

MARITIME FOREST RIDGE AND MITIGATION AREA, PORT FOURCHON, LOUISIANA

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ABSTRACT

Port Fourchon is Louisiana's southern most port located where Bayou Lafourche empties into the Gulf of Mexico. It is the major support base for the Central Gulf of Mexico oil and gas activities and LOOP, the Louisiana Offshore Oil Port. The port's proximity to the Gulf presents special challenges during hurricane season. The Maritime Forest Ridge the adjacent Mitigation Marsh Restoration Mitigation Area performs several important functions. The impetus behind the creation of the Ridge was to develop a world class birding area, use the dredged material generated from the port beneficially and provide hurricane protection. Much has been published about the concept and the implementation of the concept.

It was not until Hurricane Katrina that a fuller appreciation of the third function became apparent, the importance of the Maritime Forest Ridge as both an economic and environmental protective structure.

This paper will briefly reiterate some of the science, both physical and environmental, that went into developing the Maritime Forest Ridge and Marsh Restoration (MFRMR) project. With that as the foundation, the paper will then discuss the experience of Hurricanes Katrina and Rita and the protection provided by the small portion of the Maritime Forest Ridge. And finally, the paper will discuss the options available to the Federal Emergency Management Agency (FEMA) in reimbursing the Port for dredging the Flotation Canal and the process followed by the Greater Lafourche Port Commission, operator of the Port, and FEMA in identifying how best to use this dredged material to build the remaining portions of the planned MFRMR as a Hazard Mitigation Project as provided under the authority of the Stafford Act.

Keywords: Beneficial Uses of Dredged Material; Wetland Creation and Restoration; Environmental Concerns; Project Case Studies; Hurricane Protection.

INTRODUCTION

As a person drives down Louisiana Highway 1 from Raceland, through Cutoff, through Galliano to Golden Meadow you drive through some of the richest agricultural land in the state of Louisiana. You are also in the heart of the shrimping industry for the state as well. On one side you'll see plot after plot of sugar cane interspersed with pastures and hayfields. Right beside you is Bayou Lafourche, a former distributary of the Mississippi River, lined with shrimp boats, boat yards, homes, curio shops, schools, churches. It's impossible to tell where one town ends and the next starts without watching for the signs.

On the south edge of Golden Meadow that all changes. Highway 1 climbs up one side of the levee and down on the other, out onto the salt marsh. Miles and miles of water with islets of *Spartina alterniflora* as far as the eye can see. Through the middle of this is a ribbon of water and asphalt. Highway 1 continues to parallel the Bayou for another 30 plus kilometers (20 plus miles). With the exception of the remnants of the small town of Leeville and the high drawbridge over the Bayou, the only sign of human activity is the occasional camp or vacation home on stilts or perhaps a fisherman. The roadway is barely 40 cm. (1 foot) above the waterline at high tide, and certainly not much

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more than 70 cm. (2 feet) at low tide. On a dark, moonless night you only have the stripes on the roadway to keep you from finding the water.

Towards the end the road divides with Highway 1 veering off to the left towards Grand Island, the only heavily inhabited Barrier Island in the state. To the right Louisiana Highway 3090 leads on to Port Fourchon. Port Fourchon is vital to the nation. It is a sea port, with significant petroleum industry traffic from off shore Gulf of Mexico oil production platforms and drilling rigs as well as the Louisiana Offshore Oil Port (LOOP) pipeline coming through it. There are over 600 oil platforms within a 64 km. (40 mile) radius of Port Fourchon. Through this port, or under this port, flows 18% of the nation's supply of crude oil. Port Fourchon is the support base for 75 % of all the U.S. deep water oil drilling rigs in the Gulf of Mexico. It is also the support base for the Louisiana Offshore Oil Port through which over a million barrels of foreign oil passes each day.

Port Fourchon is also home to a substantial, and growing, fleet of shrimp and charter fishing craft. Offshore fishing charters operating out of the Belle Pass Marina and others, take guests on daily fishing trips and sightseeing trips to productive fishing areas near oil rigs located in the Gulf. Catches include Red Snapper, Tuna, Amberjack, Cobia, Grouper, Shark, Wahoo, Tarpon, and Blue Marlin etc. This area also offers great inshore marsh and surf fishing as well.

Truck traffic on Highways 3090 and LA-1 exceed 1,200 heavy trucks per day, bearing everything imaginable to support 15,000 offshore workers and the related energy activity they conduct. The trucks also transport 20% of Louisiana's seafood — fish, oysters and shrimp — north from Grand Isle and Port Fourchon for processing and sale.

