

Seize the Moment

Revisiting the priorities, projects and recommendations for restoring the Gulf of Mexico five years after the Deepwater Horizon spill

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The Nature
Conservancy 

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 Gulf of Mexico

A shrimp fisherman sorting catch off the Alabama coast of the Gulf of Mexico.

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Introduction

The Nature Conservancy has been active along the Gulf Coast for more than 40 years. We have state programs with local Boards of Trustees, land holdings, and activities in all of the Gulf Coast states. Our scientists have long been first-hand observers of the health of the region's coastal ecosystems. In recent years we have seen the health of the Gulf and its bays, estuaries, and tributary rivers decline, jeopardizing the many benefits the Gulf of Mexico provides to coastal communities and to the country as a whole.

The most acute recent expression of that decline was the Deepwater Horizon oil spill in 2010. That tragedy also presented an opportunity for a comprehensive Gulf of Mexico restoration that would address some of the Gulf's long-term problems in a way that would make the region, its communities, and its economy more resilient to ongoing stresses, such as storms and sea-level rise, as well as future natural disasters. If these restoration plans are carried out in a timely way with investments guided by good science and engineering and input from the public, The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revised Economies of the Gulf Coast States Act, RESTORE, would become the powerful tool for restoration it was intended to be.

This catalog sets out the Conservancy's recommendations as to overall priorities for the investment of Gulf restoration funds and suggests specific projects that reflect those priorities. This catalog is an update to our 2013 interim catalog titled "Seize the Moment" and provides updates on projects that have been funded as well as new priority projects. While the Conservancy is willing to help wherever it seems useful in implementing restoration projects, our larger interest is to propose large-scale, complementary investment ideas that, regardless of who carries them out, will have lasting benefits for the Gulf of Mexico and the people whose lives, safety, and livelihoods are so entwined with it.

Advancing Large-Scale Restoration in the Gulf of Mexico

Restoration of the Gulf of Mexico should include a significant focus on three critical issues:

- Restoring healthy shorelines,
- Protecting freshwater resources, and
- Ensuring participation of Gulf communities in the economic benefits of the restoration activities.

From supplying food to energy production to recreation, transportation, and tourism, the Gulf of Mexico pumps \$234 billion every year into the American economy and supports more than 20 million jobs. But the health of the whole Gulf is heavily dependent on the health of its resources—its habitats, waters, and people—and fines and penalties from the Deepwater Horizon oil spill should be directed to the lasting restoration of the Gulf via investment in actions that (1) increase the resilience of coastal communities by restoring healthy shorelines, (2) protect and restore freshwater supplies to the Gulf, and (3) offer opportunities to Gulf Coast residents to participate in and benefit directly from the restoration in all ways possible, including securing jobs and enjoying healthier, more resilient communities.

This document includes prospective projects from all five Gulf States, including the restoration of at least 100 miles of oyster reef and 1,000 acres of marsh and seagrass in Alabama's Mobile Bay and the protection and restoration of broad swaths of Florida's coastal forests and rivers. Though the projects are listed by

state and have their own parameters, they are neither disconnected nor discrete. It is important to note that these projects are designed around the same goals, and, thus, this coordinated work has the potential to help restore Gulf Coast health across the whole system without regard to state borders. If properly planned, supported, and funded, the activities proposed here will begin to restore the shorelines and water supplies that are so important to the lasting health and productivity of the Gulf.

RESTORING HEALTHY SHORELINES: Increasing community resilience by restoring and protecting critical habitats

Focusing restoration on reducing community vulnerability makes good economic sense. In the last 10 years, hurricanes in the Gulf have caused more than \$200 billion dollars in damage. Healthy marshes, wetlands, reefs, and other coastal habitats can help reduce that vulnerability by protecting against storm surges, erosion, and coastal flooding. Over the next 20 years, the Gulf will be vulnerable to an estimated \$300 billion dollars in economic damages from hurricanes. A Federal Emergency Management Agency, FEMA,-funded study found that every dollar invested in hazard mitigation results in \$4 of cost savings.

Projects such as oyster reef construction, marsh building, protection of coastal forests, and strengthening of living shorelines restore damaged ecosystems and reduce vulnerability to storms. Such actions strongly align with the Gulf Task Force's report "Gulf of Mexico Regional Ecosystem Strategy." As noted in the report, ecosystem restoration can enhance community resilience by bolstering its sustainability and well-being. With additional investment, the Gulf can be a model for a multifaceted, interjurisdictional approach to coastal hazard mitigation that offers decision support systems, restoration demonstration projects, and practitioner training.

Protecting and restoring important habitats sustains tourism and other coastal businesses, as well as improving critical nursery areas for the Gulf's fisheries. At least 97 percent (by weight) of the commercial fish and shellfish landings from the Gulf of Mexico are species that depend on estuaries and their wetlands at some point in their life cycles. Landings from the coastal zone in Louisiana alone make up nearly one-third (by weight) of the fish harvested in the entire continental United States.

With strategic selection and design of restoration projects, the Gulf can be a world leader in aligning cost-effective restoration efforts to meet the joint goals of restoring the foundation of many of the Gulf's economies—fishing, tourism, and recreation—and protecting vulnerable local communities.

PROTECTING WATER QUALITY: The lifeblood of the Gulf

Restoring and protecting the Gulf's water quality benefits everyone and everything that lives in the Gulf or depends on it. Clean, abundant supplies of freshwater are the lifeblood of the Gulf's fishing, agriculture, and tourism industries and provide drinking water for millions of Gulf Coast residents.

Just as important, habitat restoration in the Gulf—no matter how diligent or effective—will not last without an equal focus on projects that protect the quality and quantity of freshwater that reaches the Gulf. The estuaries and even the wider waters of the Gulf are highly dependent on reliable, adequate supplies

of clean freshwater, which are, in turn, highly dependent on the lands and waters that drain to the Gulf of Mexico. The Dead Zone, for instance, is born in lands and waters thousands of miles from the Gulf, but solutions to protecting and restoring the Gulf's water quality must measure and address all challenges.

Marshes and other coastal habitats in the Gulf region are highly dependent on healthy rivers, wetlands, and forests. Many of the Gulf's most important shoreline buffers—oyster reefs, mangrove forests, and marshes—depend on regular flows of freshwater for survival. Restoring and protecting rivers that ultimately flow into key Gulf estuaries will guarantee a supply of the freshwater and sediments needed to rebuild marshes while reducing the nutrient loads that create persistent dead zones in the Gulf.

Upstream forests, plains, and wetlands also play an important role in protecting the Gulf's abundance. Coastal habitats such as prairies and forests serve as important links in the life cycles of many species, including migratory birds. Water quality is extremely important to all who live in or along the Gulf or benefit from it—from sea turtles and dolphins to fishing and agricultural industries, to businesses that depend on the tourists and visitors who flock to the Gulf to enjoy the clear waters and white sandy beaches. As stated in the "Strategy" report, improved water quality works in tandem with habitat restoration to increase the ecosystem services provided by a healthy Gulf.

OPPORTUNITY IN THE GULF: Helping people benefit economically, ecologically, and socially

Directing funds to the restoration of the Gulf also offers an opportunity for communities to participate in and benefit directly from restoration investments. Particular efforts are needed to involve people who have difficulty finding employment in a still-struggling regional and national economy.

A Gulf Conservation Corps might employ young people and military veterans in Gulf of Mexico communities to restore natural features of the Gulf and its estuaries, and to construct facilities to provide community access to, and a better understanding of, the Gulf of Mexico's natural resources.

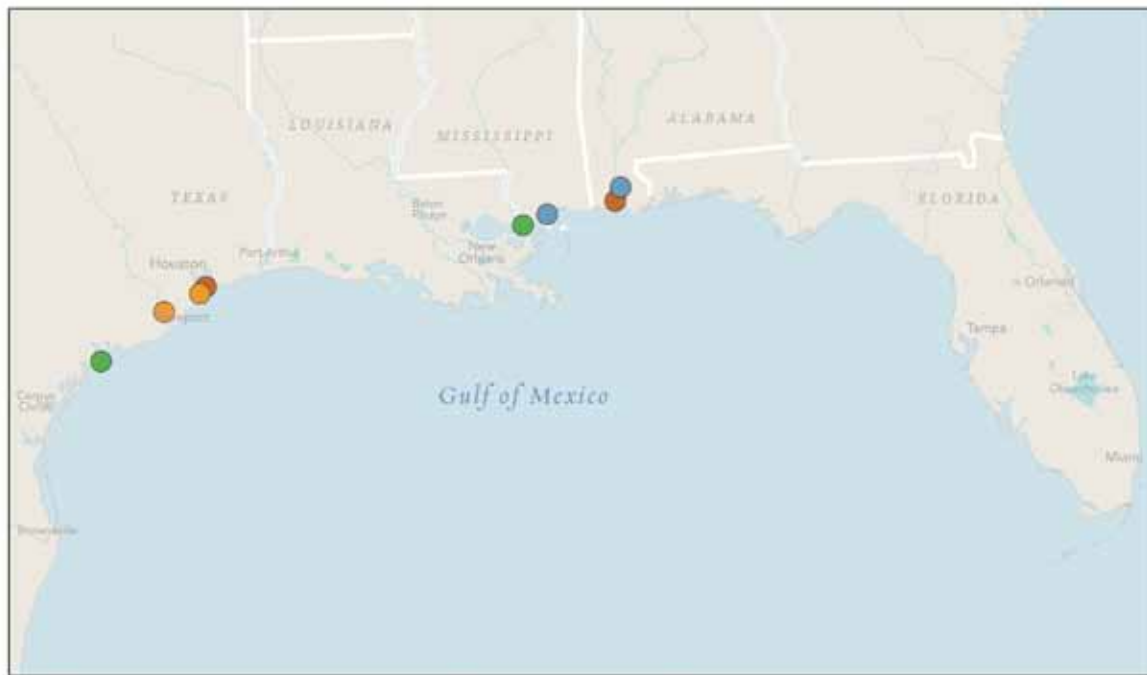
The Gulf of Mexico region is home to many young people who have limited contact with and knowledge of the natural resources so close to their homes. A Gulf of Mexico Conservation Corps could put thousands of people to work on important restoration projects under the supervision of existing community organizations and, in doing so, would teach new skills and broaden these young people's opportunities, as well as increase local understanding of the importance of healthy natural resources.

The Gulf region is also a part of the country with a number of military bases and many recent military veterans. Employing veterans with a variety of skills in conservation and natural-systems-restoration projects would provide them with valuable training, a clear purpose, a sense of accomplishment, and a structured experience that would help in their readjustment to civilian life.

Such a program would directly fill a pressing need in the Gulf and answers the call for creation of a Veteran's Job Corps. The use of oil spill funds for these purposes would offer a unique opportunity to put people in need to work, restore the critical natural infrastructure of the Gulf of Mexico, and build a long-term constituency for the use and conservation of the Gulf of Mexico.

Progress

Since the summer of 2013, many of the projects and programs proposed as part of the last version of Seize the Moment have been selected in some form through the Natural Resources Damages Assessment, NRDA, Phases 1 and 3 funding cycle, or from the National Fish and Wildlife Foundation's Gulf Environment Benefit Fund (NFWF GEBF). The Nature Conservancy applauds the decisions made to support these projects, and we look forward to the opportunities that these projects will bring to the Gulf Coast. The map below shows the projects and programs identified in the original Seize the Moment document that have progressed towards implementation via full or partial funding and/or NRDA sponsorship.



