

**2017 WEDA Environmental Excellence Award Nomination
Environmental Dredging**

Caminada Headland Beach and Dune Restoration Project

Increments 1 and 2

Lafourche and Jefferson Parishes, Louisiana, USA



**Nominated by Coastal Engineering Consultants, Inc.
Constructed by Weeks Marine, Inc. for the
Coastal Protection and Restoration Authority**

**CAMINADA HEADLAND RESTORATION PROJECT
WEDA ENVIRONMENTAL DREDGING EXCELLENCE AWARD
ENVIRONMENTAL DREDGING
PROJECT SUMMARY**

Executive Summary

The construction of the Caminada Headland Beach and Dune Restoration Project was recently completed restoring 792 acres of beach and dune habitat on the Caminada Headland. **The Caminada Headland Restoration Project is the largest coastal restoration project that has been completed in Louisiana by the Coastal Protection and Restoration Authority (CPRA).** Construction included the placement of over 8.8 million cubic yards of sand from the Ship Shoal Borrow Area offshore, which ranged from 27 to 41 nautical miles from the Project site. Innovative measures were taken to protect bird populations during construction of the Project.

Introduction

Restoring barrier shorelines is a top priority of the “multiple line of defense” restoration strategy which is a key tenet of Louisiana’s Coastal Master Plan. The goal of the Project is to protect and preserve the structural integrity of the barrier shoreline of the Caminada Headland which will reduce wave energy and salt-water intrusion from the Gulf of Mexico into back-barrier environments, consisting of chenier ridges, intertidal marshes, and bays. Restoration of these fragile habitats will protect and sustain significant and unique foraging and nesting areas for threatened and endangered species.

The Bayou Lafourche barrier island complex lies approximately 47 miles west of the mouth of the Mississippi River and about 50 miles south of New Orleans. The Caminada Headland spans the shoreline between Belle Pass and Caminada Pass and is adjacent to Port Fourchon, Louisiana’s largest oil and gas drilling services Port. The Caminada Headland Project provides storm protection to Port Fourchon. Port Fourchon currently services over 90% of the Gulf of Mexico deep water oil production and over 400 large supply vessels traverse the Port’s channels each day. Port Fourchon plays a strategic role in supporting production of approximately 18% of this country’s entire oil supply.

Over the last century, the Caminada Headland shoreline has experienced some of the highest shifts of the Louisiana coastline. The Headland has experienced significant shoreline erosion and land loss as a result of storm overtopping and breaching, saltwater intrusion, wind and wave induced erosion, and relative sea level rise. Across coastal Louisiana, over 1,880 square miles has been lost since the 1930’s, and it is anticipated that an additional 1,750 square miles would be lost if immediate actions are not taken. The Caminada Headland and Louisiana’s barrier islands are all vulnerable to this catastrophic land loss crisis. The CPRA utilized funds from the Coastal Impact Assistance Program, State Surplus, and the National Fish and Wildlife Fund’s Gulf Environmental Benefit Fund, which resulted from settlements from the Deepwater Horizon oil spill, to design, permit and build this Project.

