

# ST. BERNARD PARISH COASTAL ZONE MANAGEMENT PROGRAM



2012



# **ST. BERNARD PARISH COASTAL ZONE MANAGEMENT PROGRAM**

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## ACRONYMS

CEI:	Coastal Environments, Inc.
C.F.R.:	Code of Federal Regulations
CIAP:	Coastal Impact Assistance Plan
CPRA:	Coastal Protection and Restoration Authority
CWPPRA:	Coastal Wetlands Planning, Protection and Restoration Act
CZAC:	Coastal Zone Advisory Committee
CZMA:	Coastal Zone Management Act
CZMP:	Coastal Zone Management Program
DCD:	Department of Community Development
DCD-OCZM:	Department of Community Development of Office of Coastal Zone Management
DOQQ:	Digital Ortho Quarter Quad
EIS:	Environmental Impact Statement
EMU:	Environmental Management Unit
FEMA:	Federal Emergency Management Agency
GIWW:	Gulf Intracoastal Waterway
IHNC:	Inner Harbor Navigation Canal
HWY:	Highway
LA:	Louisiana
L.A.C:	Louisiana Administrative Code
LCRP:	Louisiana Coastal Resources Program
LDNR:	Louisiana Department of Natural Resources
LDNR-OCM:	Louisiana Department of Natural Resources, Office of Coastal Management
LDWF:	Louisiana Department of Wildlife and Fisheries
L.R.S.:	Legislative Regular Session
MRGO:	Mississippi River Gulf Outlet
NEPA:	National Environmental Protection Act
NGVD:	National Geodetic Vertical Datum
NHP:	Natural Heritage Program
NMFS:	National Marine Fisheries Services
NOAA:	National Oceanic and Atmospheric Administration
NOD:	New Orleans District
NRCS:	Natural Resources Conservation Service
NWRC:	National Wetlands Research Center
OCM:	Office of Coastal Management (State of Louisiana)
OCPR:	Office of Coastal Restoration and Protection (State of Louisiana)
OCZM:	Office of Coastal Zone Management (St. Bernard Parish)
RSLR:	Relative Sea Level Rise
SLCRMA:	State and Local Coastal Resources Management Act (of 1978, Act 361, as amended)
UBR:	Uses of regional benefit
USACE:	United States Army Corps of Engineers
U.S.C.:	United States Congress

USDA: United States Department of Agriculture  
USFWS: United States Fish and Wildlife Service  
USGS: United States Geological Survey

## ST. BERNARD PARISH

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David E. Peralta

### ***Parish Council Members (2012)***

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Guy McInnis, Councilman-at-Large (East)

Ray Lauga, Jr., Councilman, District A

Nathan Gorbaty, Councilwoman District B

Richard J. Lewis, Councilman, District C

Casey Hunnicutt, Councilman, District D

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Raymond Couture

John Gallo

Fabian Guerra\*

Jim Hasik

Joseph “Red” Hulse

Larry Jeanfreau\*

Charles Leon

Philip Livaudais

Arnold Rodriguez

#### Honorary Lifetime Members

Henry “Junior” Rodriguez

Pete Savoye

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## PREFACE AND ACKNOWLEDGEMENTS

St. Bernard Parish's local Coastal Zone Management Program (CZMP), which was finalized in 1982 and received federal approval in 1987, has enabled the parish to be an active participant in the management of their coastal zone since that time. The parish was in the process of updating their approved CZMP when Hurricane Katrina interrupted the process. As a result of the devastation that occurred in 2005, the parish obtained funding through the Coastal Impact Assistance Program (CIAP) to resume the process of updating the CZMP based on post-Katrina conditions and to pursue federal approval of the updated CZMP. This present document builds upon the content and structure of the originally approved program document, the previously updated draft document, and numerous environmental studies but it also reflects the current environmental and socioeconomic conditions and concerns as well as the goals, policies, priorities of uses and environmental management units revised with input from the Coastal Zone Advisory Committee and public review.

The management approach involves regulating uses or activities of local concern, according to performance standards and permissible uses within environmental management units, through the application of the local coastal use permit process which is detailed in Chapter 7 of this document. The authority for the continuing implementation of the local CZMP is "An Ordinance Implementing the Updated Coastal Zone Management Coastal Zone Management Program for St. Bernard Parish and Providing for the Regulation and Control of Coastal Uses of Local Concern".

The updating of the St. Bernard Parish CZMP would not have been possible without the support of the St. Bernard Parish Council and the Parish President, the Coastal Zone Advisory Committee, the Department of Community Development - Office of Coastal Zone Management, the local administrator William McCartney and the citizens of the parish who, over the years, have shown a great passion for and dedication to the conservation of their natural resources and the balancing of multiple uses within the coastal zone. The Louisiana Department of Natural Resources - Office of Coastal Management provided invaluable input and guidance in the updating of components of the CZMP implementation procedure in compliance with the State and Local Coastal Resources Management Act of 1978, as amended and the organizational structure of the implementation ordinance.

The following CEI staff participated in the preparation of the CZMP document:

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1

# INTRODUCTION AND SUMMARY



**Eastern St. Bernard Parish marshes at dawn**  
**(S. Varnado, CEL, 2010)**

# CHAPTER 1

## INTRODUCTION AND SUMMARY

### INTRODUCTION

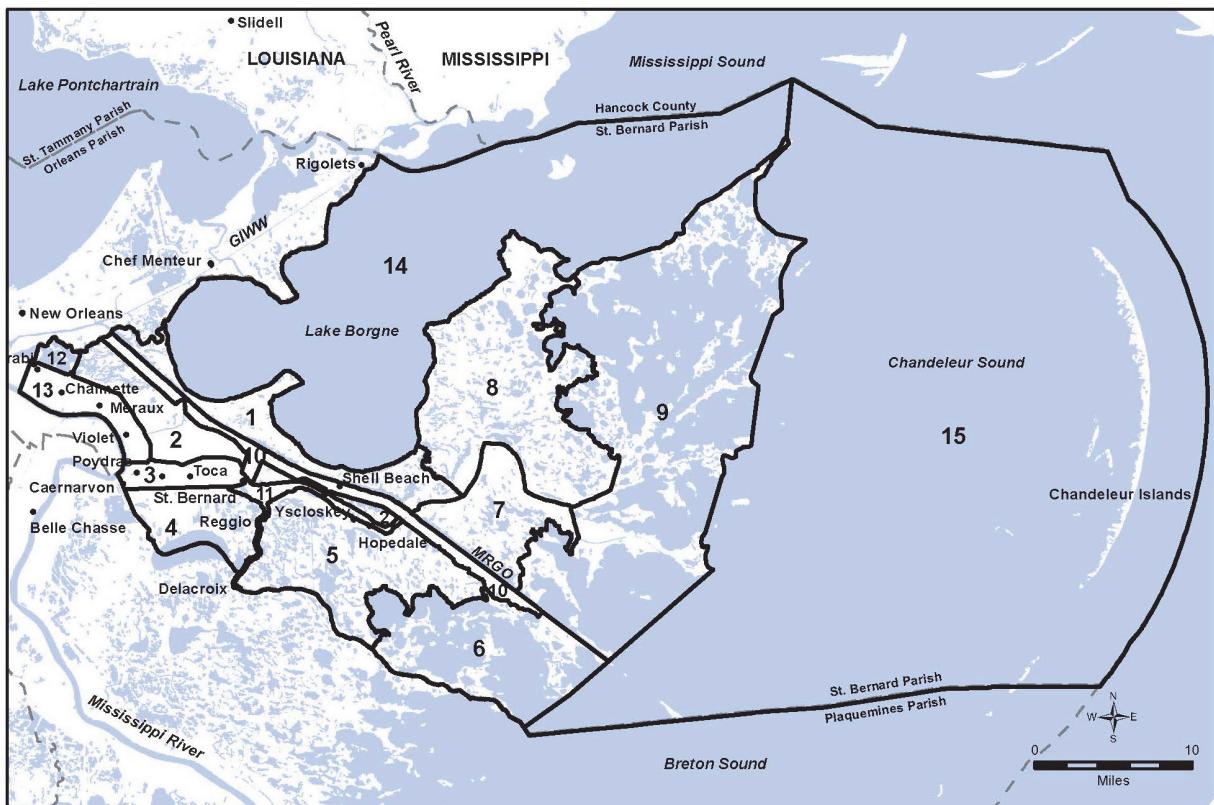
The St. Bernard Parish Coastal Zone Management Program (CZMP) was developed in 1982, and approved by the federal government in 1987, in response to a locally perceived need for comprehensive and scientific management of the parish's abundant, but threatened coastal resources. The mechanism and much of the guidance for program development is in Act 361 of 1978 (the State and Local Coastal Resources Management Act of 1978 [Act 361, La. R.S. 49.214.218 *et seq.*]) (SLCRMA), as amended, and in regulations promulgated thereafter. The St. Bernard CZMP document represents the culmination of a long and productive partnership between the parish and the Office of Coastal Management (OCM) within the Louisiana Department of Natural Resources (LDNR). An overriding consideration during the initial program development and this update was to provide a coastal resource management program incorporating a balance of conservation and development, an efficient administrative structure, and a straightforward, but effective procedure for program implementation.

The storm surge associated with the August 29, 2005, Hurricane Katrina and subsequent failure of sections of the area's hurricane flood protection levees inundated St. Bernard Parish and caused extreme damage to both the physical and socio-environment of the parish, significant property loss, as well as injuries and loss of life. Since that time, the federal, state, parish and other local governmental entities and local citizens have been in a rebuilding process with regard to the flood protection levees, closure of the Mississippi River Gulf Outlet (MRGO), erection of barrier surge protection structure, wetland restoration and enhancement and all the infrastructure needed to support living and working within the parish.

Partially in response to the impacts of Hurricane Katrina and changes in the parish's physical and socio-economic environments, the CZMP update began in 2009, in accordance with guidelines contained in Louisiana Administrative Code, Title 43, Natural Resources 1996. Funding for the update was provided by the Coastal Impact Assistance Program (CIAP), administered by the U. S. Department of the Interior, Minerals Management Service (now the Bureau of Ocean Energy Management, Regulation and Enforcement).

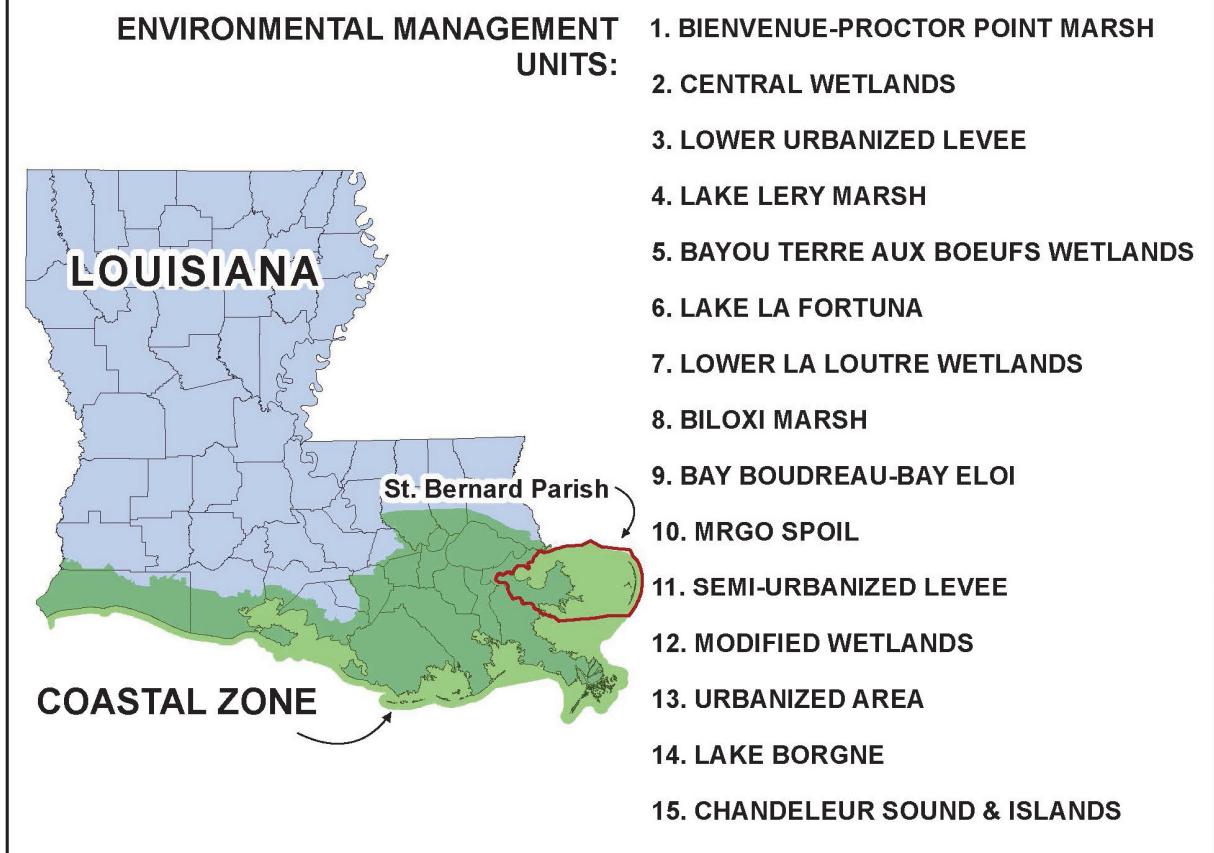
### ENVIRONMENTAL SETTING

St. Bernard Parish, covering approximately 1,384,000 acres, is located in southeastern Louisiana, entirely within the Louisiana Coastal Zone Boundary (LDNR-OCM 2010) (Figure 1-1). The parish is bounded on the west and northwest by Orleans Parish and on the north by Mississippi and the Mississippi Sound. Plaquemines Parish lies south of St. Bernard and the Gulf of Mexico is east of the parish. In 2008, approximately 1,162,600 acres or 84 percent of the parish was water and only 16 percent (222,100 acres) was land (Barras 2009).



**ENVIRONMENTAL MANAGEMENT UNITS:**

1. BIENVENUE-PROCTOR POINT MARSH
2. CENTRAL WETLANDS
3. LOWER URBANIZED LEVEE
4. LAKE LERY MARSH
5. BAYOU TERRE AUX BOEUFFS WETLANDS
6. LAKE LA FORTUNA
7. LOWER LA LOUTRE WETLANDS
8. BILOXI MARSH
9. BAY BOUDREAU-BAY ELOI
10. MRGO SPOIL
11. SEMI-URBANIZED LEVEE
12. MODIFIED WETLANDS
13. URBANIZED AREA
14. LAKE BORGNE
15. CHANDELEUR SOUND & ISLANDS



**Figure 1-1. Location of St. Bernard Parish within the Louisiana Coastal Zone Boundary, as approved on May 17, 2011, and Environmental Management Units within St. Bernard Parish.**

Between 1932 and 2008, the parish experienced a net land loss of approximately 79,115 acres (Plate 2) (Barras 2009). This loss equates to approximately 1,051 acres per year. Land use and landforms within the parish are subject to both natural and human processes and the CZMP strives to create balance and sustainability between the pressures of the expanding urbanization and industrial/commercial development of the New Orleans Metropolitan Area and the transgression of marine waters of the Gulf of Mexico onto lands outside of flood protection levees. The leveed, "urbanized" area of the parish located along the natural levee ridges of the Mississippi River and upper Bayou Terre aux Boeufs, the un-leveed, "Semi-Urbanized Levee" along Bayou La Loutre and lower Bayou Terre aux Boeufs, and the leveed portions of the Mississippi River Gulf Outlet (MRGO) spoil area constitute "islands" between these competing forces of human development and natural land deterioration.

Development in St. Bernard Parish is concentrated on the relatively small portions of natural levee land most suitable for human occupation. This land has been developed and maintained at considerable economic cost associated with the need for construction and continual maintenance of drainage infrastructure and flood protection levees. Since Hurricane Katrina in 2005, St. Bernard Parish has focused on its environmental, economic and cultural recovery. The parish is undergoing momentous change and re-calibrating the delivery of public services and re-establishing economic priorities. Even as infrastructure and public services are being restored in the fastlands (leveed areas), the critical role of the coastal wetlands has never been never been clearer. The parish recognizes that its safety and economic well-being depends heavily on the sustainability of its wetlands and coastal waters. Implementation of a CZMP facilitates responsible resource management, planning and sustainability; allows for equitable and appropriate economic utilization of resources and recognizes the important role of wetlands in helping to protect the parish's developed areas and its levee system from storm surge and associated flooding. Additionally, a CZMP provides guidance for selection and implementation of coastal restoration and protection measures through the enumeration of specified goals, policies and permissible uses within the parish.

The environmental setting of the parish is characterized by rapid change. Unlike upland areas outside of Louisiana's coastal zone where the landscape can be expected to remain relatively stable over hundreds of years, the landscape of St. Bernard changes noticeably and significantly within a single generation or with an extreme storm event. Humans modify the landscape through drainage, canal building, hurricane protection levees, and other adaptations to their surroundings. Natural forces of land erosion, subsidence, sea-level rise and storms work persistently in reshaping the parish. Thus, a combination of interrelated human and natural forces contributes to extremely rapid landscape alterations. Chapter 2 contains detailed information on the natural and human environmental setting of the parish.

## **PRINCIPAL RESOURCES**

The principal renewable natural resources (i.e., fisheries, wildlife for hunting and trapping, scenic environments for recreation such as sightseeing, bird watching, kayaking and nature tours) of St. Bernard Parish are generally associated with the vast wetland areas within the parish. The commercial and recreational users of these resources are, in turn, dependent

upon these wetlands and associated water bodies for income and enjoyment, in addition to protection from the direct forces of the Gulf of Mexico. Most of the petroleum industry is also located in the parish's wetlands, shallow lakes and bays, and offshore areas.

The extensive estuarine zones of the parish are extremely productive areas for aquatic species such as fish, oysters, shrimp, and crabs. Some of these species require marsh and tidal water environments during their entire life cycle, while for others, it is only important during some stages of their life cycle. The majority of the offshore fisheries catch in the area is dependent on the marsh region as a nursery zone.

Minerals produced in St. Bernard Parish include natural gas, petroleum, sand, and clay. Of these minerals, oil and gas constitute the highest economic value. The parish also provides a corridor through which oil and gas are transported via pipelines and a landfall area where petroleum products are refined.

The coastal marshes, historically, have been of great value to the fur and hide industry. Principal fur-bearing mammals found in the area are the common muskrat (*Ondatra zibethicus*) and the nutria (*Myocastor coypus*). The American alligator (*Alligator mississippiensis*) is the primary hide producer. Environmental changes brought about by natural forces, such as hurricanes, or by humans, such as control of freshwater influx into the marsh areas and canal construction, have altered the distribution of the fresh-to-low salinity wetland habitat upon which these animals are dependent. Such environmental changes, as well as a softening in international fur market demands, had a relatively rapid adverse impact on the fur industry, which showed a decline in the harvesting of fur-bearing animals within the last quarter of the twentieth century.

Because it is located at the terminus of the Mississippi Flyway, the parish supports a large number of wintering geese and ducks that are avidly hunted. While wintering populations of waterfowl declined with construction of the MRGO and destruction of their preferred low salinity wetland and shallow water habitat, there is an indication that operation of the Caernarvon Freshwater Diversion is improving habitat and attracting more migratory waterfowl. Spoil banks and natural levee ridges also provide habitat for deer and small game that are hunted on a seasonal basis.

The potential of the parish for marsh- and water-based recreation is practically unlimited. The parish's many waterways and their relative ease of access allow an outlet for boating, fishing, and hunting not only for parish residents, but also for residents of the Greater New Orleans Metropolitan Area, the North Shore of Lake Pontchartrain and the Baton Rouge area. St. Bernard Parish provides for recreation potential in its many bayous and small lakes in protected areas, and in larger bayous and lakes in vast, open marsh areas, the remote Chandeleur Islands and ultimately the Gulf of Mexico on both its eastern and southeastern exposures. The parish land area contains scenic sites and streams and other areas unique for particular reasons. Louisiana Highway 47 is a designated scenic highway that the parish is promoting as a corridor for sightseeing and partaking of the parish's natural and cultural opportunities, including historic sites and museums.

The close proximity to, and competing uses for, these natural and cultural resources by multiple users are leading increasingly to resource use conflicts. Often the actions of one resource user will impact another user's ability to harvest or enjoy a resource. Chapter 3 contains more detailed information on the parish's principle resources (commercial fishing and trapping, extractive industries, recreational resources) and conflicts related to use of the resources by the petroleum industry, navigation interests, development pressures, water quality impacts, and competition for space.

## **SOCIO-ECONOMIC CHARACTERISTICS**

Since prehistoric times, humans have realized the richness of coastal areas and deltaic plains. Early cradles of civilization flourished worldwide in these types of environments. The abundance of the natural resources at hand, sources of fresh water, the fertility of the soils, and the ease of water transportation contributed to the development of coastal and deltaic plains as sites of human habitation. The Louisiana coastal zone, especially the Mississippi River alluvial coastal plain, is one of the most resource-rich areas of the world. Many prehistoric and early historic Native American middens and mounds provide evidence of human's long-term habitation of this area. Europeans started settling the coastal area around St. Bernard Parish in the eighteenth century. Since then, this region flanking the Mississippi River has developed into the most important economic, industrial, commercial, and trading center of the Louisiana coast.

The geological and physical history of the origin and development of St. Bernard Parish sheds light on the values and constraints of this fragile, but very rich, natural environment. Its cultural history tells of the long-term relationship between humans and the land and its resources. The significant role that the Mississippi River system and the proximity of the Gulf of Mexico waters have always had, and continue to have, on the life of the people of St. Bernard Parish is readily apparent.

As modern humans established themselves in this environment, they left their imprints on the landscape. This is evident in the different land uses and development patterns present in the area, some of which reflect regional and cultural characteristics inherent to Louisiana's coastal physiography or landforms and to the different nationalities of its settlers.

Future increases in population will create development pressures from residential, commercial and industrial interests and local government will need to address issues related to development on marginal wetland areas where poor drainage and soil conditions present major land use constraints. Acreage suitable for farming will decrease as development pressures convert these better-drained lands to residential, commercial, and industrial uses. The demand for growing and/or harvesting fish and shellfish resources will increase while the natural areas suitable for growth and harvesting will decline as a result of land loss and changing environmental conditions, such as higher salinities associated with opening of wider avenues for saltwater intrusion. While the total production of oil and gas within the parish is expected to decrease over the long-term, the level of activity may increase in the near future, as increased product price makes smaller yields profitable, thus resulting in a demand for new rig access and pipeline canals.

Detailed information on the socio-economic setting of St. Bernard Parish is contained in Chapter 4.

## **ENVIRONMENTAL CONCERNS**

Environmental concerns in St. Bernard Parish involve land loss, habitat change, maintenance of environmental quality, maintenance of the natural resource base, flooding, and wetland restoration/conservation projects. The coastal wetlands of St. Bernard are a dynamic system undergoing constant change in response to a combination of natural and human processes. The natural environment is experiencing rapid modifications which, in the absence of corrective actions, will destroy the productive, renewable resource-rich wetlands that also serve to protect the developed areas of the parish located on upland/fastland areas and transition areas (e.g., lower-lying, subsiding natural levee ridges). Numerous processes, working singularly or in conjunction with each other, have caused the loss of approximately 79,115 acres of parish land between 1932 and 2008 (Barras 2009). These processes include erosion, submergence, and direct land removal (i.e., dredging).

The MRGO, the largest navigation channel in the parish, directly caused the loss of wetlands and shallow water bodies through dredging and deposition of dredged material. Secondary impacts of canal construction resulted in continued land loss associated with bankline erosion and destruction of freshwater vegetation by saltwater intrusion via the MRGO and exposure of the bare substrate to erosion. St. Bernard Parish opposed construction of the canal and tried to have the channel closed to deep-draft navigation since the environmental damages began to manifest themselves and increase through time. During Hurricane Katrina, the MRGO was blamed for creating a funnel for storm surge that broke flood protection levees and flooded the parish. Regional strategies for coastal restoration at the state and federal level included “closing” the canal and restoring wetlands impacted by canal construction and maintenance. In 2009, the MRGO was closed with construction of a dam across the channel south of the Bayou La Loutre south bank natural levee. The rock dike structure, 12 feet wide at the top and 450 feet wide at the base, covers approximately 10 acres of channel bottom. As part of MRGO closure and mitigation for damages, the Corps of Engineers (USACE), New Orleans District finalized the Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Study, Draft Environmental Impact Statement and submitted it for public review in December 2010.

Other transportation routes in the parish were developed, historically, on higher ground which was less subject to flooding and offered more stable soil foundations. Water transportation was along the main natural waterways. Progressive construction methods and techniques have made it possible to build highways through marshes and dig transportation channels through wetland environments. The detrimental repercussions of these activities occur not only in these fragile wetland environments, but also in certain sectors, which are founded on wetland-dependent natural resources, such as the fisheries and fur-trapping industries. Modified drainage patterns, resulting from the development of a variety of networks including transportation, drainages, communications, utilities, and oil and gas canal

systems, have had significant cumulative detrimental impacts in this parish and throughout the state's coastal region.

Extraction of non-renewable resources also affects the renewable resources of the parish, both directly and indirectly, because it is accompanied by support activities for exploration, transportation, and processing.

St. Bernard Parish's location within the Greater New Orleans Metropolitan Area places it under the potential pressure of expanding urban, industrial, commercial, and recreational demands. The forces behind development-oriented activities may look upon the parish's undeveloped land and water areas as potential areas to accommodate the needs of future growth.

More detailed information on environmental concerns is contained in Chapter 5. Major environmental issues discussed include: land loss and habitat change, saltwater intrusion, erosion, subsidence, flooding, and coastal restoration.

## **GOALS, POLICIES AND MANAGEMENT UNITS**

When reviewing permit applications for actions of local concern or state and federal permit applications, the Coastal Zone Advisory Committee (CZAC) considers whether the proposed actions are consistent with the goals and policies for the parish as a whole and the environmental management unit (EMU) in particular where the action will occur. An EMU is a geographical area with characteristics (e.g., habitat type, hydrologic regime, land use, environmental issues and other natural resource attributes) that facilitate identification and implementation of management actions to address environmental concerns, including conservation and sustainability of resources. The local CZMP includes a list of parishwide goals and policies as well as goals and policies specific to individual management units. A goal is defined as the end or desired result toward which action or effort is directed in order to achieve the stated result. A policy is a statement of a course of action that guides present and future decision-making in order to reach a specified result or goal.

### **Parishwide Goals**

The goals, which were contained in the parish ordinance pertaining to the CZMP approved by the federal government in 1987, were designed to achieve the aims of the policies. These parishwide goals have been expanded in this updated CZMP to include the following:

1. Optimal utilization and sustainability of parish resources through a balance of conservation and development.
2. Enhance productivity, flood protection and water storage functions of St. Bernard Parish wetlands.
3. Protect stable wetlands, reduce land loss in deteriorating wetlands, and create and restore wetlands, where practicable.

4. Reduce shoreline erosion in order to preserve wetlands and preserve shallow estuarine areas and protect water-dependent development outside of fastlands.
5. Identify natural habitats with unique characteristics and identify and develop methods to sustain them.
6. Introduce fresh water and nutrients into wetland areas to restore and sustain natural habitats to maximum extent practical.
7. Improve and maintain water quality.
8. Enhance multiple uses of wetlands by restoring fresh-to-saline gradients of surface water through hydrological management.
9. Reduce saltwater intrusion through the emplacement of plugs or water control structures at the ends of canals.
10. Protect water bottoms and associated biotic communities from damages induced by human activity, such as dredging.
11. Promote environmentally sound oil and gas exploration and production practices that minimize environmental damage to wetlands and sensitive natural areas and contribute to the parish's efforts to maintain and restore wetlands, sensitive natural areas, and barrier islands.
12. Restore Chandeleur Barrier Island system through coastal restoration projects involving repair of breaches and creation of dunes for protection from storm surge and for wildlife habitat.
13. Maintain of the extensive seagrass beds behind the Chandeleur Islands.
14. Restore wetlands, including marshes and where feasible cypress swamps, using sustained freshwater diversions and dredged material near levees for additional protection from storms.
15. Restore forest habitats (freshwater swamps, maritime forests, live oak natural levee forests) throughout the parish for habitat diversity, use by migratory neotropical birds, recreation and storm surge protection.
16. Encourage participation in wetland conservation and restoration programs by landowners and public agencies.
17. Review development of wetland areas for non-wetland dependent uses and require appropriate mitigation for unavoidable adverse impacts.

18. Support environmentally sound economic uses with special emphasis on sustainable multiple-use of waterfront areas.
19. Support orderly development with encouragement of land use that is compatible with wetlands and aquatic habitats.
20. Promote and enhance cultural and recreational opportunities in the parish through the development of ecologically sensitive facilities within the context of a comprehensive coastal management program.

## **Parishwide Policies**

The original policies adopted in 1982 and approved by the federal government in 1987, have been updated to reflect current environmental conditions and issues facing the parish:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Support restoration programs that utilize the introduction of fresh water and sediment into wetlands.
4. Support beneficial use of dredged material to create and/or restore wetlands, barrier islands, and beaches, where practicable.
5. Encourage use of appropriate bankline stabilization measures to retard wetland loss resulting from shoreline erosion by wind, wave and slumping actions.
6. Support and encourage wetland management and restoration projects implemented by private landowners.
7. Support state and federal wetland management and restoration projects in designated wildlife management areas.
8. Encourage the locating of new pipelines in established pipeline corridors to the maximum extent practical.
9. Encourage oil and gas exploration and production practices to be conducted in an environmentally sound manner and consistent with the CZMP and ordinance.

10. Encourage oil and gas operating companies to incorporate wetland management and mitigation components in their operation plans that are consistent with the state and local coastal management programs.
11. Support actions to restore and/or maintain barrier islands.
12. Oppose projects that damage barrier islands, beaches, wetlands, and other habitats where proposed project associated restoration or mitigation measures are inadequate.
13. Support reestablishment and/or relocation of productive oyster seed reefs that are impacted by government funded restoration projects (e.g., freshwater diversions, dredging and deposition of fill material) and man-made disasters such as oil spills.
14. Support efforts to improve water quality.
15. Support, enhance, encourage and protect multiple-use of resources consistent with maintenance and enhancement of renewable resources management and productivity, and the need to provide for economic and orderly growth and development, with minimization of adverse effects of one resource use upon another without imposing undue restrictions on any user.
16. Promote recreational activities in wetlands through the development of environmentally compliant support and staging facilities such as parks and boat launches.
17. Encourage the use of Best Management Practices during construction of development projects in upland and fastland areas in order to reduce adverse environmental impacts to adjacent wetlands.
18. Encourage avoidance of activities on upland/fastland areas that would have negative impacts on adjacent wetlands.
19. Establish separate guidelines for wetlands that recognize that:
  - a) The wetlands of St. Bernard Parish, although part of a larger estuarine ecosystem, stretching from Lake Maurepas to the Chandeleur Islands, consist of a series of distinct geographic areas. These areas have been combined into appropriate environmental units to facilitate wetland management and habitat enhancement.
  - b) Individual permissible uses for each wetland management unit are based on a balance of economic, environmental, and social priorities and needs.
  - c) The primary goal for future use of parish wetlands is to maintain them in their natural condition and to restore, when possible, those areas that

have deteriorated due to natural and human-induced actions. A major aspect of these restoration activities should be the preservation of the parish's archaeological and historical resources. Maximum use of the renewable and non-renewable resources of the wetlands is encouraged as long as high productivity is maintained and the ecological balance of the wetlands is not disrupted further.

The goals and policies, as presented in the original CZMP, were developed over a number of years with the active participation of the Police Jury (now the Parish Government), the Department of Community Development, the CZAC, scientists, citizens, and agency personnel. In the process of updating the CZMP document, some of these goals and policies have been revised in view of existing conditions. The goals and policies provide a framework and direction for implementation of the St. Bernard Parish CZMP. In the process of updating the CZMP, the St. Bernard Parish CZAC decided to forgo the use of objectives that were never fully used in the original CZMP.

### Management Units

Identification of environmental management units (EMU) enables a local CZMP to evaluate activities requiring permits on local, state, and federal levels with regard to the EMU's environmental characteristics, natural and cultural resources, existing uses, potential for detrimental environmental impacts, and user conflicts. In updating the St. Bernard CZMP, the original 13 EMU were retained and two additional EMU were defined that encompassed Lake Borgne (EMU 14) and Chandeleur Sound and Islands (EMU 15) (**Table 1-1**) (**Plate 1**).

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**Table 1-1. Environmental Management Units and Area\* in Acres in St. Bernard Parish.**

<i>Environmental Management Unit</i>	<i>Area (ac)</i>	<i>Environmental Management Unit</i>	<i>Area (ac)</i>
1-Bienvenue-Proctor Point Marsh	25,700	9-Bay Boudreau-Bay Eloi	182,000
2-Central Wetlands	22000	10-MRGO Spoil	15,700
3-Lower Urbanized Levee	8,400	11-Semi-Urbanized Levee	5,100
4-Lake Lery Marsh	19,300	12-Modified Wetlands	2,600
5-Bayou Terre aux Boeufs Wetlands	46,700	13-Urbanized Area	12,600
6-Lake La Fortuna	49,000	14-Lake Borgne	234,000
7-Lower La Loutre Wetlands	26,100	15-Chandeleur Sound & Islands	656,000
8-Biloxi Marsh	78,000	Total Area of Parish:	1,384,000

\* Area in acres is derived from 1988/90 digital data (including land and water habitat) and is rounded to nearest hundred acres.

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The parishwide goals and policies, as applied to environmental management units (EMU), help customize management goals and permissible uses for each EMU. The CZMP uses the information presented for each EMU in administering the permit component of the local program and in commenting on actions of greater than local concern. Chapter 6 contains more detailed information on each EMU, as well as goals and permissible uses for each EMU.

## PROGRAM ADMINISTRATION

The manner and procedures for administering the CZMP constitute an important element of the program. The CZMP is implemented and administered by the St. Bernard Parish Department of Community Development (DCD) through the Office of Coastal Zone Management (OCZM). The environmental staff, under the supervision of the Director of Community Development, handles the daily business of administering the program including acquisition and processing of grants, developing and negotiating contracts, accounting for expenditures, commenting on issues of greater than local concern, and performing duties as necessary for efficient implementation of the program. Among the DCD's duties related to implementation of the CZMP are review of permit applications, development of permit decisions and field monitoring to ensure compliance with permit conditions.

The permit procedure involves the submission of a Coastal Use Permit (CUP) application to the LDNR-OCM (state administrator) which makes a determination as to whether the use is one of state or local concern. The LDNR-OCM forwards a copy of the permit application to the DCD-OCZM (local administrator) for their review, and/or processing. The DCD-OCZM conducts independent environmental reviews of applications using parish goals, policies, and performance standards. The St. Bernard Parish CZAC reviews applications at their monthly meeting and advises the CZMP administrator with regard to actions to be taken on the application. The DCD-OCZM finalizes the permit application process. Activities or uses conducted within fastlands (areas within publicly maintained levees) or on uplands (above the 5-foot contour) generally do not require a coastal use permit. For state CUPs, the local administrator reports the CZAC's comments, if any to the state administrator. For local CUPs, the local administrator presents the decision to the Parish Council which approves or denies the local CUP. From this point the local administrator notifies the applicant, sends the approved permit to the St. Bernard Port Harbor and Terminal District and publishes notice of the decision. A permit decision can be appealed to the appeals committee following the established protocol.

An appeal of a Local CUP decision may be taken to the St. Bernard Parish CZMP Appeals Committee. The decision of the CZMP Appeals Committee may be reviewed by the Twenty-fourth Judicial District Court in and for the Parish of St. Bernard, pursuant to the conditions stated in the *Judicial Review* section of Chapter 7.