Gulf Coast Projects Funded, Partially Funded, or Officially Sponsored by NRDA Trustees

- | | |
|--|--------------------------------------|
| Near-Shore Habitat Restoration/Land Protection | Water Quality Restoration |
| Near-Shore Land Protection | Shell Recycling |
| Forest Conservation & Restoration | Fish Migration Restoration |
| | Coral Reef Conservation & Resilience |

D'Olive Watershed Restoration in Alabama

Through this \$6.7 million award, a series of projects will be conducted, under the management of the Mobile Bay National Estuary Program, to advance the restoration and conservation needs identified in the Watershed Management Plan for the D'Olive Creek, Tiawasee Creek, and Joe's Branch. These projects seek to repair damaged and degraded streams and utilize best management practices to improve the impact on downstream habitats. This award represents a significant amount of forward progress for this area; however, there is still much work to be done.

Swift Tract Living Shoreline Project in Alabama

Though the Swift Tract project has not been officially funded yet, this \$5 million dollar project was proposed to the NRDA Trustees by the National Oceanic and Atmospheric Administration, NOAA. This NRDA project would add 1.6 miles of critical shoreline protection and habitat creation to an existing 1/3 mile of living shoreline along the Swift Tract that was installed by TNC in southeast Mobile Bay in 2012. The project location flanks a 615-acre tract of land owned by the Weeks Bay National Estuarine Research Reserve.

Marsh Island (Portersville Bay) Restoration Project

The Marsh Island Project is being administered by the Alabama Department of Conservation and Natural Resources (ADCNR) through NRDA Phase I, and it includes the creation of approximately 50 acres of salt marsh that will add to a 24-acre secondary barrier island in Portersville Bay, Alabama. This project includes the placement of approximately one mile of south-facing breakwater and could become valuable oyster habitat in an area where commercial oystering is prevalent. The ADCNR awarded the design, engineering, and permitting of this project to a local engineering firm and a team that includes The Nature Conservancy.

Hancock County Marsh Living Shoreline Project in Mississippi

NOAA is partnering with the state of Mississippi, through a proposal to the NRDA Trustees, to construct up to 5.9 miles of living shoreline and approximately 46 acres of marsh in Heron Bay. This \$50 million project is located between Bayou Caddy and the mouth of East Pearl River and aims to reduce shoreline erosion; create habitat for oysters and other animals; and create new, and protect existing, marsh habitat.

Coastal Streams and Habitat Initiative in Mississippi

The Coastal Streams and Habitat Initiative aspires to gauge the health and threats to nine coastal streams in Hancock, Harrison, and Jackson Counties in Mississippi, while also creating restoration plans and programs that will return these coastal habitats to a more productive series of ecosystems. Through the NFWF GEBF, the National Audubon Society and The Nature Conservancy were awarded approximately \$2.6 million to work with the Mississippi Department of Environmental Quality to conduct this important watershed and restoration planning.

Mississippi Coastal Preserves Program in Mississippi

The Mississippi Department of Environmental Quality aims to improve the management of the state's coastal preserves by planning for sea-level rise, managing invasive species, and restoring ecological functions important for coastal habitats. This \$3.3 million project from the NFWF GEBF will be conducted in partnership with the Mississippi Department of Marine Resources and will impact 26 Coastal Preserve sites in coastal Mississippi.

Artificial Reef Creation off the Texas Coast

The Texas Parks and Wildlife Department followed the Texas Artificial Reef Fishery Management Plan from 1990 in selecting four suitable sites to implement artificial-reef projects. New reefs will be created, or existing reefs enhanced, in and around the Matagorda Reef, at the Freeport Reef, off the shore of Galveston, and off the shore of Corpus Christi, or the area known as High Island. This project intends to replace lost opportunities for fishing and recreation that occurred during the Deepwater spill. For just over \$2 million, this proposed NRDA project will utilize existing programs and plans to replace those lost resources.

Acquisition of Powderhorn Ranch in Texas

The Powderhorn Ranch lies northeast of Corpus Christi and is a unique and critical land purchase for the Gulf Coast because of the (a) diversity of habitat types formed by rare geologic formations, (b) saltwater influence on the wetlands, and (c) extensive woodlands that provide important “fallout areas” for migrating birds. Through the NFWF GEBF, including significant funding from The Nature Conservancy and the Conservation Fund, a partnership was formed that also included the Texas Parks and Wildlife Foundation (the nonprofit funding partner of the Texas Parks and Wildlife Department), which purchased one of the last (and largest) remaining undisturbed tracts of native coastal prairie left in Texas.

Oyster Reef Restoration in East Bay

Through an NFWF GEBF award to the Texas Parks and Wildlife Department, 30 acres of an oyster reef restoration project at Middle Reef, Pepper Grove, and Hanna’s Reef seeks to add to and improve oyster habitat in Galveston Bay. The \$840,000 project will help to replace some of the 5,000+ acres of historical oyster reefs that have been lost due to poor water quality, storms, and other factors.

Gulf Coast Migratory Waterfowl Habitat Enhancement

Ducks Unlimited received a \$1,285,206 award from the NFWF GEBF to create, in conjunction with private landowners within Texas’s Chenier Plain and the Mid-Coast, inland freshwater habitat in order to replace migratory bird habitat that has been lost over the decades. Ducks Unlimited will work with the Texas Parks and Wildlife Department, Natural Resource Conservation Service, and U.S. Fish and Wildlife Service to flood private lands during migration seasons to provide habitat for migratory waterfowl.

West Galveston Bay Conservation Corridor Habitat Preservation

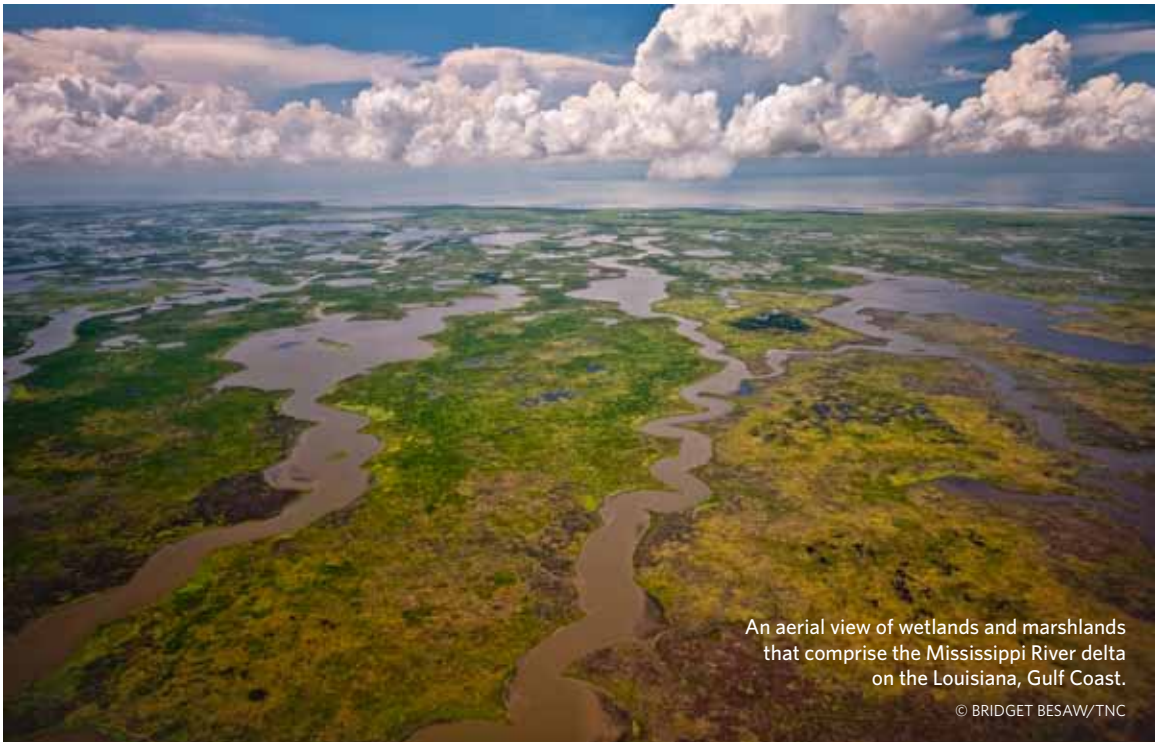
Protecting wildlife corridors is important for species across the entire Gulf Coast Region. Through this \$4 million dollar award, a contiguous stretch of saltmarsh, open water, prairie wetlands, and prairie uplands will be acquired in a permanent conservation easement along the West Galveston Bay Conservation Corridor. This acquisition is 3,200 acres and will complement a nearby 6,500 acres of conserved habitat. Scenic Galveston, Inc., in partnership with the Galveston Bay Estuary Program, the Galveston Bay Foundation, and the Texas Parks and Wildlife Department, will purchase and manage these valuable habitat types.

The Potential for Multistate Projects

In addition to the specific projects set out in the following sections, two types of multistate projects may be possible in the Gulf:

- projects that incorporate individual activities set out in this report into larger regional initiatives, such as a multifaceted project encompassing restoration action in places like Mississippi Sound, and
- projects that make funding for specific conservation tools available for restoration at multiple sites, such as funding for a multistate oyster restoration strategy or for the use of private landowner conservation tools enabled by the Farm Bill.

While we do not specify projects of these types in this report, such initiatives may emerge from the various planning and project submission processes now under way. The Conservancy may support such projects based on their cost-effectiveness and upon their utility in advancing our three primary restoration goals.



An aerial view of wetlands and marshlands that comprise the Mississippi River delta on the Louisiana, Gulf Coast.

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Seize the Moment: Restore the Gulf

In the wake of both Hurricane Katrina and the Deepwater Horizon spill, the people of the Gulf are ready to strengthen their natural resource-based industries, diversify their economies, spur innovation, and lead the emerging global market in environmental restoration. By recognizing, fostering, and leveraging the connection between a healthy, sheltering environment and a healthy, vibrant economy, the people of the Gulf can create a legacy of renewal for themselves and for our nation.

The Conservancy's work makes a strong case for the value and viability of restoring and reconnecting the Gulf's natural infrastructure—oyster reefs, coastal forests, marshes, rivers, mangroves, and coral reefs. From the Florida Keys to Texas's Matagorda Bay, the Conservancy has shown that the Gulf's natural foundation—given the opportunity and the necessary assistance—can heal and ultimately sustain itself.

Ultimately, restoration in the Gulf is not about trying to roll back history to some imagined reset point. Restoration is the art of the possible, and whether restoration efforts are successful will depend on the way the people of the Gulf choose to address the cumulative damages of historic degradation and how well they anticipate future changes. Restoring the Gulf environment so that it is resilient to natural events will help ensure that communities and their economies remain resilient as well.

This map shows the locations of the prospective projects from all five Gulf States. Though the projects are listed by state and have their own parameters, they are neither disconnected nor discrete. It is important to note that these projects are designed around the same goals and as such, this coordinated work has the potential to help restore Gulf Coast health across the whole system without regard to state borders.



Gulf Coast Projects

- | | |
|--|--|
| ● Near-Shore Habitat Restoration | ● Water Quality Restoration |
| ● Near-Shore Habitat Restoration/Land Protection | ● Shell Recycling |
| ● Near-Shore Land Protection | ● Fish Migration Restoration |
| ● Forest Conservation & Restoration | ● Coral Reef Conservation & Resilience |

FLORIDA

Florida is of major economic importance to the Gulf Coast in terms of tourism, agriculture, recreation industries, and, especially, supporting commercial and recreational fisheries. The 7.8 million people who reside in Florida's 23 Gulf Coast counties represent 37 percent of the total population of the Gulf's coastal counties. The well-being of these economies and communities depends on protecting and conserving the integrity of the Gulf's natural habitats, including coral and oyster reefs, beaches, estuaries, and forests. The natural and developed lands along the coast are highly vulnerable to the effects of storms, sea-level rise, and other stressors that in turn affect the state's economic, ecological, and cultural resilience and prosperity. Conserving the Gulf Coast's natural resources and coastal communities requires protecting and restoring the health of its riverine and estuarine habitats and the upland and wetland systems that ultimately benefit the Gulf's water quality, habitats, and species and support their time-honored ways of life.