BACKGROUND

This paper is to show that the project known as the Maritime Forest Ridge, while justified and permitted based on its environmental and operational assets alone, has a storm surge and hurricane protection component not previously acknowledged. This component is captured in an analysis following the procedures outlined in policy and practice documents promulgated by the Federal Emergency Management Agency. It will also show the importance of Port Fourchon to the Nation and the importance of the Maritime Forest Ridge to Port Fourchon.

The Greater Lafourche Port Commission was formed in 1960 to create, operate and maintain Port Fourchon. Through the years, the Commission has pursued an aggressive strategy of expansion and development primarily serving the oil and natural gas exploration, drilling, and production industries; but meeting the needs of the seafood, charter fishing and recreational fishing industries as well.

It took 10 years for the basic infrastructure to be put in place before any facilities could be built. During the late 1970's and throughout the 1980's and early 1990's, the Port witnessed a steady growth and plans were made and implemented to meet those needs. In 1995, technological advances in exploration and production, and the passage of the Deepwater Royalty Relief Act (DWRRA) by Congress, resulted in the unleashing of a new frontier in waters greater than 305 m. (1000 feet) deep in the Gulf. This surge in activity had a huge impact on Port Fourchon. As the industry geared up to take advantage of these new opportunities, it became evident that there was no better place geographically, economically, or environmentally for expansion than Port Fourchon. As a result, the area the port had planned for development for the next 30 years was completely leased out to energy support companies, by the year 2000. The port's expansion plans were being fast forwarded to meet the increased demand. Figure 1 illustrates the wide area of the Gulf of Mexico and the numbers of off shore rigs existing and planned which are supported by Port Fourchon.

This increase in demand led to the Port's decision to expand the Port in the vicinity of the Flotation Canal by dredging Slips A and B. This 283 hectare (700 acre) expansion which began in 2002, more than doubled the size of the port. Material from this dredging was used to create land out of shallow open water on the south side of the Canal where port facilities are being constructed and perform the port's mitigation requirements on the north side of the canal. In addition, the wider slips generated excess material beyond the need for creating land for development and compensatory mitigation, which led to the concept of the Maritime Forest Ridge as discussed later in this paper.

part of the dredging and marsh restoration effort. Chenier Ridges are beach ridges, usually composed of sand-sized material resting on clay or mud. “Chenier” is the Louisiana French term for the oak tree belts that mark the distribution of the ridges in the Bayou and Mississippi River delta region.

Originally, the Ridge was conceived as a means of defining the northerly edge of the Mitigation Area. From the very start it was apparent to the staff at the Greater Lafourche Port Commission that building a Chenier Ridge had far-reaching environmental benefits.

In early 2001, the Port Commission formed a partnership with the Barataria-Terrebonne National Estuary Program (BTNEP) to reestablish this Chenier ridge. Together they fostered working relationships with a wide variety of other organization in their effort.

Some of the significant partners in this effort are:

- The Gulf of Mexico Foundation,
- NOAA Community-Based Restoration Program,
- Louisiana Dept. of Natural Resources,
- Louisiana Nature Conservancy,
- Orleans Audubon,
- Americorps,
- Natural Resource Conservation Service.

Their first partnering efforts involved the Louisiana Dept. of Natural Resources, NOAA, NRCS, and the Gulf of Mexico Foundation; generally, a wide cross-section of environmental groups and interests. As first conceived, the concept met with moderate to lukewarm support while making its way through the U.S. Army Corps of Engineers Permit Process. The potential for environmental enhancement was not realized until discussions with a number of birding organizations brought further focus to the process.

Louisiana’s current climate of losing coastal wetlands means dire consequences for many species of birds. But of equal importance are the Chenier ridges. These ridge habitats and associated wetlands are extremely important for millions of migrating Neotropical songbirds that cross the Gulf of Mexico in the spring each year. “Neotropical” in this instance refer to occurrence in the tropical regions of the New World, i.e. the Americas. As these songbirds cross the wide ocean expanses, often encountering inclement weather, they become exhausted and upon reaching the coast must feed and rest at the first land they encounter. Often this first encounter is a Chenier ridge.

Thus, it became apparent that the Maritime Forest Ridge was an exceptional environmental opportunity whose value far outstripped its supporter’s first conclusions. First, it will help protect the Mitigation Area to its south from continual pounding of waves thereby helping preserve the existence of these newly developed mitigation sites. Second it will serve as habitat not only for many fish and shellfish species, but also for many migratory bird species and small furbearers. It will also provide for ecotourism opportunities once completed.