In implementing the program, the DCD-OCZM uses a number of techniques to carry out necessary studies, activities, and management strategies. The primary techniques include: (1) CZMP funding to strengthen the program, (2) mitigation for unavoidable environmental impacts, where appropriate, and (3) consistency review to ensure that state and federal activities and projects are consistent with the goals and policies of the St. Bernard CZMP.

The procedures for the designation of special areas involve a nomination with documentation by any person, a review by the staff and recommendation by the Parish Government to the DCD-OCZM administrator. Procedures for the consideration of uses of greater than local concern involve review by the staff, a provision for public presentations, and appeals, thus ensuring that fair and objective decisions are made by the DCD-OCZM. Chapter 7 contains

detailed information on program implementation with regard to: 1) Permit Administration, 2) Enforcement and Monitoring, 3) Program Implementation, 4) Special Areas, 5) Procedures for Consideration of Uses of Greater than Local Benefit or Impacts, 6) Interagency Coordination and 7) Coastal Zone Management Act Consistency.

## **PUBLIC PARTICIPATION**

Public involvement in the development of St. Bernard's CZMP has been intensive and widespread since the program was first prepared in the early 1980s. The primary vehicle for public input has been, and continues to be, the local CZAC that meets monthly and diligently considers coastal management matters in a public "town meeting" forum. Other public education efforts involve public meetings, publications, studies, newspaper coverage, and presentations. The CZAC actively participated in the latest updating of the CZMP, first approved in 1987 by the State of Louisiana and the Secretary of the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). As part of the updating process, a series of public meetings were held with the CZAC and chaired by the administrator of the parish's OCZM to review the 2001 draft CZMP that had only been processed to the point of holding a local public meeting on January 30, 2002. During a series of public CZAC meetings between 2009 and 2011, revised sections of the document pertaining to environmental and socioeconomic setting, environmental concerns, goals, policies, permissible uses, environmental management units and program administration were presented and comments were obtained regarding additional revisions. An updated draft CZMP document, including descriptions of current environmental setting; principal resources; socioeconomic resources; environmental issues; goals, policies and permissible uses parish-wide and by EMUs; updated descriptions of environmental setting of existing and two additional EMUs, and how the program is administered was presented at a public CZAC meeting in September 2011 and given to each CZMP member and the OCZM administrator for a more detailed review and comment. Comments received from this process, as well as an unofficial review of the document by the LDNR-OCM were addressed in the revised draft CZMP document made available for public review and comment in May and June 2012.

The additional public participation included advertising the availability of the draft CZMP document for a 30-day public review period and holding a local public meeting in Council chambers of the St. Bernard Parish Government Office Building on June 18, 2012, to receive additional comments on the updated CZMP document. During this period, copies of the updated CZMP document were available for review during normal business hours at the local parish library, the parish's governmental office (DCD-OCZM and Parish Council) and on the St. Bernard Parish Website. All interested parties had an additional 15-day period after the local public meeting to submit comments to be addressed in the draft CZMP document submitted to the LDNR-OCM. After any comments received from the LDNR-OCM have been addressed, the LDNR-OCM will advertise in the state's official newspaper that there will be a Public Hearing on the document within 30 days of the advertisement to receive final comments on the parish's CZMP. Within 90 days of the public notice, the LDNR-OCM either approves the document and forwards it to NOAA for final review or requests the parish to address any additional comments received at the Public Hearing before the document is forwarded for final approval.

## CONCLUSIONS

A more detailed description of the Public Participation process is presented in Chapter 8. The CZMP in St. Bernard Parish is a mature and working program that has been implemented since its official approval in 1987. The program has the necessary goals, policies, procedures, authorities, and administrative framework to achieve a balanced management approach that is necessary for the future health and welfare of the parish and sustainability of natural and economic resources.

The CZMP document contains eight chapters that provide an overview of the program; environmental and socioeconomic setting; principal resources; environmental issues; parishwide and area specific goals, policies and management issues; program administration and a summary of public participation in program development and implementation.

Appendix A, excerpted from the Louisiana Administrative Code (Jan. 2012), contains the definitions for terms commonly used in reference to the state and local coastal zone management programs.

Appendix B, An Ordinance Implementing the Updated Coastal Zone Management Program for St. Bernard Parish and Providing for the Regulation and Control of Coastal Uses of Local Concern, is the authority under which the parish implements the updated local CZMP. The ordinance must be approved by the Parish Council before the updated document is submitted to the Secretary of the Department of Commerce for final federal approval.

Appendix C is the Resolution whereby the Parish Council adopted the St. Bernard CZMP document and authorized its transmittal to the state administrator for review, comment and approval.

Appendix D contains a list of government issued maps that cover St. Bernard Parish.

Appendix E contains information pertaining to the public review process.

In addition to updating the already approved CZMP document under the CIAP grant, Coastal Environments, Inc. researched and synthesized the history of coastal restoration planning for St. Bernard Parish and identified a suite of preferred actions that would restore and sustain essential elements of the parish's landscape and economy. The St. Bernard Parish Coastal Restoration Plan: Synopsis of Proposed Projects and Identification of Preferred Actions (Gagliano et al. 2012) represents a companion document to the CZMP document and provides background information on environmental issues and user conflicts regarding resources, landscapes and restoration measures. Using goals, policies and management units contained in the CZMP document, a conceptual plan was developed for the restoration and sustainability of functional landscapes within the parish that is consistent the CZMP document.

# 2

# ENVIRONMENTAL SETTING



**Eastern St. Bernard Parish marshes  
(S. Varnado, CEI, 2010)**

## CHAPTER 2

### ENVIRONMENTAL SETTING

#### INTRODUCTION

St. Bernard Parish is within the Louisiana Coastal Zone and is experiencing dynamic changes in landforms and habitats as a result of both natural processes and human activities. The physiography or natural landforms and associated habitats and land uses of the parish reflect the deltaic nature of the parish's origin. St. Bernard Parish is a product of sediments deposited by the Mississippi River in several delta-building phases that extended from 700 to 4000 years ago. Four relict Mississippi River channels (Bayous La Loutre, Terre aux Boeufs, des Familles, and Sauvage) built the delta complex. However, natural forces have contributed to destruction of these intertidal lowlands in many areas. Today, the natural levees of Bayou La Loutre and Bayou Terre aux Boeufs and the east bank of the Mississippi River form the backbone of the parish and contain almost all of the parish's developed areas and population. The Chandeleur Barrier Island complex extends along the eastern perimeter of the parish and is separated from the remainder of the parish by the relatively shallow waters of the Chandeleur Sound. The reworking of the outer fringes of the older deltaic lobes, after the Mississippi River shifted its course to the modern birdfoot or Plaquemines-Belize delta lobe, formed this narrow island chain.

In 1956, a little more than three-fourths (79 percent) of the parish was water and less than one-fourth was land (Table 2-1) (U. S. Geological Survey, National Wetlands Research Center, Baton Rouge Project Office [USGS-NWRC-BRPO] 1996, Wicker 1980, 1981). By 1978, the water area within the parish had increased to about 82 percent and land area had decreased to 18 percent. By 2008, 84 percent of the parish was comprised of water and 16 percent consisted of land. Comparison of water areas on habitat maps prepared for 1956, 1978, 1988/90 and 1992/93/95 indicate the parish lost approximately 58,800 acres of land over a period of 39 years for an average rate of 1,507 acres per year. The total land loss measured from another data set going back to 1932 (1932 to 2000 and 2004 to 2008) shows that over a 76-year period the parish lost approximately 79,115 acres of land for an average rate of 1,041 acres per year (Barras 2009) (Plate 2).

**Table 2-1. Land and Water Area in St. Bernard Parish: 1956, 1978, 1988/90, 1992/93/95 and 2008 (Data derived from digital files provided by USGS-NWRC-BRPO 1996 and Barras 2009).**

<b>Habitat Type</b>	<b>1956</b>		<b>1978</b>		<b>1988/90</b>		<b>1992/93/95</b>		<b>2008</b>	
	<b>ac</b>	<b>%</b>	<b>ac</b>	<b>%</b>	<b>ac</b>	<b>%</b>	<b>ac</b>	<b>%</b>	<b>ac</b>	<b>%</b>
Land	287,000	21	253,400	18	243,300	18	228,200	17	222,100	16
Water	1,097,000	79	1,130,600	82	1,140,600	82	1,153,800	83	1,161,600	84
Total	1,384,000	100	1,384,000	100	1,383,900	100	1,382,000	100	1,383,700	100

St. Bernard Parish has lost land, primarily wetlands, because of erosion, subsidence, canal construction and associated saltwater intrusion into formerly freshwater habitats and severe tropical storms. Saltwater intrusion, especially intrusion associated with construction and maintenance of the MRGO, virtually eliminated the freshwater marshes and swamps outside the flood protection levees, as evidenced by habitat maps interpreted from 1956 and 1978 aerial photography (Plates 3 and 4). Between 1956 and 1978, 18,300 acres of fresh marsh and 14,000 acres of swamp and forest habitat were lost, directly through construction of the MRGO canal and emplacement of the associated dredged material retention area and indirectly through saltwater intrusion (Table 2-2). A minimal amount of the forest and swamp loss, primarily inside the protection levees, resulted from clearing for development or use as agriculture and pastureland. Over a 32-year period (1956-1995), St. Bernard Parish lost 59,900 acres of total marsh habitat and 17,200 acres of swamp and forest. The 4,400-acre increase in fresh marsh habitat between 1978 and 1995 (Plate 4) was a result of natural conversion of some scrub/shrub and brackish marsh habitat to fresh marsh habitat on the MRGO retention levee and conversion of swamp and bottomland hardwood habitat to fresh marsh inside the flood protection levees.

**Table 2-2. Habitat Area in St. Bernard Parish: 1956, 1978, 1988/90, 1992/93/95. (Derived from digital data provided by USGS-NWRC-BRPO 1996 and rounded to nearest 100 acres).**

Habitat Type <sup>1</sup>	1956		1978		1988/90		1992/93/95	
	ac	%	ac	%	ac	%	ac	%
Water <sup>2</sup>	1,096,800	79	1,130,300	82	1,139,600	82	1,153,800	82
Fresh Marsh	18,400	1	100	<1	4,600	<1	4,500	<1
Non-Fresh Marsh	229,600	17	NI	-	NI	-	NI	-
Intermediate Marsh	NI	-	6,000	<1	NI	-	NI	-
Brackish Marsh	NI	-	129,000	9	97,400	7	91,700	7
Saline Marsh	NI	-	78,400	6	100,100	7	91,900	7
Forest <sup>3</sup>	24,000	2	10,000	<1	7,100	<1	6,800	<1
Shrub/Scrub <sup>4</sup>	300	<1	14,700	1	6,300	<1	6,200	<1
Shore/Flat/Beach	2,700	<1	1,600	<1	5,800	<1	4,700	<1
Agriculture/Pasture	5,500	<1	2,800	<1	12,700	<1	12,400	<1
Inert/Upland Barren/Other	2,200	<1	2,100	<1	900	<1	700	<1
Developed	4,500	<1	9,100	<1	9,600	<1	9,500	<1
Total:	1,384,000		1,384,100		1,383,100		1,382,200	

<sup>1</sup> Individual habitats on maps grouped to facilitate comparison among time periods.

<sup>2</sup> Includes submerged and floating aquatic vegetation habitats.

<sup>3</sup> Includes forest, upland forest, bottomland forest, cypress forest, and dead forest habitats as interpreted for different time periods.

<sup>4</sup> Includes shrub/scrub, shrub/scrub spoil, upland shrub/scrub, bottomland shrub/scrub habitats as interpreted for different time periods.

NI Not interpreted separately in 1956; denoted as intermediate, brackish and saline marshes in 1978, 1988/90 and 1992/93/95

The area of developed land doubled between 1956 and 1995 (4,500 acres to 9,500 acres). The fluctuation in agriculture/pasture land use within the flood protection levees between 1956-1978 and 1995 is associated with conversion of farmland to development, later clearing of forested areas, and subsequent development of grassland in anticipation of future

development. The increase in agriculture/pasture to 12,700 acres in 1988/90 was largely due to the MRGO dredge material retention area being classified as agriculture/pasture land because of its grassland appearance (Plate 5). Most of the initial increase in scrub/shrub habitat between 1956 and 1978 (to 14,700 acres) occurred as a result of the colonization of the MRGO dredged material retention areas; the later decrease to 6,200 acres by 1995 was due to conversion to either forest or fresh marsh habitat. Changes in the shore/flat/beach and inert/barren upland/other habitat categories are related to changes in area of bare land on the Chandeleur Islands associated with tropical storms and construction of flood protection levees. The habitat interpretation for 1992/1993/1995 was derived from satellite imagery and reflected little change in area by habitat type from the 1988/90 interpretation (Plate 6).

Analysis of habitat change and land loss data indicates that St. Bernard Parish is a dynamic environment experiencing extensive physiographic changes as a result of both natural and man-made processes. In order to manage the coastal zone in the best, long-term interests of the parish, management goals, policies, and priorities of use must be utilized. Achievement of CZMP goals through implementation of policies are facilitated through documentation of the parish's physical and cultural environment, natural resources, environmental problems, and potential resource user conflicts. The parish's environmental setting is presented under the following categories: 1) Geology and Soils, 2) Climate, 3) Hydrology, 4) Vegetation, 5) Wildlife and Fisheries, 6) Endangered and Threatened Species, 7) Cultural Resources, 8) Transportation, 9) Land Use and 10) Coastal Restoration Projects.

## **GEOLOGY AND SOILS**

### **Geology**

St. Bernard Parish lies in the Gulf Coastal Plain (Figure 2-1) and its physical features (e.g., natural levees, distributary channels, interdistributary basins containing marshes and shallow lakes and ponds, and barrier islands) reflect the deposition and reworking of sediments deposited by the Mississippi River in several episodes of delta land building (Figure 2-2). The most recent of these deltaic phases is the St. Bernard delta lobe, active between 1500 B.C. and A.D. 700 (Wiseman et al. 1979). Historically, the St. Bernard delta complex is one of five major subdelta complexes of the Louisiana deltaic plain. The other major delta complexes are the Teche, Lafourche, Maringouin, and Plaquemines-Belize (Modern). The latter is the present, active Mississippi River delta lobe.

Mississippi River deltaic processes are cyclic and consist of three stages: construction, transition, and abandonment (Coleman and Gagliano 1964; Morgan 1972). The constructional stage of delta growth consists of rapid deposition of coarse, inorganic material, subsequent subaerial delta aggradation and progradation, and development of prominent natural levees. In the latter period of the constructional stage, the transitional stage begins as the rate of deposition slows and eventually ceases, thus, initiating the abandonment stage. During the transitional stage, the rate of subsidence begins to exceed the rate of sediment influx and extensive bays, interdistributary lakes, and levee flank depressions characterize the delta lobe area. The process of subsidence is related to loading and compaction of massive local sediment accumulations and down-warping along the Gulf Coast Geosyncline, a regional tectonic zone of subsidence that is active along the northwestern Gulf of Mexico.

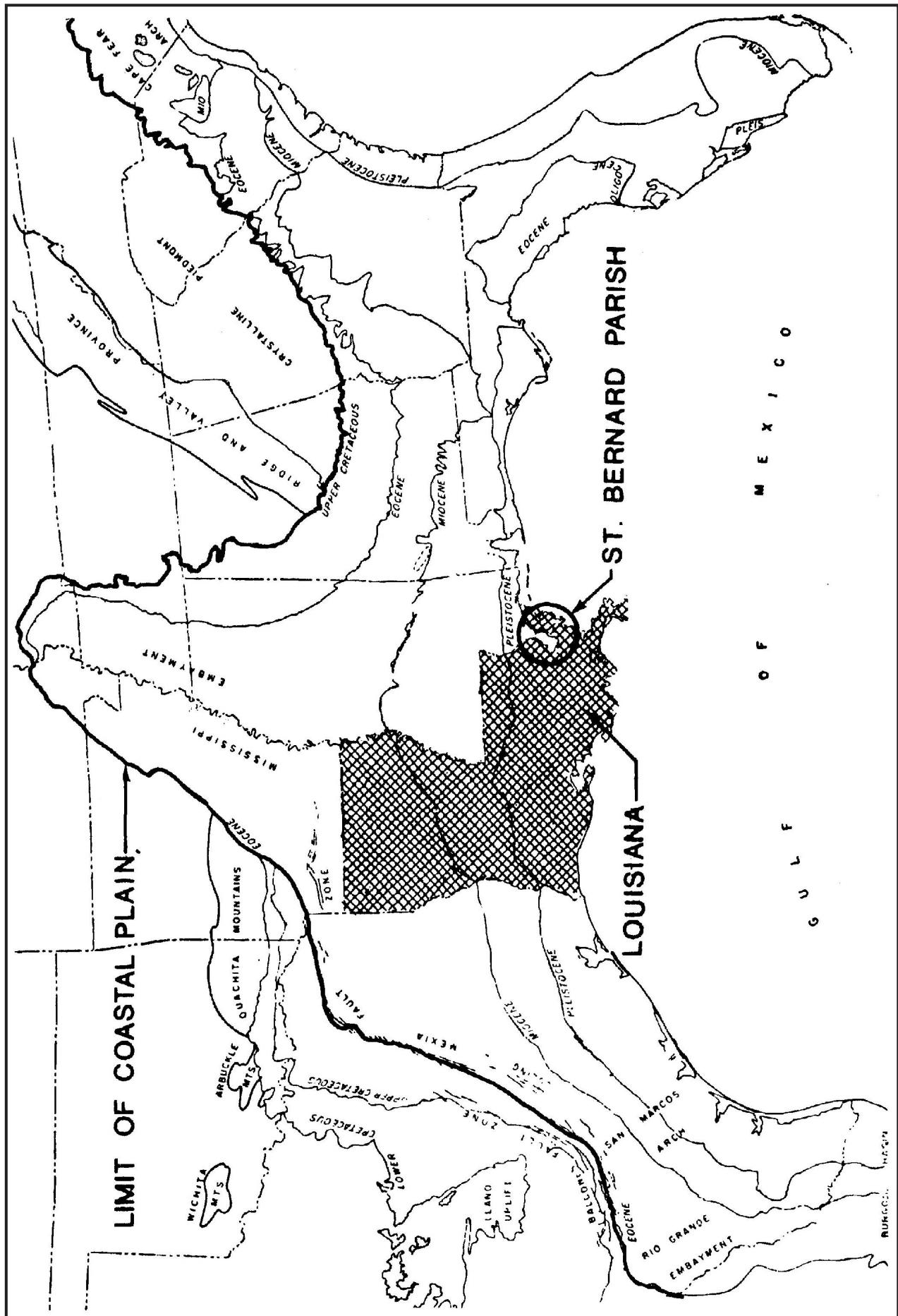


Figure 2.1. Location of Louisiana and St. Bernard Parish within the Mississippi embayment portion of the Gulf Coastal Plain (modified from Eardley 1962).

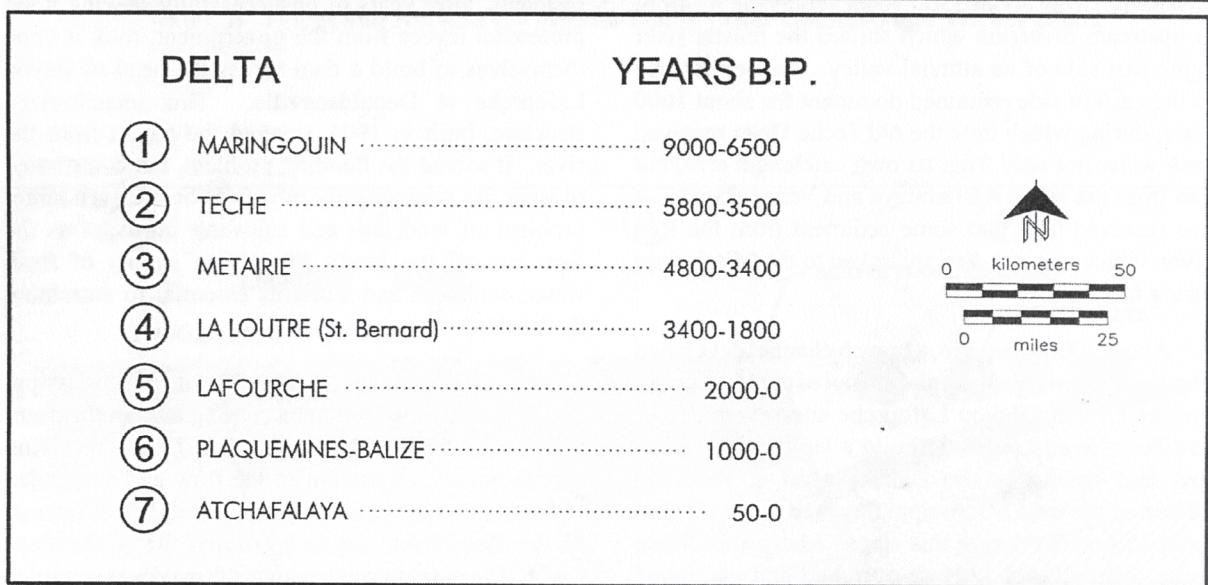
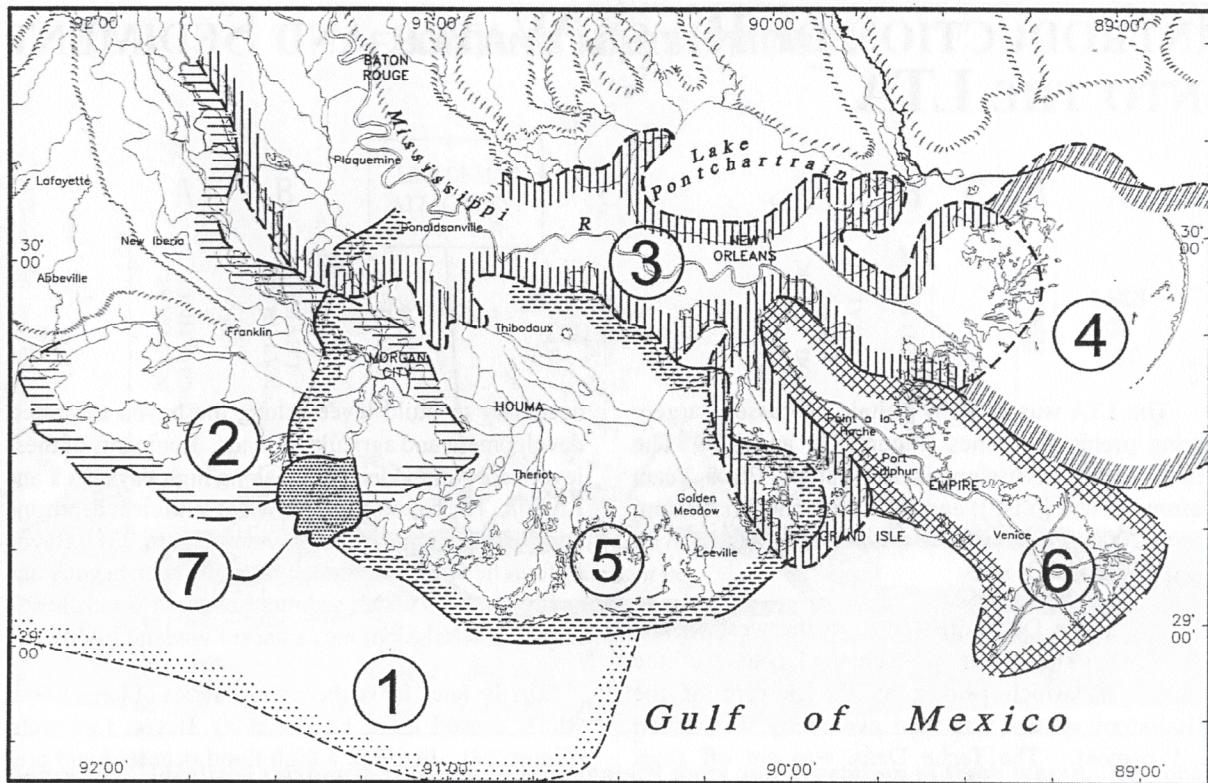
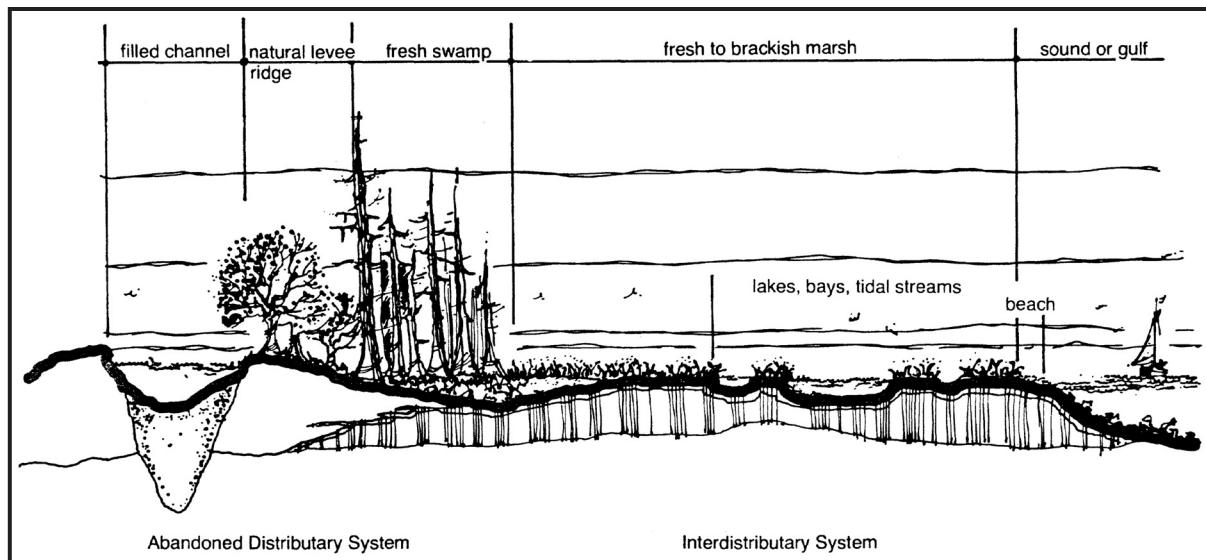


Figure 2.2. Holocene delta complexes (Modified from Frazier 1967 and Weinstein and Gagliano 1985).

In the abandonment or destructive stage of the deltaic cycle, the location of the river's main channel shifts to an area with a steeper gradient; the formerly active distributary channels of the abandoned main channel begin to fill with sediment; and the flow of sediment-laden waters to the abandoned delta lobe virtually ceases. This cycle is characterized by erosion of land areas, a lowering of delta relief, and enlargement of interior lakes and bays. The reworking of sand, shell, and other aggregate material by waves along the abandoned delta front creates beaches that eventually separate from the mainland and form barrier islands. In the absence of high, freshwater discharges, saltwater containing reworked, mineral sediments regularly overflow the low-lying marshes along the delta front and create zones of saline and brackish water marshes. The St. Bernard Parish delta complex entered its destructive phase about 900 years before present (B.P.) (Wiseman et al. 1979).

Prior to construction of flood protection levees and the MRGO channel-retention area complex, the parish's natural geologic landforms graded from higher, better drained natural levees five to fifteen feet in elevation through flanking, interdistributary backswamps to low-lying coastal marshes approximately one to two feet above sea level (Figure 2-3). The Bayou Terre aux Boeufs – Bayou La Loutre channel complex near the Mississippi River is an abandoned distributary system of the Mississippi that is largely filled with sediment. With construction of publicly maintained flood protection levees and the MRGO and the pumping of surface runoff from the leveed areas, the natural landforms and processes were impacted.



**Figure 2.3. Components of the abandoned distributary and interdistributary systems in St. Bernard Parish (after CEI 1976).**

The CZMP, at both the state and parish levels, takes into consideration the current landscape conditions for developing goals, policies, and priorities of use and for resolving resource user conflicts. The permit process, a major component of the CZMP designed to control activities in wetlands and transition areas, applies to all activities outside the leveed areas (e.g., fastlands) and certain activities inside leveed areas if they are deemed to have impacts to

coastal waters outside of the fastland area (Plate 7). Transition areas are formerly well-drained uplands located outside of flood protection levees that, through processes of subsidence and erosion, are in transition to low-lying wetlands with longer or more frequent periods of flooding. The only areas in St. Bernard Parish that are transition lands are short, narrow segments of the natural levees of Bayou Terre aux Boeufs and Bayou La Loutre lying south and east, respectively, of the flood protection levees. St. Bernard Parish has another type of transition zone that is unique to the parish; the MRGO transition area on the southern half of MRGO dredged material retention area. This former marsh-open water habitat was enclosed by retention levees and was designated as a receiving area for material initially dredged for canal construction as well as for subsequent maintenance dredged material. Some of the retention area outside the maintained levees are over five feet in elevation and thus qualify as fastlands because they are contained by the flood protection levee along the MRGO and back dredge material retention levees.

## Soils

The most recent soil classification for St. Bernard Parish denotes 19 soils and one soil association (U.S. Department of Agriculture, Natural Resource Conservation Service [USDA-NRCS] 2009) (Table 2-3) (Plate 8). Table 2-4 contains a comparative analysis of parish soils with regard to description, geologic/anthropogenic origin, hydrology and flooding, geographical location, land capacity and forest production potential. Of the approximately 17.6 percent of the parish area comprised of land, marsh soils are the predominant type (75.4 percent) followed by backswamp (11.3 percent), spoil banks (7.2 percent), natural levees (3.4 percent), beach ridges (2.0 percent) and other (dumps/landfills, levee-borrow complexes, urban land) (0.5 percent). Over 97 percent of the parish land area contains hydric soils (Table 2-4). The parish contains six Prime Farmland soils (Cancienne silt loam, Cancienne silty clay loam, Schriever silty clay loam, Schriever clay, Vacherie silt loam, gently undulating and Harahan clay) comprising 7.6 percent of the land area. All the soil types in the parish experience between 272 and 365 frost free days annually. The soils receive between 47 and 74 inches of mean annual precipitation and experience mean annual temperature ranges from 59° F to 79° F.

Since the publication of the *Soil Survey of St. Bernard Parish, Louisiana* in 1989, two soil names have been changed; Sharkey is now called Schriever and Commerce is now called Cancienne (USDA-NRCS 2009.) The Cancienne, Schriever and Vacherie soils occur on natural levees of the Mississippi River, Bayou Terre aux Boeufs and Bayou La Loutre that are either protected from flooding by artificial levees or are flooded less frequently than surrounding wetlands because of their higher elevation. These soils, covering approximately 6.8 percent of the parish, as measured at the time of the parish soil survey, support the majority of the parish's urban use. Limitations for development on this soil association include "wetness, flooding from backwaters, and the shrinking and swelling of the subsoil" (Trahan et al. 1989:7).

**Table 2-3. Area of Soil Type as Percent of Land Area and Parishwide (USDA-NRCS, Soil Data Mart 2004; area digitized by CEI 2010.)**

Symbol	Soil	Landform	Acreage	% Total Parish Area	% Parish Land Area
AD	Aquents, dredged, frequently flooded		17,630	1.3	7.3
BB	Barbary clay	Swamps	5,573	0.4	2.3
BP	Bellpass muck	Marshes-Salt	18,653	1.4	7.7
CE	Clovelly muck	Marshes-Brackish	33,185	2.4	13.6
CS	Cancienne (50%) & Schriever (30%), frequently flooded	Natural Levees and Backswamps	535	0.04	0.2
Cm	Cancienne silt loam	Natural Levee	3,328	0.2	1.4
Co	Cancienne silty clay loam	Natural Levee	3,300	0.2	1.4
Dp	Dumps	Floodplains	152	0.01	0.06
FA	Fausse clay, saline	Backswamps	10,045	0.7	4.1
FE	Felicity loamy fine sand, frequently flooded	Beach ridges	5,048	0.3	2.0
Ha	Harahan clay	Backswamps	2,473	0.2	1.0
Hf	Harahan clay, frequently flooded	Backswamps	301	0.02	0.1
LF	Lafitte muck	Marshes-Brackish	33,826	2.5	13.9
LV	Levees-Borrow Pits Complex, 0-25% slopes (Arents (60%), Aquents (40%))	Levees/Natural Levees	65	0.00	0.03
SC	Scatlake mucky clay	Marshes-Salt	63,769	4.6	26.3
Sh	Schriever silty clay loam	Backswamps	4,915	0.4	2.0
Sk	Schriever clay	Backswamps	3,228	0.2	1.3
TM	Timbalier muck	Marshes-Salt	33,620	2.4	13.8
Ub	Urban Land	Floodplains	1,108	0.08	0.4
Va	Vacherie silt loam, gently undulating	Natural Levees	1,153	0.08	0.5
Ww	Westwego clay	Backswamps	991	0.07	0.4
	<b>Total Land Area:</b>		<b>242,897</b>	<b>17.6</b>	<b>100</b>
W	Water (W)		1,138,805	82.4	0.0
	<b>Total Land and Water Area:</b>		<b>1,381,702</b>	<b>100</b>	<b>100</b>

Approximately 81.8 percent of the St. Bernard Parish land area contains five soil associations that can be grouped as “Marshes and Swamps, Frequently Flooded and Ponded” (Trahan et al. 1989): Barbary clay, Fausse clay, saline, Bellpass muck, Clovelly muck, Lafitte muck, Scatlake mucky clay and Timbalier muck (USDA-NRCS 2009, Trahan et al. 1989) (Table 2-4). Fausse and Barbary soils are found in backswamps; Clovelly and Lafitte soils are present in intermediate and brackish marshes; and Scatlake, Bellpass, and Timbalier soils support saline marshes. Most areas with these soils remain in native vegetation and are used for recreation and serve as habitat for wetland wildlife (Trahan et al. 1989:8).

A very small portion (approximately 1.6 percent) of St. Bernard Parish soils consists of the Harahan clay; Harahan clay, frequently flooded and Westwego clay present on former swampland that has been drained and protected from flooding (USDA-NRCS 2009,

Table 2-4. Characteristics of Soils in St. Bernard Parish (USDA, NRCS, Soil Survey Div. 2009, Trahan et al. 1989.)