Forest conservation/restoration and land acquisition (\$874.9M)

The following are descriptions of seven high-priority land-protection projects under way in the northwest region of Florida. The benefits, individual and collective, of the projects include increased protection of Florida's biodiversity; protection, restoration, and maintenance of the quality and natural functions of Florida land, water, and wetland ecosystems; and sufficient quantities of water for meeting the current and future needs of natural ecosystems—including estuaries—and the public.

The lands within the seven projects total more than 412,000 acres. Together with surrounding and adjacent lands already managed for conservation and public use, these projects will provide significant protection to more than 1.1 million acres of public and private natural areas. Such an interconnected system of managed landscapes and watersheds will provide critical habitat for wide-ranging vertebrate species, such as the Florida black bear and numerous waterfowl and other migratory bird species, as well as engendering tremendous ecosystem resiliency. Importantly, the region represents the largest contiguous landscape-level longleaf pine system surviving in the world.

The project's lands serve as primary watersheds that feed into several estuarine systems—Apalachee Bay, Apalachicola Bay, St. Vincent Sound, Lake Wimico, and St. Joseph Bay—that are critical to the Gulf's seafood and tourism industries. These include four State Aquatic Preserves that protect more than 1.1 million acres of Gulf waters: St. Joseph Bay, Apalachicola (also designated a National Estuarine Research Reserve), Alligator Harbor, and the Big Bend Seagrasses. Six of the projects—Flint Rock, St. Vincent Sound all the way to Lake Wimico Ecosystem, St. James Island, Bear Creek Forest, Wolfe Creek Forest, and the Aucilla River Tract—target restoration of historic longleaf pine communities.

These lands are in commercial silviculture timber operations and currently allow runoff of surface water that carries fertilizer, herbicides, and pesticides into the rivers and estuaries. With thinning, replanting of longleaf pine, the introduction of prescribed fire, and sustainable forestry management practices that would convert much of the project areas back to historically occurring longleaf pine, the projects could be transformed from areas managed for silviculture to areas managed for ecological, hydrological, and recreational benefits, thereby



increasing the region’s overall resistance to future natural and man-made disasters.

The rivers along the eastern coast of the Gulf of Mexico, including drainages in Alabama, Mississippi, and the Florida Panhandle, are globally outstanding centers of freshwater biodiversity that feed significant estuarine systems. The World Wildlife Fund recognizes these freshwater ecosystems as being among the richest in the world. The Conservancy’s freshwater ecologists classify the Mobile, Pascagoula, Perdido, Blackwater, Yellow, Chipola, and Apalachicola rivers as of highest priority for this region and for supporting the Gulf of Mexico.

Collectively, these rivers contain part of the largest remaining intact forest type on the southeast U.S. coastal plain - the Bottomland Forest natural community - which protects the ecological function and structure of rivers and are indicators of the hydrologic function of the river system. These Bottomland Forest communities provide vital habitat for many rare, wide-ranging species that require large areas, such as black bear and swallow-tailed kite, and are a natural source of nutrients for the productive estuaries that they feed.

Estuaries are the economic lifeblood of the region and the underpinnings of the ecology of the near shore Gulf. Estuarine habitats such as salt marsh, oyster reefs, and seagrasses support recreationally and commercially important finfish (e.g., speckled sea trout, redfish, black drum, snapper, grouper, mullet) and shellfish (e.g., oysters, pink shrimp, scallops, blue crabs, stone crabs) that are the foundation of a thriving seafood industry in the region and throughout the Gulf. The projects will help to restore, recover, and expand the impacted economy of Florida's Gulf communities by protecting a sustainable system of lands and waters; this in turn will stabilize, maintain, and enhance the commercial seafood industry and tourism, including sport fishing, ecotourism, and public access to conservation lands for recreation and wildlife viewing opportunities. Additionally, protecting and restoring these lands and waters will help preserve their integrity, increasing the Gulf's resistance to future natural and man-made disasters throughout the region.

1. Flint Rock (Jefferson and Wakulla counties, FL)

The project is located in Jefferson and Wakulla counties, Florida, and is contiguous with St. Marks National Wildlife Refuge. The project will transfer forested upland and wetland communities into state or federal ownership. These lands are important to conserving the natural habitats, species, and watershed of the St. Marks National Wildlife Refuge, Apalachee Bay, and the Big Bend Seagrasses Aquatic Preserve. The lands in the project are currently available for acquisition, making the project feasible and the likelihood of success high. The lands are within the St. Marks National Wildlife Refuge's approved acquisition Boundary Expansion and support numerous rare and imperiled species.

2. St. Vincent Sound to Lake Wimico Ecosystem (Franklin and Gulf counties, FL)

The project proposes to acquire and restore terrestrial and wetland natural communities that currently protect freshwater flows and buffer high-quality estuarine habitats along Florida's Panhandle. Protecting direct estuarine and Gulf of Mexico shoreline, the project preserves freshwater, wetland, and forest habitats and species, including the Florida black bear, overwintering waterfowl, Neotropical migratory avifauna, recreationally and commercially important fish species, oysters, crab, and shrimp. The project serves as a primary watershed that feeds into Apalachicola Bay, St. Vincent Sound, Lake Wimico, and St. Joseph Bay. The project is widely recognized as being one of the most important biodiversity and rare species conservation efforts in Florida.

3. St. James Island (Franklin County, FL)

The project will acquire forested upland and wetland communities and restore them to state or federal ownership. The lands buffer and are contiguous with the southwestern edge of St. Marks National Wildlife Refuge and serve as a significant connector among Tate's Hell State Forest, Bald Point State Park, Alligator Harbor Aquatic Preserve, and Ochlockonee Bay, which is particularly important for the local population of Florida black bear. Restoring uplands will protect the quality of freshwater entering the highly productive waters of the Gulf, including three Florida State aquatic preserves—Apalachicola Bay, Alligator Bay, and Big Bend Seagrasses. The area within this project footprint is under a high threat from potential urban development.

4. Bear Creek Forest (Bay, Calhoun, and Gulf counties, FL)

The project consists of mostly off site pine plantations interspersed with disturbed wet prairies and forested wetlands, as well as several upland forest types. Protection and restoration of the project is needed to

maintain clean and unrestricted freshwater flows to several estuarine systems along Florida's Panhandle. Although located inland, the basically flat lands of the project support many bottomland forests that drain into a complex system of tributary streams flowing into the St. Andrew Bay watershed and the Chipola River—the latter a major tributary of the Apalachicola River and hence Apalachicola Bay. St. Andrew Bay is unique in the Panhandle because it is the only estuarine system whose entire basin is located within the boundaries of the state of Florida. It also is one of the most diverse estuaries in America, home to more than 2,900 species. Acquisition of the project would help establish a proposed system of natural areas forming a significant corridor connecting state and federal conservation lands in the central Florida Panhandle. The project is near a major urban area, Panama City, and just six miles north of Tyndall Air Force Base, both constituting a large population center that would benefit in terms of water supply and recreation from the project's protection and restoration.

5. Wolfe Creek Forest (Santa Rosa County, FL)

The project connects Blackwater River State Forest (BRSF) to the east and Whiting Field Naval Air Station to the southwest. The project is part of a long-standing landscape-scale and watershed-based acquisition and restoration project seeking to connect the 189,594-acre BRSF, the 464,000-acre Eglin Air Force Base, and the 83,898-acre Conecuh National Forest in adjacent Alabama, along with several smaller conservation lands. Conservation of lands within the project would afford protection to numerous seepage and blackwater stream systems that are tributaries of the Blackwater River. Big Coldwater Creek is one of the most ecologically significant, scenic, and popular canoeing and kayaking creeks in all of Florida and is a major tributary of the Blackwater River, which itself feeds into the estuarine system of Blackwater Bay, which sustains important fisheries in the region.

Data from the Florida Natural Areas Inventory show that Big Coldwater Creek and Wolfe Creek are identified as Priority 1 Wetlands Protection Priorities by the state of Florida. By extending and buffering existing managed areas in the region, the project enhances management of the series of public lands and waters—including protection of the vital military mission at Whiting Field.

6. Aucilla River Tract (Jefferson County, FL)

The Aucilla River project is located along the eastern bank of the Wacissa River, with its spring fed, crystal-clear waters, just west of where the tannin stained waters of the Aucilla River intermittently disappear and reappear as they flow through a complex series of sinkholes and subterranean passages. Both rivers flow through deep cypress and hardwood dominated swamps before they join and eventually flow into the Gulf of Mexico along the productive Apalachee Bay. The project will help buffer and protect both these rivers by maintaining their water quality, protecting aquatic caves and sinkholes, and preserving important archaeological sites (e.g., 12,000 year old mastodon tusks from the Aucilla are the oldest evidence of butchering in North America), as well as enhancing public opportunities for recreation. The project will help form an enhanced connection to St. Marks National Wildlife Refuge and a variety of other state-owned and privately owned lands to help facilitate the migration of species and natural communities in response to sea level rise.

Restoring Healthy Ecosystems

FLORIDA PANHANDLE RESTORATION

The Apalachicola Project–Phase I: Apalachicola Region (\$15M)

The Apalachicola Project–Phase I (TAP) is a five-year collaborative effort to restore and manage the lands and waters of the Apalachicola Region. TAP is a public/private initiative that is organized under the structure of the Apalachicola Regional Stewardship Alliance Local Implementation Team (ARSA). ARSA is a collaboration of land managers, including state, federal, and private landowners, who are committed to a united, prioritized vision of ecosystem maintenance and restoration. This project was designed to be foundational and can either be expanded to include a larger geography or continue beyond the five-year time horizon. The project includes three components: Lower Apalachicola River Coastal Region Hydrologic Restoration, Apalachicola Restoration Team, and the Apalachicola Private Lands Healthy Forests Initiative. ARSA proposes to 1) restore natural hydrological flow across a broad area of the lower Apalachicola River drainage that will have direct and measurable effects on the quality and quantity of water flowing into Apalachicola River and Bay; 2) provide “boots on ground” restoration and management support to 20 public and private coastal and near-coastal managed areas to increase resilience of both terrestrial and estuarine natural resources and to increase public safety and awareness adjacent to these sites; and 3) deliver guidance and assistance to private landowners to encourage long-term management of their lands for environmental, economic, and social benefits; support numerous Natural Resources Conservation Service’s (NRCS) initiatives (e.g., the Regional Conservation Partnership Program and Regional “Sentinel Landscape” Initiative); and increase awareness of agricultural Best Management Practices. In 2010, ARSA members executed a Memorandum of Understanding that enabled sharing of personnel and resources for a wide variety of public and private land management and restoration activities.

OYSTER HABITAT MAPPING AND RESTORATION

1. Mapping Oyster Habitat in the Gulf of Mexico - (\$500,000)

Oyster reef habitat has declined by more than 85% worldwide (Beck, 2012), and this decline is mirrored in the Gulf of Mexico. Awareness and understanding of the suite of ecosystem services this habitat provides, in addition to the harvesting economy, is being raised. Efforts are under way by various entities to restore oyster reef habitat throughout the Gulf of Mexico’s coastal bays and estuaries. In most of these areas, the oyster reef habitat has not been mapped and there is a gap in knowledge with regard to how much oyster reef habitat exists, where it exists, and what the quality of its condition is. Establishing a baseline understanding of this will help inform restoration and management decisions in the long term. The Nature Conservancy is working with partners to develop a general mapping and sampling protocol for assessing intertidal and subtidal oyster resources that can also be applied region-wide in the Gulf of Mexico. This pilot project will be initiated in the Apalachicola Bay region and then exported to other bays and estuaries in Florida and the Gulf.