The environmental value of the Maritime Forest Ridge has been documented in a number of professional papers and articles which can be researched to gain a fuller understanding of its potential.

CONSTRUCTION OF THE RIDGE

The MFR is a series of ridges covering a distance of more than 3886 m. (12,750 feet) from the natural bank of Bayou Lafourche on the west and reaching the junction of Louisiana Highways 1 and 3090 on the east. The MFR will form the northern boundary of the Mitigation Area, the marsh restoration portion of the overall project. The other three sides are formed by the embankment of Highway 3090, the Flotation Canal and Bayou Lafourche. It is planned to be built in three phases as shown in Figure 3. The first two phases are each 953 m. (3,125 feet) long in the center and western edge of the project. The third covers the remaining 1,980 m. (6,500 feet). The ridge’s segments will each have a dimension of 305 m. (1,000 feet) in length by 61 m. (200 feet) in width, and 2.4 m. (8 ft.) in height, sloping to a 30.5-m. (100-foot) wide marsh fringe on each side for a total width of 122 m. (400 feet). Gaps of 15.25 m. (50 feet) will be constructed between these ridge segments to serve as tidal creeks that will enhance access of marine species.

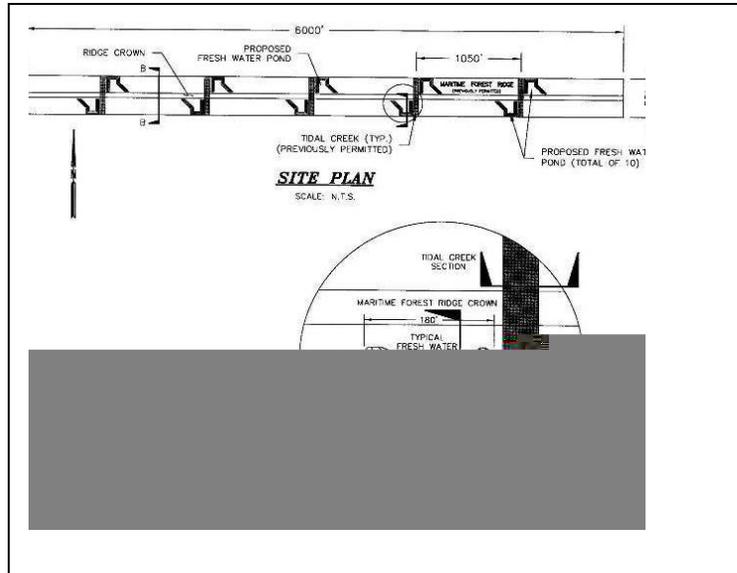


Figure 3. Plan view schematic of maritime forest ridge.

The first and second phase, which were under construction before the Hurricane event, are planned to include development of the ridge and marsh fringe area and will support the planting of 12 hectares (30 acres) of marsh around 12 hectares (30 acres) of ridge. When fully constructed, the coastal ridge will stretch for approximately 3886 m. (12,750 linear feet) and approximately 24 hectares (60 acres) of marsh will be created. Phase I was planned to be constructed within five years.

Basic construction of the Ridge is a three-step process. The first is to shape retaining dikes along the outside edges of the structures using material from the interior. This is followed by pipeline placement of dredged material in sufficient quantity to form the finished dike. After a period of consolidation, expected to be one season, the material is shaped by long-armed excavators to the final general cross-section.

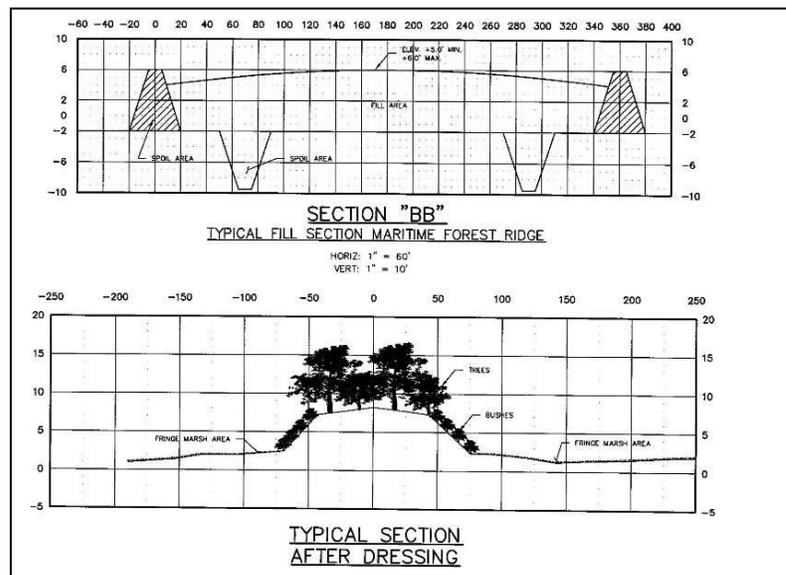


Figure 4. Cross-section of maritime forest ridge.