Soil	Description	Landform	Flooding Frequency	Ponding Frequency	Water Capacity	Land Capability	Forest Production or Land Use	Prime Farmland	Hydric Soil
<i>Natural Levees Protected from Flooding</i>									
Cancienne silt loam (Cm)	Somewhat poorly drained. Depth to water table: 18-48 in. Slope: 0-1%.	Natural Levees	None	None	Very high (~13 in)	2w	American sycamore, eastern cottonwood, green ash, Nuttall oak, pecan, water oak, willow oak	Yes	No
Cancienne silty clay loam (Co)	Somewhat poorly drained. Depth to water table: 18-48 in. Slope: 0-1%.	Natural Levees	None	None	Very high (~12.5 in)	2w	American sycamore, eastern cottonwood, green ash, Nuttall oak, pecan, water oak, willow oak	Yes	No
Cancienne (50%) & Schriever (30%) soils, frequently flooded (CS)	Somewhat poorly drained. Depth to water table: 18-48 in. Slope: 0-1%. Schriever: Poorly drained. Depth to water table: 0-24 in. Slope: 0-1%;	Natural Levees	Frequent	None	Very high (~12.9 in)	5w	eastern cottonwood, Nuttall oak, overcup oak, sugarberry, water hickory, baldcypress, black willow, green ash, overcup oak, sugarberry, water hickory, water tupelo	No	Yes
Schriever silty clay loam (Sh)	Poorly drained. Depth to water table: 0-24 in. Slope: 0-1%;	Backswamps	Rare	None	moderate (~7.9 in)	3w	cedar elm, green ash, Nuttall oak, sugarberry, sweetgum, water oak, willow oak	Yes	Yes
Schriever clay (Sk)	Poorly drained. Depth to water table: 0-24 in. Slope: 0-1%.	Backswamps	Rare	None	moderate (~8.1 in)	3w	cedar elm, green ash, Nuttall oak, sugarberry, sweetgum, water oak, willow oak	Yes	Yes
Vachene silt loam, gently undulating (Va)	Somewhat poorly drained. Depth to water table: 12-36 in. Slope: 0-3%.	Natural levees	Natural levees	None	High (~9.3 in)	2e	American sycamore, eastern cottonwood, green ash, pecan, sweetgum, water oak	Yes	No
<i>Marshes and Swamps Frequently Flooded and Ponded</i>									
Barbary clay (BB)	Very poorly drained. Depth to water table: 12-36 in. Slope: 0-1%;	Swamps	Frequent	High (~11.4 in)	8w	baldcypress, black willow, water tupelo	No	Yes	
Fausse, clay, saline (FA)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1 %.	Backswamps	Frequent	High (~11.6 in)	7w	baldcypress, water tupelo, red maple.	No	Yes	
Bellpass muck (BP)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1 %.	Salt marshes	Frequent	Very high (~16.6 in)	7w	Vegetation: Saline marshes Use: Wildlife habitat and recreation.	No	Yes	

**Table 2-4 Continued.**

<b>Soil</b>	<b>Description</b>	<b>Landform</b>	<b>Flooding Frequency</b>	<b>Ponding Frequency</b>	<b>Water Capacity</b>	<b>Land Capability</b>	<b>Forest Production or Land Use</b>	<b>Prime Farmland</b>	<b>Hydric Soil</b>
Clovelly muck (CE)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1%.	Marshes	Frequent	Frequent	Very high (~15.5 in)	8w	Vegetation: marshes Use: Wildlife habitat and recreation.	Brackish	No Yes
Lafitte muck (LF)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1%;	Marshes	Frequent	Frequent	Very high (~18.0 in)	8w	Vegetation: marshes Use: Wildlife habitat and recreation.	Brackish	No Yes
Scatlake mucky clay (SC)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1%;	Salt marshes.	Frequent	Frequent	Low (~6.0 in)	8w	Vegetation: Salt marshes Use: Wildlife habitat and recreation.	No	Yes
Timbalier muck (TM)	Very poorly drained. Depth to water table: 0-0 in. Slope: 0-1%.	Salt marshes	Frequent	Frequent	Very high (~20.9 in)	8w	Vegetation: Salt marshes Use: Wildlife habitat and recreation.	No	Yes
<i>Former Swamps, Drained and Protected from Flooding by Levees</i>									
Harahan clay (Ha)	Poorly drained. Depth to water table: 12-36 in. Slope: 0-1%.	Backswamps	Rare	None	High (~10.1 in)	3w	Bottomland hardwoods. Use: Urban land or recreation	Yes	Yes
Harahan clay, frequently flooded (Hf)	Poorly drained. Depth to water table: 12-36 in. Slope: 0-1%.	Backswamps	Frequent	None	High (~11.4 in)	5w	baldecypress, black willow, green ash, sugarberry, water hickory Use: Urban land and recreation	No	Yes
Westwego clay (Ww)	Poorly drained. Depth to water table: 12-36 in. Slope: 0-1%.	Backswamps	Rare	None	Very high (~15.1 in)	4w	Use: Urban land and pastureland.	No	Yes
<i>Spoil Banks and Sandy Ridges, Frequently Flooded</i>									
Aquents, dredged, frequently flooded (AD)	Very poorly drained. Slope: 0-1 %.		Frequent	None		Not rated		No	Yes
Felicity loamy fine sand, frequently flooded (FE)	Somewhat poorly drained. Depth to water table: 24-36 in. Slope: 0-3%.	Beach ridges.	Frequent	None	Very low (~3.0 in)	7w	Use: Barrier island wildlife and recreation.	No	No

**Table 2-4 Concluded.**

Soil	Description	Landform	Flooding Frequency	Ponding Frequency	Water Capacity	Land Capability	Forest Production or Land Use	Prime Farmland	Hydric Soil
<i>Other</i>									
Levees-Borrow Pits Complex, 0 to 25 percent slopes	Areents: Somewhat poorly drained. Slope: 5-20 %. Aquents: Very poorly drained. Depth to water table: 0-12 in. Slope: 0-1%.	Levees	None	None	6e	Use: Man-made levees or sources of excavated material	No	Yes	
Arents: (60%) Aquents: (40%) (LV)		Natural Levees	Rare	None	7W				
Dumps (Dp)		Flood plains			Not rated	Use: Solid waste disposal	No	Yes	
Urban Land (Ub)	Slope: 0-1 %.	Flood plains			Not rated	Use: Development	No	Yes	
Water (W)					Not rated	Use: Ponds for runoff retention, recreation, livestock, oxidation.	N/A	N/A	

\* Land Capability:

- 1 Soils have few limitations that restrict their use.
- 2 Soils have moderate limitations that restrict their use.
- 3 Soils have severe limitations that reduce the choice of plants or that require special conservation practices or both.
- 4 Soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.
- 5 Soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.
- 6 Soils have severe limitations that make them generally unsuitable for cultivation.
- 7 Soils have very severe limitations that make them unsuitable for cultivation.
- 8 Soils have limitations that nearly preclude their use for commercial crop production.

e The main limitation is risk of erosion unless a close-growing plant cover is maintained.

w Water in or on the soil interferes with plant growth or cultivation.

Trahan et al. 1989). Those areas, located in the western end of the parish, are either developed for urban uses or are idle and awaiting future development. Constraints for development include “flooding, wetness, low strength, subsidence, and shrinking and swelling of underlying material” (Trahan et al. 1989:9).

Approximately 9.3 percent of parish land consists of spoil banks and sandy ridges that are frequently flooded (USDA-NRCS 2009, Trahan et al. 1980:9). The Aquents, dredged and frequently flooded are located in the dredged material retention areas along the south bank of the MRGO (Plate 8). The Felicity loamy fine sand, frequently flooded soils comprise the saline sandy ridges of the Chandeleur Islands. These soil associations support native vegetation and are suitable for use for recreation and habitat for wildlife. Development of these soils is constrained due to flooding, wetness, and salinity. Most areas with these soils remain in native vegetation and are used for recreation and as habitat for wetland wildlife. A few areas on the MRGO retention site have been developed for commercial and residential uses. In some locations these soils are limited for urban uses mainly because of flooding by high tides during tropical storms, wetness and salinity (Trahan et al. 1989:10).

The remaining 0.5 percent of parish land contains three soil types: Levee-Borrow Pits Complex, Dumps and Urban Land (Tables 2-3 and 2-4). The Levee-Borrow Pits Complex soil is comprised of somewhat poorly drained Arents soil (60 percent) and very poorly drained Aquents soil (40 percent). The area and percentage of soils within the parish are subject to constant change as a result of land loss and the acreages presented above were derived prior to the passage of Hurricane Katrina in 2005. For example, Hurricane Katrina virtually destroyed the Chandeleur islands thus, greatly reducing the area of Felicity loamy fine sand, frequently flooded soil.

## CLIMATE

St. Bernard is located in a subtropical latitude experiencing mild winters and warm, humid summers. Prevailing southerly winds produce afternoon thundershowers in the summer and river fogs are common in the winter and spring when the Mississippi River water temperature is slightly colder than the air temperature. The overall temperature range can be described as moderate, with the average minimum temperature of 59.6° Fahrenheit (F) and average maximum temperature of 78.5° F, with an overall average temperature of 69.1° F (Figure 2-5). The rainfall averages 63 inches per year. Showers during the summer occur frequently from mid-June to mid-September, and the average monthly high, 6.7 inches, occurs in July. Heavy winter rains generally occur from mid-December to mid-March as the result of passing frontal systems (Figure 2-6).

Monthly precipitation lows average about 2.9 inches in October. Annual rainfall has varied from a high of 85.7 inches in 1875 to a low of 31.3 inches in 1899. Monthly rainfalls exceeding 12 inches are not uncommon; with 25 inches the maximum recorded in a single month. Snow and sleet occur infrequently.

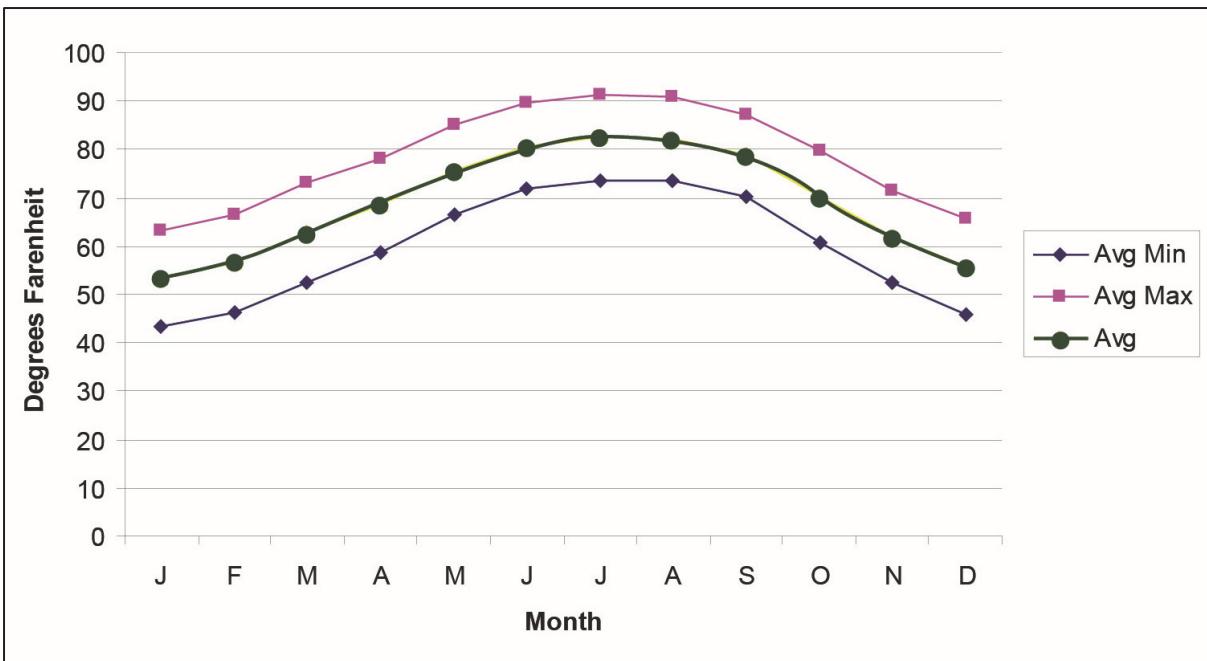


Figure 2-4. Average Annual Temperature - St. Bernard Parish (NRCS 2009).

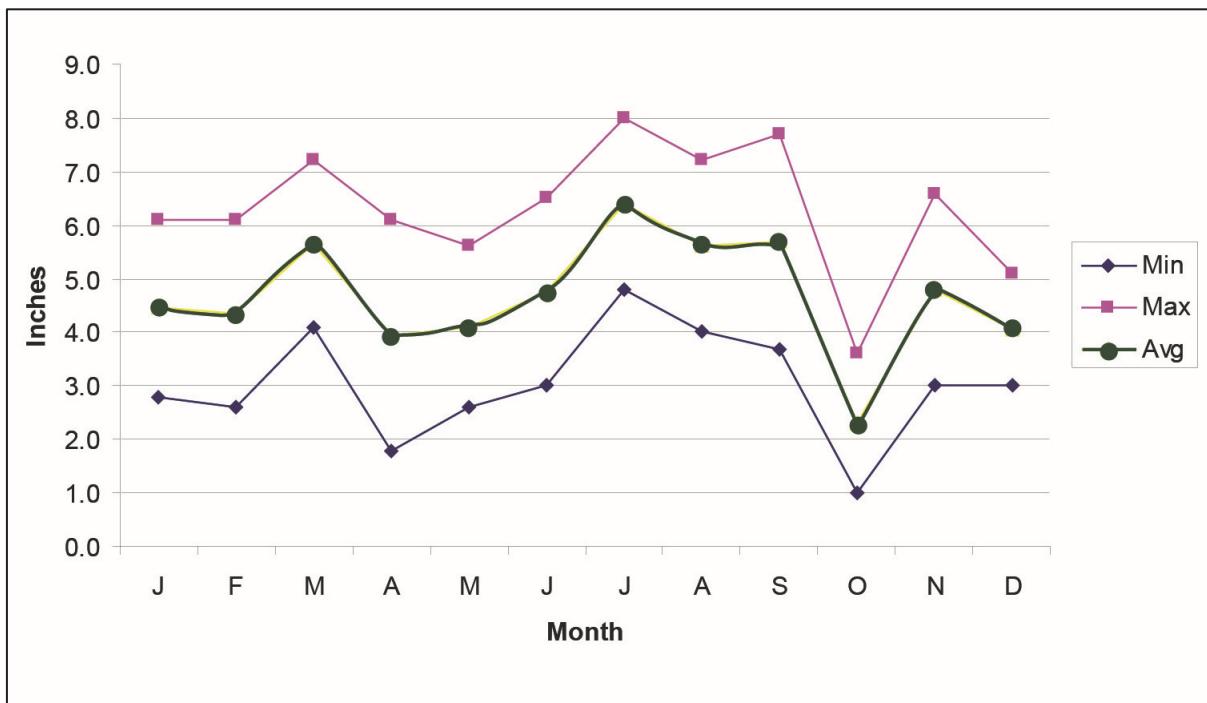


Figure 2-5. Average Annual Precipitation - St. Bernard Parish (NRCS 2010).

Prevailing winds are from south to southeast during January through July and from northeast to east-northeast during September through December. Average wind velocity is 8.6 miles per hour (7.4 knots), but maximum velocities exceed 100 miles per hour during hurricanes. Hurricanes strike the Louisiana coast an average of 1.6 times per year (CEI 1972). The hurricane surge, which inundates low coastal lands, is the most destructive of the hurricane characteristics and accounts for three-fourths of the lives lost from hurricanes (Regional Planning Commission 1978). Storm surge is a product of meteorological, beach, and shore conditions. A higher surge occurs on the east side of the hurricane and will be enhanced if the hurricane passes perpendicular to shore, the velocity of forward movement is slow, or the storm's diameter is very large. Maximum storm surge heights experienced along this region of the Gulf Coast range between 10 and 23 feet.

The parish has been affected by 16 major hurricanes from 1886 to 2009. The storms of 1901, 1947, 1956, 1965 (Betsy), 1969 (Camille), 1985 (Juan), 1988 (Florence and Beryl), 1992 (Andrew), 1995 (Opal), 1997 (Danny), 1998 (Georges), 2002 (Isidore and Lili), 2005 (Katrina and Rita) and 2008 (Gustav) caused minor to severe damage with extensive flooding both from storm-generated tides and/or excessive rainfall. Hurricane Juan, a minimal hurricane in 1985, generated a 5 to 6-foot tidal increase in water levels that inundated the communities of Yscloskey, Alluvial City, Hopedale, Reggio and Delacroix for several days and set new high-water marks along the landward margin of the Louisiana coastal zone (USACE 1972-2005). Hurricane Opal in 1995 and Hurricane Danny in 1997 produced high waters of 5.09 feet National Geodetic Vertical Datum (NGVD) and 5.54 feet NGVD, respectively, on the MRGO at Shell Beach (USACE 1972-2005).

Hurricane Isidore produced torrential rains throughout southeast Louisiana with rainfall totals between 11.83 and 18.5 inches within a 24-hour period. Maximum stages for this storm were 5.61 feet NGVD at the Rigolets, 6.0 feet at Lake Pontchartrain at West End, and 6.84 feet NGVD at Bayou Terre Aux Beoufs at Delacroix. Hurricane Lili made landfall as a category 2 storm with wind speeds of 120 mph and gusts of 150 mph. Heavy rains produced minor to moderate flooding along the lower sections of several rivers and streams. The storm tide was reported at 6.04 feet NGVD at the Rigolets near Lake Pontchartrain (USACE 1972-2005).

Hurricane Katrina crossed land as a category 3 storm and was one of the most costly and damaging hurricanes on record. The storm surge exceeded 18 feet along the southeast Louisiana coast, overtopping and breaching protection levees, and flooded virtually all of St. Bernard Parish, including 19,000 acres within the developed leveed areas. The storm damage was in the billions of dollars statewide and human casualties exceeded more than 1,300 fatalities. The estimated high water elevations were 10.9 feet NGVD in St. Bernard Parish near the courthouse, 14.8 feet NGVD at Empire Lock and 12 feet Local Mean Sea Level (LMSL) at Grand Isle (USACE 1997-2005).

Hurricane Gustav crossed into southern Louisiana and weakened to a tropical storm and caused storm surges of 12 to 13 feet along the coast in the Mississippi Delta. Wind speeds, estimated at 104 miles per hour during its landfall near Cocodrie, produced storm surges at the National Oceanic Service sites of 4.48 feet NGVD at Southwest Pass, and 9.53 feet NGVD at Shell Beach (Beven and Kimberlain 2009).

## HYDROLOGY

The hydrologic regime of St. Bernard Parish involves the movement of freshwater and saltwater masses through the region as a result of the interactions among river discharge, regional precipitation, winds and tides. This present hydrologic regime is influenced by both natural and man-made factors. Within the parish, the basic natural hydrologic system is governed by the pattern of major abandoned distributary channels of the ancient Mississippi River delta complex (i.e., Bayous La Loutre and Terre aux Boeufs), and interdistributary basin channels that serve to drain swamps and marshes into the estuarine lakes, bays, the Chandeleur Sound and the Breton Sound.

Under natural conditions, the Mississippi River flowed through the wetlands to the gulf via the distributary channels. Rainfall and Mississippi River floodwaters flowed down the gentle slopes of the natural levees and slowly through the swamps and marshes as sheet flow and interdistributary basin channel flow. The dense wetland vegetation and the shallow, winding, interdistributary channels slowed the progress of this drainage, storing and retaining the fresh water for longer periods of time prior to the gradual release into the tidewaters. These former conditions contributed to a stable environment where water levels and salinity values changed very gradually with changing meteorological and tidal conditions.

During historic times, human actions have greatly altered the natural hydrologic regime. Leveeing of the Mississippi River halted the annual overbank flooding and a channelized drainage network within the leveed areas collected precipitation to be discharged into the wetlands at point sources (e.g., pumping stations and floodgates) along the Hurricane Protection Levees near the Forty Arpent Canal. The only major sources of fresh water reaching the northern part of St. Bernard Parish in the Lake Borgne to the Chandeleur Sound area comes from the Pearl River and freshwater outflow from the Lake Pontchartrain Basin primarily via Chef Menteur Pass and The Rigolets. This freshwater input from the Pontchartrain Basin is enhanced tremendously when the Bonne Carré is opened. Salinities in the parish shift seasonally in response to freshwater input and precipitation, with the higher salinities moving inland during the fall (Orlando et al. 1993) (Plate 9).

Man-made physical modifications of the wetlands have occurred within the recent historic period. Deeper-water canals and spoil banks were constructed for logging, drainage, navigation, drilling of oil and gas wells and emplacement of pipelines. These modifications allowed surplus fresh water to pass more quickly from established drainage systems and later point discharge sources into the estuarine water bodies. Spoil banks along the canals segmented the wetlands and hindered circulation. Greater water depths in the canals provided for greater tidal fluctuation and saltwater intrusion during periods of low rainfall and/or extended periods of prevailing southerly or easterly winds. The MRGO channel, opened to navigation in 1963 and designed to be 500 feet by 36 feet, had an enormous detrimental impact on the pre-existing hydrologic regime. The MRGO conveyed a large mass of higher salinity water from the Gulf to interior drainage channels year-round, and it created greater fluctuations in tide levels. The MRGO was underutilized as a shipping channel and after 2005, the MRGO was no longer dredged to maintain navigation and the U.S. Congress authorized the USACE to close the channel. A rock dam was constructed

across the MRGO channel immediately south of Bayou La Loutre in 2009 which is intended to prevent saltwater intrusion into the interior wetlands and water bodies, including Lake Borgne. Monitoring by the USGS (2009) has recorded significantly reduced salinity levels in the MRGO channel above the dam since the closure was completed.

With human alteration of the natural hydrologic regime, the circulatory system has shifted to reflect the competition between local runoff in the upper interdistributary basin wetlands coupled with discharge from leveed areas and meteorological and astronomical tides. The overall effect of these modifications has been the rapid alteration of a stable hydrologic situation into one experiencing a greater fluctuation of water levels, drainage efficiency and salinity values. The salinity regime within the interior wetlands is now dependent upon regional precipitation, infrequent openings of the Bonnet Carre Spillway in St. Charles Parish, discharge from the Pearl River, and more recently, the implementation of the Violet Freshwater Siphon and the Caernarvon Freshwater Diversion in the early 1990s. These siphons are intended to replicate the annual pulse of freshwater to the central wetlands and Lake Borgne area north of the Bayou La Loutre Ridge and to the Lake Lery-Breton Sound area south of this ridge, respectively.

The Violet siphon, a Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Project (PO-09a), was only partially implemented because no outfall management program was developed and silting of the Violet Canal adversely affected navigation and curtailed siphon operation. The siphon project was de-authorized in 2000, after only 4 years of operation, but reactivation of a freshwater diversion project via the Violet Canal or construction of another diversion channel in the vicinity is proposed under *Louisiana's Comprehensive Master Plan* (Coastal Protection and Restoration Authority of Louisiana [CPRA] 2007). Current planning under the USACE's (2010a) MRGO Ecosystem Restoration Study and the 2007 Water Resources Development Act has identified four sites as options for increased freshwater diversion in the Violet area. The St. Clair tract was the preferred site. Another option is the enlargement of the current Violet Siphon and canal capacity, although this option is not preferred by the USACE. The USACE's hydrologic modeling has determined that a flow of 1000 cfs for 11 months and 7000 cfs in May would provide sufficient salinity reduction to protect oyster production and supply fresh water for restoration of the Central Wetlands area.

Regular operation of the Caernarvon Freshwater Diversion structure, while not at total design capacity, has had the intended beneficial results of lowering salinities in the upper basin and enhancing habitat diversity and wetland plant vigor. Mineral sediment deposition has occurred in the area of Big Mar and the Lake Pontchartrain Basin Foundation has proposed planting the area in cypress. However, some scientists have expressed concern that the Caernarvon Diversion has primarily produced a flotant marsh that was washed out by Katrina and other tropical storms, rather than a more resilient substrate-rooted marsh. The structure is subject to adaptive management changes, such as pulsing during high water stages on the Mississippi River, to enhance the wetland building functions of a structure that was originally intended only to restore salinity contours to mid-twentieth century positions.

The hydrologic regime of the two levee-protected Environmental Management Units (Lower Urbanized Levee 3 and Urbanized Area 13) covering approximately 21,000 acres consists of

forced drainage. Eight pump stations maintained by the Lake Borgne Basin Levee District discharge fresh water from these leveed areas into adjacent wetlands (Plate 9) (Table 2-5). Six communities (Reggio, Florissant, Alluvial City, Jacks Canal, Wood Lake and Delacroix), along the Bayou La Loutre and Bayou Terre aux Boeufs ridges within the Semi-Urbanized Levee EMU number 11 have a type of forced drainage in that the residential and commercial development is protected from local tidal flooding by low-lying protection levees and tidal pumps discharge drainage water into adjacent wetlands (Table 2-6).

**Table 2-5. Drainage Infrastructure for 25-Year Storm and/or 100-Year Storm (Lake Borgne Levee District 2009).**

Map No. <sup>1</sup>	Lake Borgne Basin Levee District Pump Stations	Area Pumped (ac)	Existing Pumping (gpm) Capacity (cfs)		Pumping Capacity (cfs)/Area (ac)	Water Level Maintained (ft NGVD) <sup>2</sup>
1	Pump Station No. 1 4200 B Jean Lafitte PKWY	1,620	550,900	1227 cfs	0.76	-6.0
2	Pump Station No. 2 4201 Jean Lafitte PKWY	760	258,000	576 cfs	0.76	-6.0
3	Pump Station No. 3 3700 Bartolo	710	328,000	730 cfs	0.46	-6.0
4	Pump Station No. 4 3200 Guerra Drive	2,640	225,000	501 cfs	0.46	-6.0
5	Pump Station No. 5 7701 E. Judge Perez Drive	4,000	300,000	668 cfs	0.17	0.0
6	Pump Station No. 6 4200 A Jean Lafitte PKWY	1,320	450,000	1000 cfs	0.76	-6.0
7	Pump Station No. 7 3701 Bartolo	2,150	450,000	1000 cfs	0.46	-6.0
8	Pump Station No. 8 3616 Bayou Road	5,000	375,000	835 cfs	0.17	0.0
	Total:	18,200	2,936,900			

ac: acre

cfs: cubic feet per second

gpm: gallons per minute

NGVD: National Geodetic Vertical Datum

<sup>1</sup>See Plate 9 for location of pumps.

<sup>2</sup>Level of water that is maintained during dry weather conditions.

**Table 2-6. Community Tidal Pumps (Martin, per. comm. 2009.)**

Map Label <sup>1</sup>	Community Pump	Discharge Lines (in)	Pumping Capacity (gmp)
a	Reggio	16	7,500
b	Florissant North	16	7,700
c	Florissant South	24	15,300
d	Alluvial City	12	3,800
e	Jack's Canal	12	3,500
f	Wood Lake	12	4,750
g	Delacroix	24 & 30	35,300

in: inch      gmp: gallons per minute pumped

<sup>1</sup>See Plate 9 for location of tidal pumps.

Prior to Hurricane Katrina, the parish had five wastewater treatment facilities (Table 2-7). The Frazendville and Munster plants previously discharged treated wastewater into the Mississippi River. Current plans call for the Dravo plant to be upgraded to receive all of the Frazendville wastewater and to direct the effluent from Dravo to the effluent chlorine contact chamber at Munster for disinfectant and discharge into the Central Wetlands (EMU 2). The de-chlorinated freshwater discharge would provide fresh water and nutrients to the Central Wetlands EMU and help restore and sustain fresh-to-intermediate wetland habitat.

**Table 2-7. Wastewater Facilities and Capacity Pre-Hurricane Katrina (N-Y Associates, Inc. and Burk-Kleinپeter, Inc. 2008)**

Location	Capacity (mgd <sup>1</sup> )	Average Flow (mgd)	Peak Flow (mgd)
Dravo Wastewater Treatment Plant	3.5	1.64	6.68
Frazendville Wastewater Treatment Plant	1.0	0.69	5.14
Munster Wastewater Treatment Plant	7.5	3.91	10.8
Violet Wastewater Treatment Plant	2.5	1.61	4.93
Riverbend Oxidation Pond	0.5	0.95	3.32

<sup>1</sup>mgd: millions of gallons per day

Upon restoration, the Riverbend Oxidation Pond will continue to discharge its effluent into the eastern area of the Central Wetlands EMU by the E. J. Gore Pumping Station via a distribution piping network. The Violet Wastewater Treatment Plant located at the end of Guerra Drive was not re-activated after Hurricane Katrina and now serves as a simple influent pumping station via a buried pipeline at the base of the Forty-Arpent flood protection levee. The wastewater is directed to the Munster plant for normal treatment (St. Bernard Parish Department of Public Works 2010).

Formerly, subsurface water resources of St. Bernard Parish were provided by three aquifers: 1) St. Bernard Delta “200-foot” sand, 2) the “700-foot” sand, and 3) the “1200-foot” sand (USACE 1974). However, there has been pervasive saltwater intrusion into these aquifers, and the parish no longer has potable groundwater. Domino Sugar discontinued its freshwater well approximately twenty years ago due to the saltwater intrusion and the U.S. Geological Survey has discontinued monitoring groundwater.

## VEGETATION

The variety and abundance of vegetation in St. Bernard Parish are closely associated with the topography, soils, salinity distribution, and humid sub-tropical climate (Table 2-8). The forested portion of St. Bernard Parish, consisting of bottomland hardwood and backswamp forests, has diminished substantially since it was first measured. Between 1956 and 1988/90, forest habitat as a percentage of parish land area decreased from 2 percent (23,972 acres) to approximately 0.5 percent (7,111 acres) (USGS-NWRC-BRPO 1996) (See Table 2-2). The majority of the hardwood forest habitat located on natural levees has been cleared and replaced by agriculture, pasture and urban land use. The remaining, scattered stands of hardwood forests on the better-drained areas of the natural levees typically support trees such as live oak, hickory, pecan, sweetgum, American elm, cottonwood, and green ash. On levee areas that are less well drained, the more common species are water oak, sycamore, and black willow. Commonly occurring understory vegetation species include dwarf palmetto, blackberry, hawthorns, deciduous holly, wax myrtle, switch cane, and Bermudagrass. Lower levees, which are subject to long periods of flooding, support only shrubs, grasses, and trees that are water-tolerant.

The freshwater swampland flanking the backslopes of the natural levees historically supported cypress forests. The original stands of cypress were logged by the beginning of the twentieth century and the regenerated cypress forests outside the flood protection levees, north of the Bayou La Loutre ridge, were severely impacted by a combination of processes including subsidence, alteration of the natural hydrologic regime, and especially saltwater intrusion associated with opening of the MRGO in 1963. Typical species of trees found in the swamp forests include baldcypress, swamp red maple, water oak, and tupelogum. Typical understory vegetation includes dwarf palmetto, buttonbush, baccharis, and marsh elder. Commonly occurring grasses include paille fine, sawgrass, feather grass, and wiregrass.

Marsh habitat covers most of the parish’s land area and is the principal source of detritus and organic matter that are vital elements in the biological productivity of this area of the coast. The area and distribution of fresh and non-fresh marsh has changed in response to changes in salinity regimes since the mid-twentieth century. Habitat maps for 1956 indicated that 18 percent of the parish land area was marsh, of which only one percent (18,404 acres) was fresh (USGS-NWRC-BRPO 1996) (See Table 2-2). By 1978, less than 100 acres of marsh were identified as fresh and the total area of marsh habitat had decreased to 15 percent of the parish land area (USGS-NWRC-BRPO 1996). By 1988/90, the fresh-to intermediate marsh habitat had increased to 4,562 acres (0.3 percent), but the overall marsh area, almost equally

**Table 2-8. Vegetation Characteristic of Habitat Types in St. Bernard Parish (CEI 1979).**

<b>NATURAL LEVEE VEGETATION</b>			
<b>TREE - CANOPY</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
American elm	<i>Ulmus americana</i>	Pecan	<i>Carya spp.</i>
Cottonwood	<i>Populus deltoides</i>	Sweetbay	<i>Magnolia virginiana</i>
Hackberry	<i>Celtis laevigata</i>	Sweetgum	<i>Liquidambar styraciflua</i>
Hickory	<i>Carya spp.</i>	Sycamore	<i>Platanus occidentalis</i>
Live oak	<i>Quercus virginiana</i>	Water oak	<i>Quercus nigra</i>
Magnolia	<i>Magnolia grandiflora</i>	Willow	<i>Salix spp.</i>
Overcup oak	<i>Quercus lyrata</i>	Willow oak	<i>Quercus phellos</i>
<b>SHRUBS - UNDERSTORY</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Bermudagrass	<i>Cynodon dactylon</i>	Hawthorn	<i>Crataegus spp.</i>
Blackberry	<i>Rubus spp.</i>	Persimmon	<i>Diospyros virginiana</i>
Deciduous holly	<i>Ilex decidua</i>	Switch cane	<i>Arundinaria tecta</i>
Dwarf palmetto	<i>Sabal minor</i>	Wax myrtle	<i>Myrica cerifera</i>
Elderberry	<i>Sambucus canadensis</i>		
<b>FRESHWATER SWAMP</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Baldcypress	<i>Taxodium distichum</i>	Sawgrass	<i>Cladium jamaicense</i>
Buttonbush	<i>Cephaelanthus occidentalis</i>	Swamp elder	<i>Iva frutescens</i>
Dwarf palmetto	<i>Sabal minor</i>	Swamp red maple	<i>Acer rubrum Drummondii</i>
Feather grass	<i>Panicum virgatum</i>	Tupelogum	<i>Nyssa aquatica</i>
Groundsel bush	<i>Baccharis halimifolia</i>	Water oak	<i>Quercus nigra</i>
Paille fine	<i>Panicum hemitomon</i>	Wiregrass	<i>Spartina patens</i>
<b>MARSH VEGETATION</b>			
<b>FRESH-INTERMEDIATE MARSH</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Bulltongue	<i>Sagittaria spp.</i>	Sawgrass	<i>Cladium jamaicense</i>
Bullwhip	<i>Scirpus californicus</i>	Wiregrass	<i>Spartina patens</i>
Deer pea	<i>Vigna repens</i>		

Table 2-8. Concluded.

<b>BRACKISH MARSH</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Arrowhead	<i>Sagittaria latifolia</i>	Saltgrass	<i>Distichlis spicata</i>
Black rush	<i>Juncus roemerianus</i>	Three-cornered grass	<i>Scirpus olneyi</i>
Coco	<i>Scirpus robustus</i>	Widgeongrass	<i>Ruppia maritima</i>
Dwarf spikerush	<i>Eleocharis parvula</i>	Wiregrass	<i>Spartina patens</i>
Oystergrass	<i>Spartina alterniflora</i>		

<b>SALINE MARSH</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Black mangrove	<i>Avicennia germinans</i>	Saltgrass	<i>Distichlis spicata</i>
Blackrush	<i>Juncus roemerianus</i>	Saltwort	<i>Batis maritima</i>
Glasswort	<i>Salicornia spp.</i>	Wiregrass	<i>Spartina patens</i>
Oystergrass	<i>Spartina alterniflora</i>		

<b>SPOIL AREAS</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Baccharis	<i>Baccharis halimifolia</i>	Roseau cane	<i>Phragmites australis</i>
Drummond red maple	<i>Acer rubrum Drummondii</i>	Water oak	<i>Quercus nigra</i>
Goldenrod	<i>Solidago spp.</i>	Wax myrtle	<i>Myrica cerifera</i>
Marsh elder	<i>Iva frutescens</i>	Willow	<i>Salix spp.</i>
Pokeweed	<i>Phytolocca americana</i>	Wiregrass	<i>Spartina patens</i>

<b>BARRIER ISLANDS</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Baccharis	<i>Baccharis halimifolia</i>	Sea oats	<i>Uniola paniculata</i>
Bitter panicum	<i>Panicum amarum</i>	Waxmyrtle	<i>Myrica cerifera</i>
Black mangrove	<i>Avicennia germinans</i>	Wiregrass	<i>Spartina patens</i>
Glasswort	<i>Salicornia spp.</i>	Beach morning glory	<i>Ipomea stolonifera</i>

<b>SUBERGENT GRASSBEDS</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Manateegrass	<i>Cymodocea filiformis</i>	Widgeongrass	<i>Ruppia maritima</i>
Shoalgrass	<i>Diplanthera spp.</i>	Wild celery	<i>Vallisneria Americana</i>
Turtlegrass	<i>Thalassia testudinum</i>		

divided between brackish and saline marsh, had decreased to approximately 14 percent of the parish land area (See Table 2-2). Wiregrass is the dominant vegetation species in brackish marshes, while oystergrass is the dominant species in saline marshes. Other commonly associated species are listed in Table 2-8.

A large portion of St. Bernard Parish land area contains elevated expanses of dredged material derived from dredging and maintenance of the MRGO channel. Smaller strips of dredged material are adjacent to oil and gas access canals and channels dredged to maintain navigation. The vegetation found growing on these sites is dependent upon the salinity of the water in the channel and the composition of the soils in the deposited material. Typically, the better-drained sections of dredged material support scrub/shrub vegetation such as wax myrtle, baccharis, black willow, marsh elder, and herbaceous perennials. Some impounded sections of the MRGO dredged material supported fresh marsh habitat in 1988/90 (USGS-NWRC-BRPO 1996).