2. Pensacola East Bay Oyster Habitat Restoration - (\$16.7M)

The project is located in the East and Blackwater Bays, embayments within the Pensacola Bay system in Santa Rosa County. As a collaborative effort with The Nature Conservancy, the Florida Fish and Wildlife Conservation Commission, Florida's Department of Environmental Protection, Santa Rosa County, Dauphin Island Sea Lab, and Florida SeaGrant, the project will result in the creation of up to eight miles of non contiguous oyster water habitat and the restoration of salt marsh habitat. The goals are to restore oyster reefs to help prevent shoreline erosion, increase oyster habitat and the amount of habitat available for recreationally and commercially important shellfish and finfish, and promote the growth of submerged aquatic vegetation and salt marsh.

The Panhandle/West Florida is an economically important region in the Gulf of Mexico, especially in terms of supporting the commercial and recreational fisheries and watchable wildlife (tourism) industries. Tourism is Florida's largest industry; in 2011 it accounted for \$85.1 million in value, with more than 1 million people directly employed in the industry. In 2010 it generated \$4 billion in sales tax revenue (Visit Florida, 2012).

While this project will enhance a suite of fish and wildlife populations and their supporting habitats, it will also provide benefits to the public through

- enhanced fisheries that can feed the coastal economy,
- stabilized shorelines that improve water quality,
- protected private and public properties and important cultural and historical resources,
- improved coastal community resilience, and
- improved quality of life.

3. Restoration and Mapping of Oyster Reef Habitat in Southwest Florida -(\$24.7M)

The project is a partnership with The Nature Conservancy, Florida Gulf Coast University, Sanibel-Captiva Conservation Foundation, Charlotte Harbor–Tampa Bay–Sarasota Bay National Estuary Programs, and the partners of the Southwest Florida Oyster Working Group. The purposes of this project are to 1) map inter- and subtidal oysters from Pinellas County south to Lee County and 2) implement and monitor restoration of approximately 20 acres of oyster habitat within the Charlotte Harbor estuary based on recommendations from the consensus-based Charlotte Harbor National Estuary Program Oyster Habitat Restoration Plan (2012).

A science-based habitat suitability model developed specifically for the Charlotte Harbor region identified areas appropriate for oyster habitat restoration. Segments of the Tampa Bay and Sarasota Bay estuaries may be targeted for oyster habitat restoration if the mapping phase identifies them as areas of critical need or optimal locations with high likelihood of success.

Direct creation of oyster habitat within these estuaries increases oyster density and provides habitat for a variety of commercially and recreationally important species. Seagrass may also benefit from restoration of oyster habitat. Protecting and restoring oyster reefs provides benefits to the public by

- reducing the vulnerability of human communities to the impacts of coastal hazards, such as storm surge and flooding;
- bolstering local economies through the creation of jobs and supporting natural resource livelihoods, as well as sustaining tourism and other coastal businesses;
- creating or preserving an estimated 323 jobs over the eight-year life of the project.

4. Restoration of Florida's Big Bend Oyster Reefs - (\$1.4M)

The project is a partnership, led by the University of Florida, with The Nature Conservancy, Florida Sea Grant, Big Bend Oyster Working Group, Cedar Key Aquaculture Association, local fishermen, and the community of Cedar Key. Our project seeks to 1) establish reefs in areas less susceptible to high-salinity events and 2) offer more stable substrate that can be recolonized following high-mortality events. Restoration activities involve reconstruction of reefs using donated, bagged live oysters, and the activities will foster community support through local employment, collaboration, and volunteer opportunities.

The short-term restoration goal is to create self-sustaining oyster reefs that maintain or increase area, species composition, size distribution of the oysters, and proportion of live oysters in the face of normal freshwater pulses and storm events. The long-term restoration goal is to create reef systems that are largely resistant to anticipated threats, including sea level rise, low-freshwater events, drought, human overuse of freshwater, and increased variability in weather.

The restoration of oyster reefs results in the following:

- Wave abatement and significant reductions in shoreline erosion.
- An important alternative income in the Cedar Key community, especially during times when other fishing resources are not available.
- Enhanced fishable oyster resources due to the creation of 26 high-quality subtidal oyster sites.
- Enhancement of sport fishing, both through direct restoration of reefs and adjacent habitats, such as salt marsh, and through directing the flow of freshwater from the Suwanee River system to benefit a much larger area of reefs.
- to An economically viable aquaculture of oysters over a much larger area, as well as diversified jobs for the Cedar Key community, due to the use of locally sourced materials in the restoration methods.

ESSENTIAL FISH HABITAT RESTORATION

1. Rattlesnake Bluff Road and Riverbank Restoration Project, FL - (\$3M)

The Nature Conservancy, the Department of Defense-U.S. Air Force and U.S. Army, the U.S. Fish and Wildlife Service, and the Florida Fish and Wildlife Conservation Commission are partners on this project. The objective of this project is to stabilize Rattlesnake Bluff Road and nearby eroded riverbank sites in order to reduce sediment pollution to the Yellow River and Pensacola Bay and provide a safe, reliable thoroughfare for the public. The project helps restore the estuarine habitats of the state of Florida's

Yellow River Wildlife Management Area (29,000 acres), Yellow River Marsh Aquatic Preserve (16,000 acres), and Yellow River Marsh State Park, as well as lands and waters within the boundaries of the U.S. Department of Defense's Eglin Air Force Base; it also complements the proposed Pensacola East Bay Oyster Reef Restoration project (as described earlier).

This project will benefit the environment and the public by

- restoring approximately 15 miles of road and 25 miles of river and tributary habitats;
- improving the populations and stability of riverine biota, including state and federally protected species, such as the Gulf Sturgeon;
- reducing sediment pollution to the Yellow River and Pensacola Bay;
- improving water quality and clarity by reducing suspended solids; and
- providing a stable and reliable road to local communities and the general public.

Reduced sediment pollution and improved habitat will further restore and/or improve estuarine habitats, such as oyster reefs and salt marsh, which support the area's fishery, state park, and other public resources, contributing millions of dollars to the local and state economy. In addition to improving long term public safety and access to fish and fishing, the restoration and rehabilitation of Rattlesnake Bluff Road is expected to directly employ approximately 20 people in full- or part time construction work.

CORAL REEF RESTORATION

1. Restoring Threatened Corals to Enhance Reef Functions, Fisheries Habitat, and Tourism Opportunities in the Florida Keys - (\$25M)

Staghorn and elkhorn coral restoration efforts in the Florida Keys National Marine Sanctuary and Dry Tortugas National Park have been expanding for the last ten years. In 2009 they were significantly scaled up with American Recovery and Reinvestment Act funding (administered by NOAA) and U.S. National Park Service funding. More than 30,000 corals are currently staged in undersea nurseries spread throughout the region. The Nature Conservancy and project partners—the Coral Restoration Foundation, Mote Marine Laboratory, and the Florida Fish and Wildlife Research Institute—are prepared to continue nursery propagation and outplant a minimum of 14,000 colonies per year for ten years to permitted restoration sites on degraded coral reefs in the Keys and Dry Tortugas.

This project will contribute significantly to recovery of the federally listed staghorn and elkhorn corals and restoration of the ecological and economic viability of the Gulf of Mexico's largest, most heavily used coral reefs. These corals contribute significantly to reef growth and island formation. The massive reefs they create protect the Keys' low-lying natural areas and vulnerable coastal communities from storm waves and erosion during hurricanes and other severe weather.

More than any other Atlantic corals, staghorn and elkhorn create structurally complex habitat on the seafloor that is vital to many commercially and recreationally important species, including snappers, groupers, and spiny lobster. They are also home to the colorful tropical fish and invertebrates that attract

divers and snorkelers from around the world to the tourism-dependent Florida Keys.

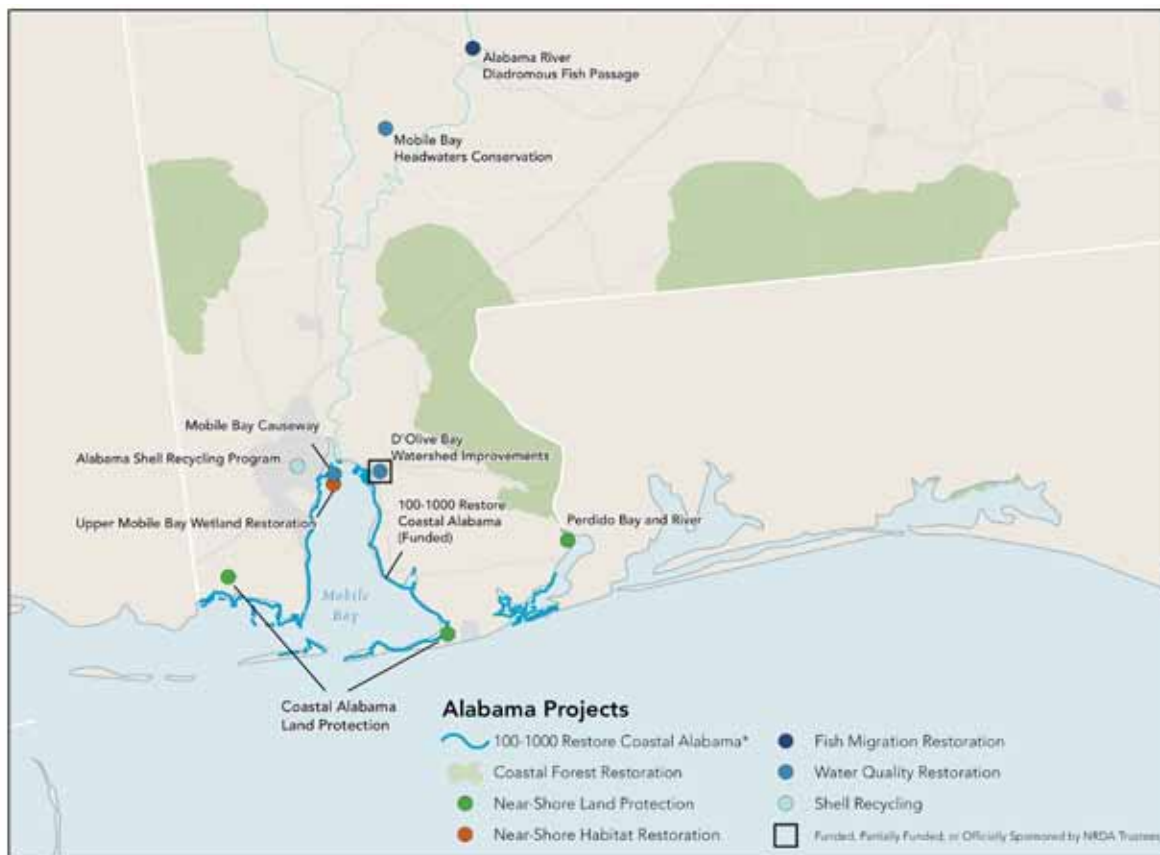
The *Florida Keys National Marine Sanctuaries Socioeconomics Fact Sheet* reports that the following:

- More than 33,000 jobs in the Florida Keys are supported by ocean recreation and tourism, accounting for 58 percent of the local economy and \$2.3 billion in annual sales.
- From 2007 to 2008, more than 400,000 visitors and residents of the Florida Keys engaged in more than 2 million person-days of recreational sports fishing. These recreational fishers spent \$262 million in Monroe County/Florida Keys, approximately \$103 million of which was directly spent on fishing items.
- Approximately 739,000 visitors and residents participated in 2.8 million days of diving in the Florida Keys between 2007 and 2008; \$51.7 million was spent at diving/snorkeling operations. Moreover, divers spent a total of \$450 million in Monroe County, Florida Keys, supporting more than 7,500 jobs.
- In 1995, it was estimated that fishermen received \$56.5 million in harvest revenue, which generated \$92.2 million in sales/output in Monroe County, or about 4.5 percent of the total economy in that year. This sales/output generated more than \$58 million in income and 4,130 jobs, 8.8 percent of all Monroe County employment.

