



# **Maritime Forest Ridge and Marsh Recreation Project At Port Fourchon**

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## **Table of Contents**

Introduction.....	3
Goals and Objectives .....	4
Discussion.....	4
Background.....	4
Objectives and Methodology .....	7
How the Project Fulfills the Award Criteria.....	12
Conclusion.....	14
Appendix A: Map of Maritime Forest Ridge .....	15

## **A. Introduction**

When industry demand dictated that Port Fourchon's slips in the Northern Expansion be widened from 500' to 700' for larger vessels, Port officials remembered concerns expressed from bird watching interests about loss of habitat as the Port developed and put together a plan to rebuild a natural forest ridge that once existed just north of Port Fourchon which had fallen victim to coastal erosion. The Maritime Forest Ridge (MFR) will ultimately stretch for approximately 12,750 linear feet, creating about 60 acres of marsh and 60 acres of ridge habitat. Ultimately, the project will include walking trails, bird identification stations and a coastal/marine ecosystem education center.

Over the last 100 years, naturally occurring coastal ridges served as buffers between the Gulf of Mexico and the highly sensitive coastal marshes. As these ridges have disappeared, marsh has become increasingly exposed to coastal erosion. The re-creation of the MFR north of Port Fourchon mimics the natural ecology of the system and restores a natural storm surge protection barrier.

This project seeks to recreate a forest ridge that is surrounded by 15 acres of marsh planted with spartina alterniflora and black mangroves. The project will provide a much-needed habitat for marine organisms as well as serve as a buffer between the Gulf of Mexico and the highly sensitive coastal marshes of the Barataria – Terrebonne Estuaries while creating a respite for migratory birds.

## **B. Goals and Objectives**

1. The main goal is to restore the historic maritime forest ridge that had eroded and subsided below sea level since the 1950s, vegetating the ridge with woody plant species will provide excellent habitat for migratory birds, and eventually adding boardwalks, trails, bird identification stations, and an interpretive center along Louisiana Highway 1.
2. The project will serve as an example of an ideal coastal ridge restoration project, and a rallying point that other agencies and coastal conservation groups can use as a base for forging partnerships towards system restoration. Additionally we hope that all scientific data generated and gathered through the processes of construction, shaping and vegetation of the project area will be put to use in future coastal restoration projects.

## **C. Discussion**

### **I. Background**

Coastal erosion and wetland deterioration are serious and widespread problems affecting Louisiana's coastal zone. With coastal wetland losses of 16,000 to 20,000 acres per year, the long term social, environmental, and economic consequences will deprive not only Louisiana, but the Gulf of Mexico Region and the nation as a whole of vitally important fish, wildlife, and other wetland-related economic and environmental benefits.

Interior vegetative marshes, shorelines, bays and ridges have significant intrinsic fish and wildlife value and are critically important habitats for many species of estuarine-dependent fish, shellfish, and wildlife that depend on Louisiana's coastal habitats for much of their life cycle. Consequently, the continued loss of interior vegetative marsh and ridge habitats will result in the collapse of estuaries and the wetlands that they protect, will severely disrupt coastal fisheries and aquatic wildlife, and will significantly increase the exposure of coastal communities to potentially catastrophic storm damage.

While Port Fourchon actively pursues its purpose of stimulating commercial development, it accepts as part of its mission the responsibility of acknowledging the environmental value of the setting in which Port Fourchon is located by working diligently to restore and protect the coastal landscape and habitats that surround it.

Port Fourchon recognizes that any efforts to restore the rapidly-vanishing coastal lands of south Louisiana not only requires a sound scientific footing, but the full support and involvement of the citizens who live, work, and play in the lands and waterways of coastal Louisiana. Port Fourchon is working in conjunction with several private and governmental entities to tackle this restoration effort including Bataria Terrebonne National Estuary Program, Gulf of Mexico Program, Gulf of Mexico Foundation, National Oceanic Atmospheric Administration, The Louisiana Department of Natural Resources, Shell, and the US Natural Resources Conservation Service's Plant Material Center.