The Chandeleur Islands, a chain of barrier islands with beaches, support saline marsh and dune vegetation that are disturbed periodically by tropical storms. The gulfward side of the Chandeleur Islands contains sand dunes, some of which become stabilized by grasses, especially wiregrass and sea oats. Farther inland, where the older dunes remain, there exist dense communities of wax myrtle and baccharis. The leeward side of the islands historically, supported dense stands of oystergrass and black mangrove. The low-wave energy, shallow, clear waters behind the islands contain the only extensive areas of submerged seagrass beds in Louisiana (Plate 10). Recent hurricanes, such as Georges in 1999, destroyed much of the marsh and dune vegetation on the Chandeleur Islands and restoration efforts were initiated in the year 2001 to replant vegetation in an effort to restore the islands. Despite some recovery, the U. S. Fish and Wildlife Service (USFWS) reported that up to 70 percent of the remaining barrier islands landmass was lost as a result of erosion from Hurricane Katina in 2005.

In response to British Petroleum's (BP) Macondo well blow out in 2010, and the spread of oil into coastal Louisiana wetlands and estuaries, the State of Louisiana obtained funds from BP to construct approximately 9 miles of berm on the eastern side of the Chandeleur Islands to trap oil coming from offshore. Approximately 5.1 million cubic yards of sediments were to be dredged from offshore of the islands or transported by hopper barge from the Mississippi River and pumped to disposal sites along the island face (Coastal Protection and Restoration Authority [CPRA] 2010). The work was performed under a Special Use Permit from the U.S. Fish and Wildlife Service, the agency managing the Breton National Wildlife Refuge and Wilderness Area. These sediments were left to be reworked and transported alongshore naturally as an addition to the islands' sediment budget. No action was taken to stabilize these dredge materials and by late 2011, no subaerial evidence of the berms remained.

## **WILDLIFE AND FISHERIES**

St. Bernard is endowed with an extremely rich and diverse heritage of renewable wildlife and fisheries resources. However, recent ecological changes involving increased salinity levels and loss of diversity in valuable marshland have caused a drop from earlier levels of peak productivity. Construction of the MRGO had an overall adverse effect on wildlife and fisheries production, particularly fur, waterfowl and oysters. The commercial fishing

industry has been experiencing a long-term reduction in catch per effort, pounds per acre and dollars per acre in recent years. This loss can be attributed to loss of low-salinity marshes that are essential to the development or reproduction of most commercial and sport fish and shellfish species. Although these environmental changes have been adverse, the parish still has an abundance of valuable wildlife and fisheries resources. Table 2-9 lists some of the mammals commonly found in the parish.

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**Table 2-9. Mammals that Occur in St. Bernard Parish (after Lowery 1974a).**

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Common Name	Scientific Name
Bobcat	<i>Lynx rufus</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Common muskrat	<i>Ondatra zibethicus</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Coyote	<i>Canis latrans</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern wood rat	<i>Neotoma floridana</i>
Fox squirrel	<i>Sciurus niger</i>
Fulvous harvest house	<i>Reithrodontomys fulvescens</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Marsh rice rat	<i>Oryzomys palustris</i>
Nearctic river otter	<i>Lutra canadensis</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
North American mink	<i>Mustela vison</i>
Northern raccoon	<i>Procyon lotor</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Nutria	<i>Myocastor coypus</i>
Red bat	<i>Lasiurus borealis</i>
Seminole bat	<i>Lasiurus seminolus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Swamp rabbit	<i>Sylvilagus aquaticus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
White-tailed mouse	<i>Peromyscus leucopus</i>
Virginia opossum	<i>Didelphis virginiana</i>

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Table 2-10 lists some of the birds commonly found in St. Bernard Parish. The parish's brackish and saline marshes provide habitat for thousands of wintering waterfowl. The best waterfowl habitat is found in the Biloxi Wildlife Management Area between Lake Borgne and Lawson Bay, in marshes on Proctor Point at the southern end of Lake Borgne and more recently in the Lake Lery area as a result of the Caernarvon Freshwater Diversion. Some plants that are attractive to various species of waterfowl found in the marshes of St. Bernard are widgeongrass, Walter's millet, three-cornered grass, coco, spikerush, and coontail.

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**Table 2-10. Birds of Common Occurrence in St. Bernard Parish (after Lowery 1974b, USACE 1974).**

Common Name	Scientific Name
American coot	<i>Fulica americana</i>
American kestrel	<i>Falco sparverius</i>
American widgeon	<i>Anas americana</i>
American woodcock	<i>Philohela minor</i>
belted kingfisher	<i>Megaceryle alcyon</i>
blue-winged teal	<i>Anas discors</i>
bobwhite (quail)	<i>Colinus virginianus</i>
canvasback	<i>Aythya valisineria</i>
clapper rail	<i>Rallus longirostris</i>
gadwall	<i>Anas strepera</i>
great blue heron	<i>Ardea herodias</i>
great egret	<i>Cammerodius albus</i>
green heron	<i>Butorides virescens</i>
green-winged teal	<i>Anas carolinensis</i>
lesser scaup	<i>Aythya affinis</i>
little blue heron	<i>Florida caerulea</i>
Louisiana heron	<i>Hydanassa tricolor</i>
mallard	<i>Anas platyrhynchos</i>
marsh hawk	<i>Circus cyaneus</i>
Mississippi kite	<i>Ictinia Mississippensis</i>
mottled duck	<i>Anas fulvigula</i>
mourning dove	<i>Zenaidura macroura</i>
pintail	<i>Anas gaita</i>
red-shouldered hawk	<i>Buteo lineatus</i>
ring-necked duck	<i>Aythya collaris</i>
shoveler	<i>Anas clypeata</i>
snow goose	<i>Chen caerulescens</i>
snowy egret	<i>Egretta thula</i>
Virginia rail	<i>Rallus limicola</i>
white ibis	<i>Eudocimus albus</i>
Wilson's snipe	<i>Capella gallinago</i>
yellow rail	<i>Coturnicops noveboracensis</i>

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Snow geese are found in the marshes in great numbers during the winter, particularly along the islands on the edges of the Chandeleur Sound. These geese feed on marsh grass, roots, and tubers and sometimes "eat out" an area of marsh causing shallow ponds to form.

There are numerous species of ducks that inhabit the marshes, mainly during the winter, although some are year-round residents. Teal breed here occasionally although the great majority of this species are winter residents only. The mottled duck is the only duck which

breeds in large numbers in the St. Bernard marshes. The gadwall, also known as the gray duck, is a very common winter visitor. Pintails are a favorite game bird that winter in the marshes of the parish. Green-winged teal are very common winter residents of the marshes. Blue-winged teal migrate through to the south in late summer and fall. The northern shoveler, or spoonbill as it is known locally, arrives in the fall and stays through spring. The American widgeon, or baldpate, is another winter resident. The canvasback, and redhead are usually uncommon winter residents but sometimes appear in great numbers, especially in the Chandeleur Sound near the Chandeleur Islands. The lesser scaup, or dos gris, is a common winter resident. Hooded, red-breasted, and American mergansers are common winter residents, especially in Lake Borgne where they feed mainly on fish.

Clapper rails are common marsh inhabitants in the brackish and saline marsh. Virginia rails are primarily winter residents who occasionally remain to breed. The American coot, or “poule d'eau” as it is known in the Cajun vernacular, is a common winter resident in the lower salinity marshes, particularly where submergent aquatic vegetation is available. Common loons are prevalent winter residents in Lake Borgne. Other winter residents include the eared and horned grebes. The pied-billed grebe is abundant during winter months and also frequently breeds in the area. The double-crested cormorant is another common resident during winter. Large flocks of white pelicans migrate into the marshes and estuaries of the parish during the winter.

St. Bernard provides excellent habitat for many species of seabirds, shorebirds, and wading birds. The numerous marshy islands with fringing mangroves and the shell reefs and beaches of the Chandeleur Islands and adjacent sound serve as nesting grounds and rookeries (Plate 10, Table 2-11). The Chandeleur Islands contained one of the “natural” colonies of brown pelicans in the state. Since the dramatic die-off of the state's population and their subsequent reintroduction from Florida, they have been observed nesting here again. Seabird colonies active on the Chandeleur Islands and perimeter marsh islands of eastern St. Bernard Parish in 2008 included brown pelicans; laughing gulls; Forrester's, royal, and sandwich terns; black skimmers; and American oystercatchers. Active shore and wading bird rookeries during this period included little blue herons; black-crowned night herons; tricolored, snowy and great egrets; roseate spoonbills and white ibises (LDWF, Natural Heritage Program [NHP] 2010). Table 2-11 identifies the type and number of seabirds and wading birds in active colonies in 2008. Environmental Management Unit 9 (Bay Boudreau-Bay Eloi) has the largest number of colonies (21) followed by EMU 6 (Lake La Fortuna) and 15 (Chandeleur Sound and Islands) with 10 colonies and EMU 14 (Lake Borgne) with one colony.

St. Bernard Parish, historically, has had some of the best marsh in the state for furbearer production, particularly muskrat and nutria. Due to increasing salinity, as well as the worldwide downturn in the fur industry, the fur-trapping industry has suffered major setbacks and is almost non-existent in the parish today. Fur production has suffered because of the loss of freshwater marsh and swamp habitats. However, with implementation of freshwater diversions such as the Caernarvon Freshwater Diversion, there has been an improvement in habitat for fur-bearing animals and the industry may rebound if market conditions are satisfactory.

**Table 2-11. Seabird and Wading Bird Colonies in St. Bernard Parish in 2008 (LDWF-NHP 2010).**

Location & Colony No.	Nesting Birds	Species	Species Present in 2008
031 <sup>a</sup>	75	1	Forester's tern
032 <sup>a</sup>	5	1	Forester's fern
066 <sup>c</sup>	500	1	laughing gull
068 <sup>b</sup>	1400	1	laughing gull
070 <sup>b</sup>	2000	2	brown pelican, laughing gull
107 <sup>a</sup>	835	3	laughing gull, snowy egret, tricolored heron
109 <sup>a</sup>	250	3	black skimmer, Forester's tern, laughing gull
137 <sup>c</sup>	1295	5	laughing gull, roseate spoonbill, tricolored heron, white ibis, black-crowned night heron
146 <sup>b</sup>	140	2	black skimmer, Forester's tern
149 <sup>c</sup>	100	1	laughing gull
153 <sup>c</sup>	1600	2	brown pelican, laughing gull
155 <sup>b</sup>	212	2	laughing gull, tricolored heron
181 <sup>b</sup>	155	2	laughing gull, tricolored heron
205 <sup>d</sup>	825	5	Forester's tern, laughing gull, snowy egret, tricolored heron, white ibis
207 <sup>b</sup>	360	2	black skimmer, laughing gull
208 <sup>b</sup>	125	2	black skimmer, Forester's tern
211 <sup>b</sup>	385	3	laughing gull, snowy egret, tricolored heron
212 <sup>a</sup>	4116	7	Forester's tern, laughing gull, roseate spoonbill, snowy egret, tricolored heron, white ibis, black-crowned night heron
280 <sup>c</sup>	7100	4	black skimmer, laughing gull, royal tern, sandwich tern
392 <sup>c</sup>	250	2	Forester's tern, laughing gull
441 <sup>a</sup>	20	1	Forester's tern
505 <sup>b</sup>	50	1	laughing gull
507 <sup>b</sup>	700	5	laughing gull, roseate spoonbill, snowy egret, tricolored heron, white ibis, black-crowned night heron
514 <sup>a</sup>	604	3	black skimmer, Forester's tern, American oystercatcher
518 <sup>b</sup>	125	1	Forester's tern
519 <sup>b</sup>	430	2	laughing gull, little blue heron
525 <sup>b</sup>	50	1	laughing gull
541 <sup>b</sup>	260	4	laughing gull, snowy egret, tricolored heron, white ibis
637 <sup>b</sup>	20	1	Forester's tern
664 <sup>c</sup>	375	3	brown pelican, laughing gull, great egret
666 <sup>c</sup>	7400	4	gull-billed tern, laughing gull, royal tern, sandwich tern
670 <sup>c</sup>	50	1	black skimmer
677 <sup>a</sup>	50	1	Forester's tern
690 <sup>c</sup>	200	1	laughing gull
743 <sup>b</sup>	385	3	laughing gull, tricolored heron, white ibis
744 <sup>b</sup>	800	3	black skimmer, royal tern, sandwich tern
745 <sup>b</sup>	1064	4	laughing gull, American oystercatcher, snowy egret, little blue heron
746 <sup>b</sup>	3200	3	laughing gull, snowy egret, tricolored heron
747 <sup>b</sup>	2250	2	laughing gull, tricolored heron
748 <sup>b</sup>	5080	2	laughing gull, tricolored heron
749 <sup>a</sup>	15	1	Forester's tern
750 <sup>a</sup>	400	1	laughing gull

<sup>a</sup> EMU 6 Lake La Fortuna

<sup>b</sup> EMU 9 Bay Boudreau-Bay Eloi

<sup>c</sup> EMU 15 Chandeleur Sound and Islands

<sup>d</sup> EMU 14 Lake Borgne

\* See Plate 10 for site location.

Muskrat and nutria, historically constituted the bulk of the furbearing animals trapped in the parish. Nutria prefer freshwater vegetation such as alligatorweed, cattail, bullwhip, cutgrass, delta duck potato, and others. When found in brackish marshes, they feed on three-cornered grass, wiregrass, leafy three-square, and hogcane. Nutria have become the scourge of coastal freshwater-to-low salinity brackish marshes in recent years since the decline in fur prices and subsequent decrease in trapping and are often cited as a major cause of land loss because of their denuding wetlands of vegetation. With improvement in marsh habitat in areas of freshwater diversion nutria are expected to proliferate and create a more serious land loss problem in these areas of the parish. Nutria have been harvested in St. Bernard Parish as part of the Coastwide Nutria Control Program (CWPPRA Project LA-03b) since the 2002-2003 season. In the 2010-2011 season, 29,279 tails were harvested, representing 8.6 percent of the 338,512 tails harvested in 19 coastal parishes (LDWF 2011a).

Muskrats, whose preferred habitat is brackish marsh supporting stands of three-cornered grass, were most common in the marshland around Lake Lery and portions of the Biloxi Marshes. Loss of favorable habitat around Lake Lery impacted muskrat populations, but reintroduction of freshwater via the Caernarvon Diversion Structure has enhanced the habitat for muskrat. Historically, wetland management for muskrat involved establishing and maintaining stands of three-cornered grass. Three-cornered grass is a subclimax species that, in the normal successional pattern of plant succession, is replaced with wiregrass, the climax species of this habitat type. Burning is a common management tool that sets back the normal pattern and allows three-cornered grass to dominate. Muskrats, like nutria, often “eat out” an area of marsh if they are too abundant. This habit causes the marsh to open up into shallow ponds that are susceptible to erosion processes and contribute to wetland loss.

Otters also contribute to the fur harvest of St. Bernard. Their pelts are the more desirable; however, they usually make up only a small percentage of the pelts taken. Their most productive habitats in St. Bernard are the intermediate-to-brackish marshes. Even in the best habitats, however, they are never found in great numbers.

Raccoon is another animal that contributes to the fur harvest of St. Bernard. The pelts taken in this area, like those from other areas of coastal Louisiana, are not of the highest commercial value. Their great numbers make them an important resource, nevertheless. Their preferred habitat is fresh marsh, however, they are relatively abundant in brackish marsh and along the natural levees. Preferred foods include crawfish, frogs, grasshoppers, and other animal matter, including bird eggs. Their diet also includes some plant material. Mink are another important resource of St. Bernard. The best mink pelts come from freshwater cypress swamps. Destruction of these freshwater areas has led to a decrease in the number of mink. The diet of mink consists of animal matter including fish, crawfish, frogs, rats, mice, and birds. Other furbearers of lesser importance are the Virginia opossum, striped skunk, eastern cottontail, and swamp rabbit.

Natural levees provide habitat for many species of animals and birds and serve with spoil banks as the only high ground when flooding occurs. White-tailed deer inhabit these levees, but are becoming less common as these areas are converted to other uses including residential and commercial development. Deer are browsers and feed on many species of

plants. Acorns from the oaks on these levees supply the bulk of their winter diet. Many songbirds use natural levee habitat for nesting. Other species on the levees include the eastern cottontail, raccoon, and striped skunk.

Fishing is an important part of life, as well as an important source of income, for many residents of St. Bernard. The Pontchartrain estuarine unit, of which St. Bernard is a major component, ranks second in total harvest only to the Barataria Basin area. Louisiana as a whole produces 27 percent of the fisheries tonnage of the entire United States. Despite the problems of saltwater intrusion, subsidence, and land loss, estuarine areas of the parish still serve as important nursery grounds and grow-out areas for many species of fish and shellfish.

In the estuaries and offshore waters of St. Bernard, there are many species of commercial and sport fish and shellfish (Table 2-12), among the most commercially important of which are Gulf menhaden; white and brown shrimp; blue crab; speckled trout; red drum; black drum; spot; sand seatrout; southern flounder; Atlantic croaker; and American oyster. Table 2.13 summarizes the life history and wetland-aquatic habitat use of eight of the more commercially valuable aquatic fauna in St. Bernard Parish.

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**Table 2-12. Common Commercial Fish, Sport Fish, and Shellfish Found in the Waters of St. Bernard Parish.**

<b>FISH</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Alligator gar	<i>Lepisosteus spatula</i>
Atlantic croaker	<i>Micropogon undulatus</i>
Black drum	<i>Pogonias cromis</i>
Gulf menhaden	<i>Brevoortia patronus</i>
Red drum (redfish)	<i>Sciaenops ocellata</i>
Sand sea trout	<i>Cynoscion arenarius</i>
Sheepshead	<i>Archosargus probatocephalus</i>
Southern flounder	<i>Paralichthys lethostigma</i>
Spotted seatrout	<i>Cynoscion nebulosus</i>
Striped mullet	<i>Mugil cephalus</i>

<b>SHELLFISH</b>	
<b>Common Name</b>	<b>Scientific Name</b>
American oyster	<i>Crassostrea virginica</i>
Blue crab	<i>Caleinectes sapidus</i>
Brown shrimp	<i>Penaeus aztecus</i>
White shrimp	<i>Penaeus setiferus</i>

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**Table 2-13. Summary of Life History and Habitat Data for Commercially Valuable Aquatic Fauna in St. Bernard Parish (After Wicker et al. 1982).**

SPECIES	REPRODUCTION	POSTLARVAE	JUVENILES	SUBADULTS	ADULTS
<b>Brown Shrimp</b>	<u>Sept.-Jun.</u> Gulf of Mexico (GOM), 16-60 fathoms (fath.) (96-360 ft)	<u>Feb.-Apr.</u> (12-25 mm SL) (0.47-0.98 in SL) Lower estuary, tidal passes, bays, sounds	<u>Mar.-Jun.</u> (25-90 mm SL) (0.98-3.54 in SL) Upper estuary, nursery grounds, shallow marsh shorelines, bayous, 10-20 ppt, 20-30°C (68-86°F)	<u>May-Nov.</u> (90-140 mm SL) (3.54-5.51 in SL) Mid-lower estuary, staging grounds, bayous, lakes, bays, sounds, Gulf of Mexico	<u>All Year.</u> (140 mm SL) (5.5 in) GOM
<b>White Shrimp</b>	<u>Mar.-Nov.</u> GOM, 4-17 fath. (24-102 ft)	<u>Jul.-Aug.</u> Lower estuary, tidal passes, bays, sounds	<u>Jun-Sept.</u> Upper estuary, nursery grounds, shallow marsh shorelines, 0.5-10 ppt, 20-30°C (68-86°F)	<u>Aug.-Dec.</u> Mid-lower estuary, staging grounds, bayous, lakes, bays, sounds, GOM	<u>All year.</u> GOM
<b>Blue Crab</b>	<i>Mating: May-Sept.</i> Estuarine waters <20 ppt <i>Spawning: Jun.-Aug.</i> Lower estuary, bays, sounds, GOM, >21 ppt	<u>Feb.-Nov.</u> Lower estuary, tidal passes, bays, sounds	<u>Dec.-Mar.</u> Upper estuary, nursery grounds, shallow marsh shorelines, 0.5-10 ppt	<u>All year.</u> Throughout estuary	<u>All year.</u> Throughout estuary
<b>American Oyster</b>	<u>May-Oct.</u> Reef waters >10 ppt and near 27°C (80.6°F)	<u>Jun.-Oct.</u> (Spatfall) Reef waters >20 ppt and 29°C (84.2°F)	<u>All year.</u> (Seed oysters) Reef waters 5-15 ppt	<u>All year.</u> (Cultured oysters on bedding grounds) Reef waters 10-25 ppt	<u>All year.</u> Reef waters 5-30 ppt
<b>Spotted Seatrout</b>	<u>Apr.-Oct.</u> Lower estuary, near tidal passes, bays, sounds, shallow GOM, >20 ppt and near 25°C (77°F)	<u>May-Sept.</u> (5-15 mm SL) (0.19-0.59 in SL) Lower estuary, tidal passes, bays, sounds	<u>All year.</u> Mid-upper estuary nursery grounds, shallow marsh shorelines to freshwater	<u>All Year.</u> Mid-lower estuary, bayous, lakes, bays, sounds, >5 ppt and 10°C (50°F)	<u>All Year.</u> Mid-lower estuary, GOM, bayous, lakes, bays, sounds > 5 ppt and 10°C (50°F)
<b>Red Drum</b>	<u>Aug.-Nov.</u> GOM near tidal passes, > 20 ppt	<u>Sept.-Nov.</u> (5-15 mm SL) (0.19-0.59 in SL) Lower estuary, tidal passes, bays, sounds	<u>All Year.</u> Mid-upper estuary, nursery grounds, shallow marsh shorelines to freshwater	<u>All year.</u> Mid-lower estuary	<u>All year.</u> Lower estuary, GOM, >20 ppt
<b>Gulf Menhaden</b>	<u>Oct.-Apr.</u> GOM, < 20 fath.	<u>Feb.-Apr.</u> (12-21 mm SL) (0.47-0.83 in SL) Lower estuary, tidal passes, bayous, bays, sounds	<u>May-Oct.</u> Upper estuary, nursery grounds, shallow marsh shorelines, <15 ppt to freshwater	<u>Sept.-Dec.</u> Lower estuary, bayous, lakes, bays, sounds, nearshore GOM	<u>All year.</u> GOM
<b>Atlantic Croaker</b>	<u>Sept.-Apr.</u> GOM, mid-outer continental shelf	<u>Nov.-Feb.</u> (5-15 mm SL) (0.19-0.59 in SL) Lower estuary, tidal passes, bays, sounds	<u>Jan.-Aug.</u> Upper estuary, nursery grounds, shallow marsh shorelines, to freshwater	<u>May-Dec.</u> Mid-lower estuary, bays, sounds, bayous, lakes	<u>All year.</u> Lower estuary, GOM

mm = millimeters

in = inches

SL = standard length

ppt = parts per thousand (a measure of salinity level)

The oyster growing areas of St. Bernard Parish are divided into public oyster growing area and private oyster growing areas which are leased by individuals from the state (Plate 10). Recent data indicate that there are approximately 89,124 acres of privately leased oyster grounds and 700,872 acres of public oyster growing areas in St. Bernard Parish (Plate 10) (Table 2-14) (LDWF-NHP 2009.) Commercial fishing is a year-round activity for many residents of the St. Bernard Parish, and sport fishing is important for both residents and visitors.

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**Table 2-14. Public Oyster Grounds and Private Oyster Leases by Environmental Management Units (LSU Dept. of Geography & Anthropology [DGA] 2007).**

Environmental Management Unit	2006 Public Grounds (ac)*	2007 Private Grounds (ac)**
EMU 1 - Bienvenue-Proctor Point Marsh	315	940
EMU 4 - Lake Lery Marsh	0	173
EMU 5 - Bayou Terre Aux Boeufs Wetlands	0	1,548
EMU 6 - Lake La Fortuna	18,112	14,730
EMU 7 - Lower La Loutre Wetlands	0	2,760
EMU 8 - Biloxi Marsh	276	3,770
EMU 9 - Bay Boudreau – Bay Eloi	49,744	54,491
EMU 14 – Lake Borgne	182,335	9,670
EMU 15 – Chandeleur Sound	450,090	1,042
<b>Total:</b>	<b>700,872</b>	<b>89,124</b>

\* Louisiana Department of Wildlife & Fisheries 2006

\*\* Louisiana Department of Natural Resources 2007. Oyster Lease Data

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## ENDANGERED AND THREATENED SPECIES

According to the USFWS and LDWF-NHP (2008), seven protected species are listed for St. Bernard Parish (Table 2-15). The Gulf sturgeon inhabits all saltwater habitats of Louisiana, except during the spawning season when it is found in major rivers that empty into the Gulf of Mexico. Most records of the Gulf sturgeon have been in the Pearl, Bogue Chitto and Tchefuncte rivers, although it is likely to be found in any large river in the Lake Pontchartrain drainage basin. According to USFWS, critical habitat for the Gulf sturgeon exists in St. Bernard Parish, particularly in the Lake Borgne areas. The single most important threat to this species is the incidental catch in trammel and gill nets (LDWF-NHP 2008).

The pallid sturgeon inhabits large rivers throughout the southeast United States and can be found in the Mississippi and Atchafalaya Rivers and Lake Pontchartrain Basin. Threats to

**Table 2-15. Rare, Threatened and Endangered Species, St. Bernard Parish (LDWF-LNHP 2008a, Lorenz 2010.)**

Common Name	Scientific Name	Federal Status	State Status
Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	T
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	E	E
Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	T
Piping Plover	<i>Charadrius melanodus</i>	T/E	T/E
Snowy Plover	<i>Charadrius alexandrinus</i>	PS:T	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	D	E
Brown Pelican	<i>Pelecanus occidentalis</i>	D	E
Manatee	<i>Trichechus manatus</i>	E	E
Diamondback Terrapin	<i>Malaclemys terrapin</i>		Restricted Harvest
Paddlefish	<i>Polyodon spathula</i>		Prohibited Possession

\*T – Threatened; E – Endangered; D – De-listed; PS – Partial status (only on portion of its range)

this species includes the channelization of rivers and construction of reservoirs that eliminate spawning habitat, changes in habitat and water quality, and interbreeding with shovelnose sturgeon (LDWF-NHP 2008a).

The loggerhead sea turtle inhabits both shallow and deep marine water, especially with submerged seagrass beds, salt marshes, bays, tidal passes, and coastal dunes during nesting season, and has been known to nest on the Chandeleur Islands. Main threats to this species include the erosion of barrier islands where nesting occurs, the take of eggs, young, and adult turtles as food and incidental take by fishing and shrimping gear (LDWF-NHP 2008a).

The piping plover habitat includes beaches, washovers and mudflats of barrier islands in the southeastern coastal parishes of Louisiana, but the species is an uncommon visitor to the parish's sandy beaches. Threats to this species include disturbances by humans and destruction of nests and young, the loss of nesting habitat from erosion and loss of coastal land (LDWF 2008a). The USFWS has designated the Breton Islands and Chandeleur Island chain as critical habitat for the piping plover (USFWS 2008a).

The snowy plover nests in loose colonies on open beaches and occupies a winter habitat consisting mostly of dry sandy or shell beaches above the high tide mark and along the coast or on barrier islands. The species is a relatively rare migrant and winter resident along the coast. In general threats include trampling of eggs and nests by humans, vehicles or large mammals; entanglement in discarded fishing line; habitat degradation or abandonment of colonies as a result of the expansion of development and recreation; and habitat loss due to coastal erosion and land loss (LDWF-NHP 2008a). Within St. Bernard Parish, potential habitat could occur on shell islands and barrier islands bordering the Chandeleur Sound.

The bald eagle nests primarily in the southeastern coastal parishes of Louisiana, typically in the tops of cypress trees near open water and feeds in open lakes. The numbers for the bald eagle are increasing annually and, because of this, they have been de-listed by the USFWS,

but area still protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. In general, the bald eagle remains subject to threats including the loss of critical habitat, and disturbances by human activity to nesting pairs during nesting season by humans (LDWF-NHP 2008a).

The brown pelican inhabits bays and tidal estuaries along the coast and nests commonly in shrub thickets within dunes of barrier islands. This species disappeared from the parish in the early 1970s, but was restocked by the LDWF and recently colonized the Chandeleur Islands, Isle au Pitre and North Island (LDWF-NHP 2008a). The USFWS has de-listed the brown pelican, but the state status remains as endangered.

The manatee is found in open marine waters, bays and rivers with submerged aquatic beds or floating vegetation, but is not commonly found in Louisiana. It has been known to visit the Pearl, Mermentau, Calcasieu, and Sabine Rivers and waterways of the Pontchartrain and Barataria basins. Major threats to the manatee include being struck by boats and barges, habitat loss and death due to flood control structures and extended periods of below freezing temperatures (LDWF-NHP 2008a).

Neither the diamondback terrapin nor the paddlefish are listed as threatened or endangered by the state or federal government. However, there are restrictions on the harvest of diamondback terrapins in Louisiana and possession of paddlefish are prohibited (LDWF-LNHP 2008a.)

No federally listed endangered or threatened plant species occur in St. Bernard Parish (LDWF-LHNP 2008).

## **CULTURAL RESOURCES**

### **Historic Information**

St. Bernard Parish was settled by non-Native Americans in 1718, when immigrants entered the region to develop indigo and sugarcane plantations. The parish received its name from the old ecclesiastical district of St. Bernard. During the French regime, St. Bernard was included in the District of New Orleans, one of the nine districts into which the province of Louisiana was first divided in 1723. After the sale of Louisiana to the United States in 1803, St. Bernard was in the New Orleans District. In 1807, when the Territorial Legislature divided the territory into 19 parishes, the parish of St. Bernard was created with the City of Chalmette as the parish seat.

Europeans first settled in the New Orleans area around 1700, and by the late 1800s, the population had reached about 120,000. The contributions of various cultures including French, Spanish, including Islenos from the Canary Islands, British, Africans, Croatian-Americans and others give the area its character and their influence can be seen in the monuments, buildings, folklore and historic place names. Acadians also settled in the parish, coming from Canada and from Santo Domingo in the Caribbean. The settlers were farmers, planters, and excellent trappers, and their influence is evident also in the folklore and food of the area. The French were the first European settlers of the parish and most were farmers of

indigo until cotton was introduced in 1740. From 1762 until 1803, the Spanish had control of Louisiana. On 20 December 1803, the territory of Louisiana was officially transferred to the United States. On 8 January 1815, the famous battle of New Orleans, where Andrew Jackson defeated the British forces, took place almost entirely in St. Bernard Parish. Near the battlefield is the “Four Oaks” commemorative site where it is said that the British General Pakenham died.

Many areas of the parish contain a number of sites commemorated by historical markers, including the St. Bernard Church and Cemetery, the sites of the former De La Ronde, Villere, and Contreras Plantations, the Ducros Historical Museum, and the former sites of the Jumonville and Reggio Plantations. The Kenilworth Plantation, a private residence, was built in 1759, and is in excellent condition.

The U.S. National Cemetery near Chalmette was established in 1864. More than 14,000 soldiers and sailors from every part of the United States are interred here, although about half of the graves are unidentified. Two graves are those of men who died in the Battle of New Orleans. The cemetery is listed in the National Register of Historic Places. The parish also contains the site of the first steam sugar mill, and examples of the latest advances in the oil, gas, and manufacturing industries can also be found in this area.

After the Civil War (1861-1865), the economy of St. Bernard Parish began to change from the plantation type economy to small farms. About this time, the lumbering period began, and nearly all the virgin cypress forests were harvested from the area by the early 20th century.

Since the 1920s, St. Bernard Parish’s character and economy have been changing gradually from rural/agricultural to urban/industrial. Urbanization of the most suitable parish lands on the natural levees has been almost total, and today the marginal, low-lying areas are experiencing the increasing demands of urbanization, industrialization, and other development forces.

### **Archaeological Sites**

St. Bernard Parish is rich in historic and cultural places as indicated by the number of sites shown in Plate 11 and recorded on Table 2-16 (LA Dept. of Culture, Recreation and Tourism, Division of Archaeology [LDCRT-DA] 2009). Since prehistoric times, humans have found this coastal environment a very desirable place in which to live. Archaeological records show that the St. Bernard delta complex has been occupied by humans at least as far back as 1740 B.C., as evidenced by the many Native American mounds and middens located throughout the parish.

The sites depicted on Plate 11 represent cultures from the Poverty Point Period (1800-500 B.C.), the Tchefuncte and Marksville Periods (500 B.C.-A.D. 300), the Troyville and Coles Creek Periods (A.D. 300-1000), to the Mississippi Period and early historic times (A.D. 1000-1700) (Gagliano et al. 1978). These cultures provide a valuable record of the development of prehistoric people in the region and how they coped with the environmental conditions, used the natural resources, and structured their society.