During construction of the ridge it is possible and desirable to establish different elevation gradients at predetermined sites, allowing for a vegetation gradient from woody species at higher elevations to low woody shrubs then subsequently marsh vegetation at lower elevations. Swales and different inclines will be constructed which will serve as small freshwater ponds that are extremely important to many species of wildlife that will use this habitat. Shallow inclines will provide for different ridge geometries that will support different wooded habitats and provide for shallow gradients from the highest point of the ridge to shallow open water areas that provide for inundated hard bottom habitat that is important to many species of shorebirds.



Figure 5. Maritime forest ridge construction phase I (2004).



Figure 6. Preliminary shaping of maritime forest ridge.



Figure 7. Volunteers planting the marsh and side-slope.

EVENTS OF AUGUST, 2005

In mid-August, 2005 the first reports of Hurricane Katrina were made public. Katrina began in the Atlantic Ocean and steadily intensified on its track through the Gulf of Mexico. The history and tracking of this storm are well known and well documented.

Port Fourchon, being on the very southern extent of Louisiana mainland is often the first to experience Tropical Storms and Hurricanes. Up until the last day or two before Katrina landfall, the Port was preparing to experience the brunt of the storm's fury. Generally, storms following the track that Katrina was taking, up until August 28, 2005, will make landfall in the Port Fourchon area with significant storm surge and high winds from the south-east and east. Offshore breakwaters and beach areas provide good protection to the Port from these directions.

During the day on August 28, 2005 Katrina veered to the east thus sparing the Port from direct attack from the storm. Instead, it exposed the port to intensive winds of up to 200 kph (125 mph) from the north-east. These winds generated waves of 4 to 6 m. (15 to 20 feet) across a fetch that included over 32 km (20 miles) of severely eroded salt marsh, essentially shallow open water with scattered islets of *Spartina alterniflora*.

Thus, the Port experienced a storm surge of 2.4 m. (8 feet). In addition to the surge, the wind buildup and wave action resulted in flood elevations of an additional 2.4 m. (8 feet) from the North as well. The flooding in and of itself did not cause significant damage. And in fact the Port facilities survived the storm with relatively minor damage.

The wave action across the salt marsh did cause significant amounts of sediment transport. When this wave regime struck the Port facilities, the resulting loss of wave energy caused significant amounts of sedimentation. The high water levels from the storm surge and the wind set-up did alleviate some of the sedimentation problems by washing much of the sediment from the land areas of the Port into the waterways in and around the port. The amount of nature of the sedimentation on the land area and in the Port facilities is not part of this report. It is difficult to ascertain the totality of these damages in the Port Fourchon area as much of the recovery was done cooperatively by the Port's tenants and much of the financial information is proprietary.

Approximately 610 m. (2000 feet) of the MFR had been constructed beginning in 2001. Material had been placed and the initial shaping with some planting. Katrina did cause some damage to the MFR, principally undoing some of the shaping action and loss of between 75 and 90 percent of the plantings.

This paper deals with the sedimentation in the Flotation Canal. There was significant sedimentation in the Bayou Lafourche Federal Navigation Channel as well, but the handling and disposal of that material is not discussed in this paper.

RECOVERY

In the United States, response to and recovery from natural and man-made disasters is managed by the Federal Emergency Management Agency (FEMA). When natural disasters occur, the local communities have the first response responsibility. After that, it is the State that is called on to respond. When their combined efforts are not sufficient to effectively cope with the direct results of the disaster, Federal assistance is available to supplement the State and local efforts. This assistance is available under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended, 42 U.S.C. §5121, et seq. (hereinafter referred to as the Stafford Act). The Stafford Act authorizes the President to provide assistance to individuals (Individual Assistance) and to State and local governments as well as certain Private Non-Profit organizations (Public Assistance) to help them respond to and recover from a disaster.