Project Team Members

Owner	Coastal Protection and Restoration Authority	
Consulting Team	Coastal Engineering Consultants, Inc.: Prime Engineering Consultant, Coastal Engineer, Geology, and Construction Administration [WEDA Member and Nominating Entity]	
	EMC Surveying: Bathymetric and Topographic Surveying	
	Picciola & Associates, Inc.: Bathymetric and Topographic Surveying	
	Geoengineers Inc.: Geotechnical Engineering	
	Ocean Surveys, Inc.: Geophysical and Geotechnical Investigations	
	R.C. Goodwin and Associates, Inc.: Archaeological Investigations	
	Coastal Technology Corporation: Peer Review and Resident Inspectors	
	GEC, Inc.: Permitting and Environmental Assessment	
	Aero Data Corporation: Aerial Photography	
	Barataria Terrebonne National Estuary Program: Bird Monitoring	
Contractors	Weeks Marine Inc.: Prime Contractor [WEDA Member] (Increments 1 and 2)	
	The Dutra Group: Hopper Dredging Subcontractor (Increment 2) [WEDA Member]	
	T. Baker Smith, LLC: Surveying (Increment 1)	
	HydroTerra Technologies, LLC: Surveying (Increment 2)	
	Mitch's Landscaping & Lawn Company: Sand Fencing (Increment 1)	
	Soil Erosion Services, Inc.: Sand Fencing (Increment 2)	
	Coastwise Consulting, Inc.: Turtle Trawling and Relocation (Increment 1)	
	East Coast Observers, Inc.: Bird Abatement, Turtle Trawling & Relocation (Increment 2)	
	Research Environmental & Management Support: Marine Species Observer	
	Norman Wildlife Consulting: Bird Abatement Services (Increment 1)	
	RES: Prime Vegetative Planting Contractor (Increment 2)	
	Soil Erosion Services, Inc.: Prime Vegetative Planting Contractor (Increment 1)	
Stakeholders	Greater Lafourche Port Commission	US Army Corps of Engineers
	Edward Wisner Donation	US Fish and Wildlife Service
	Caillouet Land Corporation	National Fish and Wildlife Foundation
	Lafourche Parish	Louisiana Department of Wildlife and Fisheries
	Jefferson Parish	National Marine Fisheries Service
	Terrebonne Parish	Bureau of Ocean Energy Management
	Town of Grand Isle	Barataria Terrebonne National Estuary Program

Environmental Benefits

The primary environmental benefit of the Project is the restoration of over 1,059 acres of beach and dune habitat. In Louisiana, the Caminada Headland and other barrier shorelines and islands are important ecological communities which play a critical role in mitigating the impacts of Gulf of Mexico storm events on adjacent wetlands and coastal communities in Louisiana. The protected bays and marshes behind the barrier islands provide essential nursery and foraging

habitats for many species of both commercially and recreationally important fish and shellfish, as well as numerous species of waterfowl that utilize the Mississippi Flyway.

CPRA worked cooperatively with the US Department of Interior through the Bureau of Ocean and Energy Management (BOEM) to acquire a lease to mine sand. Ship Shoal has been estimated to contain 900 million cubic yards of sand, and thus been designated by BOEM as a Significant Outer Continental Shelf (OCS) Sediment Resource. With limited nearshore sand resources available for future barrier island restoration projects in Louisiana, the dredging of sand from the OCS to restore the Caminada Headland provided a tangible proof of concept.

“This is the largest single ecosystem restoration the state Coastal Protection and Restoration Authority has ever undertaken, and the results are outstanding. This sets the stage for even larger projects further inland as we restore our land and marshes that are vital to the protection of our homes, families, business, infrastructure and our very way of life.”

John Bel Edwards
Louisiana Governor

Project Metrics

- ☑ Dredged and placed over 8.8 million cubic yards on the Headland, adding new sediment to the barrier island chain from outside of the active littoral system.
- ☑ Created 792 acres of critical beach and dune habitat which provides habitat for migratory, threatened, and endangered species.
- ☑ Installed over 13 miles of sand fence (see Photo 4) to promote deposition of windblown sand to create dune features and conserve sediment placed on the Headland.
- ☑ Planted 275,976 native plants on the dune to accelerate colonization of vegetation on the dune to conserve sediment (see Photo 4).

Unique Challenges

The unique environmental challenges that were addressed by this Project were the creation of critical habitat for protected bird species (threatened, endangered, and migratory) with sand from an offshore borrow area that is also critical habitat for protected turtle species (threatened and endangered). Significant care was taken to employ **reasonable and prudent measures during construction to protect** the species which the Project will benefit. Tremendous outreach by the Project Team reduced the potential for conflict among the client, construction contractor and natural resource agencies, to achieve consensus, and result in successful Project implementation.