**Table 2-16. St. Bernard Parish Archaeological Sites with Reported Culture Periods and Phase Designations (Gagliano et al. 1979, Weinstein 2009, LDCRT-DA 2009.)**

Map No.*	Site No.	Site Name	Cultural Period	Phase
1	16SB1	Lawson Bay	Coles Creek Mississippi	Bayou Cutler Bayou Petre
2/3	16SB2/3	Machias Lake (Pass Fernandia)	Marksville Baytown Coles Creek	
2/3	16SB3	Same as 16SB2		
4	16SB4	Pirate Point	Coles Creek Mississippi	Bayou Cutler Bayou Petre
5	16SB5	Shell Island	Mississippi	Bayou Petre
6	16SB6	Shell Point	Baytown Coles Creek	Whitehall Bayou Cutler Bayou Petre
7	16SB7	Northwest of Jack Williams Bay	Baytown Coles Creek Mississippi	Whitehall Bayou Cutler Bayou Petre
8	16SB8	Yscloskey	Coles Creek Mississippi	Bayou Cutler Bayou Petre
9	16SB9	Malheureux Point	Coles Creek Mississippi	Bayou Cutler Bayou Petre
10	16SB10	Bayou Pierre	Coles Creek Mississippi	Bayou Cutler Bayou Petre
11/13	16SB11	Bayou Pierre	Coles Creek Mississippi	Bayou Cutler Bayou Petre
12	16SB12	Mulatto Bayou (Lone Oak Mound)	Baytown Coles Creek Mississippi	Whitehall Bayou Cutler Bayou Petre
11/13	16SB13	Same as 16SB11		
14	16SB14	Site in Mississippi, not Louisiana		
15/23	16SB15	Same as 16SB23 (eroded, not mapped)		
16	16SB16	Door Point	Neo-Indian	
17	16SB17	Flower Island	Pre-Mississippi Neo-Indian	
18	16SB18	Same as 16SB12		
19	16SB19	Free Mason Island	Coles Creek Plaquemine Mississippi	
20	16SB20	Grand Pass I	Coles Creek Mississippi	Bayou Cutler Bayou Petre
21	16SB21	Grand Pass II	Coles Creek Mississippi	Bayou Cutler Bayou Petre
22	16SB22	Isle au Pitre	Coles Creek Mississippi	
23	16SB23	North Island (eroded, not mapped).	Marksville Mississippi	Labranche Bayou Petre

**Table 2-16. Continued.**

Map No.	Site No.	Site Name	Cultural Period	Phase
24	16SB24	Bayou Eloi	Coles Creek Mississippi	Bayou Cutler Bayou Petre
25	16SB25	South Island	Marksville Mississippi	?** Bayou Petre
26	16SB26	Lake Jean Louis Robin	Unknown	
27	16SB27	Grand Coquille Point I	Unknown	
28	16SB28	Grand Coquille Point II	Marksville Baytown Coles Creek	Magnolia Whitehall Bayou Petre
29	16SB29	Lake of the Second Trees I (Yucca Mound)	Mississippi	Bayou Petre
30	16SB30	Negro Point	Unknown	
31	16SB31	Johnson Bayou	Mississippi	Bayou Petre
32	16SB32	Twilight Harbor	Baytown Coles Creek	Whitehall Bayou Cutler
33	16SB33	Seven Dollar Bay	Neo-Indian	
34	16SB34	Point Gardner	Unknown	
35	16SB35	Three Mile Bay	Neo-Indian Historic	
36	16SB36	Elephant Point Pass	Neo-Indian	
37	16SB37	Kerchimbo Bay	Neo-Indian	
38	16SB38	Reggio I	Prehistoric Historic	
39	16SB39	Shell Beach Bayou	Marksville	
40	16SB40	Dupre	Marksville Baytown Coles Creek Mississippi	? Whitehall Bayou Cutler Bayou Petre
41	16SB41	Kenilworth Canal	Coles Creek Mississippi	Bayou Cutler Bayou Petre
42	16SB42	Reggio II	Prehistoric	
43	16SB43	Doulluts Canal	Neo-Indian	
44	16SB44	Shell Beach	Tchula Marksville Coles Creek Mississippi Historic	Pontchartrain Magnolia Bayou Cutler Bayou Petre 19 <sup>th</sup> & 20 <sup>th</sup> Centuries
45	16SB45	Bayou Yscloskey I	Coles Creek Mississippi	Bayou Cutler Medora
46	16SB46	Bayou Yscloskey II	Unknown	
47	16SB47	Bayou St. Malo	Coles Creek Mississippi	Bayou Cutler Bayou Petre
48	16SB48	East Bayou	Baytown Coles Creek	Whitehall Bayou Cutler
49	16SB49	Magnolia Mound	Marksville Mississippi	Magnolia Bayou Petre

**Table 2-16. Continued.**

Map No.	Site No.	Site Name	Cultural Period	Phase
50	16SB50	Southwest of Cut-off Lagoon	Marksville Baytown Coles Creek	Magnolia Whitehall Bayou Cutler
51	16SB51	Northwest of Cut-off Lagoon	Marksville	Magnolia
52	16SB52	Shotgun Shell	Neo-Indian	
53	16SB53	Bayou Biloxi I	Marksville Coles Creek Mississippi	Magnolia Bayou Cutler Bayou Petre
54	16SB54	Lone Tree Hill	Unknown	
55	16SB55	Bayou Biloxi II	Unknown	
56	16SB56	Lake of the Mounds	Unknown	
57	16SB57	Bottle Bayou	Coles Creek Mississippi	Bayou Cutler Bayou Petre
58	16SB58	Bayou Terre aux Boeufs II	Coles Creek Mississippi	Bayou Cutler Bayou Petre
59	16SB59	Eighty Arpent Canal	Coles Creek	Bayou Cutler
60	16SB60	Grand Bayou	Unknown	
61	16SB61	Lake of the Second Trees II	Marksville Coles Creek Mississippi	Magnolia Bayou Petre
62	16SB62	Lake Borgne	Mississippi	Bayou Petre
63	16SB63	South of Lake Borgne	Unknown	
64	16SB64	Cut-off Bayou	Marksville Baytown Coles Creek	Magnolia Whitehall Bayou Cutler
65	16SB65	Bayou Guyago	Historic	
66	16SB66	No Name	Unknown	
67	16SB67	No Name	Mississippi	Medora(?)
68	16SB68	Bayou La Loutre, Section 30	Coles Creek Mississippi	Bayou Cutler Bayou Petre
69	16SB69	Bayou La Loutre, MRGO	Marksville Mississippi	Magnolia Bayou Petre
70	16SB70	Padre Bayou	Coles Creek Mississippi	Bayou Cutler Bayou Petre
71	16SB71	Lake Borgne Bayou Dupre	Coles Creek Mississippi Historic	Bayou Cutler Bayou Petre 19 <sup>th</sup> Century
72	16SB72	Raccoon Island	Coles Creek Mississippi	Bayou Cutler Bayou Petre
73	16SB73	La Petit Pass Island	Neo-Indian	
74	16SB74	Orange Mound	Unknown	
75	16SB75	Northwest of Bayou Guyago	Unknown	

**Table 2-16. Continued.**

Map No.	Site No.	Site Name	Cultural Period	Phase
76	16SB76	Bayou La Loutre Levee	Mississippi Neo-Indian Historic	
77	16SB77	Bayou La Loutre	Mississippi	Bayou Petre
78	16SB78	Garfish Point	Unknown	
79	16SB79	Northeast of Joe Shiman Pass	Unknown	
80	16SB80	Mussel Bayou	Unknown	
81	16SB81	Bayou Lery	Coles Creek Neo-Indian	
82	16SB82	Northeast of Bayou Lery	Neo-Indian	
83	16SB83	Fort Proctor (Fort Beauregard)	Historic	19 <sup>th</sup> Century
84	16SB84	Battery Bienvenue	Historic	19 <sup>th</sup> Century
85	16SB85	Martello Castle	Historic	19 <sup>th</sup> Century
86	16SB86	Kenilworth Plantation	Historic	19 <sup>th</sup> Century
87	16SB87	Proctor Sugar Mill	Historic	19 <sup>th</sup> Century
88	16SB88	De La Ronde Plantation	Historic	19 <sup>th</sup> Century
89	16SB89	Lake Borgne Canal Redoubt	Historic	19 <sup>th</sup> Century
90	16SB90	Bayou La Loutre Cemetery	Historic	19 <sup>th</sup> Century
91	16SB91	Bayou La Loutre Homes	Historic	19 <sup>th</sup> Century
92	16SB92	MRGO - Homes	Historic	19 <sup>th</sup> Century
93	16SB93	Bayou Bernard Canal	Historic	19 <sup>th</sup> Century
94	16SB94	Bakers Ditch	Historic	19 <sup>th</sup> Century
95	16SB95	Pearstein	Historic	19 <sup>th</sup> Century
96	16SB96	Grand Pass Midden (Same as 16SB20) (Not mapped)	Coles Creek (?) Mississippi	Bayou Cutler (?) Bayou Petre
97	16SB97	Gardner Island	Coles Creek	Bayou Cutler
98	16SB98	Mosquito Inlet	Mississippi	Bayou Petre
99	16SB99	Shell Beach Railroad	Mississippi Historic	Bayou Petre 19 <sup>th</sup> Century
100	16SB100	Horseshoe Bayou	Neo-Indian	No Data
101	16SB101	Reunion Plantation	Historic	18 <sup>th</sup> – 20 <sup>th</sup> Centuries
102	16SB102	Merits Plantation	Historic	18 <sup>th</sup> & 19 <sup>th</sup> Centuries
103	16SB103	No Name	Coles Creek Mississippi	Bayou Cutler Bayou Petre
104	16SB104	No Name	Historic	19th Century
105	16SB105	Lake Borgne Canal Lock	Historic	19th Century
106	16SB106	No Name	Historic	20th Century
107	16SB107	No Name	Historic	19th Century
108	16SB108	No Name	Historic	20th Century

**Table 2-16. Continued.**

Map No.	Site No.	Site Name	Cultural Period	Phase
109	16SB109	No Name	Historic	20th Century
110	16SB110	No Name	Historic	19th Century
111	16SB111	No Name	Historic	19th Century
112	16SB112	No Name	Historic	19th Century
113	16SB113	No Name	Historic	20th Century
114	16SB114	No Name	Historic	20th Century
115	16SB115	No Name	Historic	19th Century
116	16SB116	No Name	Historic	19th Century
117	16SB117	No Name	Historic	20th Century
118	16SB118	No Name	Historic	20th Century
119	16SB119	Chateau des Fleur Plantation House (?)	Historic	19th Century
120	16SB120	No Name	Neo-Indian, possibly Mississippi	
121	16SB121	Yscloskey Plantation	Historic	19th Century
122	16SB122	Poydras Plantation Mill remains	Historic	18-20th Centuries
123	16SB123	Merritt Plantation	Historic	18-20th Centuries
124	16SB124	Jumonville Plantation Site	Historic	18-20th Centuries
125	16SB125	Bettie Pendley Site	Multi-component includes Marksville Coles Creek	
126	16SB126	Daniel Site	Neo-Indian	
127	16SB127	Delta One	Neo-Indian	
128	16SB128	Delta 2	Neo-Indian, possibly Marksville	
129	16SB129	Delta 3	Neo-Indian	
130	16SB130	Delta 4	Neo-Indian	
131	16SB131	Delta 5	Neo-Indian	
132	16SB132	Newfield Site	Neo-Indian	
133	16SB133	Pirate Point Site	Neo-Indian	
134	16SB134	Delta 12	Pre-Mississippi	
135	16SB135	Delta Thirteen	Mississippi Historic	
136	16SB136	Delta 14	Possibly Tchefuncte Marksville	

**Table 2-16. Concluded.**

Map No.	Site No.	Site Name	Cultural Period	Phase
137	16SB137	Delta 15	Baytown Historic Possible Oyster Dump?	
138	16SB138	Delta 16	Pre-Mississippi	
139	16SB139	Delta 18	Pre-Mississippi Baytown	
140	16SB140	No Name	Plaquemine	
141	16SB141	Delta 22	Mississippi Pre-Mississippi	
142	16SB142	Delta 23	Mississippi Historic	
143	16SB143	Emily V	Neo-Indian Mississippi	
144	16SB144	Linda Site	Plaquemine- Mississippi	
145	16SB145	Three Oaks Site	Historic to modern	19-20th century
146	16SB146	No Name	Historic	19-20th century
147	16SB147	Chalmette Unit, Jean Lafitte NHP	Historic	Colonial
148	16SB148	ES1 6/8/92	Prehistoric Historic	
149	16SB149	Locus LS-07	Late Mississippi Historic	
150	16SB150	Locus LS-08	Mississippi	
151	16SB151	Locus LS-09	Prehistoric	
152	16SB152	Locus LS-11	Tchefuncte Early Marksville Baytown Coles Creek Mississippi/Protostoric Historic	
153	16SB153	Locus LS-01/LS-02	Prehistoric	
154	16SB154	Two Points Site	Plaquemine Mississippi Baytown Coles Creek	Barataria Bayou Petre
None	16SB15- 16SB165	Numbers not assigned		
166	16SB166	Olivier Plantation	Prehistoric Historic	

\* See Plate 11 for site locations.

\*\* "?" Shown as recorded in files

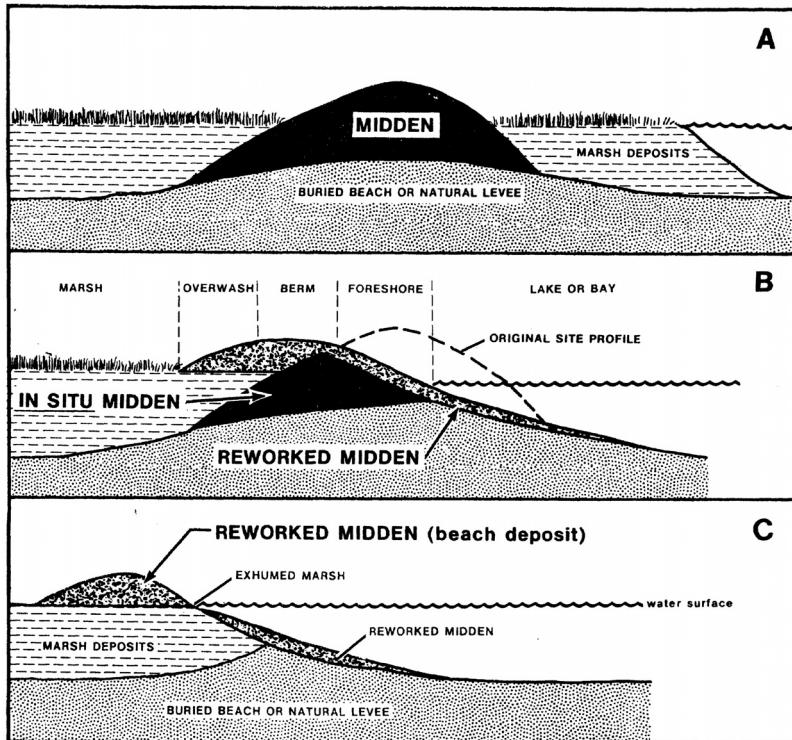
As of the year 2009, about 155 archaeological sites had been recorded for St. Bernard Parish by the Division of Archaeology. The archaeological sites fall into four different classes: earth mounds, shell mounds, shell middens, and beach deposits. The earth mounds are quite distinguishable in the landscape because they are elevated from the normally flat topography.

Native Americans probably built these mounds as burial tumuli or temple foundations. The Magnolia Mound complex (Figure 2-6), near the Great Bend of Bayou La Loutre, is a fine example of an earth mound complex. Numerous shell mounds and shell middens indicate that early Native Americans occupied sites in the parish.



Figure 2-6. Magnolia Mound shell midden and mound complex (Gagliano et al. 1982).

While earlier researchers made no distinction in the mapping of shell mounds and middens, the current practice is to identify these as separate archaeological types. Shell mounds are general shell accumulations similar in structure to the earth mounds. The shell middens are accumulations of sherds and shell and are commonly referred to as trash deposits. The beach deposit sites are the remains of a shell midden or mound that has been naturally destroyed by wave action. Figure 2-7 illustrates the process of the natural destruction of these shell mounds and middens. The recorded Native American sites in St. Bernard Parish are depicted in Table 2-16. The principal threats to these archaeological resources are subsidence, dredging, wave erosion, and vandalism. For additional information on the status of these sites refer to the *Cultural Resources Survey of the Mississippi River-Gulf Outlet, Orleans and St. Bernard Parishes, Louisiana* (Wiseman et al. 1979).



**Figure 2-7. Progressive shoreline erosion of coastal midden. The end product is a beach deposit (after Gagliano et al. 1979).**

## Historical Sites

St. Bernard Parish has 18 historical sites, seven of which also qualify as archaeological sites. Such sites are distinguished because of their architecture, age, or rarity, or because they were the scene of an important event. Plate 11 shows the location of historical and National Register Sites in the parish while Table 2-17 lists the sites along with general information about each site.

### National Register of Historic Places

There are presently seven historic sites in St. Bernard Parish listed on the National Register of Historic Places (Chalmette National Historical Park, Fort Proctor, Chandeleur Lighthouse, Overseer's House of Sebastopol Plantation, Kenilworth Plantation, Old Arabi National Register Historic District, Friscoville Street National Register Historic District) and one prehistoric site, the Magnolia Mound Archaeological Site. The Chalmette National Historical Park includes most of the area where the Battle of New Orleans was fought and where Andrew Jackson defeated the British on January 8, 1815. Fort Proctor (16SB83) was built in 1856 to defend the City of New Orleans from an attack by British forces sailing through Lake Borgne. The fort represents a masterpiece of military construction for the time. The fort now stands almost completely surrounded by Lake Borgne waters because of shoreline erosion (Figure 2-8).

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**Table 2-17. Points of Historic Interest in St. Bernard Parish (CEI 1979, LDCRT-DA 2009).**

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MAP ID *	SITE NO.	NAME	INFORMATION
a	NA	Old St. Bernard Courthouse	Built around 1915
b		Overseer's House of Sebastopol Plantation*	Built around 1830; National Register in 1986.
c		St. Bernard Cemetery	Earliest intact cemetery in the region; graves date back to the 18 <sup>th</sup> century.
86	16SB86	Kenilworth Plantation*	Ground floor built in 1759 and used for a time as a Spanish military post. Additions made to the house after 1800. National Register 2006
d		Contreras	Birthplace of P.G.T. Beauregard (1818-93).
e		Solis Plantation House	Ruins of an early modest plantation where sugar was first granulated in Louisiana in 1791.
83	16SB83	Fort Proctor* (Fort Beauregard)	1856 ruins of a fort that was never completed, with the early use of metal I-beam and tie-rod construction. National Register 1978.
87	16SB87	Proctor Sugarmill	Ruins of a plantation sugar refinery.
85	16SB85	Martello Castle	Remains of a fort built in 1829. Structure destroyed by Hurricane Katrina 2005.
f		George Villere House	Built in the 1840s in the Greek Revival Era.
g		LeBeau House	Built in 1850.
h		Ducros Museum	Artifacts from prehistoric Native Americans; the Battle of New Orleans, and other historic periods.
147	16SB147	Chalmette National Historic Park: Unit of Jean Lafitte National Historical Park and an Historic District*	Includes Rene Beauregard Plantation House built in 1832; Earthworks from the Battle of New Orleans in 1815; Chalmette Monument; and the Chalmette National Cemetery laid out in 1864 and containing graves over 14,000 union soldiers. National Register.
88	16SB88	De La Ronde Plantation	Site of the first encounter of the Battle of New Orleans; used as a hospital by the British.
84	16SB84	Battery Bienvenue	Ruins of a fort begun in 1826 and rebuilt several times before abandoned after the Civil War.
i		Chandeleur Lighthouse*	Built in 1896. National Register in 1986. Destroyed by Hurricane Katrina 2005.
j		Old Arabi Historic District*	Encompasses 140 buildings dating mainly from the 1880s through 1920s. National Register 1998.
k		Friscoville Street Historic District*	Encompasses 95 buildings dating from 1906 through 1948. National Register 1998.

\* Listed on National Register of Historic Places.

See Plate 11 for location.

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**Figure 2-8. Aerial view of Fort Proctor (USACE, NOD 2006).**

The Sebastapol Plantation Overseer's House was built around 1830 and added to the National Register in 1986. The Chandeleur Lighthouse was built in 1896 and added to the National Register in 1986, but was destroyed by Hurricane Katrina in 2005. The Old Arabi National Historic District was added to the National Register in 1998 and includes buildings constructed from the 1880s through the 1920s. The Friscoville Street National Historic District encompasses buildings dating from 1906 through 1948 and was added to the National Register in 1998 as well. Kenilworth is a large, two story French Creole plantation house and was listed on the National Register in 2006. The Magnolia Mound site (16SB49) is an extensive complex of clam middens and conical mounds of the Marksville period (0-400 A.D.) that surrounds a plaza with pyramidal mounds of the Mississippi period dating from A.D. 1000 to 1700. This site may have had a central junction in the cultural settlement of the two periods. A number of other prehistoric and historic sites and landmarks in St. Bernard, such as the powder magazine at Battery Bienvenue (16SB84) (Figure 2-9), are eligible for nomination to the National Register of Historic Places. Construction of this Battery began in 1825 (Gagliano et al. 1978). The structure was built to accommodate 23 artillery pieces and two mortars and to house 196 men.



**Figure 2-9. Ground view of powder magazine at Battery Bienvenue looking to the east, June 10, 1976 (Gagliano et al. 1978).**

## TRANSPORTATION

Early transportation corridors in St. Bernard Parish followed the major natural levees and deeper water channels. This dual land-water transportation system satisfied the needs of the parish with minimum disturbance to the natural environment. Today, most of the major land transportation corridors are still located on the higher grounds of the natural levees but have been expanded substantially to meet the growing needs of the parish. Some of the natural channels (i.e., Bayou St. Malo, Bayou La Loutre, Bayou Yscloskey, Bayou Dupre) were dredged in the late nineteenth century and early twentieth century to accommodate deeper draft watercraft such as petroleum support vessels and offshore fishing boats. Plate 12 depicts the major transportation routes in the parish.

### Roadways

St. Bernard was one of the first parishes in Louisiana to construct permanent highways. Sebastien Roy initiated highway construction in 1899, and the first paved highway extended from the Orleans Parish line to Paris Road in Chalmette. Major thoroughfares today are Judge Perez Drive (LA HWY 39), Paris Road (LA HWY 47), St. Bernard Highway (LA HWY 46), HWY 624, and HWY 300. Judge Perez Drive, St. Bernard Highway, and Paris Road are the primary roads in the urbanized area of the parish around Chalmette. Louisiana Highway 39 (Judge Perez Highway) intersects with LA HWY 47 and becomes I-510 until it connects to I-10 in Orleans Parish. Louisiana Highway 39 serves as the main thoroughfare of Chalmette, extending through Poydras to Verret where it crosses LA HWY 46 and turns into

local HWY 300 south of Reggio to Delacroix. A section of LA HWY 39 extends west from LA HWY 46 at Poydras and crosses into Plaquemines Parish as St. Bernard Parkway. Louisiana Highway 47 extends across LA HWY 39 and LA HWY 46 to the Ferry Landing on the Mississippi River. Louisiana Highway 46 is south of and parallel to LA HWY 39 and extends to the Poydras area where it veers east and follows the natural levee ridge to Yscloskey. The local Yscloskey Highway veers north from LA HWY 46 to Shell Beach. Louisiana Highway 624 connects Yscloskey with Hopedale, extending to its eastern terminus near the MRGO. All of the major roadways are located within leveed areas with the exceptions of LA HWY 624 and a portion of HWY 300. There are no roadways in St. Bernard Parish located on the north side of the MRGO.

The current Transportation Improvement Program (Regional Planning Commission 2009) does not include any major changes to the major road system with the exception of inclusion of the construction of the Florida Avenue Bridge over the Industrial Canal with an arterial extension to Parish Road and railroad grade separation on the St. Bernard Highway. However, there is no current funding and the projects are listed in the FY 2013-2018 plans as potential projects. No funding source is listed for the grade separation. The Transportation Infrastructure Model for Economic Development (state gas tax) is identified as the funding source for the Florida Avenue Bridge and Extension (Regional Planning Commission 2009).

## Waterways

The principal natural waterway serving St. Bernard Parish is the Mississippi River. It accommodates ocean-going ships at docks located at the Port of St. Bernard's Chalmette Slip and Arabi Terminal, Chalmette Refinery docking facilities, Domino Sugar and CCI Industries. Ships may also dock at the Murphy Oil Company Wharf in Meraux. The major natural bayous used for transportation through the marshes to open water areas are Bayou La Loutre (40 feet by 6 feet), Bayou Terre aux Boeufs, Bayou Bienvenue, Bayou St. Malo (40 feet by 5 feet), Bayou Yscloskey (40 feet by 5 feet), and Bayou Dupre-Violet Canal Waterway (100 feet by 6 feet).

The MRGO channel is no longer a U.S. Coast Guard designated navigable waterway. The channel was dredged between 1958 and 1968 across existing waterways and through wetlands to provide a shorter route to New Orleans and to enhance shipping interests in the area. After 2005, the USACE ceased dredging the MRGO to maintain deep draft navigation. In 2009, the MRGO was damned south of the Bayou La Loutre south bank natural levee thus preventing the channel's use by ocean-going ships. A second closure on the MRGO was in place by 2011 with construction of the flood wall across the MRGO south of its crossing of Bayou Bienvenue as part of the Inner Harbor Navigation Canal (IHNC) Lake Borgne Surge Barrier Project. This action further segmented the former navigation channel to reduce the risk of storm damage associated with a tidal surge (USACE 2010b).

There are numerous dredged canals that cross the wetlands at various locations in St. Bernard Parish. These canals were constructed for a variety of purposes including navigation (e.g., Violet Canal), exploration, extraction and transport of petroleum and natural gas resources, drainage, such as Baker's Canal associated with proposed reclamation projects within the big bend of Bayou La Loutre, water access to plantations (e.g., Creedmore Canal, Kenilworth

Canal, Olivier Canal radiating north from Lake Lery) and as a borrow location for the MRGO back retention levee. These canals, as well as small natural waterways, are used by shallow draft boats largely for recreational purposes associated with fishing throughout the St. Bernard wetlands.

### **Rail Service**

The AGS Railroad Company and Louisiana Southern, both subsidiaries under the Norfolk Southern Corporation, provide Class I freight rail carrier service to St. Bernard Parish. The AGS Railroad Company transports goods from the Orleans-St. Bernard Parish line to Chalmette, including service to slip and dock facilities along this portion of the Mississippi. The Louisiana Southern runs from the Orleans-St. Bernard Parish line along the Mississippi River to the Plaquemines Parish line. There is an extension from Poydras Junction to Toca, but that service has been discontinued. The right-of-way is retained and service could be restored in the future. The Norfolk Southern provides daily service and direct connections with all other railroads operating in the New Orleans area.

### **Pipelines**

There are numerous petroleum and natural gas pipelines located within St. Bernard. This infrastructure transports oil and gas to refineries and processing plants located within St. Bernard and to markets throughout the country. The two major petroleum refineries in the parish are the Exxon Mobile Chalmette Refinery on St. Bernard HWY in Chalmette and the Murphy Oil USA Refinery in Meraux. Plate 12 shows a recent compilation of pipeline distributions in the parish (LDNR, SONRIS 2008).

### **Airports**

There are no public airports in the parish. There are two small private airports in St. Bernard Parish. Fischer's Field provides a single aviation airstrip and Southern Natural Gas has operated a heliport located east of Poydras (Burk-Kleinپeter, Inc. 2002). Two public airports exist in the adjacent metropolitan area and serve the parish, as well as the New Orleans area. The Louis Armstrong New Orleans International Airport (formerly known as the New Orleans International Airport and Moissant International Airport) was constructed in the mid-1940s. The airport handles mainly passengers, mail, and cargo and provides national and international service. The New Orleans Lakefront Airport located just east of the Inner-Harbor Navigation Canal (IHNC) currently serves only non-scheduled commercial and private flights.

## **LAND USE**

A comparison of the habitat maps for 1956, 1978, 1988/90 and 1992/93/95 show changes in the temporal and spatial distribution of vegetative habitat types and the general human land use categories of development and agriculture/pasture (Plates 3, 4, 5 and 6; Table 2-2). The relatively low-lying natural levees along the Mississippi River, Bayou Terre aux Boeufs, and Bayou La Loutre offer the most suitable land within the parish for development and agriculture, and there exists a mixture of residential, commercial, agricultural, industrial,

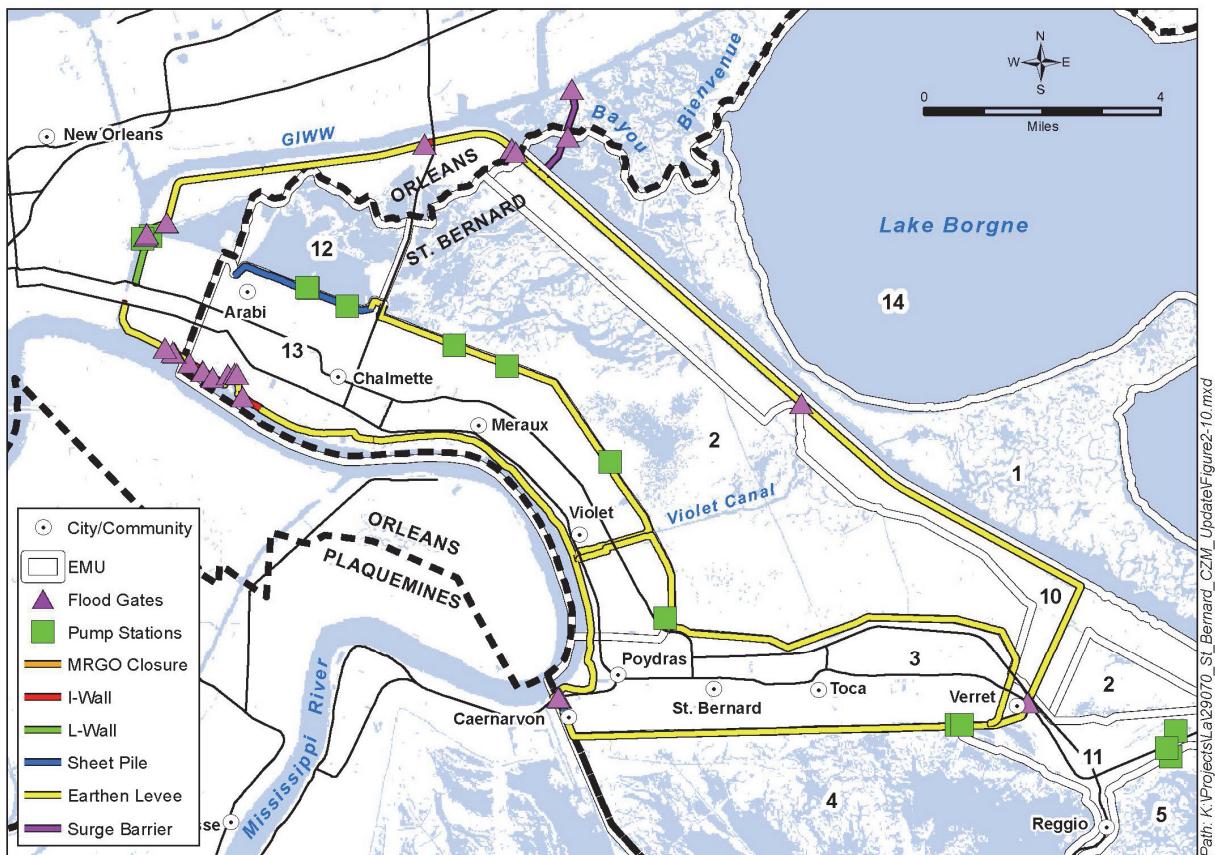
recreational, and transportation related development concentrated along these corridors. The Urbanized Area (EMU 13) within the flood protection levee system between Arabi and Poydras supports the largest concentration of the parish's population. The Lower Urbanized Levee area (EMU 3) extending from Poydras to Verret is slightly less densely developed and populated. The remainder of the natural levee corridor in EMU 10 extending from Verret east to Hopedale and south to Delacroix contains residential and commercial development along the roads and some of the denser populated reaches are protected from tidal flooding by parish maintained back protection levees. This later corridor is home to several historic fishing villages: Delacroix (Delacorix Island), Reggio, Yscloskey, Shell Beach and Hopedale. A land use study prepared before Hurricane Katrina (Burk-Kleinpeter 2002) identified the following land use within the flood protected urbanized areas of EMU 3 and 13 which cover approximately 9 percent of the total land area of the parish: residential use (27.7 percent); shopping, business and trade (4 percent); industrial, manufacturing and waste related activities (6.6 percent); social, institutional or infrastructure (2.6 percent); travel or movement related activities (3.2 percent); mass assembly of people 3.2 percent; leisure activities (1.7 percent); natural resources (1.7 percent) and vacant or undeveloped land (48 percent).

Portions of the MRGO dredged material retention area (EMU 10) are the highest landmasses in the parish (10 to 16 feet NGVD on the segment from Bayou Bienvenue to the levee connecting to Verret). Commercial and residential development exists, to a very limited extent, in this unit in the vicinity of Shell Beach, but there is potential for more extensive development, especially that which is related to water-dependent uses.

## **Flood Protection**

Almost all of St. Bernard is a flood-prone area according to Federal Insurance Rating Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA) (Plate 13) (LSU Dept. of Geography and Anthropology [LSU, DG&A] 2007). Natural levee ridges inside Environmental Management Units 3 (approximately 3,400 acres) and 13 (approximately 5,700 acres) and a very small area (approximately 60 acres of former public land fill property) in EMU 12 are the only areas above the 100-Year Flood. This non-100-Year Flood Zone equated to about 3.8 percent of the total land area in the parish in 1988/90. In order to protect the development along the natural ridge areas, an artificial levee system was constructed. This system rings the area from Arabi to Verret and has historically defined the boundary between urban land and wetlands. Since the passage of Hurricane Katrina, the USACE has committed to providing a 100-year level of risk reduction for southeast Louisiana through the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (USACE 2010) which includes repairing and upgrading levees and floodwalls and installing the Inner Harbor Navigation Canal (IHNR) Lake Borgne Surge Barrier in St. Bernard Parish (Figure 2-10). The ridge areas outside the levee system from Verret south to Delacroix and east to Hopedale are not protected by major levees. However, several concentrations of settlements along these reaches of the natural levee are protected from tidal flooding by parish maintained levees.

The construction of the levee system required the installation of an internal drainage system (See Table 2-7). The area within the levees is, in effect, a giant saucer, and runoff must be



**Figure 2-10. Lake Borgne Basin Levee District Levee Alignments and Structures in St. Bernard Parish (After OCPR 2011, USACE, NOD 2010b).**

channeled to drainage canals and then pumped over the flood protection levees. This system must constantly be maintained and improved to ensure that water trapped within the area is removed quickly before it can accumulate and cause flood related damage to life and property. The Violet Canal to Verret portion of the parish within the Hurricane Protection System is the only area where the USACE permits drawdown of a reservoir below a prescribed water level.

The forced drainage system has created small areas of uninhabited and undrained land inside the flood protection levee system. The impoundment of freshwater isolated from saltwater intrusion have created zones that act as buffers between the adjacent higher salinity wetlands outside the levees and the enclosed ridge areas. These areas within the levees should be maintained as areas for retention of upland runoff and enhancement of water quality prior to discharging drainage water into adjacent wetlands. However, these areas also provide an option for future development when the parish's need for future developable lands become critical.

## **Solid Waste Disposal**

Until the early 1970s, solid wastes were handled by incineration followed by land filling. From a management standpoint, this is an ideal system. Incineration reduces waste volumes by 70 to 85 percent, landfill life span is greatly prolonged, and landfill site management is relatively simple and inexpensive. Incineration, however, has one main drawback: air pollution. Incinerators constructed in the 1960s were made obsolete by particulate (smoke) control requirements established by the Air Pollution Control Act of 1972. Technology for controlling particulates was not well developed at the time, and refitting of aging incinerators was an expensive proposition. Thus, incinerators in most parts of Louisiana were either completely abandoned or turned into transfer stations. St. Bernard's incinerator was abandoned and the parish has been relying exclusively on landfill. The parish has an ordinance that governs the proper disposal of solid and hazardous wastes. Solid waste is currently hauled to a transfer station on Parish Road where it is transferred to landfills outside of the parish. The former parish run land fill on Paris Road was closed in compliance with procedures required by the regulatory authority of the Louisiana Department of Environmental Quality.

## **Sewerage Treatment**

Wastewater treatment in St. Bernard Parish is currently available in Management Unit 13 and in the Poydras area of Management Unit 3. Wastes are collected by a series of collection lines and lift stations and are transported to three treatment plants and one oxidation pond. As discussed previously, prior to Hurricane Katrina all wastes above Violet are treated and discharged into the Mississippi River, while below Violet the wastes were treated at the Riverbend oxidation pond and discharged into the Central Wetlands. Table 2-7 identifies the treatment plants being repaired and future operations include the discharge of treated wastewater into the Central Wetlands as part of a plan to restore freshwater wetland habitat.

The remainder of the inhabited area does not have major treatment facilities at the present time. These areas must rely on individual sewage systems (e.g., septic tanks or mechanical plants) for wastewater treatment.

## **Utilities**

Entergy supplies electricity to the parish. Atmos Energy provides residential gas service to the urbanized leveed area (Management Units 13 and 3) and approximately one mile east of the levee along LA HWY 46. The gas lines resume at Reggio and follow HWY 300 to Delacroix and HWY 624 to Hopedale and the Yscloskey Highway to Shell Beach. The gas company anticipates that existing facilities should be adequate to meet future service requirements.

Water District Number 2 maintained water lines for Management Units 3 and 13. A 10-inch main line services the area between Poydras and Reggio, while a 4-inch line extends from Poydras to East Wood Manor. The area between Reggio and Delacroix is served by a 6-inch main line, and an 8-inch main line stretches between Reggio and Yscloskey. The communities of Shell Beach and Hopedale receive water through a 6-inch main line out of Yscloskey. Water District Number 1 services Arabi to the Violet Canal and has the only purification system in the parish. It sells purified water to Water District Number 2. The current water system is being upgraded from Violet south to Delacroix and east to Hopedale.



3

# PRINCIPAL RESOURCES



**Oyster lugger on Bayou La Loutre**  
**(K. Wicker, CEI, 2009)**

## CHAPTER 3

### PRINCIPAL RESOURCES

#### INTRODUCTION

Knowledge of the parish's renewable and non-renewable resources base is essential in achieving development goals and management practices which lead to long-term benefits for the citizens of the parish and the environment. Renewable resources, such as shrimp, oysters, crabs, fish, agricultural and forestry products, furs and hides, and the environment that produces them, can be utilized by the citizens and visitors of St. Bernard Parish for the long-term, if the extraction is carefully managed and the environment supporting these resources is sustained. Non-renewable resources, such as oil, gas, and other minerals, contribute to the parish's economic base and provide a net benefit to the parish when extracted in an environmentally sound manner. Extraction of non-renewable resources can negatively impact renewable resources and lead to their depletion or degradation through unwise exploitation, bad management practices, or environmental damage, such as pollution, habitat degradation and land loss, which affect renewable resource productivity. In many instances, the cause of these changes can be traced directly or indirectly to human activities in the wetlands. These activities often happen independently of each other, and their cumulative impacts are not taken into consideration. Overall goals, policies and effective management programs and implementation procedures can help sustain renewable resources while allowing for multiple uses of the parish's resources.