Each year, the United States is struck by disasters that severely affect communities and State and local governments. The list of events that cause disasters includes natural events, such as hurricanes, tornadoes, storms, floods, earthquakes, fires, volcanic eruptions, landslides, snowstorms, and droughts, and non-natural events, such as fires, floods, and explosions caused by human activities. The effects of disasters may be limited to a single community, such as when a small town is hit by a tornado, or they may be widespread, such as when a hurricane affects several States. Regardless of the scope of a disaster, the affected communities and States often need the assistance of the Federal government when responding to and recovering from the event.

Essentially, the difference between the two programs, Individual Assistance (IA) and Public Assistance (PA) is who is receiving the assistance. IA programs address the needs of individuals who are affected by the disaster. PA programs address the actions taken by public entities and damages to public facilities. This paper deals only with PA programs and their part these programs played in the response and recovery efforts surrounding the Maritime Forest Ridge.

To facilitate the processing of Public Assistance Program grants, FEMA has divided disaster related work into seven “Categories of Work”. These categories are listed below.

- Category A: Debris Removal
- Category B: Emergency Protective Measures
- Category C: Roads and Bridges
- Category D: Water Control Facilities
- Category E: Buildings and Equipment
- Category F: Utilities
- Category G: Parks, Recreational Facilities, and Other Items

Categories A and B are designated “Emergency Protective Measures”. Emergency Protective Measures are actions taken by Public entities before, during, and after a disaster to save lives, protect public health and safety, and prevent damage to improved public and private property. Emergency communications, emergency access and emergency public transportation costs may also be eligible.

Categories C - G are designated “Permanent Work”. Permanent Work refers to any activity that must be performed to restore a damaged facility, from minor repairs to complete replacement.

There are three basic criteria for permanent work:

- Design: FEMA provides funds to restore a facility to its pre-disaster design. If a gravel road is washed out during a flood, FEMA cannot provide a grant to replace the gravel with a paved surface.
- Function: The facility must perform the same function that it was designed to perform before the disaster. For example, a school gymnasium is in need of repair after an earthquake. The School District proposes to convert the space into a two story office complex. Only the repairs to the gym are eligible. FEMA cannot provide a grant for the conversion to office space.
- Pre-disaster capacity: The restored facility must operate at the capacity available before the disaster. For example, a hospital designed for 100 beds is damaged beyond repair during a hurricane. The eligible replacement facility must be designed for at least 100 beds. FEMA will not reimburse for the cost to build a larger hospital required due to a greater service area or over-utilization of space. If code dictates a larger area per unit of capacity, only then will FEMA pay to increase the size of the facility.

Port Fourchon Flootation Channel Damages

Direct application of FEMA’s reimbursement policies, following the criteria for permanent work as stated above, will pay for the dredging of the channel with disposal in an accepted manner following existing environmental laws and policies.

The practical application of these policies is to complete a “Project Worksheet” which is the documentation of the damage and the decision document upon which the reimbursement is based. The Project Worksheet is a brief document that presents a description of the damage, including any dimensions to help define the damage; a Scope of Work which presents the expected course of action to repair the damage; and a cost estimate based on the Scope of Work. A copy of the original Project Worksheet is attached.

The Damage Description portion of the Port Fourchon Flootation Channel Project Worksheet presented the following information:

- Geographic description of the surrounding marsh,
- Brief description of the development,
- Wind direction and wave intensity (qualitatively),
- Source of sediment,
- Sediment movement during and after the storm,
- Maintenance responsibility of the Greater Lafourche Port Commission,
- Status of dredging permits,
- Pertinent items documented in the permits,
- Channel conditions prior to the storm,
- Channel conditions after the storm, and how these conditions were determined,
- Extent of the sedimentation, in this case 849,638 cubic meters (1,111,285 Cubic Yards) calculated,
- Economic factors driving a conclusion that the dredging must be accomplished.

The Scope of Work for this project is essentially a straight-forward dredging job with disposal in the permitted disposal site, the Mitigation Area. The estimate for this work based on information provided by the Port Commission’s Engineer was \$2,636,905.88. This was the amount presented to FEMA in the Project Worksheet as the basis for approval and obligation of funds. Because the nature of the damages all related to dredging of a waterway, the Flotation Canal PW was classified as Category D.

The existing portion of the MFR that was built beginning in 2001 also experienced damage during the Katrina event. These damages were also recorded in a separate Project Worksheet using the same procedures. Because the MFR was an existing structure at the time the storm occurred, the work was classified as Category E, Buildings and Equipment. The repair work anticipated in the Project Worksheet amounted to re-shaping the existing ridge to pre-storm conditions and replacing the plantings lost.