Construction of the Project took place in two increments. Increment One (the western side) commenced in June 2013 and was completed in January 2015 and Increment Two (the eastern side) commenced in May 2015 and was completed in November 2016. Two methods of sediment excavation and delivery were utilized to place sand from the Ship Shoal borrow area on the Headland. The first method utilized a cutterhead dredge loading scows with sand to transport the sediment to the Headland, and then an unloader re-suspended the sediment and pumped it to the fill template (see Photo 2 below). The second method employed two hopper dredges to excavate the sediment, sail to a nearshore pump-out area at the Headland, and then pump the sediment to the fill template.

As part of the construction of Increment 1 of the Project, when hopper dredges were utilized, the contractor was required to use relocation trawling to reduce the impact on sea turtles. Over the

course of relocation trawling efforts consisting of 111 days, 157 sea turtles were captured and successfully relocated. This number exceeded the relation biennial take limit of 76 turtles established by the 2005 Biological Opinion (BO) issued by the National Marine Fisheries Service (NMFS). As relocations efforts approached the biennial take limit, BOEM in accordance with the BO, coordinated with NMFS on numerous occasions as an analysis of the situation was conducted. The analysis revealed a minimal risk of impact to the species through trawling activities and potential benefit through reduced entrainment risk and the potential to advance the scientific understanding of sea turtle species. NMFS recommended continuation of construction subject to the condition that trawling continue in conjunction with hopper dredging along with complying with all other BO requirements for sea turtle protection and reporting.

The Caminada Headland Project Area is crossed by numerous, active oil and gas pipelines, including the Louisiana Offshore Oil Pipeline. The Project Team coordinated location and protective measures with multiple oil and gas pipeline companies in an effort to protect the existing infrastructure. Further, the areas that hopper dredges and scow barges traversed from the borrow area at Ship Shoal to the pump out areas include significant, active oil and gas facilities all requiring services primarily from Port Fourchon which provides service to over 90% of deep water oil and gas facilities in the Gulf of Mexico. The construction contractor worked diligently and cooperatively with these interests to ensure safety of their employees in an area that has significant maritime traffic and to avoid impacting existing oil and gas infrastructure.

Innovation

One significant innovation of the Project in coastal Louisiana resulted from the fact that the Caminada Headland has historically been a productive nesting area for several species of beach-nesting and migratory birds and the necessity to mitigate any adverse impacts during construction. Since construction of the Project spanned multiple nesting seasons, Least Terns and Wilson's Plover would arrive at the Project Area in the spring and begin showing displays of nesting potential. During construction of the Project, the US Fish and Wildlife Service approved an alternative method of abatement by creating wind rows (see Photo 3 below) within the fill template in advance of the active fill discharge area during the nesting season. This abatement measure consisted of creating ridges and valleys out of in-situ sediment that were tightly spaced and promoted an unfavorable nesting area. This method of abatement proved to be the most effective of all measures attempted and no nests were discovered in the areas where wind rows were employed.

From a sustainability standpoint, the Caminada Headland Project utilized sand resources from outside of the active, sediment starved system. While the sand placed on the Caminada Headland was important to establish the beach and dune habitat, it will also provide long-term benefits to the system as the littoral drift will benefit areas outside of the Project footprint providing sustainability adjacent to for those areas as well.

Economic Benefits

Restoration of barrier islands is a significant component of the Louisiana Coastal Master Plan. Full implementation of the Coastal Master Plan is projected to reduce expected annual damage

from flooding throughout Louisiana's coast by \$5.3 to \$18 billion annually. Restoration projects in the Coastal Master Plan contribute to overall risk reduction for coastal communities by reducing storm surge. Barrier island restoration contributed to the economy by being the first line of defense in reducing storm surge.

Contribution to the Economy

The short-term economic benefits of the construction of the largest coastal restoration project in Louisiana by the CPRA were significant and supported a number of jobs at various levels ranging from temporary construction labor to highly training professionals. In addition, heavy equipment was utilized and fuel and other supplies were required to construct the Project over a period of years. Completion of the Project results in the loss of the temporary construction jobs, the long-term benefits of a restored barrier shoreline is significant in making Port Fourchon more resilient to future storms and the economic engine that the Port provides is one of national significance. Projects like the Caminada Headland have benefits for our nation's energy infrastructure, international trade, and the natural resources on which we all depend.