ALABAMA

Over the last century, Alabama has experienced significant loss of habitats and water quality degradation from coastal development, dredge and fill activities, hardening of shorelines, erosion, and storm events. Coastal Alabama represents one of the largest areas primed for restoration, replacement, and enhancement of these lost habitats and water quality improvements, due to the size of the estuary, historic distribution of oysters, high natural oyster spat sets, and warm water for fast growth. By focusing on conservation opportunities that holistically link land acquisition, habitat restoration, hydrologic connectivity, stormwater improvements, and stewardship of forested and non-forested landscapes, significant improvement in the long-term health, resilience, and sustainability of both the environment and the economy of Alabama and the Gulf will be realized.

Restoration projects to improve the coastal resilience and overall health of the Gulf of Mexico.



NEAR-SHORE HABITAT RESTORATION

1. 100-1000: Restore Coastal Alabama - (\$150M)

100-1000: Restore Coastal Alabama is a partnership among federal and state agencies, organizations, colleges and universities, municipalities, non-profits, businesses, and citizens to restore 100 miles of oyster reefs, creating the conditions needed to protect, support, and promote more than 1,000 acres of coastal marsh, intertidal habitat, and seagrass beds. This restoration effort will expand existing projects to provide habitat for oyster larvae to settle in and colonize, establish nursery habitat for commercially and recreationally important fish and shellfish, dampen wave energy, decrease erosion, stabilize sediments, and improve water clarity. This coastal restoration project also includes critical workforce-development, job-creation, and community-involvement components to support and sustain the vision of a better coastal Alabama.

This project aligns with goals in Alabama's Wildlife Action Plan, the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan, and The Nature Conservancy's Gulf of Mexico and Global Marine Strategic Plans. It will do the following:

- restore habitat for commercially and recreationally important fish and shellfish,
- buffer public and private properties from wave energy and coastal hazards,
- support more than 300 jobs during the 10-year construction period,
- sustain and enhance traditional fishery livelihoods and their local cultures, and
- enhance local economies by boosting commercial and recreational fishing and ecotourism.

2. Wetland Habitat Restoration in Upper Mobile Bay, Alabama - (\$90M)

By repurposing dredge material, this habitat-restoration project will create approximately 500 acres of marsh and three miles of reef habitat at the nexus of Mobile Bay and the south end of the Mobile-Tensaw Delta. This project also incorporates a public access component that will provide a parking area and public fishing pier off the Mobile Causeway, providing a safe area to access Upper Mobile Bay for land-based fishing, wildlife watching, and public enjoyment. Construction of the Causeway in the late 1920s created restriction in the flow of water and sediments from the rivers that feed into northern Mobile Bay. Thus, sediment transport that would have naturally constructed and maintained these wetlands was interrupted, contributing to the extensive loss and degradation of marsh in the system. This project proposes to recreate these lost marshes using dredge material that would otherwise be lost, and border them with living shoreline reefs to minimize erosion and increase habitat complexity.

This project aligns with goals in Alabama's Wildlife Action Plan and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will

- restore critical wetland habitats, providing areas for seagrass recruitment and benefitting listed species, such as the endangered Alabama red-bellied turtle;
- buffer adjacent natural areas, as well as the nearby cities of Mobile and Daphne and emergency evacuation infrastructure, from erosion, storm surges, and other coastal hazards;

- utilize dredge material that would otherwise be wasted;
- support local jobs during the multiyear construction period; and
- expand public recreation opportunities.

LAND ACQUISITION

Coastal Alabama Land Protection - (\$250M)

Conservation partners have worked over the last several decades to protect more than 100,000 acres in Alabama's coastal counties. Acquiring lands that protect the Gulf of Mexico's critically important bays, estuaries, barrier islands, and coastal rivers ultimately provides habitat for animals, plants, and people; protects coastal communities during storm events; protects and enhances coastal fisheries; and supports heritage based tourism and recreational opportunities.

This project seeks to provide meaningful connections between conservation projects to provide habitat and migration corridors, as well as connect public lands across state borders along the Gulf Coast, including the Perdido River, the Escatawpa River, Fort Morgan Peninsula, Grand Bay Savanna, and Dauphin Island, among others. From coastal pine savannas, maritime forests, and wetlands to beach dunes and coastal marshes, these habitats provide storm and flood protection for adjacent communities and are a strong, permanent investment in our future.

More than 130,000 acres have been identified for purchase, and acquisition efforts are under way for several high-priority tracts that are currently available in these areas. This project aligns with goals in Alabama's Wildlife Action Plan and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will do the following:

- Provide coastal habitat protection for the Gulf of Mexico's critically important bays, estuaries, barrier islands, and coastal rivers;
- Buffer private and public properties, communities, and infrastructure from erosion, storm surges, and other coastal hazards; and
- Provide new recreational and ecotourism opportunities.

FLOODPLAIN RESTORATION AND WATER QUALITY IMPROVEMENT

1. D'Olive Bay Watershed Improvements - (\$150M)

Since the 1970s, excessive erosion and sedimentation have plagued the D'Olive Watershed, a primary watershed feeding eastern Mobile Bay, and ongoing urban development continues to intensify these problems. Almost half of the streams in the watershed are or will soon be degraded, and five of the streams are listed on the Alabama Department of Environmental Management's 2010 303(d) impaired waters list.

In 2010, a broad-based coalition of federal, state, and local stakeholders facilitated by the Mobile Bay National Estuary Program completed a comprehensive Watershed Management Plan. The Plan

recommends improvements to the watershed that address historical and ongoing problems to prevent future stream and wetland degradation, reduce sediment transport downstream, and improve water quality. Restoration of watershed hydrology through improved stormwater management is critical for eliminating the factors that have degraded the watershed that feeds Mobile Bay.

This project aligns with the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan and will

- restore and enhance degraded watershed habitats and water quality,
- provide management of stormwater for local communities, and
- support or create jobs during the multiyear construction period.

2. Mobile Bay Causeway - (\$80M)

The Mobile–Tensaw Delta empties into Mobile Bay and is the terminus of the fourth-largest watershed by volume in the continental United States, receiving 20 percent of our nation's freshwater supply from five major rivers. At the southern end of the Delta, a large dike-like causeway built in the late 1920s has sealed off a number of once-open bays from immediate contact with the bay and Gulf, severing migratory fish routes, altering saltwater and freshwater exchange, disrupting natural sediment transport regimes, and impacting coastal marsh and seagrass that filter the water entering Mobile Bay, all of which affects the downstream bays and estuaries and the fish, shellfish, and wildlife that depend on them.

The Delta's importance lies in this connection between the riverine and coastal ecosystems, and upstream and downstream modifications have altered its ecological productivity. This project will restore tidal exchange between the Delta and bay, opening migratory corridors for fish, turtles, waterfowl, and other wildlife, reestablishing sediment transport, and enhancing estuarine habitat. This project aligns with goals in Alabama's Wildlife Action Plan and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will do the following:

- Restore and enhance habitats adversely affected by impeded tidal exchange, benefitting nearshore, estuarine, and listed species;
- Enhance community resilience by restoring natural pathways for storm surges and flood waters; and
- Support jobs during the multiyear construction period.

3. Mobile Bay Headwaters Conservation - (\$200M)

The watershed and contributing rivers of the Mobile Basin transport and filter freshwater downstream to Mobile Bay, protect water recharge areas for municipal water supplies, and provide migratory routes for terrestrial and aquatic wildlife. Likewise, the Conecuh–Escambia, Yellow, and Choctawhatchee rivers play the same role for other important Gulf estuaries, including Escambia Bay and Choctawhatchee Bay.

The predominant longleaf pine and hardwood forests are intermingled with pockets of other unique habitats, such as prairies, pitcher plant bogs, rock outcrops, and caves. Collectively, this patchwork serves as “nature's kidney” by removing excess nutrients, sediments, and other pollutants from water as it seeps into

aquifers or travels downstream to the coast. This project targets acquisition, restoration, and management of more than 250,000 acres in critical headwaters that feed the Gulf Coast.

This project aligns with goals in Alabama's Wildlife Action Plan and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will

- protect the headwaters and improve water quality for the Gulf's critically important bays, estuaries, and coastal rivers;
- work with private landowners along streams to stabilize riparian, floodplain, and in-stream habitats, thus reducing erosion and sedimentation;
- propagate and reintroduce Alabama's unique aquatic life, including mussels, which filter the water;
- improve the movement of fish and other aquatic life past dams and other obstacles;
- protect aquifer recharge areas that supply drinking water for local communities; and
- provide new recreational and ecotourism opportunities.

SHELL RECYCLING

Alabama Shell Recycling Program - (\$6.4M)

Despite significant loss of oyster reefs, Mobile Bay, with the fourth-largest drainage basin in the United States, represents one of the largest areas for restoration, replacement, and enhancement of this lost habitat due to the size of the estuary, historic distribution of oysters in the bay, high natural oyster spat sets, and warm water for fast growth. The project will engage local businesses and the public in restoration through an oyster shell recycling program, serving as a nexus between education, commerce, and restoration to create direct, tangible linkages between oyster restoration and local communities.

It will provide a mechanism to return shells to the water that would have been discarded by restaurants, via restoration projects, to provide additional substrate for larval settlement.

This program will also raise awareness and engage the business community. This project aligns with goals in Alabama's Wildlife Action Plan and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will do the following:

- Recycle oyster shells discarded by businesses and the public;
- Raise awareness among businesses and the public about the connection between their food and the natural resources that support them;
- Utilize this limited resource, which is currently being discarded, in a cost-effective way;
- Create business opportunities for private entrepreneurs; and
- Reduce community vulnerability to coastal hazards, such as storm surge and flooding, through incorporation in the resultant reefs.

Some 545 volunteers that came out to Mobile Bay in Alabama to help restore the Gulf of Mexico. During the course of this weekend event, the volunteers worked alongside Conservancy scientists and partners to construct nearly one kilometer of oyster reef.

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FOREST CONSERVATION & RESTORATION

Alabama Coastal Forest Restoration - (\$3M)

By working with selected private landowners, managers, and public partners on longleaf pine conservation and restoration strategies, large private forest ownerships will implement stewardship practices to improve land management activities that result in healthier systems across the watershed. Improvements will be achieved in the Perdido, Escatawpa, and Mobile-Tensaw River habitats surrounding the headwater streams and rivers critical to the survival of healthy estuarine and marine systems, while maintaining land in private ownership.

Healthy, intact forests are important for preventing erosion, purifying water, and otherwise protecting the quality of rivers and streams that provide drinking water for local communities and ultimately feed the Gulf's estuaries.

This project aligns with goals in Alabama's Wildlife Action Plan, America's Longleaf Plan, the Northern Bobwhite Conservation Plan, and the Mobile Bay National Estuary Program's Comprehensive Conservation Management Plan. It will

- restore important headwater habitats, including tidal freshwater marshes, cypress-tupelo swamps, bottomland hardwood forests, longleaf pine forests, Atlantic white cedar swamps, and pitcher plant bogs;
- preserve and conserve plants (such as pitcher plant bogs) and animals (such as gopher tortoises and black bear) that use these habitats as shelter, resting, and forage areas;
- protect aquifer recharge areas that supply drinking water for local communities;
- create multiple full-time, seasonal, and contract positions for restoration and management activities; and
- provide economic benefits for local businesses through riparian restoration, invasive species control, and silviculture.

DIADROMOUS FISH MIGRATION RESTORATION

Alabama River Diadromous Fish Passage - (\$1.5M)

In collaboration with the U.S. Army Corps of Engineers and several other agencies and partners, lock operations on the two lowermost dams on the Alabama River, installed around 1970, will be modified to improve the passage of migratory fish across approximately 400 river miles. Structural and operational modifications at Claiborne Lock and Dam and Millers Ferry Lock and Dam have the potential to benefit more than 50 species of fish that migrate between freshwater and saltwater, numerous mussel species, and overall ecosystem health, stretching from the Gulf of Mexico, across Mobile Bay, through the Alabama River and reaching upstream to the free-flowing Cahaba River.