FEMA’S Hazard Mitigation Program

Written into Section 406 of the Stafford Act are provisions for expending funds as part of repair or remediation effort that can be shown to be cost effective in reducing the potential for the same type of damage in the future. This carries the nomenclature of “Hazard Mitigation”. Hazard Mitigation is any cost-effective measure that will reduce the potential for damage from a future disaster event. It is important to note that under the Public Assistance Program, Hazard Mitigation measures are considered part of the total eligible cost of repair, restoration, reconstruction, or replacement of a facility and only apply to permanent work projects (Categories C through G). Hazard Mitigation measures are very important in minimizing the impact of future disaster events and in making your facilities disaster resistant.

In looking at the situation of the need for dredging, the stability of the existing portion of the MFR that survived the Hurricane event and the causative factors leading to the sedimentation of the Flotation Canal, the Project Officer from FEMA and the staff of the Greater Lafourche Port Commission saw an opportunity to combine several different features for implementation under the Section 406 Hazard Mitigation Program. Costs of dredging and disposal in the Mitigation Area were compared with costs of dredging with placement along the MFR alignment. Costs for preliminary shaping and planting of the newly built and shaped MFR were developed. From this a Hazard Mitigation Proposal (HMP) was developed and presented for approval and funding obligation.

The mitigation proposal developed was to use the material dredged under from the Flotation Canal to build as much of the Maritime Forest Ridge (MFR) as possible rather than employing the standard practice of depositing it in the Mitigation Area. This proposal also included reshaping the material to the final cross-section with ridge elevation of +2.4 m. (+8 ft.) following the plan for the MFR and creating the marsh area. Volunteer labor will be used for placing the vegetation which is needed for the MFR to become fully effective as was the practice for Phase I.

The HMP pointed out that the MFR, when completed, would be a physical barrier separating the Mitigation Area from the surrounding open, shallow water. This barrier would prevent much of the wave energy, and resulting sedimentation, from reaching Port Fourchon. This was the basis for the benefit analysis, i.e. reduced costs for dredging the Flotation Canal. It would also protect the restored marsh area within the Mitigation from wave damage. These marsh protection benefits were not included in the analysis.

A simplifying assumption in this analysis was that the MFR would only be 50% (not 100%) effective in reducing the dredging requirement in the Flotation Canal. A programmatic decision which also simplified the analysis was to separate the repair and restoration of the existing ridge components from the HMP, thus any work contemplated on the Maritime Forest Ridge under the HMP was all new construction.

The MFR mimics the naturally occurring Chenier ridges in salt marsh areas. In this case the MFR will protect the mitigation area from high wave energy which then reduces the erosion potential in the mitigation area and the shoaling potential in Bayou Lafourche, the Flotation Canal, adjacent slips 'A' and 'B', and the commercial marina.

Table 1. Economic analysis factors and results.

Cost to Repair Flotation Canal to pre-disaster Conditions	\$1,377,992.00
Additional Costs to implement the HMP	\$1,540,851.00
Total Project Costs (sum of the two above)	

The Hazard Mitigation Proposal was approved as part of the Project Worksheet for the Flotation Canal dredging. This approval was made at the Headquarters level of FEMA because of the size of the project. Funding to support the combined project was obligated and made available to the State of Louisiana on August 23, 2006. Contract documents had been prepared in anticipation of this approval and the contract for dredging and disposal was awarded to Mike Hooks Dredging Co. on July 27, 2006.

With the high demand for new land at Port Fourchon, some of the material from the Flotation Canal was used to fill dock space on the south side of the Canal. Material from the dredging was used to fill approximately 914 m. (3000 ft.) of the 3886 m. (12,750 foot) length of the MFR. The dredging project itself was fairly straight forward with few complications.

It should be noted that the Project Worksheet assumed a more stable bottom in the marsh area than was experienced. More material per foot was required to actually construct the MFR. With the placement by pipeline discharge, much of the soft bottom material was displaced in a manner that negated the need for pre-shaping of containment dikes.

Funding from FEMA is made on a reimbursable basis, based on monthly expenditures made by the Port. The final accounting will be made at a point in time called "Close Out" when FEMA and the Port will jointly determine what work was done that falls within the Scope of Work for the combined Project Worksheet and Hazard Mitigation Proposal. This final accounting is not expected to occur for about two years.