"The increased protection this (project) provides to our port facility is already paying dividends. Word has gotten out about the huge improvements the state has made here, and that commitment to our security is sparking serious discussions with a number of companies interested in moving to our facility or expanding their investment here. We're talking about many millions of dollars in economic development."

Chet Chiasson, Executive Director
Greater Lafourche Port Commission

Transferability

The lessons learned through coordination with BOEM in complying with NEPA and acquisition of a sand lease and through the construction of the Caminada Headland Project using long distance sediment transport methodology is a model for other projects and has great transferability. The sediment resources from Ship Shoal are currently being dredged for a coastal restoration project and another project is currently being designed is planning to use sediment resources from Ship Shoal to restore habitat. Other lessons that were learned through the implementation of the project include the following.

- **Flexibility for Construction Contractors.** The design, permit and land rights access for construction demonstrated that large scale restoration projects can be designed to allow significant flexibility for construction contractors to access the site using multiple pump out areas and construction access corridors.
- **Close, Constant Coordination with Resource Agencies.** Demonstrated the benefits of active, engagement with regulatory agency personnel when constructing coastal restoration projects in dynamic environments.
- **Public Outreach.** Demonstrated the importance of active engagement of the public and recreational users to the shoreline when public access in sensitive dune areas was changed.

The use of wind rows for abatement and that has potential application for future restoration projects. Lessons learned from this project have been incorporated into planning and execution of other barrier island restoration projects.

Outreach and Education

Extensive stakeholder coordination was conducted by CPRA and the Project Team during the planning, design, and construction phases. The planning of this Project started back in 2005 as a component of a larger feasibility study that was a joint effort between the State of Louisiana and the USACE. Dozens of meetings were held to solicit input from the diverse interest groups, landowners, stakeholders, natural resource agencies, and public. The extensive outreach program was paramount in achieving success.

Given the high profile of this significant restoration Project, the CPRA has hosted dozens of reporters from news organizations who have reported on the Project in media outlets ranging from the New York Times to the Houma Courier. In addition, recent field trips to the Project Area to demonstrate the success of Louisiana's coastal restoration efforts have included Congressional delegations and staff from the U.S. Department of Interior. Members of the Project Team have submitted abstracts and given presentations on various aspects of the project at the following conferences and meetings:

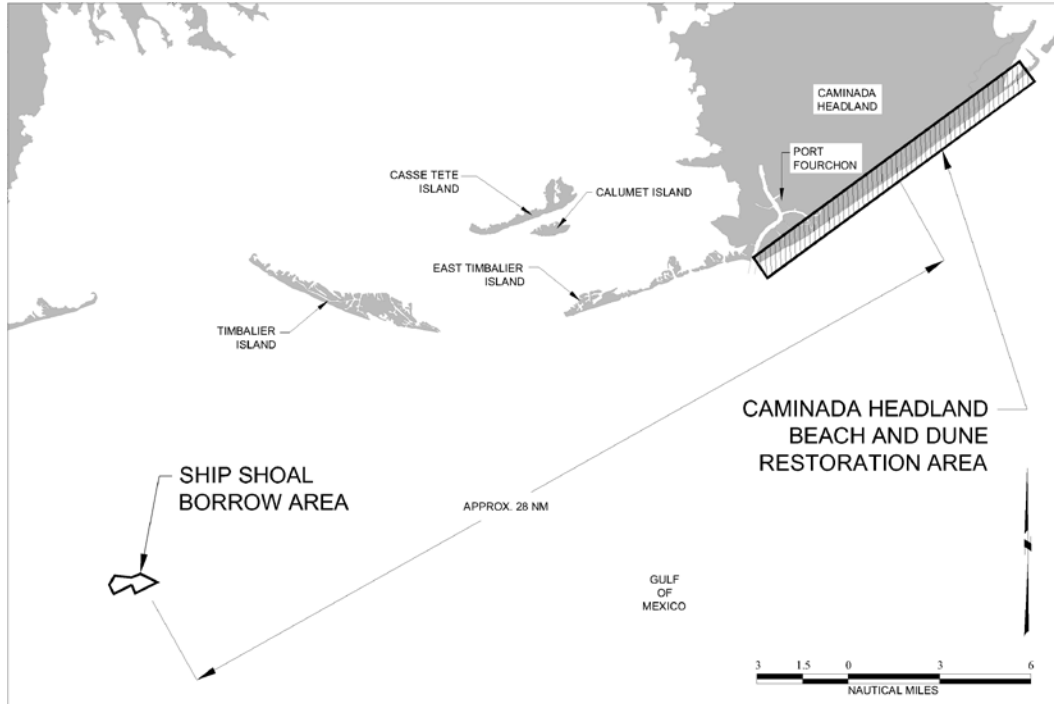
- ☑ Brad Miller – Restore America's Estuary National Conference, December 2016
- ☑ Jacques Boudreaux and Brad Miller – State of the Coast Conference, June 2016
- ☑ Steve Dartez – WEDA Gulf Coast Chapter Meeting – November 2015
- ☑ Clayton Breland, Steve Dartez, and Brad Miller – Gulf of Mexico Offshore Sand Management Working Group, October 2015
- ☑ Michael Poff – Florida Shore & Beach Preservation Association, February 2014
- ☑ Greg Grandy – Coasts, Oceans, Ports & River Institute Louisiana Chapter, October 2013
- ☑ Greg Grandy – ASBPA National Meeting, October 2013