#### COMMERCIAL FISHING AND TRAPPING

The Louisiana marshes and shallow estuarine water bodies are among the largest and most productive prime nursery grounds in the world for over 100 species of estuarine-dependent fish and shellfish, many of which support the offshore fisheries industries. The extensive wetlands of St. Bernard Parish are extremely productive for commercially and recreationally harvested oysters, shrimp, crabs, and fish and contribute to making Louisiana the premier state in the annual production of fisheries products. Some of these aquatic species require marsh and shallow water fresh-to-estuarine environments during their entire life cycle; for others this type of habitat is only important during specific stages of their life cycle. An assessment of the magnitude of commercial harvesting of renewable resources and trends in the recent past can be derived from reviewing 1980 through 2009 wildlife and fisheries production data (Table 3-1, Center for Business & Economic Research 2001a, LA Coop. Extension Service 1999; LSU AgCenter Research & Extension 2000-2009) and 1989 through 2009 resident commercial licenses sales (Table 3-2, LA Dept. Wildlife & Fisheries 2011a).

The largest acreages in private oyster leases in Louisiana are found in St. Bernard and Plaquemines Parishes. By 2007, there were approximately 89,124 acres of leased oyster grounds and 700,872 acres of public seed grounds in St. Bernard Parish (LDWF 2006, 2007) (See Table 2-10, Plate 10). The production of oysters has fluctuated greatly in the past 29 years, going from a reported high of 2,836,778 sacks recorded in 2005 to a low of 42,462 sacks in 2003 (See Table 3-1 footnote regarding actual time of reported data). The number of resident commercial oyster harvester licenses in St. Bernard Parish has declined steadily

**Table 3-1. Fisheries and Wildlife Production, St. Bernard Parish: 1980-1999 (Center for Business & Economic Research 2001a; LA Coop. Ext. Ser. 1999; LSU AgCenter Research & Extension 2000-2009) (Note: data from estimates; nd = No Data Presented).**

Fisheries & Wildlife	Units of Measure	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
<i>Fisheries</i>											
Crawfish (farm)	pounds	12,000	12,000	13,200	13,200	2,200	4,000	nd	nd	2,000	637
Catfish (farm)	pounds	nd	nd	nd	nd						
Shrimp	pounds	1,700,000	2,597,927	2,250,000	3,989,796	4,000,000	3,200,000	3,307,500	3,892,718	2,897,931	nd
Fishbait	pounds	25,000	nd	nd	nd	nd	nd	nd	nd	nd	nd
Oysters	sacks	1,050,000	1,050,000	135,000	480,000	400,000	350,000	300,000	300,000	200,000	71,900
Crabs	pounds	2,049,500	2,214,646	2,420,000	3,520,000	3,200,000	3,500,000	3,000,000	3,250,000	3,250,000	1,856,500
Commercial Finfish	pounds	1,672,200	31,595	2,100,000	2,100,000	5,960,000	4,500,000	15,000,000	5,000,000	4,000,000	902,757
Gar	pounds	nd	nd	nd	nd						
Other Finfish	pounds	nd	nd	nd	nd						
Soft-shell Crabs	dozens	nd	nd	nd	nd						
<i>Fur Animals</i>											
Pelts	pelts	250,000	250,000	150,000	15,750	10,000	nd	30,000	20,000	10,067	nd
Meat	pounds	nd	nd	nd	nd						
<i>Alligators</i>											
Wild Skins	hides	nd	nd	nd	nd	nd	nd	300	nd	nd	nd
Wild Meat	pounds	nd	nd	nd	nd						
Farm Skins	hides	nd	nd	nd	nd						
Farm Meat	pounds	nd	nd	nd	79						

**Table 3-1. Continued.**

Fisheries & Wildlife <i>Fisheries</i>	Units of Measure	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Crawfish (farm)	pounds	nd	nd	nd	nd	nd	6,041	4,800	nd	nd	nd
Catfish (farm)	pounds	nd	nd	nd	nd	4,000	9,901	10,000	nd	nd	nd
Shrimp	pounds	5,515,145	5,757,743	5,469,856	5,458,917	5,431,623	4,603,620	3,913,007	3,678,412	4,533,000	4,533,000
Fishbait	pounds	nd	45,000	nd	105,000	100,000	150,000	150,000	135,000	146,000	146,000
Oysters	sacks	120,378	120,378	91,006	90,733	91,500	211,819	576,176	623,500	648,871	481,315
Crabs	pounds	3,182,800	3,182,800	3,023,660	3,008,542	2,978,457	3,406,264	3,267,400	3,507,500	4,331,000	6,059,010
Commercial Finfish	pounds	4,993,813	4,993,813	5,043,751	5,048,794	5,230,658	771,830	685,900	500,000	329,000	1,993,062
Gar	pounds	nd	nd	nd	nd	2,100	9,584	10,860	12,300	19,500	15,517
Other Finfish	pounds	nd	nd	42,000	45,000	42,000	nd	nd	nd	nd	nd
Soft-shell Crab	dozens		5,000	4,500	4,200	5,000	4,700	4,300	5,100	5,100	
<i>Fur Animals</i>											
Pelts	pelts	859	16,012	732	426	672	652	693	1,201	1,156	347
Meat	pounds	nd									
<i>Alligators</i>											
Feet of Skin	feet	nd	nd	nd	nd	nd	427	932	862	1,020	1,027
Wild Skins	hides	156	190	122	111	126	nd	nd	nd	nd	nd
Wild Meat	pounds	3,510	5,700	4,017	3,663	4,158	nd	nd	nd	nd	nd
Farm Skins	hides	5	38	8	12	nd	10	nd	nd	nd	nd
Farm Meat	pounds	30	171	35	54	nd	nd	nd	nd	nd	nd

**Table 3-1. Concluded.**

Fisheries & Wildlife	Units of Measure	2000	2001	2002	2003 <sup>1</sup>	2004 <sup>2</sup>	2005 <sup>2</sup>	2006 <sup>2</sup>	2007 <sup>2</sup>	2008 <sup>2</sup>	2009 <sup>2</sup>
<i>Fisheries</i>											
Crawfish (farm/wild)	pounds	nd	nd	nd	91,458 / 91,450	nd	nd	nd	nd	nd	nd
Catfish (farm/wild)	pounds	nd	0/400	nd	nd	nd	nd	nd	nd	nd	nd
Shrimp (farm/wild)	pounds	nd	3,611,111	nd	1,511,690	2,594,436	2,948,685	1,160,919	2,360,325	1,921,837	1,890,215
Fishbait	pounds	146,000	146,000	nd	nd	nd	nd	nd	nd	nd	nd
Oysters	sacks	nd	329,182	nd	42,462	817,831	592,674	2,836,778	235,638	270,672	370,491
Crabs	pounds	nd	2,940,022	nd	5,169,637	6,588,677	6,172,716	3,913,260	3,791,321	6,118,134	5,818,653
Commercial Finfish	pounds	nd	40,156	nd	23,809	1,725,916	691,885	25,706	624,588	246,857	432,259
Gar	pounds	nd	15,651	nd	nd	nd	nd	nd	nd	nd	nd
Other Finfish	pounds	nd	nd	nd	200	1,634	4,520	1,160,919	nd	nd	nd
Soft-shell Crab	dozens	5,100	5,000	nd	10,000	nd	nd	nd	nd	nd	nd
<i>Fur Animals</i>											
Pelts	pelts	98	141	92	161	248	148	nd	nd	nd	nd
Meat	pounds	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
<i>Alligators</i>											
Farm/wild	feet	2,557	2,662	2,557	2,400	1,560	78 / 1,822	0 / 1,597	0 / 1,747	0 / 1,897	0 / 262
Wild Skins	hides	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Wild Meat	pounds	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Farm Skins	hides	97	78	78	nd						
Farm Meat	pounds	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
VALUE <sup>3</sup>	\$987,099	\$17,072,962	\$1,197,165	\$6,248,083	\$21,241,978	\$16,671,200	\$13,123,690	\$9,945,258	\$13,467,022	\$15,527,538	

<sup>1</sup> 2003 Fisheries data estimated Sept. – Dec. 2003<sup>2</sup> Marine, freshwater & oyster data for 2004 - 2009 reflect previous year's data (i.e., data in column for 2004 would be data for 2003). Release of fisheries landings data by collecting agencies occurs 4-5 months after the fact. Another reporting system was used prior to 2004, so data for 2004 - 2009 are not directly comparable to that of previous years.<sup>3</sup> Value is for all fisheries and wildlife enterprises reported.

**Table 3-2. Resident Commercial Licenses Sales, St. Bernard Parish: 1989-2009 (LA Dept. Wildlife & Fisheries 2011a).**

Year	Oyster Dredge	Commercial Fishermen	Vessel License	Shrimp Trawl	Oyster Harvester	Crab Traps
1989	354	1338	1420	1121	nd	167
1990	314	1289	1399	1052	385	162
1991	215	1158	1281	875	260	204
1992	224	1155	1288	828	239	261
1993	271	985	1110	586	166	238
1994	269	947	1122	568	176	220
1995	263	923	1089	526	175	355
1996	262	937	1066	531	190	301
1997	264	876	980	493	198	270
1998	267	933	998	497	194	269
1999	239	973	1021	517	163	392
2000	261	1007	1037	508	196	343
2001	276	993	1015	501	206	294
2002	305	953	954	440	224	271
2003	309	912	908	396	223	288
2004	291	821	829	341	200	293
2005	294	733	757	285	200	280
2006	220	425	440	129	140	252
2007	220	413	453	107	138	237
2008	229	438	471	111	146	239
2009	151	501	596	114	169	272

from 385 in 1989 to 160 in 2009. During this same period the resident oyster dredge licenses in the parish also declined from 354 to 151.

Factors affecting production include both long-term trends and short-term events. By the end of the twentieth century there was a trend toward loss of production on formerly productive lease and seed grounds because of increased salinity, predation and disease. New leases and public grounds were being established further inland in Lake Borgne and the eastern end of Lake Lery in order to offset production losses as saltwater intrusion made these interior water bodies more suitable for oyster growth. However, these interior grounds are subject to periodic closures because of pollution from pump discharges during heavy rainfall events. Other factors that affect oyster production on the inland oyster zone areas include active and proposed freshwater diversions for coastal restoration and restoration of historic oyster growing zones further eastward (e.g., Caernarvon and Violet), operation of diversions to keep contaminants such as oil out of estuarine areas (e.g., BP Deepwater Horizon rig explosion in 2010) and opening of the Bonnet Carre Spillway to maintain the integrity of flood protection levees during extreme flood events. Since it was first constructed the Bonnet Carre Spillway has been opened 10 times (Wikipedia 2011) (Table 3.3).

**Table 3-3. History of Bonnet Carre Openings (Wikipedia 2011).**

<b>Year Opened</b>	<b>Days Opened</b>	<b>Bays Opened</b>
1937	48	285
1945	57	350
1950	38	350
1973	75	350
1975	13	225
1979	45	350
1983	35	349
1997	31	298
2008	31	160
2011	42	42

Other commercially valuable fisheries resources include shrimp, hard and soft-shell crabs, fish bait and commercial finfish. Shrimp landings have fluctuated greatly over the past 30 years. Between 1980 and the early 1990s, there was a general increase in production from 1.7 million pounds to around 5.5 to 5.8 million pounds. However, productivity declined in the first part of the twenty-first century and ranged from 1.2 to 3.6 million pounds. There was also a steady decline in the number of resident commercial shrimp trawl licenses sold for St. Bernard Parish from a high of 1121 in 1989 to 114 in 2009.

Hard crab production generally increased over the past 30 years, ranging from 1 to 2 million pounds in the 1980s to 3 to 6.6 million pounds in the 2001 to 2009 period. The number of resident commercial crab trap licenses in St. Bernard Parish showed a steady increase from 167 in 1989 to a high of 392 in 1999. Since that time there has been a slight decline to 272 licenses sold in 2009. Soft-shell crab production was first recorded in St. Bernard Parish in 1992 at 5,000 dozens (Center for Business & Economic Research 2001a) and by 2002, 10,000 dozen soft shell crabs were reported (LSU AgCenter Research & Extension 2000-2009). However, it is difficult to tell if the lack of reported data for most years is a result of no production or a lack of reporting.

Commercial finfish production has varied widely in recent years. The highest production was in the 1980s and early 1990s, generally in the millions of pounds. Recorded production has been lower from the late 1990s to 2008 from tens of thousands to hundreds of thousands of pounds. The number of recorded resident commercial fishermen licenses in St. Bernard Parish showed a significant decline from 1338 licenses in 1989 to 501 in 2009.

The low-salinity wetlands in St. Bernard Parish supported a lucrative fur industry during the first half of the twentieth century. The principle furbearing animals found in this area are the common muskrat, the nutria, and the North American mink. The area surrounding Delacroix historically was an extremely important prime habitat. From 1980 through 1983 trappers harvested an estimated 250,000 pelts, but in 1984 there was a precipitous drop to 15,750 pelts. From the 1990s through 2005, the last data recorded, production was generally in the

hundreds of pelts with a low of 92 pelts recorded in 2002. The decrease in production of pelts can be attributed initially to a decrease in suitable habitat (e.g., fresh-to-intermediate wetland habitat) in the mid-twentieth century and subsequently to a decrease in world-wide demand from fur in the later part of the twentieth century. Operation of the Caernarvon Freshwater Diversion Structure has lowered salinities in the area north of Lake Lery and created better habitat for furbearing animals in the early twenty-first century; however, trapping has not increased primarily because of lack of demand for fur.

Recorded data for wild and farm raised alligator products (pounds of meat and number of hides and hide length in feet) is sketchy and inconsistent. Recorded information from 1990 through 1994 showed number of hides and pounds of meat, and 1995 through 2009 data reported the length of hides in feet. From 1995 to 2001, hide harvest rose from 427 feet to 2662 feet then declined steadily to a low of 262 feet in 2009. This decline also is related to a collapse in world-wide market demand for skins.

## **EXTRACTIVE INDUSTRIES**

Hydrocarbons (natural gas and oil), sand, and clay are the primary minerals produced in the parish, with hydrocarbons being the most valuable. St. Bernard Parish does not have as extensive oil and gas deposits as some other parishes, but revenues from existing deposits constitute an important economic resource. Clay and sand mining occur at two sites within the urbanized area of the parish in the vicinity of the natural levees. As of 2010, 554 oil and gas wells had been drilled in St. Bernard Parish and 51 fields had been developed (Table 3-4). Plate 14 illustrates the recorded location of oil and gas wells and fields drilled in the parish as of 2010 (LDNR, SONRIS 2010). Since the beginning of the twenty-first century there has been increased drilling activity in Lake Borgne.

## **RECREATIONAL RESOURCES**

### **Recreational Areas**

The natural environment of St. Bernard Parish is a true sportsman's paradise because the potential for wetlands and water-based recreation is almost unlimited. The many waterways and their easy access provide an outlet for boating, bird watching, trapping, fishing and hunting activities in the wetlands. While Hurricane Katrina destroyed most of the physical infrastructure that supported recreation, great strides were made after the storm in restoring access to the natural resources and providing recreational facilities.

In addition to the numerous private camps and boat launches, there are approximately 25 local, state, and federal parks, monuments and playgrounds, one state wildlife management area and one national wildlife refuge in the parish (Table 3-5) (Plate 15). The state and parish parks are located on the natural levees of the parish within fastlands and provide baseball fields, tennis courts, picnic areas, and barbecue pits year-round for the parish residents and visitors. Approximately 10 marinas and boat launching facilities were rebuilt by 2011, primarily along LA HWY 47, the Shell Beach-Yscloskey-Hopedale area, and along Bayou Terre aux Boeufs in the vicinity of Delacroix (Table 3-5) (Plate 15).

**Table 3-4. . Oil and Gas Fields in St. Bernard Parish as of 2010 (LDNR, SONRIS 2010).**

<b>Discovery Year</b>	<b>Map ID</b>	<b>Field Name</b>	<b>EMU Location</b>
1952	1	Shell Point	Lake Borgne
1968	2	Stuards Bluff	MRGO Spoil
1964	3	Treasure Bay	Bay Boudreaux-Bay Eloi
1972	4	Stuards Bluff, East	Bay Boudreaux-Bay Eloi
1975	5	Rigolets	Lake Borgne
1963	6	Bayou Biloxi	Biloxi Marsh
1998	7	Bayou Loutre	Bay Boudreaux-Bay Eloi
2003	8	Breton Sound Block 16	Chandeleur Sound
1981	9	Breton Sound Block 2	Chandeleur Sound
1976	10	Chandeleur Sound Block 35	Chandeleur Sound
1954	11	Chandeleur Sound Block 41	Chandeleur Sound
1977	12	Chandeleur Sound Block 51	Chandeleur Sound
1988	13	Chandeleur Sound Block 52	Chandeleur Sound
1966	14	Chandeleur Sound Block 54	Chandeleur Sound
1976	15	Chandeleur Sound Block 58	Chandeleur Sound
2003	16	Chandeleur Sound Block 67	Chandeleur Sound
2002	17	Chandeleur Sound Block 68	Chandeleur Sound
1954	18	Chandeleur Sound Block 69	Chandeleur Sound
1978	19	Chandeleur Sound Block 71	Bay Boudreaux-Bay Eloi
1964	20	Chandeleur Sound Block 73	Lake La Fortuna
1994	21	Chandeleur Sound Block 8	Chandeleur Sound
2003	22	Chandeleur Sound West Block 28	Chandeleur Sound
2004	23	Chandeleur Sound Addition Block 28	Chandeleur Sound
1989	24	Chandeleur Sound Addition Block 41	Chandeleur Sound
2003	25	Chandeleur Sound Addition Block 51	Chandeleur Sound
1983	26	Chandeleur Sound Block 15	Chandeleur Sound
2003	27	Chandeleur Sound Block 26	Chandeleur Sound
2002	28	Chandeleur Sound Block 31	Chandeleur Sound
1953	29	Eloi Bay	Bay Boudreaux-Bay Eloi
1963	30	Half Moon Lake	Bay Boudreaux-Bay Eloi
2006	31	Kenilworth, Northwest	Urbanized Area
1974	31	Hopedale Lagoon	Bayou Terre aux Boeufs Wetlands
1951	33	Lake Borgne	Lake Borgne
1978	34	Lake Calebasse	Lake La Fortuna
1953	35	Lake Fortuna	Lake La Fortuna
1962	36	Main Pass Block 11	Chandeleur Sound
2006	37	Hopedale Lagoon, North	Semi-Urbanized Levee
1954	38	Lake Athanasio	Bay Boudreaux-Bay Eloi
1939	39	Kenilworth	Lower Urbanized Levee
1999	40	Main Pass Block 10	Chandeleur Sound
1984	41	Main Pass Block 4	Chandeleur Sound
1962	42	Main Pass Block 6	Chandeleur Sound
1955	43	Breton Sound Block 1	Chandeleur Sound
1966	44	Breton Sound Block 12	Chandeleur Sound
1976	45	Bayou Lery	Bayou Terre aux Boeufs Wetlands
1981	46	Chandeleur Sound Block 28	Chandeleur Sound
1992	47	Chandeleur Sound Block 32	Chandeleur Sound
2003	48	Chandeleur Sound Addition Block 27	Chandeleur Sound
2005	49	Chandeleur Sound Addition Block 43	Chandeleur Sound
1982	50	Chandeleur Sound Addition Block 63	Chandeleur Sound
1965	51	Chandeleur Sound Block 25	Bay Boudreaux-Bay Eloi

See Plate 14 for location of fields.

**Table 3-5. Parks, Marinas, and Wildlife Management/Refuge Areas (St. Bernard Parish Gov't. 2009; Schurr 2000 & 2002, LA Dept. of Culture, Recreation & Tourism 1981).**

Map Label	Site	Responsibility	Acreage
<b><i>Large Parks, Refuge/Management Areas &amp; Museums</i></b>			
A	Spotts Monument	State	nd
B	Sydney D. Torres Memorial Park	Parish	~20
C	Chalmette Battlefield & Monument, Jean Lafitte National Historical Park and Preserve	Federal	130
D	Breton National Wildlife Refuge	Federal	Indefinite
E	Biloxi State Wildlife Management Area	State	39,583
F	St. Bernard State Park	State	358
G	Pakenham Oaks	State	nd <sup>2</sup>
H	Val Reiss Park	Parish	23
I	Los Islenos Museum Complex	Non-Profit	nd
<b><i>Small Parks and Playgrounds</i></b>			
a	Parc Chenier (Damaged 2005)	Parish	17.8
b	Carolyn Park (Damaged 2005)	Parish	2
c	Chalmette Vista Playground	Parish	2
d	Prosper Park (Damaged 2005)	Parish	2
e	Violet Ball Field	Parish	2
f	Riverbend Playground (Violet #2)	Parish	1
g	Patricia Park (Damaged 2005)	Parish	1
h	Community Park	Parish	1
i	Versailles De La Ronde Park (Damaged 2005)	Parish	3.9
j	Rebel Park (Damaged 2005)	Parish	2
k	Borngemouth Park (Damaged 2005)	Parish	2
l	Kenilworth Park	Parish	1.5
m	Bucaneer Villa Park (Damaged 2005)	Parish	3.8
n	Schneider Park	Parish	1
o	Chalmette Trapshooters	Non-Profit	5
p	Verret Park	Parish	2.5
q	Heights Park (St. Claude Park)	Parish	0.7
r	Our Lady of Lourdes	Parish	2
s	Goodwill Park	Parish	2.5
<b><i>Marinas, Bait Shops and Boat Launches</i></b>			
1	Gulf Outlet Marina	Commercial	1
2	Bait inc.	Commercial	nd
3	De'Pope Launch	Commercial	1
4	Reggio Marina	Commercial	.5
5	Serigne's Marina	Commercial	1
6	Sweet Water Guide Service and Marina	Commercial	1
7	Blackie Campo's Marina (Frank Campo Marina)	Commercial	1
8	Dudenhefer's Marina	Commercial	nd
9	Pip's Place Marina	Commercial	0.2
10	Breton Sound Marina	Commercial	nd

<sup>1</sup> Map number corresponds to recreational sites on Plate 15.

<sup>2</sup> nd = no data

The Biloxi Wildlife Management Area is the largest publicly accessible wetland in the parish and offers tremendous hunting and fishing opportunities. The area is privately owned by the Biloxi Marsh Lands Corporation but is leased and managed by the LDWF. The management area is located 40 miles east of New Orleans and is accessible by boat from the commercial launches at Hopedale and Shell Beach. Species hunted in the area include rabbits, ducks and to a lesser extent geese. Nutria, mink, raccoon and muskrat can be trapped commercially. Sport and commercial fishermen harvest large catches of fish, crabs, shrimp and oysters from the management area. In addition to hunting opportunities on the management area, the parish had approximately 100 landowners who leased an additional 50,000 acres of wetlands for hunting in 1999 (LA Coop. Ext. Ser. 1999).

Historically, hundreds of thousands of waterfowl stayed in St. Bernard Parish during the winter, primarily in the Lake Borgne - Biloxi Marsh area and around Lake Lery. Completion of the MRGO in 1963, and the subsequent inland movement of salt water destroyed much of the fresh-to-low salinity wetlands and submerged aquatic vegetation upon which they fed. However, operation of the Caernarvon Freshwater Diversion Structure in recent years has greatly improved habitat conditions in the southwestern part of St. Bernard Parish around Lake Lery, resulting in more waterfowl hunting and greater demand for commercial outfitters who guide waterfowl hunts.

The Chandeleur Islands, Freemason Islands, North Islands and New Harbor Islands in St. Bernard Parish and Breton Island and Grand Gosier Islands in Plaquemines Parish comprise a 45-mile long barrier island complex extending 20 miles east and south of St. Bernard Parish. These islands, designated as the Breton National Wildlife Refuge in 1904, are the second oldest national wildlife refuge in the United States (USFWS 2011a, b, c). The refuge, most of which was designated a National Wilderness Preservation System in 1975, is under Federal jurisdiction and was established to: (1) provide sanctuary for nesting seabirds, (2) protect and preserve the wilderness character of the islands, and (3) provide sandy beach habitat for a variety of species (USFWS 2011a, b, c). The area of the refuge fluctuates greatly in response to natural processes, but prior to a series of devastating hurricanes in the early twenty-first century its area was described as approximately 6,923 acres above mean sea level. The public can use the beaches, fish from the nearshore area, and conduct primitive camping; as long as they avoid posted nesting bird colonies. The refuge provides important nesting habitat for 13 species of shore and aquatic birds including the state listed endangered brown pelican and federally listed threatened snowy plover and piping plover. The waters surrounding the island chain are also a vital spawning area for many crustaceans and fish. The Federally listed threatened loggerhead sea turtle nested on the islands in past years.

Recreational fishing is a major activity in St. Bernard Parish and the numerous local marinas serve as the gateway to fishing in both the parish waters and the Gulf of Mexico for fishermen in the Greater New Orleans and Baton Rouge Metropolitan Areas. Prior to Hurricane Katrina, basic fishing licenses in area parishes constituted approximately 20 percent of the statewide total. Basic license sales dropped drastically post-Katrina and in 2007 only 104 basic licenses were sold in St. Bernard Parish (Table 3-6). By 2010, there was

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**Table 3-6. Recreational Fishing License Trends, Southeast Louisiana (LDWF 2011c).**

<b>License Year</b>	<b>Statewide Saltwater</b>	<b>Statewide Basic</b>	<b>St. Bernard Basic</b>	<b>Plaquemines Basic</b>	<b>Jefferson Basic</b>	<b>Orleans Basic</b>	<b>St. Charles Basic</b>	<b>St. Tammany Basic</b>
2004	275,572	462,657	10,072	7,507	44,705	6,365	4,987	20,919
2005	270,132	454,555	9,539	6,099	43,561	6,107	5,100	20,593
2006	238,901	412,584	5,587	3,843	33,757	5,637	4,440	17,834
2007	258,949	428,304	104	1,427	41,364	3,115	4,107	7,860
2008	273,126	438,273	1,981	2,596	41,137	3,578	4,531	21,244
2009	271,433	441,252	2,878	3,018	39,132	4,650	4,401	20,735
2010	278,563	444,661	3,284	2,996	39,736	4,582	4,244	21,073

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a strong rebound and area basic license sales increased to approximately 17 percent of statewide license sales. The interest in recreational fishing is expected to continue to increase as the recreational support infrastructure is rebuilt and fishing rodeos and competitions return to the parish. For example, the 2009 Academy Sports and Outdoors Big Easy Redfish Cup drew thousands of spectators to St. Bernard Parish between July 31 and August 2 at the Gulf Outlet Marina in Chalmette and the competition was broadcast nationally on ESPN2.

The Louisiana coast, in general, is very popular for recreation, especially activities such as fishing, sight-seeing, boating, picnicking, swimming, camping, jet skiing, water-skiing and bird watching. Continued redevelopment of marinas, overnight accommodations, boat ramps and bait shops, fishing charter boat operations, ecotourism guide operations and other water-oriented activities in St. Bernard Parish provides opportunities for residents from the parish, the Greater New Orleans Metropolitan Area and tourists to access the wetlands and waterways for recreation and education. The parish's rich cultural heritage and historic role in the Nation's development are also prominent features worthy of further promotion as a tourist destination. Table 3-7 lists areas where the parish could help facilitate additional recreational opportunities to accommodate future recreational needs and enhance the local economy.

### **Scenic Rivers and Byways**

St. Bernard Parish has seven designated scenic bayous in the Louisiana Natural and Scenic Rivers Program (Table 3-8, Plate 10). A natural or scenic river is a river, stream or bayou that is in a free-flowing condition and has not been altered by channelization or realignment. A stream can also be classified as scenic if it has been altered, but contains native vegetation and has little or no man-made structures along its bank. The Lake Borgne Canal (or Violet Canal) is an example of such a scenic stream that was altered by dredging to improve navigation but still retains its scenic characteristics.

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**Table 3-7. Potential Recreation Sites Suitable for Enhancement in St. Bernard Parish**

Site	Proposed Use or Facility
LA HWY 46 Corridor	Designated scenic highway; roadside parks; historical tours; Islenos Museum
Shell Beach Area	Boat launch; fishing pier, interpretative center for Hurricane Katrina
Fort Proctor Area	Historical interpretation.
End of LA 46 (HWY 624) to Hopedale – MRGO Corridor	Camp rentals; boat launching facilities; commercial dockage; Center for Oyster Reef Restoration
LA 47 - Bayou Bienvenue Area	Recreational camp development; fishing and marina complex.
Chandeleur Islands	Boat camping, surf fishing, bird watching.
MRGO Spoil Bank - inside levee from Bayou Dupre to Verret	Water oriented facilities

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**Table 3-8. Designated Scenic Streams in St. Bernard Parish (LDWF 2009).**

Name	Location	Length (miles)
Bayou Dupre	Lake Borgne Canal to Lake Borgne	1.86
Lake Borgne Canal (Violet Canal)	Forty Arpent Canal to Bayou Dupre	3.62
Bashman Bayou	Origin in marsh northeast to Bayou Dupre	1.31
Terre Beau Bayou	Bayou Dupre to the New Canal parallel to and south of MRGO retention area	2.08
Piroque Bayou	Bayou Dupre to the New Canal parallel to and south of MRGO retention area	2.46
Bayou Bienvenue	Bayou Villere east of LA 47 to Lake Borgne	8.24
Bayou Chaperon	Mississippi River back protection levee to spoil retention area south of MRGO	1.43

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\*See Plate 10 for location of scenic rivers.

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The LDWF administers the scenic river system and protects these streams from the effects of channelization, channel realignment, clearing and snagging projects, and reservoir construction projects. The scenic river system is designed to protect the overall ecology of the stream including the wildlife, vegetation, and hydrology. Scenic stream designation is also designed to preserve the wilderness qualities, scenic beauty, archaeological resources, and other features of the stream or bayou. All of these streams are used for recreational activities such as boating, fishing, bird watching, canoeing and kayaking.

The San Bernardo Scenic Byway is part of the National Scenic Byway Program. This scenic byway consists of LA HWY 46 in eastern St. Bernard Parish and extends from the Chalmette National Battlefield east to Yscloskey and south to Delacroix (Delacroix Island).

### **Conservation and Restoration Areas**

In the 1982 Federally approved CZMP document, four areas were identified as potential preservation sites based on a previous study of Potential Preservation and Restoration Areas in the Louisiana Wetlands (Burk and Associates, Inc. 1977). This study evaluated and rated 50 potential natural areas representing a cross section of all major physiographic types in coastal Louisiana. These areas were generally remote, relatively inaccessible, and showed little or no physical alterations within historic times. Each of these sites had varying degrees of ecological, recreational, economic, or aesthetic value. The site evaluation of each of these areas consisted of the following criteria: naturalness, diversity, representativeness, unique ecological value, susceptibility to damage, degree of threat, aesthetic quality, recreational value and educational and scientific value. Within St. Bernard Parish the areas recommended for preservation included the Biloxi Marsh, the Proctor Point Marsh and the eastern end of the Bayou La Loutre - Bayou St. Malo Alluvial Ridge and the Chandeleur Islands (Table 3-9). The MRGO corridor (channel and spoil bank) was recommended for restoration. As a result of continued environmental degradation associated with the almost 50 years of MRGO operation and a combination of natural processes, these four areas now require substantial restoration efforts to sustain them. The MRGO has been de-authorized as a navigation channel and its channel has been segmented by a dam and floodwall and sections of its banks are to be stabilized as part of the USACE (2010a, b) ecosystem restoration efforts.

Since this earlier study, additional areas of St. Bernard have been identified as priority areas for conservation and restoration. Restoration of freshwater marsh and swamp habitat within the Central Wetlands (EMU 2), comparable to that which existed prior to construction of the MRGO, is a major mitigation project currently proposed by the USACE (2010). Efforts have been underway since 1990, to use the Caernarvon Freshwater Diversion structure to restore the former fresh-to-intermediate wetland habitat and salinity regimes within the upper Breton Sound Basin, including the Lake Lery EMU 4.

Actions to achieve the conservation and restoration of valuable habitats within St. Bernard Parish have been discussed in numerous plans including *Louisiana's Comprehensive Master Plan for a Sustainable Coast*, (Coastal Protection and Restoration Authority 2007), *Louisiana Coastal Area (LCA)*, *Louisiana Ecosystem Restoration Study* (USACE 2004a, b, c), and *Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Study, Draft Environmental Impact Statement* (USACE 2010a). Strategies for restoring and or conserving these valuable habitats, as well as additional sites, are described in a separate report, St.

Bernard Parish Coastal Restoration Plan: Synopsis of Proposed Projects and Identification of Preferred Actions (Gagliano et al., 2012). This report is an informational companion report to the updated CZMP document and presents the parish's position on coastal restoration and flood protection measures that supports their vision for the parish's future.

## **POTENTIAL UNIQUE AND PARTICULAR AREAS**

Louisiana's coastal zone possesses a wide variety and diverse assemblage of natural resources that have many types of unique features. The habitats of the alluvial ridges, swamps, marshes, beaches, bays and nearshore gulf waters support extremely dynamic and productive biotic communities. In addition to supporting dense populations of commercially important species, the region provides critical habitat for several rare or endangered species. The marshes and bays in the coastal area are responsible for Louisiana being so productive. These potentially unique ecological features have been divided into zoological, botanical, and geological components. A unique ecological feature is defined as an area or a resource whose characteristics qualify it as one of the following: (1) a critical habitat for rare or endangered species, (2) an area of extremely high biological productivity, (3) a location of vital importance as a nesting, feeding, wintering, or spawning area for fish and wildlife, (4) a rare or unusual occurrence of a particular species near the limits of its ranges, (5) an area vital to the maintenance of a coastal ecological process, (6) a unique physiographic feature, or (7) an area of exceptional recreational value (Burk and Associates, Inc. 1976).

In addition to unique features, particular areas of concern may also be identified as areas requiring special management procedures. An area that qualifies can be nominated and classified as a Special Area using the procedure described in Chapter 7, and special management plans can be developed for the area. While no Special Areas were identified within this updated CZMP document, potential areas for future consideration could include:

- Violet Freshwater Diversion Area and Central Wetlands
- Biloxi Marshlands
- Fort Proctor and Fort Proctor Marsh
- Bayou La Loutre Ridge and Magnolia Mound
- Bayou La Loutre – Bayou Terre aux Boeufs Corridor & Fishing Communities
- Bird Islands: Seabird Colonies and Wading Bird Rookeries
- Oyster Growing Areas

Even though many of these areas are identified for restoration and management under state and/or federal plans, this does not preclude the parish from developing specific guidelines for management and use now or in the future. The Chandeleur Islands within the Breton National Wildlife Refuge could also qualify as a Special Area; however, the USFWS has already developed and is in the process of implementing management plans for this area with input from state agencies.