CONCLUSIONS

Prior to Hurricane Katrina, the value and utility of the Maritime Forest Ridge was well established based strictly on its marsh restoration and habitat creation aspects. At the time it was recognized that there may be a hurricane protection component, but not much value was given to that aspect. From the experience of Hurricane Katrina and the interaction between the Port and FEMA, it became apparent that significant hurricane and storm damage reduction benefits will result from the Maritime Forest Ridge, to the point that significant funding for construction of the ridge is available to mitigate the potential for damages.

REFERENCES

FEMA, Federal Emergency Management Agency, (October 1999), *Public Assistance Guide*, Publication No. 322, Response and Recovery Directorate, 500 C. Street SW, Washington DC 20472
FEMA, Federal Emergency Management Agency, (October 1999), *Public Assistance Policy Digest*, Publication No. 321, Response and Recovery Directorate, 500 C Street SW, Washington DC 20472
Stafford Act, P.L. 93-288 as amended, *44 CFR §206.288*

ATTACHMENTS

Project Worksheet No. 10333, Greater Lafourche Port Commission, *Flotation Channel, Slips "A" & "B", & Commercial Marina at Port Fourchon*, March 20, 2006.

ATTACHMENT

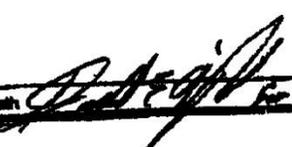
10333	FEDERAL EMERGENCY MANAGEMENT AGENCY PROJECT WORKSHEET	O.M.B. No. 3067-0151 Expires April 30, 2001
PAPERWORK BURDEN DISCLOSURE NOTICE		



FEDERAL EMERGENCY MANAGEMENT AGENCY PROJECT WORKSHEET – Damage Description and Scope of Work Continuation Sheet				O.M.B. No. 3087-0151 Expires April 30, 2001
DECLARATION NO. FEMA- 1603 -DR- <u>LA</u>	PROJECT NO. GLPC-CH	FIPS NO. 057-UPFLP-00	DATE 3/20/06	CATEGORY D
APPLICANT Greater Lafourche Port Commission		COUNTY Lafourche Parish		
DAMAGE DESCRIPTION AND DIMENSIONS (CONTINUED): The Greater Lafourche Port Commission operates Port Fourchon. This includes responsibility for maintaining the 24 ft. deep channel in the Flotation Canal and maintaining the slips off of this channel as well as the commercial marina at the east end of the Flotation Canal. Long-term dredging permits have been issued to the Port Commission by the U.S. Army Corps of Engineers and the State of Louisiana (#'s P950184, Bayou Laf. 1141). Under terms of these permits, disposal of dredge spoil is in an area known as the "Mitigation Area" just north of and adjacent to the Flotation Canal. Dredging limits				

DR 1603 1 PW 10333

FEDERAL EMERGENCY MANAGEMENT AGENCY HAZARD MITIGATION PROPOSAL (HMP)						
Declaration No.	Applicant Project No.	FIPS Number	Date:	Category:		
FEMA 1003 DR LA	GLPC-CH	057-UPFLP-00	03/20/2006	A		
Applicant: Greater Lafourche Port Commission			County: Lafourche Parish			
<p>SCOPE OF MITIGATION WORK: Refer to PW # GLPC-22 The mitigation proposal is to use the material dredged under this PW to build as much of the Maritime Forest Ridge (MFR) as possible rather than employing the standard practice of depositing it in the Mitigation Area. This proposal also includes reshaping the material to the final cross-section with ridge elevation of +8' following the plan for the MFR and creating the marsh area. Volunteer labor will be used for placing the vegetation which is needed for the MFR to become fully effective. The MFR, when completed, will be a physical barrier separating the Mitigation Area from the surrounding open, shallow water. A description of the MFR is found in PW # GLPC-22. The total length of the MFR will be approximately 12,750 ft. The footprint of the MFR is typically 400 ft. wide. The MFR will have 100 ft. wide marsh areas on either side of the 200 ft. wide center ridge which is crowned with a maximum elevation of +8'. It is planned to be completed in three phases, each about 4,000 ft. long. Phase I of the MFR is complete. The partial reconstruction work required for Phase I is covered under PW #GLPC-22. The future Phases II & III are not currently funded. At the conclusion of the 2003 dredging project, material from which to build the MFR was placed to a nearby level +6 ft. elevation from Sta. 0+00 to Sta. 38+50, to +4 ft. elev. to Sta. 48+00 and to +3 ft. elev. to Sta. 55+00, all at the requisite 400 ft. width. Katrina eroded 10,773 CY of material from Phase I (as per PW #GLPC-22) which provides for its replacement. Upon completion of the work described in PW #GLPC-22, bringing the existing sections (0+00 to 48+00) up to +6 ft. elev. will require 40,742 cubic yards of the 1,111,265 cubic yards of material available. Assuming the existing grade for the remainder of the MFR is approximately -2 ft. elev., an additional 751,626 cubic yards of material will be required to satisfy the material requirements of the entire length of the MFR. Fill material to the MFR will be pumped in a slurry through portable pipelines directly from the dredging operation. SEE CONTINUATION SHEET</p>						
ESTIMATE OF WORK						
Item	Code	Material and/or Description	Quantity	Unit	Unit Price	Cost
1	0000	Items Needed if HMP Approved				
		Placing dredged material on the MFR alignment	702,667	CY	\$1.50	\$1,180,850.50
		Reshaping material to required cross-section	230	Day	\$1,800.00	\$415,000.00
		Mobilization for excavator	1	LS	\$7,000.00	\$7,000.00
		Sub-total				\$1,540,850.50
Total for Line Item Only						\$1,540,850.50
Recommended by (Signature): <i>Mark Kamprath</i>					DATE	6/27/06
Agency: FEMA Mark Kamprath (Don Wedeligh) <i>Project officer</i>					DATE	
Concurrence by State Applicant Liaison (signature)					DATE	
Agency: STATE					DATE	
CONCURRENCE BY LOCAL REPRESENTATIVE (Signature)					DATE	6-29-06
Agency: APPLICANT <i>Sonora P. Bruce</i>						
Note: Signature by the Federal Inspector is not an approval of this work, and signature by the State and local applicant is not a commitment to perform the work						