Interpretive signage for the Project was developed and placed in public areas at Elmer's Island and the Port Fourchon Boat Launch (see Photo 5). The signage interprets the geology of the Caminada Headland, provides information on wildlife that use the habitat during their life cycle, and details regarding the effort to restore critical habitats.

"Today, Caminada stands as the largest and most significant restoration project in the history of Louisiana and NFWF."

Jeff Trandahl
Executive Director
National Fish and Wildlife Foundation
(NFWF)

PROJECT FIGURES, DIAGRAMS AND PHOTOGRAPHS



Project Overview Map



Photo 1: Aerial Photograph of the Caminada Headland Showing a Dredge in Bayou Lafourche Pumping Sediment From a Scow to a Pipeline Along the Gulf Shoreline With Port Fourchon in the Background.

Sediment Transport Methods

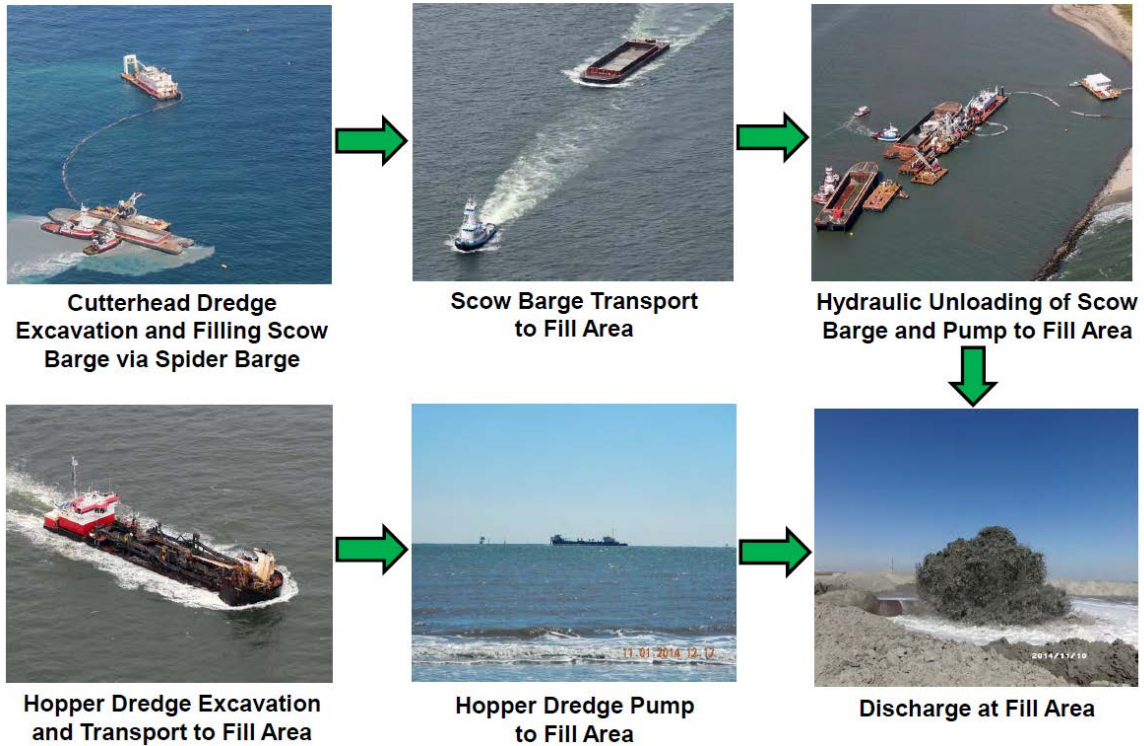


Photo 2: Innovative Sediment Transport Conveyance Methods Used on the Project: Cutterhead Dredge + Spider Barge + Scow Barge + Suction Un-loader and Hopper Dredge. One Way Trip From the Borrow Area at Ship Shoal to the Caminada Headland Ranges from 27-41 Miles



Photo 3: Least Terns and Wind Rows



Photo 4: Sand Fence Capturing Wind Blown Sand Along the Caminada Headland

Welcome to the Caminada Headland

The Caminada Headland
 Located in the heart of Louisiana's barrier islands, the Caminada Headland is a 14-mile stretch of sandy beach and dune landscape between Bayou Lafourche to the west and Caminada Pass to the east.

The headland's natural beauty is only rivaled by its importance as a defense of our natural energy infrastructure. The western portion of the Headland directly protects Port Fourchon, the country's most important energy port. The eastern portion of the Headland includes the Elmer's Island Wildlife Refuge, which is managed by the Louisiana Department of Wildlife and Fisheries (LDWF).

BUILDING LAND WITH WATER: Past and Present Delta Lobes

FROM MARSH TO BARRIER ISLAND