**Table 3-9. Potential Conservation and Restoration Sites in St. Bernard Parish (Burk & Associates, Inc. 1977, USACE 2010a).**

<b>SITE</b>	<b>EMU</b>	<b>CHARACTER AND DESCRIPTION</b>
Proctor Point Marsh	1-Bienvenue-Proctor Point Marsh	A brackish-to-saline marsh that is being eroded along MRGO and Lake Borgne shorelines. Prime fish nursery ground, waterfowl habitat, and site of Fort Proctor.
Bayou La Loutre - Bayou St. Malo Alluvial Ridge Complex	North ridge: EMU 1-Bienvenue-Proctor Point Marsh and EMU 8-Biloxi Marsh; South ridge: EMU 7-Lower La Loutre Wetlands	Portion of the natural levee ridge of an abandoned Mississippi River distributary channel and an important natural barrier to saltwater intrusion and storm surge. Magnolia Mound Native American Site and several other archaeological sites are present on this live oak and palmetto vegetated ridge.
Biloxi Marsh	8-Biloxi Marsh	Part of Biloxi Wildlife Management Area and essentially a wilderness area. Excellent fisheries nursery grounds, waterfowl wintering habitat, fur-bearer habitat, and oyster production area.
Chandeleur Islands	EMU 15-Chandeleur Sound & Islands	Barrier islands consisting of beaches, dunes, mangroves, and saline marshes with submergent seagrass beds on the westward side. Within the Breton Island National Wildlife Refuge and Wilderness Area and an extremely important nesting area for a variety of seabirds, waterfowl, and the endangered loggerhead sea turtle. Also important spawning area for many fish and crustaceans, and a popular surf fishing area.
Central Wetlands	EMU 2-Central Wetlands	Former freshwater marsh and cypress swamp converted to brackish marsh and shallow estuarine ponds after construction of MRGO. Now surrounded by flood protection levees with connection to MRGO via Bayou Dupre and Bayou Bienvenue. Suitable for restoration and management as a freshwater habitat.
Caernarvon Freshwater Outfall Area	EMU 4-Lake Lery Marsh	Former fresh to intermediate marsh habitat used extensively by freshwater and estuarine organisms, furbearing animals and overwintering waterfowl. Experienced extensive land loss and conversion to brackish marsh due to saltwater intrusion. Adaptive management of Caernarvon Freshwater Diversion structure is designed to restore and sustain fresh-to-intermediate marsh habitat.

## **RESOURCE USE CONFLICTS**

There are a number of resource use conflicts within the parish. Conflicts develop generally between users who wish to change the natural landscape in order to pursue their activities and users who wish the landscape (i.e., habitat) to remain in a natural or barely altered condition and supportive of natural, renewable resources. The former users are usually developers (including residential, commercial and industrial interests), shipping and transportation interests and the oil and gas industry. The latter users are sport and commercial fishermen, trappers and those having recreational interests. Both categories of users are necessary in today's economic and social order, and wise coastal planning and management can minimize these conflicts. One of the goals of the St. Bernard CZMP, as contained in the ordinance, is "...minimization of adverse effects of one resource use upon another...". This goal is set in a general framework of balancing development and conservation/restoration. This is a clear directive to the CZMP to provide conflict resolution to users and to mitigate impacts. The following discussion briefly outlines the nature of resource user and natural habitat maintenance conflicts in St. Bernard Parish.

### **Petroleum Resource Extraction**

St. Bernard Parish lands contain considerable amounts of oil and gas reserves that have been under development for many years. Exploration and production activities have created conflicts with other users of coastal wetlands and waterways through changes in landscape use, such as rig access cuts, pipeline canals, drilling rigs and other petroleum related hardware and property damage. Canal dredging for access to new drill sites and for pipeline emplacement has caused salinity intrusion and primary and secondary wetland loss in the vicinity of the canals and property damage, most notably to oyster growing areas. Seismic operations have occasionally caused oyster and other wildlife mortalities and damage to wetlands. Spills of oil, drilling muds and other chemicals sometimes impact habitat and especially affect those species unable to move, such as oysters. Pipes and other hardware lost or abandoned in water bodies have become snags for fishermen's nets and are responsible for fishermen suffering economic loss.

The oil spill from British Petroleum's Deepwater Horizon drilling platform at the Macondo Well site in the Gulf of Mexico on April 29, 2010, is an example of an extreme adverse impact of petroleum industry operations on the parish's natural and socioeconomic environments.

### **Navigation**

Navigation and waterborne commerce are major financial interests operating in St. Bernard Parish, especially along the Mississippi River. The Port of New Orleans, one of the busiest ports in the country, and its spin-off industries situated near the parish, are major employers for the area. The de-authorized and now closed MRGO channel, completed in 1963, was a major navigable waterway that contributed directly and indirectly to substantial land loss and habitat change in St. Bernard Parish as a result of initial dredging and deposition and subsequent erosion and saltwater intrusion. The canal widened continuously after its construction to the extent that it exceeded its project width design specifications and negotiated right of way. Almost since its conception, there was opposition to construction of

the channel and subsequent to construction there were continuous efforts to close the channel and mitigate the detrimental impacts through environmental restoration. The negotiations over the type and spatial and temporal distribution of mitigation and restoration measures continues into the twenty-first century with the preparation of and comment on the USACE's (2010b) Draft Environmental Impact Statement for MRGO Ecosystem Restoration. Closure of the MRGO now requires commercial and recreational vessels to use alternative routes between interior docking facilities and destinations within the wetlands, sounds and Gulf of Mexico.

Problems related to land loss and property damage associated with boat wakes and wave washing exist along other canals and waterways. With increased camp development and boat traffic along waterways, the potential for conflict between property owners and boaters over development and use of waterways also increases. Of particular concern on some narrow waterways are the placement of wharves and boat sheds that affect viewsheds and navigation along these waterways.

## **Development**

The landforms of the parish are dominated by a pattern of higher lands (natural levees) along existing and abandoned channels of the Mississippi River with lower wetlands (interdistributary basins) between the levee ridges. Development has concentrated along these ridges, with the higher density development within the leveed fastlands (EMU 13 and 3) and sparser development along unleveed ridges between Verret and Delacroix and Verret to Hopedale and Shell Beach (EMU 11). As the higher lands available for new development become increasingly scarce, development spreads to the lower, marginal, flood-prone lands on the backslope of the natural levees. As wetlands near the base of the levees are reclaimed and developed there is a need for greater collection and removal of potential flood waters by pumps. Discharge of floodwaters from fastlands into waterways in the adjacent wetlands has the potential to impact water quality and fisheries resources.

The cumulative impact of expansive recreational camp, bulkhead and dock development has the potential to negatively impact the wetland environment by removing or degrading the wetland-water interface that is crucial to the life stages of many estuarine organisms. Runoff from developed sites, improper treatment of sewage and resulting effluent, and improper disposal of solid wastes can degrade water quality and negatively impact the growth and harvesting of renewable resources such as oysters. Development and expansion of commercial sites, such as marinas and other water-dependent facilities, can also impact wetlands directly and indirectly through direct destruction of wetlands and degradation of habitat and water quality through improper disposal of solid wastes and sewage.

## **Water Quality**

As urbanization encroaches on lowlands, sewage and storm runoff cause pollution problems in the adjacent backswamps, marshes and estuarine water bodies. Water quality in the Mississippi River is of concern because "clean" Mississippi River water is needed for freshwater diversion into the wetlands. Because oysters tend to accumulate coliforms, an indicator of sewage pollution, polluted diversion waters can cause the periodic closure of oyster beds by the Department of Health and Human Resources when standard coliform levels are exceeded.

## **Space Conflicts**

Because there is little ridge land available, the competition for space for future development will become more intense, especially in the lower reaches of the parish where the ridges are already narrow and becoming narrower because of subsidence and erosion. Transportation networks (roads) compete for space with recreational usage, such as camps and marinas. This conflict for space is especially evident along the levee ridge from Reggio to Delacroix and Yscloskey/Alluvial City to Hopedale and to Shell Beach.

## **Coastal Restoration and Flood Protection**

St. Bernard Parish, like the rest of coastal Louisiana, faces ongoing land loss, changes in the distribution and size of habitats, and periodic severe flooding from storm surge associated with hurricanes. Measures to restore land, increase the diversity and sustainability of coastal habitats, and protect the parish and inland communities from storm surge often directly impact current land and resource uses. For example, freshwater diversions, such as the existing Caernarvon Freshwater Diversion and proposed Violet Diversion, are designed to restore historic salinity gradients for enhancement of fresh-to-low salinity wetlands and historic oyster growing areas. However, these diversions will potentially adversely affect private oyster leases that have been established further inland in response to historic saltwater intrusions into the Lake Lery and Lake Borgne areas. Emplacement of hard structure shorelines, such as rock dikes, designed to reduce shoreline erosion and protect interior marshes can have adverse effects on existing private oyster leases and complicate future placement and/or maintenance of petroleum based operations such as rig access canals and pipelines. Obtaining dredged material from existing water bottoms (e.g., Lake Borgne, the Chandeleur Sound) for restoration or nourishment of marshland will potentially adversely impact private oyster leases, fishing areas and submerged aquatic vegetation.

## **Conflict Resolution**

Resolution of the conflicts described above is a major goal of the CZMP. The performance standards, goals and policies described in Chapter 7 are designed to provide a means of resolution to the conflicts and to ensure that one user does not unnecessarily impact or hinder other users. The CZMP is also a mechanism whereby the parish can make its position known regarding proposed activities and comment on activities proposed by or under state and federal regulatory authority.

# SOCIOECONOMIC CONSIDERATIONS



**Camp in Eastern St. Bernard Parish  
(E. Fike, CEI, 2010)**

## CHAPTER 4

### SOCIOECONOMIC CONSIDERATIONS

#### POPULATION CHARACTERISTICS

Between 1950 and 1960 the population of St. Bernard Parish increased by 190.3 percent. Through the year 2000, the population showed a slow but declining percentage increase to reach a population high of 67,229 persons. Virtually all of the parish's population was forced to relocate temporarily following the total flooding of the parish in 2005. The parish is on a steady path toward rebuilding; however, the 2010 population of 35,897 people is 46.6 percent less than resided in the parish in the year 2000. Population trends for St. Bernard Parish between 1950 and 2010 are presented in Table 4-1.

**Table 4-1. Population of St. Bernard Parish Per Census Period (U.S. Census Bureau 1950-2010).**

Year	1950	1960	1970	1980	1990	2000	2010
Population	11,087	32,186	51,185	64,097	66,631	67,229	35,897
% Change*	53.3%	190.3%	59%	25.2%	4.0%	0.9%	-46.6%

\* Change from previous year

The ethnicity of the parish compared to the rest of Louisiana is presented in Table 4-2. As in the 2000 U.S. Census, the two major races recorded were white persons (74.0 percent in 2010 and 88.3 percent in 2000) and black persons (17.7 percent in 2010 and 7.6 percent in 2000). The Asian population was 1.9 percent in 2010 and 1.3 percent in 2000. The 2010 U.S. Census recorded 2.9 percent of the population reporting to belong to two or more races. Persons of Hispanic or Latino origin constituted 9.2 percent of the parish in 2010, but they were also included in other applicable race categories because they could be of any race.

**Table 4-2. Percentage by Race of Population in St. Bernard Parish and Louisiana (U.S. Census Bureau 2011).**

Race	St. Bernard Parish	Louisiana
White persons, percent, 2010 (a)	74.0 %	62.6 %
Black persons, percent, 2010 (a)	17.7 %	32.0 %
American Indian & Alaska Native persons, percent, 2010 (a)	0.7 %	0.7 %
Asian persons, percent, 2010 (a)	1.9 %	1.5 %
Native Hawaiian & Other Pacific Islander, percent, 2010 (a)	0.1 %	Z
Persons reporting two or more races, percent, 2010	2.9 %	1.6 %
Persons of Hispanic or Latino origin, percent, 2010 (b)	9.2 %	4.2 %
White persons not Hispanic, persons, 2010	68.5 %	60.3 %

(a) Includes persons reporting only one race

(b) Hispanics may be of any race, so also are included in applicable race categories

Z: Value greater than zero but less than half unit of measure shown

The area of St. Bernard that lost the most population after Hurricane Katrina is located north of West Judge Perez Drive in Arabi and Chalmette. Additionally, a buffer zone was established around the Murphy Oil refinery, through the purchase of properties west of the refinery. As in the past most of the parish's population is concentrated on the higher natural levee ridges in Management Unit 13 (Urbanized Area) and Management Unit 3 (Lower Urbanized Levee) that are enclosed by flood protection levees. Some settlement extends along the lower-lying, non-protected natural levees in Management Unit 11 from Verret to Hopedale-Shell Beach and south to Delacroix.

Parishwide, population density in 2010 was approximately 103 people per square mile of land (based on 347 square miles of land in the parish as of 2008). The population density for Management Units 3, 11 and 13, an area covering 40.78 square miles, equals approximately 880 people per square mile. Based on 2009 residential mail delivery data, 99 percent of the mail delivery was to five zip codes in the northwestern part of the parish: Chalmette 47 percent, Arabi 11 percent, Meraux 12 percent, Poydras 13 percent and Violet 16 percent.

Development in Management Unit 13 can be characterized as an extension of the Greater New Orleans Metropolitan area located to the northwest because many parish residents commute to the metropolitan area for employment, education, recreation and business purposes. The suburban nature of Management Unit 13, comprised of residential housing and community services, commercial establishments and traditional industrial uses, is expected to remain in place. Management Unit 3 is largely semi-rural and no major change in character is anticipated in the near future although there is additional development potential because it has leveed vacant land areas. The only concentrated areas of population residing outside of the flood protection levees are adjacent to the highways on top of the natural levee ridges in Management Unit 11 (Semi Urbanized Levee) that extend from Verret eastward to Hopedale and Shell Beach (HWY 46 and HWY 624) and from Verret southward to Delacroix (HWY 300). Most structures outside the levee system were destroyed completely by Hurricane Katrina; many simply washed away from their foundations. There is rebuilding of both homes and camps, but because of a smaller post-Katrina population the progress has been limited.

Over the years, the character of EMU 13 and to a lesser extent EMU 3 has changed slowly from rural to urban. In 1950, the U.S. Census classified 24 percent of the population as urban and 76 percent rural. By 1980, the population changed to 94 percent urban and 6 percent rural with the trend continuing to 1990 when 96 percent of the parish was classified as urban and four percent was rural (U.S. Census 1980 and 1990). Management Units 3 and 13 are expected to continue mainly as a suburban enclave for the foreseeable future. The elevated areas outside the hurricane protection levee (EMU 11) and the MRGO Spoil EMU 10 in the vicinity of Shell Beach are likely to experience a gradual and steady increase in structures for residences and camps. A new zoning ordinance was drafted in 2009 which essentially maintains the existing land use designations (Pollard 2009).

## **COMMUNITIES AND HOUSING CHARACTERISTICS**

There are five U.S. Census Bureau-designated places in St. Bernard Parish: Arabi, Chalmette, Meraux, Poydras and Violet. Chalmette is the seat of government in the parish and all of these communities except Poydras are located in the northern part of the parish in the Urban Area EMU 13. The parish contains twelve unincorporated communities: Caernarvon, Cantreras, Delacroix Island, Hopedale, Kenilworth, Reggio, Sebastopol, Shell Beach, Toca, Verret, Versailles and Yscloskey. These historic communities, most established as agricultural communities in the western part of the parish, are located on the natural levees of the Mississippi River, Bayou Terre aux Boeufs and Bayou La Loutre. However, the communities of Delacroix Island, Hopedale, Reggio, Shell Beach and Yscloskey in the southern and eastern part of the parish are characterized as fishing villages, where the major enterprises focus on commercial and recreational fishing and associated support businesses.

The U.S. Census Bureau (2011) data documented 17,220 housing units in the parish in 2009, down from 26,790 housing units that were recorded in 2000 (U.S. Census 2000). As of 2009, there were 12,993 households in St. Bernard, in contrast to the 25,123 households that existed in 2000. Each household contained an average of 2.93 people per household in 2009.

## **EDUCATION**

In 2009, St. Bernard Parish had three elementary schools, two middle schools, one high school and one alternative school. Total enrollment was approximately 5,316 students (St. Bernard Parish Public Schools 2009). In addition, one private school was operating. Nunez Community College had 1844 students enrolled for the Fall Semester of 2009, which equaled 79 percent of pre-Katrina enrollment. There are approximately eleven colleges in the Greater New Orleans Metropolitan Area that are within a one-hour commuting distance from Chalmette (Department of Economic Development 2009).

## **COMMUNICATIONS**

Two weekly newspapers are published in the parish. The regional daily newspaper includes a weekly supplement highlighting parish activities. Since Hurricane Katrina, communications facilities have been restored throughout the parish to facilitate the delivery of cable television, land line and cellular telephone and internet services.

## **ECONOMIC CHARACTERISTICS AND EMPLOYMENT**

As the population and population density increased over time, the nature of the economic base of the parish changed. Agriculture, fishing and trapping, which were the basis of the economy in St. Bernard Parish from historic times, began to be replaced by other economies, most notably, oil and gas exploration and production. The new economic base for the parish includes shipping, manufacturing, tourism, residential development and hydrocarbon and petroleum chemical (petrochemical) production. Many of these types of development require large tracts of land that must come from areas previously utilized for agriculture, and to a lesser extent commercial and recreational fishing, hunting and trapping activities.

As of 2009, manufacturing and trade (wholesale and retail) industries employed about 30 percent of the people in the parish, while construction employed 19 percent. Accommodations and Food Services accounted for 8.5 percent and Public Administration employed slightly over 7.7 percent. Transportation and Warehousing constituted 6.5 percent and Healthcare and Social Assistance was 5 percent. Administrative and Waste Services were 4 percent of employment and Professional and Technical Services were 1.5 percent of the workforce. Education Services were 5.5 percent of employment. All other labor categories were approximately 1 percent or less (Louisiana Workforce Commission 2009). The largest corporations in St. Bernard Parish in 2009 were Associated Terminals Chalmette, Boasso America, Capital One Bank, Domino Sugar, Chalmette Refining LLC (ExxonMobil), Gulf Coast Bank and Trust, Murphy Oil USA Refining LLC and Regions Bank (St. Bernard Economic Development Commission 2009).

Agriculture has decreased over the years and accounts for only a small segment of the parish economy. In 2007, Gross Farm Value for crops equaled \$205,000 and livestock equaled \$690,313. Agriculture and Marine Fisheries accounted for 98 percent of all Gross Farm Value at \$13,467,022 (Louisiana Agricultural Center 2008).

The fisheries industry remains a vital part of the economic base of St. Bernard. The published employment figures for this industry are misleading, due to the fact that most of the commercial fishing is done “in season” or on a part-time basis, and is, therefore, not incorporated into the employment statistics.

During the period from 2005 – 2009, the average per capita money income was \$18,182, compared to the statewide average of \$22,535. The median household income for this period was \$36,660, compared to the statewide average of \$42,460. Data show that 21.3 percent of the people in St. Bernard Parish were living below the poverty level, compared to the statewide average of 17.6 percent (U.S. Census 2011).

## **FUTURE LAND USE NEEDS AND REQUIREMENTS**

It is anticipated that St. Bernard will continue to receive a portion of its future development from the expansion of the New Orleans area eastward along St. Bernard's highways. The development that is expected to occur is generally in accordance with the natural environment and the parish's zoning designations. As of 2010, St. Bernard Parish continues to recover from the effects of Hurricane Katrina while simultaneously working to redefine itself as a parish with approximately 53 percent of its pre-Katrina population. The parish is updating its zoning ordinance but does not propose any major changes in land use designations. The parish infrastructure continues to be repaired creating the opportunity for continued re-population and development. However, it is anticipated that the general character of the parish will remain as a suburban entity.

The flood-protected portions of the MRGO Spoil unit (EMU 10) between Bayou Bienvenue and Shell Beach constitute the largest area of the parish with elevated land suitable for future development. This area could be used for selected types of water-dependent commercial,

residential and industrial development. The future use and development of the MRGO Spoil area should be facilitated and guided by a master planning effort with significant input from the private landowners, the public and parish representatives and in coordination with design plans for mitigation and restoration of St. Bernard Parish post-closure of the MRGO as a deep water navigation channel.



# 5

# ENVIRONMENTAL ISSUES



**Dead oak trees on subsided natural levee,  
eastern St. Bernard Parish  
(E. Fike, CEI, 2010)**

## CHAPTER 5

### ENVIRONMENTAL ISSUES

#### INTRODUCTION

The coastal wetlands of St. Bernard are a dynamic system undergoing constant change due to a combination of natural processes and human actions. The environment is experiencing rapid modification in land area and habitat type that, if left unchecked, will destroy the productive, resource-rich wetlands and significantly adversely affect the economic, cultural, and natural habitat conditions of the parish. Three major processes and associated actions, catalysts, and factors that contribute to land loss, and consequently habitat change, in coastal Louisiana are erosion, submergence, and direct removal of land (Penland et al. 1996) (Figure 5-1). Erosion of land is associated with scouring caused by wind-induced and navigation-generated water movement (i.e., waves, currents, tidal surge, etc.) and transport of mineral and organic materials as a result of loss of vegetation cover and exposure of channel banks. Land loss due to submergence is associated with flooding caused by impoundment or high water, substrate collapse caused by loss of vegetation cover or dewatering, and subsidence resulting from sediment loading, mineral extraction and faulting. The third land loss process, direct removal, is the result of excavation to create navigation channels, canals and rig access slips, ponds, other water bodies; for borrow material and deep burning of highly organic marsh substrate from lightning and uncontrolled fires (Figure 5-1). Fire can destroy marsh vegetation, and if the fire is hot enough and the marsh floor is exposed because of low water or drought conditions, the highly organic substrate will also burn. In brackish and saline marsh areas, the burns can create holes that subsequently fill with water and are too deep for natural revegetation by salt tolerant marsh vegetation. All of the factors listed in Figure 5-1 have contributed to land loss in St. Bernard Parish to varying extents. A fourth process that has gained renewed attention in recent years is relative sea level rise which is a combination of the sinking of the land surface and the worldwide elevation of the sea surface due to melting of the world's large ice masses and increases in sea water temperatures. Land loss is often associated with changes in habitat type and renewable resource distribution that can lead to conflicts among resource users.

#### Land Loss and Habitat Change

Detailed habitat mapping studies involving interpretation of aerial photographs show that between 1956 and 1995, St. Bernard Parish lost approximately 58,800 acres of land for a rate of approximately 1,507 acres (2.35 square miles) per year (See Table 2-1). Data from a study of changes in land and water area in coastal Louisiana reveals that over a 76-year period between 1932 and 2008, land loss in St. Bernard Parish was approximately 79,115 acres for a rate of 1,041 acres (1.63 square miles) per year (Barras 2009) (See Plate 2).

Quantification of habitat changes show that fresh marsh virtually disappeared between 1956 and 1978 (18,300 acres lost), but increased to almost a fourth (4,500 acres) of its 1956 area by 1995. The 1978 to 1990 increase in fresh marsh resulted from the development of fresh marsh on dredged material within the MRGO retention area and the conversion of bottomland hardwood/cypress swamp to fresh marsh along the backslope-base of the Bayou

PROCESS	ACTIONS	CATALYSTS	FACTORS
Erosion	Scour Transport	Wind Navigation Loss of Cover (Vegetation) Exposure Via Channels	Storms, engineered coastal Structures Recreation, Commercial Waterlogging, salt, herbivory, pollution Navigation, drainage, canal, overland flow
	Flooding	Impoundment High Water	Aquaculture, levees, roads recreation, canals altered hydrology
	Substrate Collapse	Loss of Cover (Vegetation) Dewatering	Seasonal, storms engineered drainage Waterlogging, salt herbivory, pollution
Submergence	Subsidence	Loading Extraction Faulting	Failed land reclamation Sediments, structures, reduced sediment input Oil and gas, salt, sulphur
	Excavation	Channels Ponds	Navigation, drainage, access, pipelines Agriculture, sewage, borrow pits
Direct Removal	Burning	Controlled Fires Lightning	Marsh management, agriculture
Undetermined			

**Figure 5-1. Classification of processes responsible for land loss and habitat change in coastal Louisiana (Penland et al. 1996).**

La Loutre natural levee inside the flood protection levees. There was an overall loss (46,000 acres) in non-fresh marsh (e.g., intermediate, brackish and saline) between 1956 and 1995. Between 1978 and 1995, the intermediate-brackish marsh habitat decreased by 43,300 acres and the saline marsh increased by 13,500 acres so that by 1995, the brackish and saline marsh types were almost equal in area (See Table 2-2). There has been a shift in the spatial distribution of marsh zones in the upper Breton Sound Basin since the implementation of the Caernarvon Freshwater Diversion structure in 1991. However, no mapping studies have quantified changes in habitat types since 1995. By the year 2000, a fresh marsh zone occupied the immediate outfall area of the diversion structure and an intermediate marsh zone extended eastward from Big Mar to the general vicinity of Delacroix. A narrow band of brackish marsh extended from Bayou Terre aux Boeufs in the vicinity of Reggio to just inland of Lake Jean Louis Robin. Saline marsh zone had moved eastward to the lower reaches of the Breton Sound Basin between Lake Jean Louis Robin and Lake Fortuna.

Major factors contributing to land loss through erosion, submergence and direct removal include: 1) construction and enlargement of canals for navigation, drainage; pipelines, and rig access; 2) tropical storms; 3) failed land reclamation; 4) animal overgrazing (herbivory); 5) continuation of loss of sediment input from Mississippi River; 6) construction of ponds for borrow pits, sewage, etc., and 7) saltwater intrusion into formerly freshwater areas. Major environmental problems identified by the parish for consideration through the local coastal management program are saltwater intrusion, erosion, subsidence, and flooding.

### **Saltwater Intrusion**

Saltwater intrusion has been a major problem in St. Bernard Parish because it has affected the type, distribution and area of habitats and associated resources used by commercial and recreational interests. While natural processes of subsidence (e.g., submergence) and erosion associated with delta deterioration would facilitate saltwater intrusion and alteration of formerly freshwater habitats in the parish, the rate of intrusion has accelerated since the late 1950s, largely as a result of the construction of rig access canals, pipeline canals and navigation channels, especially the MRGO. Saltwater intrusion, especially into deep, freshwater swamps and marshes, accelerates wetland erosion because it destroys the salt-intolerant plants, and salt-tolerant plants are either slow or are unable to colonize these deeper-water, organic habitats. Wave and tidal action on unconsolidated, unvegetated flats and along channel banks wash away the soil. As these processes continue, they create larger and deeper areas of open water that are susceptible to the influence of gulf tidal waters, thereby increasing flushing action and erosion, as well as permitting saltwater to progress further inland.

Channelization also alters marsh salinities by disrupting sheet flow over the marsh, accelerating the removal of fresh water and providing direct linear routes for saltwater intrusion. Sheetflow, the gradual overland flow of water that distributes nutrients and flushes out detritus, is very important to the maintenance of marsh productivity. Man-made channels are straight, deep, disrupt sheetflow, and prevent fresh water from reaching the outer portions of a marsh. These canals accelerate the loss of freshwater from upper marsh areas. On the flood tide, and during periods of drought, salt water is returned to the marsh in exchange for the fresh water that is absent or that was conveyed quickly out of the area through the canals.

The 76-mile long MRGO channel completed to project dimensions through the Chandeleur Sound in 1968 (Kerlin 1979), is the largest man-made channel in St. Bernard Parish with project design dimensions of 500 feet by 36 feet. However, erosion increased the MRGO surface width to over 2000 feet in some reaches. After completion in 1963, salinities along the MRGO corridor increased threefold. The formerly fresh and intermediate marsh between Lake Borgne and the East Hurricane Protection Levee (along the Forty-Arpent Canal) became brackish to saline, and trees in the freshwater swamps outside the protection levees were killed. The only surviving segments of cypress swamp were in the vicinity of pump outfalls. Figure 5-2 illustrates the rapidity of change in salinities and habitat distribution in the vicinity of the MRGO pre- and post-MRGO construction based on studies by Wright et al. (1960) and Fruge (1980).

Even prior to the proliferation of canal construction beginning in the early to mid-twentieth century related to oil and gas activities and the need for deeper channels for navigation, there had been a slow inland movement of more saline waters due to leveeing of the Mississippi River and prevention of periodic freshwater flooding into wetlands. Prior to the extensive construction of levees on the banks of the Mississippi River following the devastating Mississippi River flood of 1927, river floods deposited nutrients and sediments in the marsh and produced large zones of low-salinity waters due to the mixing of river and Gulf waters. Construction of the levee system began in 1717 to protect communities and plantations, and continued into the early twentieth century largely through the efforts of local governing entities and private landowners. There was no overarching authority to govern the quality of the levee construction and ensure proper maintenance during this period so periodic crevassing occurred. After the 1927 flood, the U.S. Congress enacted legislation and provided funding for comprehensive construction and maintenance of a flood protection system to professional engineering standards that was heavily dependent on levees to prevent overbank flooding by the Mississippi River.

As salinities increased, the oyster-producing zone moved landward. After completion of the MRGO, oyster grounds began to be leased in areas formerly too fresh to support oyster production, such as Lake Borgne and Lake Lery. This landward migration of the oyster-producing zone was not due to an intolerance of gulf-strength salinities by oysters but, rather, is a response to increased predation by oyster drills and diseases in waters having salinities greater than 15 ppt. Oysters are a convenient indicator species for illustrating the effects of increasing salinities because they are immobile organisms. Other mobile fish and shellfish have shifted their zones of abundance according to their salinity preferences. With increasing salinities, the acreage of prime low-salinity, highly productive nursery grounds decreased. Expansion of the higher salinity brackish and saline marsh zones also resulted in a decrease of habitat for freshwater fisheries, waterfowl and furbearers (Kerlin 1979) in the three decades following construction of the MRGO. The two most important fur-bearing animals, nutria and muskrat, prefer to feed on plants that grow in marshes having lower salinity.

Efforts to reverse the inland movement of salt water through operation of the Caernarvon Freshwater Diversion appear to be successful in the southern portion of St. Bernard Parish south of the MRGO. Fresh to intermediate marshes have been restored in the western half of this area and adaptive management policies (e.g., pulsing of discharges, changes in amount

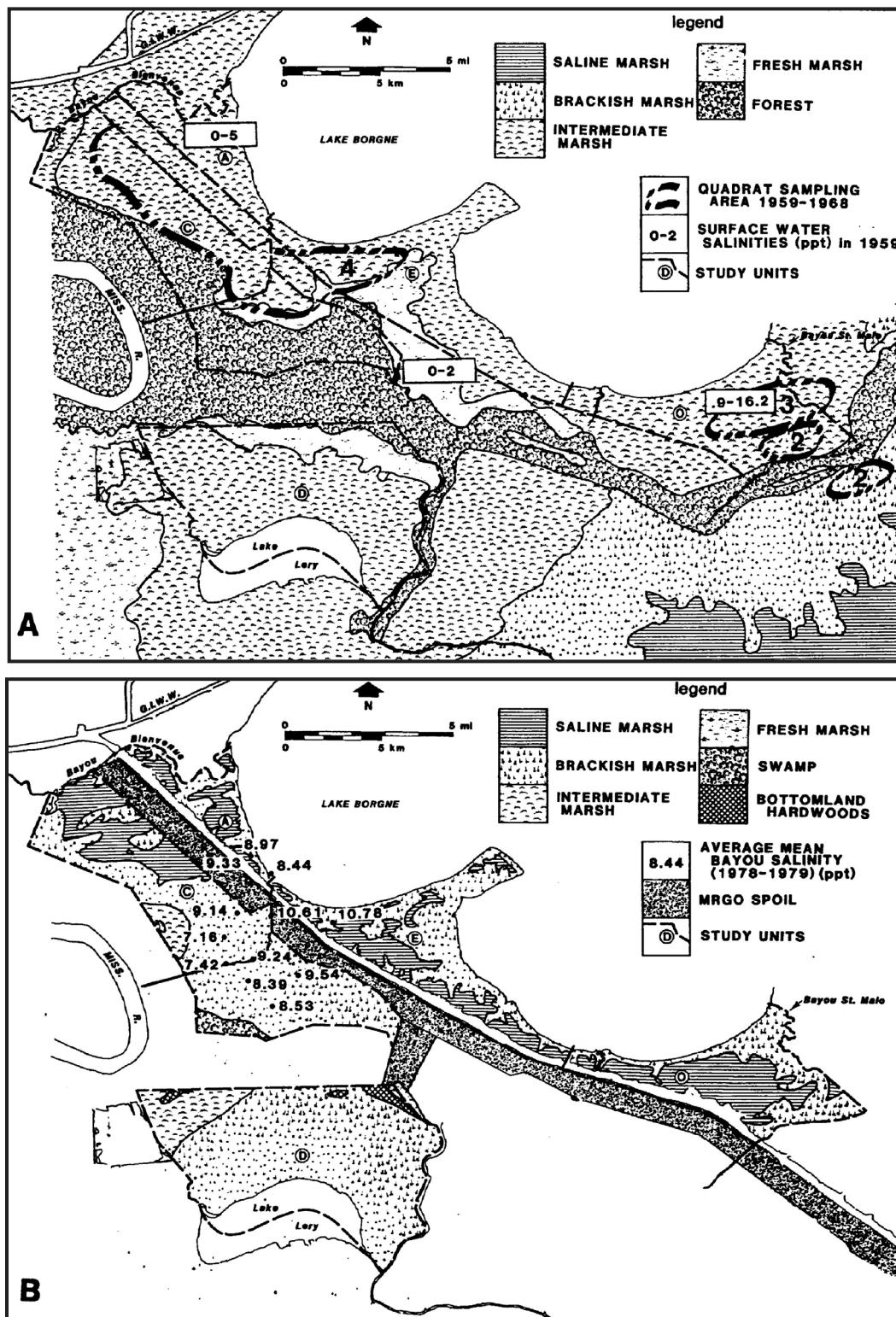


Figure 5-2. Distribution of vegetation types and salinity in the vicinity of the MRGO Canal pre-construction (1958-60) (A) and post-construction (1978-79) (B) (Wicker et al. 1982; after Wright et al. 1960, Fruge 1980).

of discharge, management of surface flows, etc.) are being used to maximize the benefits of freshwater and nutrient diversion and increase the amount of sediment input without adversely affecting oyster and shrimp production in the eastern portion of the Breton Basin. Addressing adverse saltwater intrusion issues in the northern portion of St. Bernard Parish is largely dependent on the array of management measures selected for implementation as mitigation for damages caused by construction and maintenance of the MRGO since 1963.

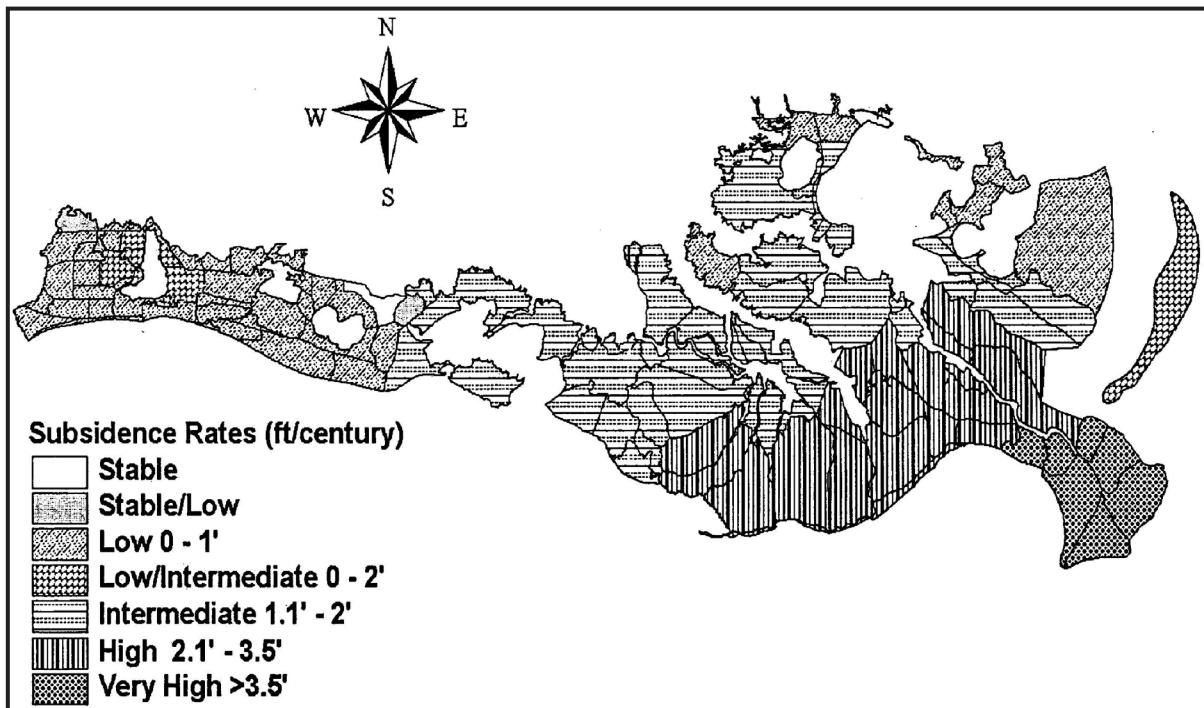
## **Erosion**

Land loss due to erosion and subsidence is accelerating as the number, size, and depth of water bodies increases. Major natural erosive forces in St. Bernard are wind-generated waves and violent storms, especially hurricanes; while the man-made erosive forces include canal and borrow pit construction and boat and ship-generated waves. Wind-generated waves continuously erode the shorelines along Lake Borgne, the Chandeleur Sound, the gulf side of the Chandeleur Islands, and other large, interior water bodies, such as Lake Lery. However, the greatest amount of shoreline erosion can occur in a very short time when these exposed areas that are subjected to hurricane-generated waves. Hurricanes are especially destructive to the marsh environment when their wind-generated waves scour interior marsh ponds and “eatouts” and floodwaters flush out the organic debris leaving deeper water bodies and a broken marsh surface.