By engaging the people of the estuary on a personal level through volunteerism, Port Fourchon is not only forging new community partnerships and fostering public support and sentiment for coastal restoration, it is putting a face on the efforts to save this landscape by allowing citizen volunteers to work shoulder-to-shoulder with the biologists, geologists, engineers and scientists who are working on the immense problems coastal Louisiana faces.

Once constructed, the entire project will include over 2.25 miles of ridge/marsh habitat and will consist of approximately 60+ acres of maritime forest ridge and 60+ acres of marsh and tidal creeks. This project is not being constructed as part of any mitigation requirement imposed on Port Fourchon or any other entity. Construction of this project will occur in phases. Phase I and II are currently under construction. Phase III will begin within the next several years.

## **II. Objectives and Methodology**

The objectives of this project are twofold – the first objective is to restore approximately 120+ acres of salt marsh and adjacent upland ridge habitats through construction using herbaceous/woody plants to restore the habitat values that once occurred here. Restoring this important habitat not only improves the local fish habitat by adding highly productive marsh edge habitat to the region, but it also adds 120 acres of protection to the region's coastal defenses in the eventuality of a storm event.

The project has been divided into three phases. Phase I is the center 3,000 feet. Phase II encompasses the 3,000 feet to the west of Phase I. Phase III is the 6,000 feet to the east of Phase I that will stretch to Louisiana Highway 1. For a diagram of project area, see Appendix A.

The first phase or ridge construction encompassed about 3,000 linear feet and involved planting about 15 acres of marsh. The first 3,000 feet of levees to surround Phase I of the Maritime Forest Ridge were constructed in 2002. The first lift was maintained at a +4 elevation. The area was filled with 383,584 cubic yards of dredge material to an average elevation of +3 feet. The second lift of the levee was maintained as the dredge material was pumped into the site to a +8 foot elevation. There are approximately 300 feet of ridge shaped to a +8 foot elevation in Phase I of this project.

Due to storms in 2002, the damage to the lifts on the retainer levees in Phase 1 had to be re-built by the Port in 2003. The material used to fill Phase I did not hold as well as we had hoped, and therefore, the construction of the ridge in Phase I has been slower than anticipated.

In 2004, 1,322,547 cubic yards of dredge material from Slip B were able to cap off Phase 1 with the additional fill material to an 8 foot elevation. The remaining material was able to fill all of Phase 2 to a partial elevation of +3 feet.

The shaping of 2,000 of the 6,000 foot ridge with heavy machinery to specified dimensions began in January 2005 (see Figure 1 below). Construction on the ridge was interrupted again by the hurricanes of 2005. Most of the grass and vegetation along the Maritime Forest Ridge in Port Fourchon took a beating from Hurricane Katrina and Rita but survived. The dead marsh grass pushed into the ridge provided an additional layer of protection. Overall the ridge held up remarkable well and clearly acted as a barrier reducing some of the storm surge from the north winds of Hurricane Katrina.

**FIGURE 1: Excavator working on Maritime Forest Ridge**



The resulting project has created over 60 acres of salt marsh, and another 60+ acres of maritime forest ridge at an elevation of +8 feet. The entire MFR Project to date has cost over \$2 million. The port has been financially responsible for almost 90% of the project with a cost of \$1,873,613. (See chart below for a cost breakdown).

**Figure 2. Cost Breakdown to Date of Maritime Forest Ridge**

<b>Item Description</b>	<b>Cost</b>
Shaping of the Ridge	\$360,456
Dredge Material Deposition	\$1,797,248
<b>TOTAL</b>	<b>\$2,157,704</b>
<i>Port Paid</i>	<i>\$1,873,613</i>
<i>Paid by Other Agencies</i>	<i>\$284,091</i>

After shaping, the project area will include fringe marsh habitat 100 feet wide on both edges at approximately a +1.6 foot elevation. The ridge itself will be approximately 200 feet wide in the center with a crest of approximately +8 feet. Additionally, tidal channels will be constructed every 1,000 feet along the length of the marsh fringe/ridge habitats to provide access for marine animals from the open water habitats to the north and the mitigated marsh restoration sites to the south.

Port Fourchon has agreements with the Barataria – Terrebonne National Estuary Program, Natural Resource Conservation Service, and Louisiana Universities Marine Consortium to plant marsh grass as well as trees on the ridge which began in May 2005 and will continue through 2006 (See Figure 3 below).