This project aligns with goals in Alabama's Wildlife Action Plan and will do the following:

- Restore and rehabilitate connectivity between riverine habitats and estuarine habitats, especially for diadromous fish, such as the Alabama shad and federally threatened Gulf sturgeon, and
- Restore and enhance impacted, degraded, and lost riverine habitat and estuarine and freshwater fisheries, and provide feasible restoration for more than 400 river miles using low-cost techniques.

MISSISSIPPI

Successful and lasting restoration of Mississippi's coastal ecosystems needs to address issues surrounding water quality and clarity, incompatible land use, habitat loss and fragmentation, invasive species and land management, and the exacerbation of these ongoing challenges by sea-level rise and tropical storms. Restoration and protection of critical habitats is an essential part of long-term, sustainable management of the resources that are needed for clean water, fisheries, tourism, biodiversity, and proper quality of life for Gulf citizens. The following projects seek to address the most pressing issues, and though they are designed to be implemented in Mississippi, they also contribute to the improvement of the health and resilience of coastal communities across the Gulf. These projects will help to create habitat connectivity, improve water quality, and ensure more resilient biological and human communities.

NEAR-SHORE HABITAT RESTORATION

1. Subtidal oyster reef restoration - (\$23M)

Mississippi's coastal bays historically (since circa 1890) have held several thousand acres of oyster reef that has provided important ecosystem services (water filtration, biodiversity/habitat, wave attenuation, sediment sequestration, etc.), and also supported a robust oyster fishing industry. Over the last century, unsustainable fishing practices, shell extraction, water-quality degradation, and incompatible land use practices on the nearby mainland have led to significant declines in the oyster harvest, as well as a loss of the benefits that oyster reefs provide far beyond food.

In recent decades, the Mississippi Department of Marine Resources (MDMR) has been successful in managing a sustainable commercial oyster harvest. Although this has been an important success, commercially harvested oyster reefs do not maintain the same level of biomass that a large and complex three-dimensional reef structure holds. In fact, Mississippi holds only 8 percent of the oyster reef biomass that was historically present. (Ermgassen, 2012). This biomass directly affects the amount of habitat available for fisheries, the capacity of the oyster reef to filter water, and the effectiveness of wave attenuation and sediment sequestration (preventing erosion and rebuilding marshes).

In an effort to restore lost habitat and ecosystem services, the Conservancy and the MDMR have partnered on six subtidal oyster reef restoration projects since 2004, totaling approximately 65 acres. Expanding the scope of this restoration to include up to 600 acres of oyster reef restoration will build on these projects' successes. This restoration would be sited in portions of Biloxi Bay and Bay St. Louis that historically have supported oyster reefs and could be closed to commercial harvest, so the reefs can grow into three-dimensional habitats. New subtidal reefs will be constructed using natural oyster shell or other appropriate natural materials. Restored subtidal reefs improve water quality, create fish and wildlife habitat, slow coastal erosion, and attenuate wave energy to help protect coasts from storm surge.

Project benefits:

- This project will create short-term economic benefits through job creation.
- Long-term benefits include enhanced habitat for important commercial and recreation species (fish, shrimp, and crabs), and improved future prospects for such traditional industries as commercial fishing, charter boat fishing, and seafood processing.



- Although these oyster beds will not be open to harvest, they will provide brood stock for nearby harvestable reefs and will provide refuge and forage habitat for migratory finfish species of recreational and commercial importance.

2. Implementation of living shorelines - (\$41M)

As in most coastal communities, many Mississippi landowners armor their coastlines using structures such as seawalls and bulkheads to prevent erosion and property damage. These structures have a number of unintended consequences. They destroy coastal habitats, including marsh shorelines and natural beaches. They also create a cycle by speeding up erosion on adjoining tracts, which in turn results in further shoreline hardening. In addition to contributing to erosion, hardened shorelines eliminate the potential for inshore habitat migration in the face of projected sea-level rise.

The Conservancy will work with natural resource agencies, cities, and private landowners to promote and construct living shoreline structures as an alternative to sea walls and jetties and other hardened structures, to protect private shoreline lands.

Project benefits:

- This project will protect both natural habitats and private property.
- Shoreline resilience will be improved; fish, invertebrate, and bird habitat will be protected and enhanced; and scenic vistas will be preserved. As with shoreline stabilization on public lands, these projects will enhance fisheries habitat and help to insure the future of commercial and recreational fisheries.
- Naturally stabilized shorelines will help attenuate storm surge and allow for inshore habitat migration.
- In the short term, shoreline stabilization will create construction jobs and teach contractors new techniques that are transferrable to other projects and places.

LAND ACQUISITION

1. Acquisition and management of priority lands within the Mississippi Coastal Preserves Program - (\$150M)

Mississippi's Coastal Preserve Program currently protects more than 30,000 acres of estuarine marsh, coastal wetlands, and maritime forest as public wildlife habitat and recreation lands. These lands are owned by the Mississippi Secretary of State (MSOS) and managed by the Mississippi Department of Marine Resources. An additional 40,000 acres of land remains eligible to be included in the popular Coastal Preserves Program. Working with the MSOS, the Conservancy has identified and prioritized these remaining lands based on habitat connectivity, type, and quality.

The Conservancy proposes to acquire up to 20,000 acres of land that will be placed into the Coastal Preserves Program. Additionally, to manage these lands into the future, a management endowment will be established to pay out 20 percent of the lands' assessed value, per Conservancy recommended practices.

Preserved and well-managed coastal lands provide wildlife and nursery habitat for commercial and recreational fishery species, including shrimp, finfish, and crabs, enhancing conditions for these species and traditional industries related to them, such as commercial fishing, seafood processing, and charter boat fishing.

These coastal lands also provide vital stopover habitat for neotropical migratory birds.

Intact coastal marshes protect natural lands and human structures from storm surge and wind damage, potentially reducing insurance costs. Finally, they enhance humans' quality of life by protecting scenic vistas and providing access to opportunities for traditional outdoor recreation.

2. Protection and Preservation of Strategic Coastal Lands - (\$32M)

Besides the Mississippi Coastal Preserves Program, other agencies, such as Mississippi State Wildlife Fisheries and Parks, the U.S. Department of Interior, the U.S. Department of Agriculture, and several non-profit organizations, also work in land conservation along the Mississippi Coast. With the goal of protecting an additional 20,000 acres, strategic land acquisitions will target coastal properties that add to and buffer lands owned by the Conservancy; the Mississippi Department of Wildlife, Fisheries, and Parks; the National Park Service; the U.S. Forest Service; and the U.S. Fish and Wildlife Service.

Protected coastal lands provide habitat for native plants and animals, including critical nursery habitat for commercial and recreation fishery species, including shrimp, finfish, and crabs.

This has lasting benefits to local communities because it enhances survival conditions for particular species and the traditional industries that depend on them, such as commercial fishing, seafood processing, and charter boat fishing.

Additions to NGO preserves, national wildlife refuges, national parks, and state wildlife management areas will allow those agencies to better fulfill their mandated missions, increase protection of coastal communities from storms and other disasters, increase lands and waters available for public access, and promote ecotourism and outdoor recreation.

FLOODPLAIN RESTORATION AND WATER-QUALITY IMPROVEMENT

1. Support for Research & Education to Advance Conservation and Habitat (REACH) - (\$50M)

REACH is a statewide collaborative partnership (state/federal agencies, private industry, farmers/producers, academia, and non-profits) that provides coordination and support for delivering water resource conservation, and documenting the benefits to natural resources of conservation efforts. Such documentation not only has tangible benefits to inland waters but also has direct links to downstream aquatic systems—specifically, the Gulf of Mexico.

The Gulf of Mexico Alliance, a strategic partnership among the states of Mississippi, Alabama, Louisiana, Texas, and Florida, is engaged in an initiative to significantly increase regional collaboration to enhance the ecological and economic health of the Gulf of Mexico. Recognizing that the Dead Zone in the Gulf (also called the Hypoxic Zone) is a coastal problem with an inland solution, the Alliance developed nutrient-

reduction objectives for the entire Mississippi River Basin (MRB), with the ultimate goal of reducing the size of the hypoxic zone and the occurrences of other hypoxic events across Gulf coastal waters. The Alliance's Action Plan 2008 calls for 45 percent reductions in total nitrogen and total phosphorus delivered to the Gulf to achieve ecosystem restoration and to reduce the size of the hypoxic zone.

With its transparent and collaborative structure, Research and Education to advance Conservation and Habitat (REACH) provides a vehicle to ensure the achievement of the Alliance's goals. Research and Education to Advance Conservation and Habitat (REACH) quantifies the direct water-quality benefits of conservation implemented on farms throughout the MRB and showcases how those benefits are directly linked to reducing the size of the Gulf of Mexico's hypoxic zone.

Critical to the widespread adoption and implementation of practices that reduce nutrient runoff are knowledge of how such practices work and why they work, and an ability to deliver the relevant information to people who can use it. REACH provides information to farmers to foster improved landscape stewardship and agricultural production systems, and gives them the hands-on help they require. REACH will document the benefits of current conservation practices implemented on working farms, test new conservation practices along with cutting-edge technologies, and disseminate this information across new and existing landscapes within the MRB. Additionally, REACH will provide farmers and other producers the help they need to establish these new conservation practices and implement new technologies.

REACH is a bottom-up approach that showcases how inland on-farm conservation practices, when combined with advances in technology, are beneficial to the health of the Gulf.

REACH encourages and facilitates profitable and sustainable agriculture by coordinating interdisciplinary collaborations on specific farms, addressing specific interests, from which outcomes can be shared with other producers.

Ultimately, encouraging sustainable agriculture will lend support to the traditional livelihoods and cultures of these local communities and enhance their local economies.

2. Advance the Mississippi Conservation Reserve Enhancement Program - (\$2M)

One of the key conservation opportunities in Mississippi also plays out across other Gulf states. Agriculture, while vital to local economies and time-honored ways of life, often creates twin challenges in terms of water quality and supply.

Farmers are some of our country's best conservationists and have a very keen eye for the value and uses of their land. In Mississippi, many have adopted proven conservation farming practices that require less water for irrigation, and also help protect nearby waterways from runoff. Additionally, on lands that are difficult or less profitable to farm, Mississippians have been quick to participate in the Wetlands Reserve Program, especially within the Mississippi Delta Region. Unfortunately, some of the Mississippi Delta counties have reached their maximum levels of enrollment allowed through the program.

Advancing a Mississippi Conservation Reserve Enhancement Program (MS CREP) would increase the state's capacity to work with farmers whose lands are important for the protection of water supplies that

serve the people of Mississippi and ultimately flow into the Gulf of Mexico. By restoring bottomland forests and wetlands, and forests that buffer bayous/brakes/oxbows, MS CREP will improve groundwater levels and maintain major drinking water sources for citizens within the project area by reducing non-point source impacts from agricultural runoff and the demand for agricultural irrigation.

A collaborative partnership among state/federal agencies, private industry and non-profits, the MS CREP will provide critical habitat for the federally threatened Louisiana black bear, and the endangered least tern.

Habitat will also be created for migratory waterfowl, shorebirds, and wading birds during the winter and spring months.

The local economies of the target geography will benefit financially from the MS CREP project. When they enroll their crop acreage into the MS CREP, eligible landowners and farmers would receive payment for the functional value of their lands.

LOUISIANA

Louisiana is experiencing more coastal land loss than any other state in the Gulf of Mexico. The primary cause is the loss of sediment and freshwater input from the Mississippi River. This land loss, coupled with other threats, such as sea level rise, subsidence, and a significant reduction in native coastal habitats, creates challenges for the people of Louisiana's coast.