 There is a combination cycle of building and decay occurring in much of the land. Currently, a great deal of the Caminada Headland is Louisiana's only headland still attached to the delta that built it.

A Dynamic Landscape
 The Caminada Headland was originally created by the Mississippi River 1,000 years ago when it flowed where Bayou Lafourche currently exists. Nourished by river sediments, the Lafourche Delta and Caminada Headland expanded over time. However, about 750 years ago the Mississippi River gradually switched course to its current location as it sought the shortest path to the Gulf. The Lafourche Delta was cut off from its supply of freshwater and sediment which caused the landscape to subside and erode. Over the last 100 years, the Caminada Headland has experienced significant shoreline erosion and land loss. To respond to this land loss crisis, the Louisiana Coastal Protection and Restoration Authority and its partners are constructing a series of restoration projects to rebuild and restore the area.

SHIFTING SHORELINES
 1800-1900 1900-1950 1950-1970 1970-2000

Elmer's Island: Home to Birds, Turtles, & Fish

Elmer's Island Wildlife Refuge
 Elmer's Island Wildlife Refuge is a 469-acre tract of barrier beachfront and marsh area. The property, historically known as Goat Island but, referred to as Elmer's Island since the 1970s, is well known for the excellent fishing opportunities it has provided over the years for many popular species such as redfish and speckled trout that frequent the State's coastal beaches and passes, especially Caminada Pass.

Turtles in the Gulf of Mexico
 There are three sea turtle species that are known to occur in Louisiana waters in large numbers: the federally threatened loggerhead and green sea turtles, and the federally endangered Kemp's ridley sea turtle. In 2015, two loggerhead nests were identified on Grand Isle Beach, and false crows were noted on Elmer's Island. Other "crows" have been noted in recent years where a sea turtle emerges onto the beach (presumably to search for a nest site and return to the water without constructing a nest).