FEDERAL EMERGENCY MANAGEMENT AGENCY PROJECT WORKSHEET - Hazard Mitigation Proposal Confirmation Sheet				O.M.B. No. 3087-0181 Expires April 30, 2001
DECLARATION NO. FEMA-1802-DR- <u>LA</u>	PROJECT NO. GLPC-CH	FIPS NO. 057-UPFLP-00	DATE 3/20/08	CATEGORY D
APPLICANT Greater Lafourche Port Commission		COUNTY Lafourche Parish		
<p>SCOPE OF MITIGATION WORK (CONTINUED):</p> <p>Leaving the MFR at a net elevation of +5 ft. will not satisfy the objectives of reducing the loss from the Mitigation Area or reducing the possibility of shoaling in the waterways from Hurricanes. Shaping the MFR to its final configuration and planting the vegetation as designed are necessary. The finished elevation of the MFR is to be +8 ft. This elevation is to be achieved by reshaping the material previously placed to elevation +5 ft. The material on the outer 100 feet of each side of the MFR is to be placed on the middle 200 feet to bring the ridge elevation to +8 ft. The relocation of this material will create the 100 foot wide marsh areas on each side of the MFR. See the attached horizontal and overhead schematics of ridge and marsh platform for diagrams of the proposed MFR. As described in PW # GLPC-22, the shaping of the dike can be done effectively and efficiently with a long reach Porton Excavator with mats.</p> <p>The MFR will provide protection from hurricane winds coming from the north and east of the port facility. The port did not suffer significant shoaling from Hurricane Rita, partly because the port facility itself served to break up the wave action coming from the south and caused the suspended sediments to drop out before reaching the flotation channel and slips.</p> <p>The estimates for this HMP are based on an excavator production rate of 1,200 sq. yards per day plus mobilization. Phase I of the MFR was planted by volunteers from the Barataria Terrebonne National Estuary Program (BTNEP). It is anticipated that Phases II and III will also be planted by volunteers from BTNEP. According to the Port Commission, the cost of plant materials for Phase I was \$75,000.00. The plant list for Phase I consists of live oak, hackberry, yaupon, black mangrove, French mulberry, wax myrtle, Hercules' club, smooth cordgrass, marshhay cordgrass, seashore paspalum, and sea grass.</p>				
PREPARED BY: Mark Kamprath 			TITLE: Project Officer	

Federal Emergency Management Agency Mitigation Benefit and Cost Effectiveness Analysis

Declaraton No: FEMA - 1603		DR- LA		Parish: Lafourche Parish	
Applicant: Greater Lafourche Port Commission		FIPS No: 057-UPFLP-00		Cat: D	
Project Name: Flotation Channel, Port Fourchon		Project #		GLPC-CH	
Date: 3/20/06					