To address these challenges, the state of Louisiana, developed the science-based Comprehensive Coastal Master Plan for a Sustainable Coast. Participants from many stakeholder groups assisted in the development of the plan, which was approved by the Louisiana Legislature in 2012. The Coastal Master Plan provides a comprehensive, long-term restoration strategy for Louisiana's coast, and will guide the state's coastal investments for the next 50 years. The plan proposes a total of \$50 billion in flood protection and ecosystem restoration projects, and will be updated in 2017.

The Conservancy has been heavily involved in the development of the state's Master Plan and fully supports its implementation. In addition to the projects described below, we strongly support directing



oil spill penalty dollars toward the construction of landscape scale projects, including the river diversions proposed in the 2012 Master Plan. The restoration of sediment and freshwater supply, via river diversions, to Louisiana's coastal marshes is essential to balancing erosion with accretion and can also moderate salinity impacts to these same marshes. Restoring the flow of sediment and freshwater is also critical to, and complementary with, many other restoration efforts in the state.

The restoration of near-shore habitat, in particular, native oyster reefs, directly complements other restoration efforts, such as diversions, because it helps protect existing coastlines (whereas diversions help create new land and restore estuarine functions). The near-shore habitat restoration projects described below are fully consistent with Louisiana's Master Plan, which calls for the "establishment of bioengineered oyster reefs to improve oyster propagation and serve as breakwaters to attenuate wave energies."

Restoration projects to improve coastal resilience and the overall health of the Gulf of Mexico.

NEAR-SHORE HABITAT RESTORATION

1. Oyster Reef Restoration/Shoreline Protection, St. Bernard Parish - (\$30M)

The Conservancy is conducting oyster reef restoration in all five Gulf states. These efforts act to slow or reverse the rates of shoreline erosion by reducing wave energy, improving water quality through increased filtration capacity, creating structural habitat for ecologically and economically important fish and crustacean species, and allowing sediments to accumulate by slowing the velocity of the current and returning oysters to areas in which they have been lost or considerably reduced. Oyster habitat restoration also protects shorelines where human communities have invested in property and infrastructure.

The most critically eroding area of Louisiana's coast is St. Bernard Parish. The Conservancy has already placed nearly 3 miles of artificial oyster reef there and proposes an additional 25 miles. In Louisiana, the Conservancy has used Reefblk® and OysterBreak® technologies and would consider others. The project itself will consist of placing constructed oyster reef where the water salinities required to support oyster growth are adequate and there is a need to abate coastal erosion.

Reef structures will be placed parallel to the shoreline to reduce wave energy reaching the shoreline, thereby reducing erosion. Costs include permitting and geotechnical work, the fabrication and installation of reef structures, and five years of monitoring and project management. Coastal landowners adjacent to our existing projects have been supportive, as these projects help protect their property. This project can provide the following benefits:

- Enhance fisheries. Many of the coastal waters of St. Bernard Parish are privately leased to commercial oyster production, and the successful restoration of oyster habitat can increase the amount of oyster larvae that find their way to these leases, possibly increasing production of the fishery.
- Protect vulnerable coastlines. The reestablishment of oyster habitat with a strong vertical component allows the continued growth of oysters and will enable tracking of incremental changes in sea-level rise or subsidence.
- Save dollars. Successful oyster habitat restoration is a technology that appreciates with time (oysters continue to grow) and requires little to no maintenance compared with some shoreline-armoring projects.

- Create and maintain jobs. A previous oyster habitat restoration project conducted by the Conservancy in southeast Louisiana not only put 3.4 miles of reef structure along the shoreline but also maintained or created 93 jobs. Not only is the restoration economy important for generating local employment but also it creates more ownership for those who live in places where coastal restoration is needed.

2. Freshwater/Basin Connectivity to the Gulf - the Atchafalaya (\$7.0M)

The delivery of freshwater and sediment created the productive, extensive coastal marshes that make Louisiana such an engine for seafood production. Over the last 100 years, however, much of this basin-to-Gulf connectivity has been severed or constrained between levees, with the result being greatly exacerbated rates of coastal land loss, which in turn confers a reduction in resiliency and an increase in risk to natural and human communities in the coastal zone. Even so, there remains one system that is still building land.

The Atchafalaya River Basin takes 30 percent of the flow of the Mississippi River. Unlike the Mississippi, the outlets of the Atchafalaya (its river mouth and the Wax Lake delta) are building new coastal wetlands bit by bit. The connectivity between the Basin, the estuary, and the Gulf, while the only example of land-building in the state, is threatened by a highly altered hydrology in the Basin. Areas of the Basin do not circulate and drain as they should, and this creates large anoxic zones that result in fish kills. Additionally, because parts of the Basin do not dry out seasonally, the regeneration of cypress and other iconic swamp trees does not occur, setting the stage for large areas of fetid, open water when the existing older trees die off. Finally, hydrologic alterations in the Basin are reducing the supply of sediment that is required to build new coastal lands. The Conservancy has a keen interest in the Basin and its connectivity to the Gulf, and in implementing a plan to ensure that those conditions persist.

This plan includes the purchase of critical lands within the Atchafalaya River Basin. As a landowner in the Basin, the Conservancy could reconnect traditional drainages that allow freshwater and sediment to move more naturally through the Basin and into the Gulf. Benefits would accrue to traditional fishing interest via reduction in the size and duration of anoxic zones. Iconic cypress forests would be able to regenerate, and fish and invertebrate communities would not have to escape low-oxygen conditions. Recently created coastal land forms would benefit from a dynamic but reliable supply of freshwater and sediment that would also support migrating waterfowl. Finally, coastal communities would benefit from the storm surge protection afforded by an increase in coastal wetlands. Adding coverage and function of coastal wetlands will augment the high levels of production found in Louisiana's estuarine and marine environments.

3. Acquisitions in Southwest Louisiana Coastal Zone (\$10M)

During periods of lower sea level in Louisiana, ancient dune ridges became populated with live oak and hackberry and are now commonly called cheniers (chen being the French word for "oak"). The cheniers run parallel to the shoreline and are often found around the landward limit of coastal marshes. They are critical land forms in Louisiana because their vertical profile has historically been a natural defense against storm surge—they operate like natural levees. Moreover, the thick canopy formed on cheniers serves to harbor neotropical migrants in both the spring and fall. These landforms are one of the first places that warblers, tanagers, thrushes, and other bird species that migrate along the Mississippi flyway will land in the spring, after they have crossed the Gulf of Mexico. The trees provide a place to rest, dodge predators, and forage to acquire the energy they require to access breeding grounds throughout North America.

Coastal marshes and bottomland hardwoods also constitute wetland habitats in the coastal zone and serve an essential role in filtering freshwater traveling coastward, plus they are instrumental as nursery engines that drive Louisiana's seafood production. The importance of coastal marshes has been in the news recently in Louisiana; efforts to recover the endangered whooping crane have seen these birds introduced into this habitat. Like cheniers, bottomland hardwoods also function to abate storm energy and as critical habitat for migrating birds.

In southwest Louisiana, The Nature Conservancy has identified approximately 2,000 acres that is comprised of one or more of the above habitats, need little to no restoration, and represent historic, integrated functioning habitats that represent what were once more widely spread habitats. Additionally, these properties are not threatened by the coastal land loss that plagues other locations along the state's coast. Acquisition of these properties would allow the aforementioned benefits to continue to be realized by species and ecosystems and also adjacent human communities. The high conservation value of these tracts can be imparted to other properties and landowners as the mature habitats represented therein can serve as a target for restoration in other areas. Finally, these properties could serve as platform preserves where TNC has a permanent presence to provide education and outreach opportunities to partners and stakeholders.

4. Mapping of Oyster Resources (\$3M)

The Nature Conservancy has placed 4.5 miles of oyster reef structures along Louisiana's coastline, to not only recover oyster habitat but also protect eroding shorelines, improve water quality, and create structural habitat that benefits recreationally and commercially important fish, shrimp, and crabs. The vast majority of the state's oyster resources exist on private, commercial leases. These leases are managed solely for production of oyster meat and shell, and as such are harvested regularly, so they have little to no vertical profile, nor do they, in any meaningful way, provide the ecosystem services described above. The only natural oyster habitat in the state of Louisiana that is not available to harvest is the reef complex in Sabine Lake. Sabine reef is shared by Louisiana and Texas (two-thirds of the reef resides in Louisiana) and is so large as to be estimated to contain one million sacks of oysters. This reef complex has not been harvested since 1966, and modelling suggests that by being a physical barrier to salinity, the reef reduces salinity in adjacent marshes by 3ppt. The Sabine reef provides value not only as a commodity but also for shoreline protection, which may actually outstrip its commodity value. In a state that plans to spend billions in the next decade on protection of its coast, having natural systems and structures that perform that task at no cost is significant.

A map exists of the footprint of Sabine reef, but there is no information on the structural complexity/height of the reef. This project would employ side scan sonar, and possibly acoustic technologies, to determine the three-dimensional character of this large reef complex. In addition, the nearby public reefs in Calcasieu Lake would be similarly mapped. Results would allow for comparisons between harvested and unharvested subtidal reefs and would be a means for resource managers to consider how changes in policy and management might allow for the recovery of reefs in parts of Louisiana while also supplementing Louisiana's existing commercial activities.

TEXAS

Texas is home to 377 beautiful miles of prairies, wetlands, coastal habitats, and barrier islands that contain a remarkable array of plants and animals, and provide innumerable benefits to residents and visitors, from supporting robust tourist and fishing industries to providing a unique quality of life that can be found only along the Gulf Coast. All of these businesses depend on strong and resilient coastal and Gulf ecosystems, systems that are currently threatened by development, changes in water quality and quantity, and loss of habitats that buffer the coast from impacts such as sea-level rise and storm surges. A healthy ecosystem means a healthy economy in the Gulf region and for the entire country.

Restoration projects to improve coastal resilience and overall health of the Gulf of Mexico.



MARINE AND COASTAL RESTORATION

1. Oyster reef restoration - (\$588M)

While Texas still has many oyster reefs and a thriving oyster fishery, the extent of oyster reefs along the Texas Gulf Coast has been greatly reduced by harvest for food and shell, and also by reduced freshwater flows that elevate salinity levels. Since 2000, Texas has experienced a 40 percent decline in oyster reefs, on top of losing more than 25 percent of its historic oyster reefs since 1890.

Most recently, Galveston Bay had 4,000 acres of oyster reef habitat destroyed and silted over by Hurricane Ike in 2008. The loss of these oyster reefs represents not only a loss to the commercial fishing industry in Texas but also a loss to a number of fish and other marine species that depend on oyster reefs for habitat. Fewer oyster reefs also means reduced water quality, since a single oyster can filter as much as 30 gallons of water a day.

The Nature Conservancy and a number of partners are proposing a major effort to restore as much as 4,000 acres of oyster reefs along the Texas Coast, including in Galveston Bay, Copano Bay, Corpus Christi Bay, and Matagorda Bay. As in other areas of the Gulf, restored oyster reefs

- improve water quality and clarity;
- provide nursery and forage habitat for numerous birds, fish, and other marine species;
- protect shorelines from erosion; and
- help protect local communities from the effects of storm surge and other disasters.

2. Restore coastal wetlands, seagrass beds, and nesting islands - (\$70M)

Coastal freshwater marshes and islands are important habitat to resident and wintering waterbirds, but are threatened by shoreline erosion and saltwater intrusion. These wetlands also trap sediments and pollutants, improving water quality for both wildlife and people, as well as helping reduce shoreline erosion. Seagrass beds are shelter to juvenile shrimp, shellfish, and sport fish, including speckled sea trout and redfish shelter. Sea turtles, crabs, and water birds come to feed and rest. In fact, the Texas Gulf Coast is world-renowned for its importance to all types of bird life, from common terns to the exotic and highly endangered whooping crane.

Restoring these interconnected habitats—coastal wetlands, seagrass beds, and nesting islands—not only improves the natural health of the Gulf but also supports a thriving tourist industry centered on the increasingly popular hobby of birding. In fact, the Conservancy's Mad Island Marsh Preserve has logged the highest number of species—more than 200—in the Audubon Christmas Bird count for the last two years.