Help Protect Our Birds
 More than 170 species of birds utilize Elmer's Island during some part in their life cycle; almost 40 of these species are listed as bird species of conservation concern in Louisiana. Common nesting species include mottled duck, vesper sparrow, piping plover, and sea sparrow. Piping plovers, which are federally listed as threatened, forage on Louisiana's beaches up to nine months out of the year and Elmer's Island has been formally designated as Critical Habitat for the species. Red knots, also listed as threatened, use Elmer's Island as a stopover point during their long migratory route, which can span over 9,000 miles in a season.

How you can help to protect nesting birds:

- Keep your distance. If birds become agitated or leave their nests, you are too close! If you mean too close, they may call loudly or dive-bomb you.
- Never intentionally force birds to fly. When birds are chased or disturbed, they use energy they need to reserve for nesting or migration.
- Spread the word! If you see people disturbing nesting birds, gently remind them how their actions may hurt birds' survival!

Barrier Islands: Our First Line of Defense

Importance to Our State and Nation
 Given the importance of so many of South Louisiana's natural assets—its waterways, natural resources, unique culture, and wetlands—this land loss crisis has wide-ranging impacts on local citizens, regionally important industries, and our nation as a whole. We are facing nothing about of a national emergency.

Did you know: 90% of our nation's outer continental oil and gas passes through Louisiana ports, 20% of our nation's waterborne commerce flows through Louisiana shipping channels, and 26% of the continental commercial fishery landings are transported from Louisiana to markets nationwide?

With impacts both locally and globally, projects like the Caminada Headland Beach and Dune Restoration have benefits for our nation's energy infrastructure, international trade, and the natural resources on which we all depend.

Our Coastal Crisis: A Call to Action
 Over the last century, the Caminada Headland has experienced significant shoreline erosion and land loss of salt marsh, beach, and dune habitats. The Caminada shoreline has undergone some of the most noticeable shifts of the Louisiana coastline as a result of storm surge, subsidence, wind and wave erosion, sea level rise, and oil and gas exploration.

The map above illustrates the land we could lose over the next 50 years if we fail to implement any further protection or restoration measures. Louisiana has already lost about 1,860 square miles since the 1920s, but an additional 1,750 square miles could be lost over the next 50 years if no further action is taken.

The Caminada Headland and Louisiana's barrier islands are all vulnerable to this catastrophic land loss crisis. Restoring barrier islands is a top priority because they serve as a first line of defense against hurricanes and storm surge.

Rebuilding and Restoring Louisiana's Coast

Restoring Our Barrier Shorelines
 To address the significant land loss occurring along the Caminada Headland, the CPRA is restoring the beach habitat by transporting sand from Ship Shoal, a sand body located approximately 28 miles away. A beach nourishment project in Louisiana to dredge sand from an offshore shoal in the Gulf of Mexico to restore habitat on a barrier shoreline.

The first portion of the project (the western half) restores approximately 300 acres and 6 miles of beach and dune habitat, while the second portion (the eastern half) is larger and restores approximately 600 acres and 7 miles of beach and dune. In total, the two projects valued at over \$200 million restore 13 miles of Louisiana's barrier shoreline and represent one of the largest restoration projects ever constructed by the CPRA. Restoring our coastal landscape is vital to protecting our future. To learn more about coastal restoration and how you can get involved, please visit coastal.la.gov.

This beach restoration project is funded in part with Qualified Outer Continental Shelf Oil and Gas Revenues by the Coastal Impact Assistance Program, Fish and Wildlife Service, and U.S. Department of Interior. The second increment of this project is funded by the National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund. The CPRA appreciates the contributions of all its key partners (see below) whose support was vital to the successful implementation of the Caminada Headland Beach and Dune Restoration Project. Thanks Marine! We see the construction contract for the project.

Photo 5: Interpretive Signage that Was Placed at Parking Lots at Louisiana Department of Wildlife and Fisheries Elmer's Island Wildlife Refuge and Port Fourchon Public Boat Launch.