**Figure 3. Rows of Shoreline Spartinas on Ridge (*picture taken in May 2005*)**



The efforts of countless volunteers to vegetate, and thus stabilize, the shoreline and slopes of this restored habitat are especially crucial as the Gulf of Mexico region heads into another hurricane season (See Figure 4 below). Another large-scale volunteer effort is slated for the fall months, during which volunteers will plant the woody trees and shrubs on the crown of the ridge.

**Figure 4. Volunteers Planting on Ridge in May 2005**



### **III. How the Project Fulfills the Award Criteria**

1. The benefits of the Maritime Forest Ridge to the environment are numerous. Restoring this important habitat not only improves the local fish habitat by adding more highly productive marsh edge habitat to the region, but it also provides a habitat for migratory birds and other species of wildlife. The Maritime Forest Ridge also adds 120 acres of protection to the region's coastal defenses in the eventuality of a storm event.
2. This project was conceived by the port, constructed by the port, owned by the port, and will be operated by the port. The port has been the cornerstone for much of this project, and has put together a diversified team of stakeholder, participating both financially and physically. The port has maintained its commitment to construct the project even though poorer than anticipated soil conditions have more than doubled the amount of material necessary and have increased the cost considerably.
3. This project is truly unique and extremely creative in that it is the first project of its kind that will actually re-establish a ridge that was open water. It is providing not only extremely rare and valuable ridge habitat, but a marsh buffer as well which is situated within a 3,000 acre marine sanctuary established by and owned by the port. This project will provide birding opportunities that are truly world-class, create hurricane protection for the port's 700 acre mitigation area, as well as the port itself, and create a very valuable habitat. This will all be completed by utilizing material that will be generated from port slip widening.

4. The Maritime Forest Ridge project, with Phases I and II constructed, proved its concept during the storms of 2005. Most of the grass and vegetation along the Maritime Forest Ridge took a beating from the hurricanes of 2005 but survived. Overall the ridge held up remarkably well and clearly acted as a barrier reducing some of the storm surge impacts to both the port mitigation area and facilities within the port.
  
5. It is difficult to place a value on the product this project will yield; therefore it is equally difficult to measure its cost effectiveness. Considering that the largest cost of the project, dredging of the material, is generating a direct benefit to the port by achieving slip widening, approximately 83% of the cost would have been incurred, regardless of what the port would have done with the material. If this cost is removed from the project, then the cost effectiveness of the project sky rockets. The best testament to its cost effectiveness is that other similar projects are being planned where the total cost of dredging will be attributed to the project, and they are still being viewed as cost effective by environmental interests.
  
6. The Maritime Forest Ridge and Marsh Restoration project at Port Fourchon is one of the projects which will serve as an example for future ridge restoration projects, and a rallying point that other agencies and coastal conservation groups can use as a base for forging partnerships towards system restoration. All data generated and gathered through the processes of construction, shaping and vegetating of the project area are available for use in future ridge restoration projects, and are being presented by the port and agencies to many groups. The US Natural Resources Conservation Service's Plant Material Center is utilizing this project to experiment with the develop plant ecotypes that can be used in future restoration as well.

## **D. Conclusion**

The vision for the future of the ridge is clear: restore a natural ridge to provide protection for coastal lands, provide habitat for migratory birds and other species of wildlife, provide an example of how coastal restoration projects can work with multiple partners and provide multiple benefits, and provide a platform for the appreciation of these habitats and wildlife by visitors and locals alike. The performance of Phases I and II have already proved the ridge's value to coastal protection.

Upon completion of all three phases, the port will commence to build foot paths, bird identification stations, observation platforms, and bridges along the ridge and out onto the marsh platform. Kiosks and interpretive signage will be constructed as well. The long-term plans include a nature/interpretive center close to where the ridge/marsh platform will begin – next to LA highway 1 just north of Port Fourchon. The entire area has already been established as a sanctuary and no consumptive use is allowed. The local and tourist communities will have access to much of the property when the project is completed. Port Fourchon will manage and maintain this site over the long term.