Restoring these Texas coastal areas will do the following:

- improve ecosystem function and
- provide habitat for a variety of terrestrial and aquatic species, including wintering waterfowl, highly prized sportfish, and colonial-nesting waterbirds, such as brown pelicans, black skimmers, and various species of terns, herons and egrets—species that are of interest to tourists, communities, hunters, anglers and birdwatchers.

3. Native prairie restoration - (\$19M)

Historically, Texas has had millions of acres of coastal prairies that have supported a diverse assemblage of native plants, grassland birds, wading birds, and the endangered Attwater's prairie chicken. These prairies also have stabilized soil and filtered water flowing into the rivers and streams that empty into the Gulf's bays and estuaries. Less than 3 percent of this coastal prairie now remains, replaced by agriculture and urban development.

As a result, there are much greater levels of sediments and water contaminants in coastal rivers and bays. Since most of the remaining coastal prairie is in private ownership, working with coastal landowners is the key to conserving and improving this important habitat type. The Nature Conservancy will expand current cooperative efforts to restore coastal prairie habitats, focusing on 200,000 acres of coastal prairie in the Refugio-Goliad region, perhaps the largest contiguous block of native coastal prairie remaining in Texas.

The Conservancy will expand its efforts to assist with grazing management and planning, using prescribed fire to maintain and enhance coastal prairie habitats, and providing cost incentives for landowners to maintain this unique habitat. In addition, the Conservancy is developing cooperative agreements for harvesting and distributing native prairie seed to restore coastal prairies with locally adapted, native plant species in mid coast Texas.

Preserving and restoring native prairies does the following:

- Helps to stabilize the soil and prevent erosion that damages the water quality of rivers and the waters off the coast,
- Preserves an important part of Texas cultural heritage, and
- Provides important habitat for many different plants and animals.

4. Sea Turtle Conservation and Restoration - (\$15M)

Sea turtles are a unique part of the biodiversity of the Gulf of Mexico, and they have been greatly impacted by development and human activity in the Gulf. Five species of sea turtles are found in the Gulf of Mexico, all of which are either endangered or threatened. The most endangered species of sea turtle in the world is the Kemp's Ridley, which is also the most common species found in the waters off of Texas.

The Kemp's Ridley's life cycle is tied to the Gulf of Mexico coast, as it provides important reproductive, foraging, and migratory habitat, and the largest known nesting beaches are in Mexico and Texas. But sea turtle populations have been greatly reduced over the years by loss of protected beach nesting habitat, egg collection for food, and accidental deaths when caught in shrimp and fishing nets. Funds would be used to

- actively conserve at least 10 known nesting beaches, and the waters adjacent, by finding nests, supporting law enforcement, developing monitoring programs, and promoting coordination among agencies and citizens;
- protect key nesting sites/habitat by acquiring two properties, especially in the lower Texas Coast;
- help eliminate mortality from incidental catch in commercial shrimping by purchasing and distributing Turtle Excluder Devices (TEDS) to achieve full compliance with regulations;

- develop a comprehensive educational curriculum and program that communicates the need to conserve sea turtles and their nesting beaches and foraging habitat in Texas; and
- help care for and rehabilitate injured sea turtles found at the project sites.

5. Lionfish Assessment, Control and Education - (\$10M)

Lionfish are an exotic species originally from the Indian and Western Pacific oceans that have been accidentally introduced to Gulf, Atlantic, and Caribbean waters. Unfortunately, lionfish populations are rapidly expanding into a huge variety of marine habitats and displacing many species of native fish, including sport fish and commercial species.

In addition, lionfish are voracious predators, and if their populations are left unchecked, it is feared they might disrupt the food web and damage the health of coral reefs and other sensitive Gulf habitats. To manage the risk, the Conservancy will work with partners to

- develop a scientific assessment of impacts and potential impacts in the Gulf,
- design and implement a control and monitoring program,
- conduct fisheries restoration projects where lionfish have already damaged native fish populations, and
- develop a comprehensive education and outreach program to help anglers and divers learn to recognize this distinctive fish.

PROTECT COASTAL LANDS

1. Land Acquisition and Conservation Easements - (\$183M)

Acquiring lands and easements that protect the Gulf of Mexico's critically important bays, estuaries, barrier islands, and coastal rivers ultimately provides habitat for animals, plants, and people; protects coastal communities during storm events; protects and enhances coastal fisheries; and supports heritage-based tourism and recreational opportunities.

The lands being discussed include tracts near Matagorda Bay, to help expand wintering grounds for endangered whooping cranes, as well as the Columbia Bottomlands south of Houston, where the Colorado, Brazos, and San Bernard rivers provide important freshwater to the Gulf. Farther south, the Conservancy and partners are also seeking restoration opportunities and identifying lands and waters instrumental in the protection and restoration of Laguna Madre. The conservation and restoration of key tracts along the Texas Gulf Coast would provide tremendous ecological and coastal resilience benefits, including the following:

- Enhanced and expanded public access to lands and waters for recreation,
- Increased protection from storm surge and other coastal hazards, and
- Additional habitat for many different species, including birds, fish, mammals, and invertebrates.

2. Lone Star Coastal National Recreation Area (50,000 acres) - (\$50M)

In the wake of Hurricane Ike, a unique consortium of citizens, business leaders, and academic, municipal, and conservation organizations are proposing to protect a 130-mile area of the Texas Gulf Coast in the four-county area around Galveston Bay to provide buffer and storm protection to Galveston and the Houston metropolitan area.

The consortium is acting on the findings of Rice University's Severe Storm Prediction Education and Evacuation from Disaster Center (SSPEED) that document the benefits of natural coastal structures in reducing damage to urban areas from storm surges and flooding. The National Recreation Area proposal is one of several strategies proposed by the SSPEED coalition, representing a combination of "green" and "gray" infrastructure (natural habitats and engineered structures) that would provide landowners financial incentives to protect 450,000 acres of tidal marshland, brackish wetlands, and coastal prairie and about 150,000 acres of bay and estuarine area south of Houston and Galveston, some parts of which have already been protected by the U.S. Fish and Wildlife service, The Nature Conservancy, the Texas Parks and Wildlife Department, and units of local government.

In the aftermath of Ike's devastation, it became clear that undeveloped areas of the Texas coastline helped protect inland communities from the massive storm. People who lived near these natural areas suffered less damage because the land absorbed the floodwater and buffered the storm surge.

Gulf restoration funding would be used to provide incentives to local landowners to keep their lands undeveloped using a variety of approaches, such as habitat management advice, landowner agreements, incentive payments, and conservation easements.

Creating this National Recreation Area would have numerous benefits, including

- providing strong natural defenses for the 1.2 million people and hundreds of billions of dollars of property in the greater Galveston and Houston metropolitan areas and
- increasing economic development and diversity. Studies estimate that by its tenth anniversary, the recreation area could attract 1.5 million new visitors annually, create more than 5,000 local jobs, and sustain a 2 percent growth in the private economy.

3. Ensuring Freshwater Flows to Texas Bays and Estuaries - (\$200M)

A critical issue for the health of the Texas Gulf Coast and the western Gulf of Mexico is the quantity and quality of freshwater that flows into Texas's 11 major bays and estuaries. Without steady, reliable supplies of clean freshwater, the bays and estuaries begin to lose their value as nursery areas for important commercial and sportfish, their attractiveness to tourists, and their ability to support all of the functions of a healthy coast.

In the wake of lingering drought, Texas's rivers are under increasing stress, and the 2012 Texas Water Plan states the risk plainly: in serious drought conditions, Texas does not and will not have enough water to meet the needs of its people, its businesses, and its agricultural enterprises. In fact, the flows of several Texas rivers are already half of what they were historically, impacting the health and productivity of Texas bays and estuaries by allowing the water to become too salty and too shallow to support the species that have long depended on them. In turn, degraded water quality in bays and estuaries damages the waters of the wider Gulf.

To begin to restore and protect freshwater flows to the Gulf, the Conservancy believes initial efforts could focus on the Guadalupe and San Antonio river basins. Rising in the Hill Country, the Guadalupe River is one of the finest rivers in Texas. It is renowned for the many pleasures it offers, such as tubing, rafting, canoeing, fishing, swimming, and many other great activities for relaxing and enjoying the outdoors. The San Antonio River rises from headwater springs before making its way through its namesake city and eventually joining the Guadalupe River as it flows to the Gulf. The spring flow of the San Antonio and its principal tributaries, the Medina River and Cibolo Creek, makes the volume of the river steadier than that of most Texas streams.

Alternatively, The Nature Conservancy and its conservation partners might focus on the Matagorda Bay system, which is Texas's second-largest bay system.

Protecting and restoring these rivers in concert with the State Water Plan would require a number of strategies and approaches for freshwater conservation that have been identified, such as the use of "scorecards" to assess the relative health of Texas rivers and aquifers; improved monitoring of river water quality and flow; and financial incentives toward securing freshwater flows, such as buying water rights, paying farmers to improve irrigation efficiency, offering incentives for retiring irrigated lands, restoring riparian buffers, and working with rural and urban landowners to reduce non-point source pollution. Restoring and protecting the Gulf's water quality benefits everyone and everything that lives in the Gulf or depends on it. Improved water quality works in tandem with habitat restoration to increase the ecosystem services provided by a healthy Gulf.

Clean, abundant supplies of freshwater are the lifeblood of the Gulf's fishing, agriculture, and tourism industries and provide important sources of drinking water for millions of Gulf Coast residents.

4. Gulf of Mexico planning, monitoring, research and science support - (\$96M)

Good ecological data are essential to setting priorities for restoration across the Gulf, as well as for assessing the success and impact of various coastal restoration efforts. Unfortunately, scientific efforts across the Gulf are currently too small and disconnected, and what data are available are scattered, incomplete, and often difficult for conservation partners and scientists to access.

No single entity can assess and accomplish all the coastal restoration and protection needed on the Texas Gulf Coast alone. While Texas is fortunate to have a large number of partners that work well together, the state does not have a comprehensive plan for Gulf restoration. And though current partnership efforts are strong, they lack coordination and do not contribute to Gulf restoration as effectively as they could. A well-funded, widely supported process to develop statewide and coastal restoration plans for Texas would improve collaboration and integration of proposals to restore coastal wetlands, grassland, forest, freshwater, marine, and urban habitats, and their associated benefits, to human communities.

Potential partners in developing the restoration plans include the Harte Research Institute for Gulf of Mexico Studies (HRI), the Galveston Bay Foundation, the Coastal Bend Bays and Estuaries Program (CBBEP), the Coastal Conservation Association (CCA), Ducks Unlimited (DU), Audubon Texas, the Texas Parks and Wildlife Department (TPWD), the Texas General Land Office (GLO), the U.S. Fish and Wildlife Service (USFWS), and assorted municipalities.

Investment in research and planning, as well as developing collaborative tools, will significantly improve proposed Gulf restoration efforts in Texas and around the Gulf. Online data and decision-making tools could help scientists and practitioners make the most informed decisions possible by enabling them to assess impacts of sea level rise, determine the values provided by environmental services, and monitor the state of coastal ecosystems. Investments in science and management in the Gulf could include a conservation and sustainability assessment and plan, a marine biodiversity online dashboard, a coastal and marine ecosystem services restoration toolkit to standardize planning and restoration processes, and a marine conservation community to coordinate restoration in states and across the Gulf.

Improving science and collaboration in the Gulf would help ensure the most effective, coordinated investment of restoration funds resulting from the Deepwater Horizon oil spill, and improved monitoring and management of the Gulf's natural resources.

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.

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Nearly 400 volunteers came out to Mobile Bay in Alabama to help restore the Gulf of Mexico. During the course of this weekend event, the volunteers worked alongside Conservancy scientists and partners to construct the first quarter-mile of oyster reef.

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