Ship-generated waves, along with strong tidal currents, were a primary cause of bank erosion along the MRGO. This erosive action removes the marsh substrate by flushing out surface materials and by causing large sections of the bank to cave into the deep channel. Closure of the MRGO to large ship traffic and armoring of the marsh shoreline will reduce this source of land loss along much of the former MRGO channel. Bank erosion due to tidal scouring and wind and boat-generated waves will continue to be a problem on other navigable waterways because of the highly organic substrate.

## **Subsidence**

Subsidence (sinking of the earth's surface) is a pervasive process in coastal Louisiana and results from the loading of deltaic deposits onto the continental shelf, downwarping along the Gulf Coast Geosyncline, compaction of newly deposited sediments, and faulting. Natural and man-made levees tend to subside into the less dense marsh deposits and are sometimes found completely buried beneath marsh level. The natural levees of Bayou Terre aux Boeufs below Delacroix and Bayou La Loutre east of Hopedale have subsided noticeably even within the twentieth century. Coupled with the land subsidence processes is a gradual rise in sea level (tide gauge records indicate about one foot in the last century). In the absence of sediment input (i.e., Mississippi River alluvium) to offset the subsidence processes, the natural levee ridges will be lowered to marsh level and the existing marshes will sink below sea level. Regional subsidence rates were mapped as part of the Coast 2050 project (Figure 5-3) and reveal that subsidence in St. Bernard Parish ranges from low (0 – 1 foot/century) in the north eastern marshes (Biloxi Marsh area) to low/intermediate (0-2 feet/century) on the Chandeleur Islands, and intermediate (1.1-2 feet/century) in the vicinity of the natural levees (LCWCRTF & WCRA 1998:37).



**Figure 5-3. Subsidence rates in coastal Louisiana by Coast 2050 mapping unit (LCWCRTF & WCRA 1998:37).**

Localized subsidence associated with reclamation of wetland habitats for agriculture or development is a potential problem in the parish for all but the highly inorganic (mineral) natural levee soils. Subsidence potential refers to the maximum possible loss of surface elevation after a soil with organic or semi-fluid mineral layer is artificially drained and dried. After drainage and air-drying (oxidation), the organic layers in most soils lose more than half of their original volume in the first one to three years. The initial subsidence results from the loss of groundwater buoyancy, consolidation, and compaction. The lowering of soil surface levels will continue at a uniform rate after the initial subsidence due to the biochemical oxidation of organic materials. This subsidence will continue at a rate of up to one inch or more per year until the water table or mineral material is reached. The soils with semi-fluid mineral layers and without organic layers have a potential for subsidence due to consolidation and loss of water after drainage, but have little or no subsidence after drying. The five major categories of soil subsidence potential are as follows:

There is a close correlation between soil types and soil subsidence potential and consequently land loss. Those areas with organic soils and a very high soil subsidence potential will have a high potential for land loss upon drainage. Lafitte and Timbalier soils have a very high subsidence potential of over 51 inches and 51 to 59 inches, respectively. Clovelly and Bellpass soils have a high subsidence potential of 16 to 51 inches upon drainage. Soils with moderate subsidence potential are Scatlake (6-12 inches), Harahan (4-10 inches), Barbary (6-15 inches), and Westwego (6-20 inches) (Trahan, et al. 1989). See Plate 5 for location of these soil types.

## **Flooding**

Another major environmental problem confronting St. Bernard Parish is the threat of flooding. Plate 13 depicts the FEMA designated 100-year flood zone and reveals that almost 98 percent of the parish is susceptible to flooding. The crest of the natural levees from the vicinity of Kenilworth west to Arabi are mapped as being in the 500-year flood plain and not readily subject to flooding.

Flooding can occur in nearly all of St. Bernard Parish because of its low elevation and proximity to the Gulf of Mexico. Flooding occurs primarily as a result of hurricane tidal surge entering from the gulf and excessive rainfall that accompanies hurricanes and severe local storms. Preservation of wetlands can lessen the impact of flooding in two ways. First, the wetlands can function as a buffer to storm surge by dampening the force of the hurricane-generated waves. Second, wetlands inside the base of the storm protection levees can serve as holding basins, or reservoirs, for water collecting inside the leveed areas (fastlands) either from hurricane surges overtopping the levees or from excessive rainfall.

Theoretically, the protection levees, drainage canals, and pumping systems are designed to protect lives and property inside the levees from flooding. Experiences with severe hurricane events such as Hurricane Betsy in 1965 and Hurricane Katrina in 2005 demonstrated that levee-drainage system cannot effectively function under the most severe flood-generating conditions (e.g., overtopping and/or breaching of levees). The presence of a wetland buffer zone between developed areas and the Gulf of Mexico can offer an added measure of protection to the integrity of the levee system by dampening wave energy and tidal surges. For this reason, it is essential that a viable marsh habitat remain outside the levees and a healthy swamp-bottomland hardwood forest be preserved inside the base of the protection levees in the low-lying (near sea-level) areas.

## **Sea Level Rise**

Another catalyst to land loss that has gained prominence in recent years is the acceleration of the rate of relative sea level rise. Sea level is measured with a tide gauge that shows the height of the level of the sea above the land upon which the gauge is set. Changes in the height of the sea surface above the land surface can be caused by eustatic or world-wide changes (e.g., melting of polar ice or expansion of water through increases in water temperatures) and/or more local vertical movements in the elevation of the land surface. In Louisiana relative sea level rise includes both the elevation of the level of the sea surface and the downward movement (e.g., subsidence) of the earth's surface.

Recent studies by the Intergovernmental Panel on Climate Change determined that the rate of sea level rise has been accelerating from a mean of 1.7 millimeters (mm)  $\text{yr}^{-1}$  (0.04 inches [in])  $\text{yr}^{-1}$  during the twentieth century to 3 mm  $\text{yr}^{-1}$  (0.12 in  $\text{yr}^{-1}$ ) since 1993 (Blum and Roberts 2009:489, Bindoff et al. 2007). The IPCC studies conservatively "...predict extra global sea level rise of 0.2 – 0.6 meters (m) (0.66 – 1.96 ft) by the year 2100 (Blum and Roberts 2009:489, Meehl et al. 2007). Worst case scenarios have placed sea level at more

than 6 ft (1.82 m) by the year 2100. In the Louisiana deltaic plain region, subsidence resulting from compaction and other processes increases the total amount of sea level rise. Blum and Roberts (2009:489) project that "...in the absence of sediment input, land surfaces that are now below 1 m (3.28 ft) in elevation will be converted to open water or marsh" by the year 2100 (Figure 5-4). The land area shown as remaining in St. Bernard Parish, after a 1 m (3.28 ft) rise in sea level, exists largely within the flood protection levees and natural levee ridgeland on the relict Mississippi River - Bayou La Loutre distributary channels (Blum and Roberts 2009:489).



**Figure 5-4. Coastal Louisiana in 2100 assuming a 1-m (3.28-ft) rise in sea level, no mineral input and no catastrophic events (After Blum and Roberts 2009:489).**

### Coastal Restoration and Flood Protection

In an effort to address environmental problems associated with saltwater intrusion, land loss, and habitat change, St. Bernard Parish has been very proactive in proposing and supporting coastal management and restoration efforts since the early 1970s. In addition to opposing actions that negatively impact the environment, such as construction and maintenance dredging of the MRGO, and using local regulations to minimize environmental damage, such as development of compliance standards for petroleum related exploration and production activities, the parish has supported development of local wetland management plans (Wicker

et al. 1982), MRGO restoration and mitigation plans (Gagliano et al. 2006) and in general, regional restoration strategies, as presented in the *Coast 2050 Program* (LCWCRTF & WCRA 1998, 1999a, 1999b, 1999c), the state's *Comprehensive Master Plan for a Sustainable Coast* (CPRA 2007), the *Louisiana Coastal Area Louisiana Ecosystem Restoration Study* (USACE 2004b, c) and the *Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Study Draft Environmental Impact Statement* (USACE 2010a).

The parish has also supported individual coastal restoration projects funded through government funded programs such as:

- Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA, Public Law 101-646, Title III), also known as the Breaux Act – Passed by Congress in 1990 and authorized through 2017, this has been the lead program for implementing coastal restoration and protection projects in Louisiana.
- Louisiana Coastal Protection and Restoration Fund (CPRF) – Fund developed to serve as a recurring funding source for implementing the state's coastal restoration and protection program and primarily based on revenues generated from oil and gas activities within the state's territorial boundaries and federal territorial seas that comprise the OCS.
- State Surplus Funds (Act 203 of 2007; Act 7 of 2008; Act 2 of 2009) – surplus funds available for us in hurricane protection and coastal restoration measures.
- Coastal Impact Assistance Program (CIAP) (Energy Policy Act of 2005, Pub. L. No. 109-58 § 384) – Intermittent funding program to assist states with mitigating impacts from Outer Continental Shelf (OCS) related oil and gas production activities.
- Gulf of Mexico Energy Security Act of 2006 (GOMESA) (Pub. L. No. 209-432, Div. C, Title I § 308) – Louisiana will receive approximately one quarter of 37.5 percent of OCS revenues and proposes to use the funding for coastal restoration and hurricane protection projects and improvements.
- Water Resources Development Act (WRDA) of 1986 (Section 1135: Environmental Impact Restoration) – authorization to incorporate modifications to existing USACE public projects to restore ecosystems adversely impacted by the projects and to support construction of new restoration projects to restore areas impacted by USACE projects.
- WRDA of 2007 (Projects and Programs, Title VII Louisiana Coastal Area) – Congress authorized USACE to address enhanced storm protection and develop specific ecosystem projects in the Louisiana Coastal Area. The WRDA of 2007 also authorized the Mississippi River Gulf Outlet MRGO Ecosystem Restoration Plan (USACE 2010b) to restore the coastal wetland ecosystem that was adversely affected by the emplacement and operation of the MRGO channel. The WRDA of 2007 funded the de-authorization study and subsequent damming of the MRGO south of its Bayou La Loutre crossing.

- Oil Pollution Act of 1990 (OPA) and Water Pollution Control (Clean Water) Act, amended 1990 (CWA) – Provisions in the OPA and CWA provide for restitution and civil penalties for damages to the natural environment caused by the responsible party. Damages are determined through the Natural Resources Damages Assessment (NRDA) process undertaken by federal and state trustee agencies. Funds generated through the damage assessments can be used to restore the natural resources and habitats detrimentally impacted by polluting events such as an oil spill.
- Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economics of the Gulf Coast Act of 2011 (RESTORE Act of 2012) – Requires that eighty percent of the penalties, paid by British Petroleum (BP) for violations of the Water Pollution Control Act (Clean Water Act), will be held in the Gulf Coast Restoration Trust Fund of the U.S. Treasury for restoration measures in five gulf coast states (Louisiana, Texas, Mississippi, Alabama and Florida) affected by the worst offshore oil spill in U. S. history.

The RESTORE Act (The Library of Congress 2011) was specifically enacted and signed into law on July 6, 2012, to ensure that the state's most adversely affected by the April 2010 blow out of BP's Macondo 252 well, be adequately compensated in order to restore impacted coastal and marine habitats and communities. Clean Water Act violations by BP are projected to provide a total of \$4 billion (B) to \$16.8B to the five states depending on the results of litigation or reaching a settlement (Reuters 2012). Criminal penalties against BP are projected to be in the order of \$5B to \$10B (Reuters 2012). In addition, BP and other responsible parties will be required, under the Oil Pollution Act, to restore damages to natural resources, caused by the oil, through a process known as a Natural Resources Damage Assessment (Environmental Law Institute 2012).

Of the monetary penalties assessed by the Clean Water Act, sixty five percent will be allotted to state and local governments for environmental and economic recovery. Thirty percent will be managed by the Gulf Coast Ecosystem Restoration Council, an 11-member group that will be charged with development of a comprehensive restoration plan. Half of the remaining five percent will be allocated to the Gulf States Marine Fisheries Commission and the other half to “a center of excellence” in each state (USA Today 2012). Louisiana’s center of excellence is the Water Institute of the Gulf.

While the concept of coastal restoration is almost universally supported, implementation of various projects can lead to conflicts with users of particular resources. For example, freshwater diversions such as Caernarvon, which became operational in 1991, demonstrate that they facilitate revegetation of formerly denuded marsh areas, increase wetland habitat and species diversity by restoring freshwater habitat, and restore the “optimum” salinity line for oyster production in this area to near its historic location. However, implementation of the diversion negatively impacted owners of oyster grounds that had been leased as far inland as Lake Lery in response to the inland movement of more saline habitat. Other types of coastal restoration activities and private efforts at land management have potential for user conflicts as well because they often restrict access and use of areas or facilitate one set of coastal processes at the expense of others. A more detailed discussion of coastal restoration

activities and the parish's position regarding future restoration and flood protection measures is included in St. Bernard Parish Coastal Restoration Plan: Synopses of Proposed Projects and Identification of Preferred Actions (Gagliano et al., 2012).

# 6

# GOALS, POLICIES AND MANAGEMENT UNITS



**Storm-hardened structure in eastern St. Bernard Parish  
that survived Hurricane Katrina in 2005  
(K. Wicker, CEI, 2010)**

## **CHAPTER 6** **GOALS, POLICIES AND** **MANAGEMENT UNITS**

### **INTRODUCTION**

The St. Bernard Parish Coastal Zone Management Program was developed in the early 1980s, with the program document formally approved by the federal government in 1987. Goals were initially developed and adopted on both a parishwide and an individual Environmental Management Unit (EMU) basis. Both the parishwide and individual EMU goals have been revised and expanded, primarily, in response to the environmental degradation that has occurred since the 1980s and the need to respond to said damages. Parishwide goals and policies are presented below and goals for individual environmental management units, as well as permissible uses, are included with the sections on management units.

### **PARISHWIDE GOALS**

The implementation and administration of the St. Bernard Parish's CZMP was initially based on the first five parishwide management goals listed below. In updating the previously approved CZMP, additional goals were identified:

1. Attain proper use of parish resources through a balance of conservation and development.
2. Identify natural habitats with unique characteristics and develop methods to maintain them.
3. Determine the degree of development intensity suitable for all areas of the parish.
4. Enhance the biologically productive and physically protective aspects of the parish's wetland environment.
5. Enhance cultural and recreational opportunities in the parish by the development of ecologically sensitive facilities within the context of a comprehensive program.
6. Enhance the productivity, flood protection and water storage functions of St. Bernard Parish wetlands.
7. Protect stable wetlands, reduce land loss in deteriorating wetlands, and create and restore wetlands, where practicable.
8. Reduce shoreline erosion in order to preserve wetlands and preserve shallow estuarine areas and protect water-dependent development outside of fastlands.

9. Introduce fresh water and nutrients into wetland areas to restore and sustain natural habitats to the maximum extent practical.
10. Improve and maintain water quality.
11. Enhance multiple functions of wetlands through the restoration of fresh-to-saline gradients of surface water using hydrological management.
12. Reduce saltwater intrusion through the emplacement of plugs or water control structures at the ends of canals.
13. Protect water bottoms and associated biotic communities from damages induced by human activity, such as dredging.
14. Achieve environmentally sound oil and gas exploration and production practices that minimize environmental damage to wetlands and sensitive natural areas and contribute to the parish's efforts to maintain and restore wetlands, sensitive natural areas, and barrier islands.
15. Restore Chandeleur Barrier Island system through coastal restoration projects involving repair of breaches and creation of dunes for protection from storm surge and for wildlife habitat.
16. Maintain the extensive seagrass beds behind the Chandeleur Barrier Islands.
17. Restore wetlands, including marshes and where feasible cypress swamps using freshwater diversions and dredged material, near protection levees for additional protection from storms.
18. Restore forest habitats (freshwater swamps, maritime forests, live oak natural levee forests) throughout the parish for habitat diversity, use by migratory neotropical birds, recreation and storm surge protection.
19. Encourage participation in wetland conservation and restoration programs by landowners and public agencies.
20. Evaluate proposed development of wetland areas for non-wetland dependent uses and require appropriate mitigation for unavoidable adverse impacts.
21. Support environmentally sound economic uses with special emphasis on sustainable multiple-use of waterfront areas.
22. Support orderly development with encouragement of land uses that are compatible with wetlands and aquatic habitats.

## PARISHWIDE POLICIES

The original Statement of Policy, adopted by St. Bernard Parish in 1982, has been reformulated with input from the CZAC, parish representatives and stakeholders to consist of a more comprehensive set of parishwide policies relevant to current conditions in the parish:

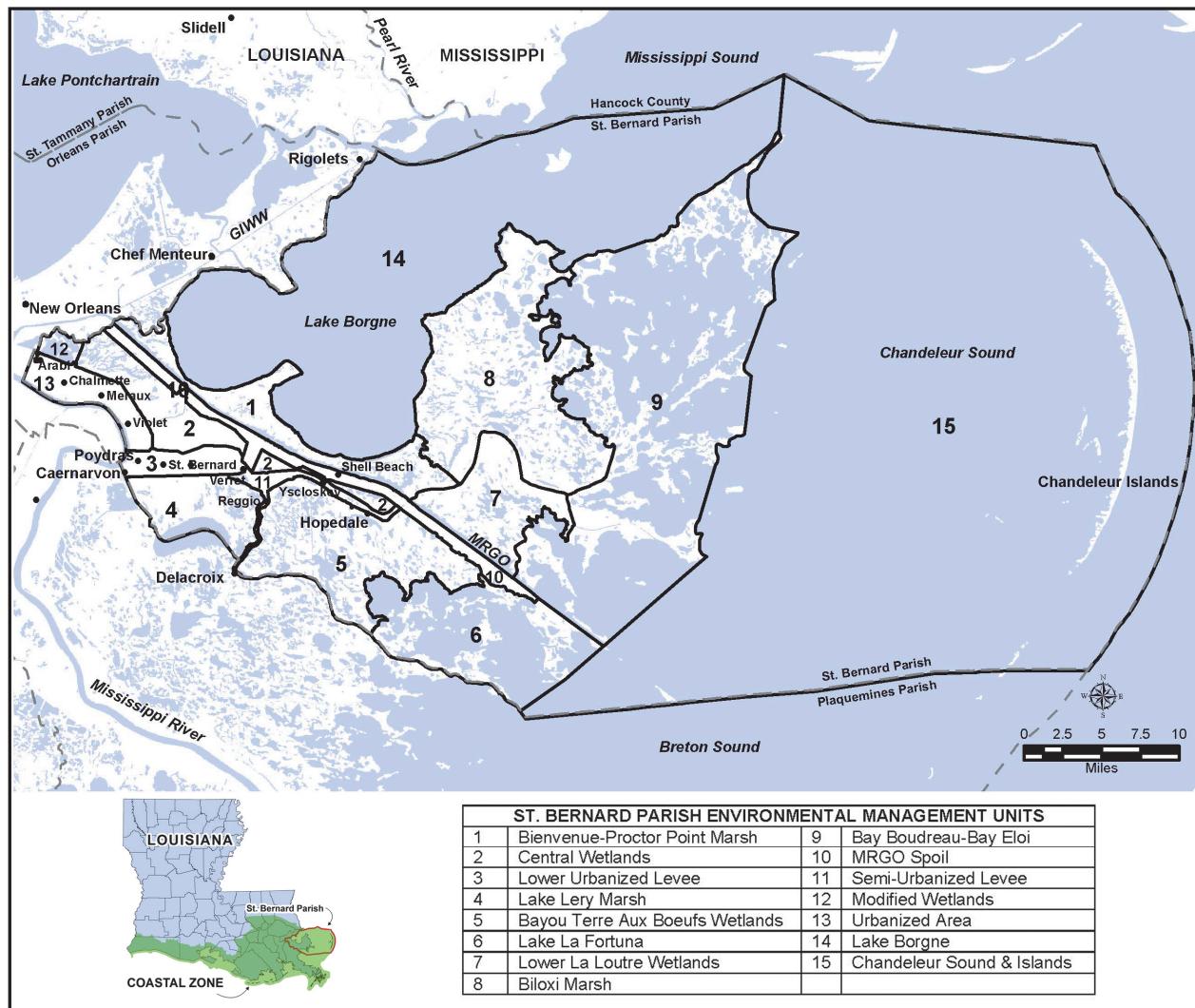
1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Support restoration programs that utilize the introduction of fresh water and sediment into wetlands.
4. Support beneficial use of dredged material to create wetlands, barrier islands, and beaches, where practicable.
5. Encourage use of appropriate bankline stabilization measures to retard wetland loss resulting from shoreline erosion by wind, wave and slumping actions.
6. Support and encourage wetland management and restoration projects implemented by private landowners.
7. Support state and federal wetland management and restoration projects in designated wildlife management areas.
8. Encourage the locating of new pipelines in established pipeline corridors to the maximum extent practical.
9. Encourage oil and gas exploration and production practices to be conducted in an environmentally sound manner and consistent with the CZMP and implementation ordinance.
10. Encourage oil and gas operating companies to incorporate wetland management and mitigation components in their operation plans that are consistent with state and local coastal management programs.
11. Support actions to restore and/or maintain barrier islands.
12. Oppose projects that damage barrier islands, beaches, wetlands, and other habitats where proposed project associated restoration or mitigation measures are inadequate.

13. Support reestablishment and/or relocation of productive oyster seed reefs that are impacted by government funded restoration projects (e.g., freshwater diversions, dredging and deposition of fill material) and man-made disasters such as oil spills.
14. Support efforts to improve water quality.
15. Support, enhance, encourage and protect multiple-use of resources consistent with maintenance and enhancement of renewable resources management and productivity, and the need to provide for economic and orderly growth and development, with minimization of adverse effects of one resource use upon another without imposing undue restrictions on any user.
16. Promote recreational activities in wetlands through the development of environmentally compliant support and staging facilities such as parks and boat launches.
17. Encourage the use of Best Management Practices during construction of development projects in upland and fastland areas in order to reduce adverse environmental impacts to adjacent wetlands.
18. Encourage avoidance of activities on upland and fastland areas that would have negative and unmitigated impacts on adjacent wetlands.
19. Establish separate guidelines for wetlands that recognize that:
  - a) The wetlands of St. Bernard Parish, although part of a larger estuarine ecosystem, stretching from Lake Maurepas to the Chandeleur Islands, consist of a series of distinct geographic areas. These areas have been combined into appropriate environmental units to facilitate wetland management and habitat enhancement.
  - b) Individual permissible uses for each wetland management unit are based on a balance of economic, environmental, and social priorities and needs.
  - c) The primary goal for future use of parish wetlands is to maintain them in their natural condition and to restore, when possible, those areas that have deteriorated due to natural and human-induced actions. A major aspect of these restoration activities should be the preservation of the parish's archaeological and historical resources. Maximum use of the renewable and non-renewable resources of the wetlands is encouraged so long as high productivity is maintained and the ecological balance of the wetlands is not disrupted further.

## **PERMISSIBLE USES**

Permissible uses are those uses which may be undertaken in each Environmental Management Unit (EMU) (Figure 6-1), but which may be subject to permit requirements and conditions of the parish ordinance or the CZMP. The parish's application of permissible uses is not intended to be all encompassing, but rather have a degree of flexibility.

The goals and policies contained herein will be implemented through the adoption of a revised CZMP ordinance, continued processing of Coastal Use Permit applications, and general administration of the CZMP. Coastal Use Permits will normally be required for local uses in all EMU except the Lower Urbanized Levee (Unit 3), the Urbanized Area (Unit 13), and fastlands/uplands sections of the Semi-Urbanized Levee (Unit 11). No coastal use permits would be required in these three EMU if proposed activities have no direct or significant impact on coastal waters. In EMUs 3, 11, and 13, uses are subject to existing parish zoning codes, ordinances and local permit requirements.



**Figure 6-1. Environmental Management Units in St. Bernard Parish.**

## ENVIRONMENTAL MANAGEMENT UNITS

### Introduction

The identification and use of EMUs in implementation of local coastal programs are an integral requirement of the Louisiana Coastal Resources Program. The EMU concept is based on dividing a parish's land and water environments into individual management components according to characteristics such as habitat, hydrology, other natural resource attributes, and land use that would facilitate planning and decision-making regarding proposed actions requiring permits. The St. Bernard Parish CZMP was approved in 1987 with 13 EMUs and these same units were retained for the updated program. However, two additional EMUs were added to include the Lake Borgne and the Chandeleur and Breton Sound areas of the parish because of the enhanced potential for competing land uses in these areas (e.g., dredging for fill material for wetland creation, oyster growing areas, pipelines and oil wells, surge barriers, critical habitat, etc.) (Table 6-1). The following sections of this chapter characterize the 15 EMUs according to existing resources, trends and uses and identify permissible uses and management goals.

**Table 6-1. Environmental Management Units and Defining Characteristic.**

<b>Unit No.</b>	<b>EMU Name</b>	<b>Characteristic</b>
1	Bienvenue-Proctor Point Marsh	Wetlands
2	Central Wetlands	Wetlands
3	Lower Urbanized Levee	Fastlands/Uplands
4	Lake Lery Marsh	Wetlands
5	Bayou Terre aux Boeufs Wetlands	Wetlands
6	Lake La Fortuna	Wetlands
7	Lower La Loutre Wetlands	Wetlands
8	Biloxi Marsh	Wetlands
9	Bay Boudreau-Bay Eloi	Wetlands
10	MRGO Spoil	Transition Area
11	Semi-Urbanized Levee	Transition Area
12	Modified Wetlands	Wetlands
13	Urbanized Area	Fastlands/Uplands
14	Lake Borgne	Wetlands (Mostly Water)
15	Chandeleur Sound & Islands	Wetlands (Mostly Water)

The Louisiana Coastal Resources Guidelines (OCZM, LCRP 1980) require that the parish delineate and map three categories of land: 1) fastlands/uplands, 2) transition areas, and 3) wetlands (See Plate 7). The definitions of fastlands, uplands, and wetlands, along with other terms related to coastal management programs, are included Appendix A. Each of the 15 EMUs basically corresponds to one of these three categories. Table 6-2 contains a summary of EMU environmental characteristics and considerations relevant to coastal management program implementation and decision-making.

## **Wetland EMUs**

The ten EMUs that consist primarily of wetlands and / or open water are outside of the hurricane protection levees and away from the base of the natural levee ridges. Historically, the wetlands graded from saline marshes along the perimeter of the abandoned Mississippi River-St. Bernard Delta, to brackish-to-intermediate, and finally to fresh marshes in the interior portions of the parish adjacent to the cypress swamps located at the toe of the natural levees of the Mississippi River and Bayou Terre aux Boeufs and Bayou La Loutre. Saltwater intrusion via the MRGO, canals, abandoned Mississippi River distributaries, and enlarging wetland water bodies had diminished the natural habitat diversity to the extent that there were virtually no freshwater marshes or cypress swamps and only very limited expanses of intermediate marsh in the unleveed portions of the parish by the later part of the twentieth century. Most of the fresh-to-intermediate wetland environments occur inside the hurricane protection levees, in isolated wetland pockets between the natural levee ridges and spoil deposits and on sections of the MRGO spoil area transition EMU (Unit 10). Brackish marshes comprise the wetlands along the gulfward base of most of the hurricane protection levees and natural levees of Bayou La Loutre and Bayou Terre aux Boeufs. Large expanses of saline marsh are located gulfward of the brackish marshes and constitute the largest habitat classification found in the parish, other than open water. With implementation of the Caernarvon Freshwater Diversion project at the end of the twentieth century, intermediate marsh has been re-established in St. Bernard Parish north of Lake Lery.

Two EMUs, Lake Borgne (Unit 14) and Chandeleur Sound (Unit 15), are newly designated units that consist primarily of large expanses of open water. These EMUs were designated in recognition of their potential use for construction of nearshore coastal protection measures, their function as oyster growing areas and their potential future use as a source of dredged material for marsh restoration in wetland EMUs. The Lake Borgne EMU, Unit 14, which is actually an embayment opening into the Mississippi Sound and the Gulf of Mexico, includes all of the designated Lake Borgne area and a small portion of the Mississippi Sound, and Grand Island (recently relabeled Halfmoon Island on USGS topographic maps).

The Chandeleur Sound and Islands EMU, comprised of the Chandeleur Sound and the Chandeleur barrier island chain and remnants of islands including Free Mason Islands, Bush Island, Martin Island, and Comfort Island, is located east of Bay Boudreau – Bay Eloi EMU 9. Three islands, Holmes, Point Lydia and Point Chicot, formerly located within this unit have now disappeared. Because the Chandeleur Islands are mostly owned by the federal government and have been under long-term management by the USFWS as part of the Breton National Wildlife Refuge, they were not included as an EMU in St. Bernard's initial CZMP. The island chain has long been recognized as containing important habitat including beaches, sand dunes, overwash flats, and extensive beds of submerged aquatic vegetation. The configuration, area, and location of the Chandeleur Barrier islands have always changed in response to marine transgression and erosion processes, especially those produced by hurricanes. While the islands were ravaged by multiple storms during the 2005 and 2008 hurricane seasons, the passage of Hurricane Katrina in 2005 caused the most extensive damage and loss of land. The future restoration and maintenance of these islands is important to St. Bernard Parish and for this reason they have been included in this updated version of the CZMP document.

**Table 6-2. Environmental Summary of Environmental Management Units in St. Bernard Parish.**

Environmental Management Unit	Soils	Vegetation (1992-95 & 2001)	Elevation (ft)	Hydrology	Archaeological Historical Site	Significant Ecological Features
1 Bienvenue-Proctor Point Marsh	Organic	Brackish & saline marshes	0 to 1 ft	Tidal; drainage altered by MRGO, spoil & levee & surge barrier	22 Archaeological 2 Historic & Arch.	Primary fish & shellfish nursery; Leased oyster
2 Central Wetlands	Organic	Brackish & intermediate marsh, dead cypress forest	0 to 1 ft	Tidal; drainage altered by MRGO, spoil & levee; receives pumped (4) drainage	3 Archaeological	Seven scenic streams
3 Lower Urbanized Levee	Primarily mineral clays & loams	Live oak ridgeland & bottomland hardwoods, cypress swamp, Shrub/scrub	0 to 5 ft	Forced drainage pumped from leveed area to outside marsh	3 Archaeological 1 Historic & Arch. 4 Historic	Scenic corridor with oak ridge forest
4 Lake Lery Marsh	Organic	Intermediate & brackish marshes	0 to 1 ft	Tidal channels & old drainage canals; Caernarvon Freshwater Diversion	2 Archaeological	Primary fish & shellfish nursery; freshwater sports fishery; trapping &
5 Bayou Terre aux Boeufs Wetlands	Organic	Intermediate, brackish & saline marshes	0 to 1 ft	Primarily natural tidal channels	5 Archaeological 1 Historic & Arch.	Shrimping area; leased oyster grounds
6 Lake La Fortuna	Organic	Saline marsh	0 to 1 ft	Natural tidal channels, estuarine embayment	7 Archaeological	10 bird rookeries (2008); shrimping &
7 Lower La Loutre Wetlands	Primarily organic	Brackish & saline marshes, dying oaks on Bayou La Loutre	0 to 5 ft	Natural tidal channels; relict drainage canals	5 Archaeological 2 Historic & Arch.	Bayou La Loutre ridge is storm buffer, oyster leases
8 Biloxi Marsh	Organic	Brackish & saline marshes, Shrub/scrub on La Loutre ridge	0 to 1 ft	Natural tidal channels and ponds	21 Archaeological 1 Historic & Arch.	Primary fish & shellfish nursery; Leased oyster
9 Bay Boudreau-Bay Eloi	Organic	Saline marsh	0 to 1 ft	Natural tidal channels, large bays	31 Archaeological	Leased oyster & public seed grounds; geese, excellent fishing, 21 bird
10 MRGO Spoil	Combination organic mineral	Shrub/scrub, fresh - saline marshes, pasture (grassland) & barren	Variable 10 - 15 ft	Gravity drainage from land-locked ponds on spoil	2 Archaeological	Good waterfowl & rabbit hunting in certain areas
11 Semi-Urbanized Levee	Primarily mineral	Hardwood forest, agriculture/pasture, scrub/shrub, fresh & brackish marshes	0 to 5 ft	Ridges drain through natural & drainage channels, 7 tidal pumps	10 Archaeological 2 Historic & Arch. 2 Historic	Important saltwater & storm barrier; scenic, live oak forested ridge
12 Modified Wetlands	Organic	Dead cypress trees, brackish marsh, mostly open water, closed grass covered	0 to 1 ft	Tidal open water & Bayou Bienvenue; receives pumped (3) drainage	None	Abandoned land fill/Potential Park, open water estuary
13 Urbanized Area	Primarily mineral clays	Upland & bottomland hardwood forests, fresh marsh, agriculture &	0 to 10 ft	Forced drainage pumped (6) to EMU 2	19 Historic & Arch. 4 Historic 1 Historic & Arch.	Pakenham Oaks; part of Violet Canal scenic waterway
14 Lake Borgne		Submerged aquatics, saline marsh	0 ft	Tidal estuary	5 Archaeological	Private & public oyster grounds. 1 bird rookery (2008); Critical habitat for
15 Chandeleur Sound & Islands		Submerged aquatics, saline marsh, beach vegetation, mangroves	0 ft	Tidal estuary	12 Archaeological 1 Historic	Public oyster seed grounds, barrier islands, seagrass beds; 10 bird rookeries (2008)

Note: All wetland areas are important fishery nursery areas. Those areas with salinities ranging from 5 to 15 ppt are most important.

Institutional	Total Fisheries Value	Trapping Value	Waterfowl Value	Shoreline Erosion	Saltwater Intrusion	Flood Zone	Soil Subsidence Potential	Public Service Facilities	Other Pertinent Factors
None	Very High	Moderate	Moderate to High	C	C	100-Yr	VH	Storm surge barrier	Conservation & restoration; high recreational value
None	Low to Moderate	Moderate	Low	L	M	100-Yr	M-VH	Power Lines	Conservation & restoration; freshwater management area; Violet diversion; potential port
Schools, churches, fire stations	None	Low	Low	NA	NA	100- & 500- Yr	L	Levees Roads Utilities pumps	Development corridor, scenic byway, recreation
None	High	Moderate to High	High	M	L	100-Yr	VH	Power Lines	Caernarvon freshwater diversion; wetland restoration; high recreational & fisheries
None	Very High	Moderate to High	High	M	C	100-Yr	VH	None	Conservation & restoration
None	Very High	Low	Moderate	C	C	100-Yr	H	None	Prime shrimp and oyster producing area.
None	Very High	Moderate	Moderate	C	C	100-Yr	VH	None	Conservation & restoration; prime shrimp & oyster
Biloxi Wildlife Management Area	Very High	High	Very High	M	M	100-Yr	VH	None	Valuable waterfowl, trapping, and fishing area
None	Very High	Low to None	Moderate to High	C	C	100-Yr	H	None	Conservation & restoration; prime shrimp & oyster producing area; excellent
None	None	High in areas	Moderate	L	M	100-Yr	M	Levees Roads Utilities	Contains flood protection levee easements.
Schools, churches	None	Low	Low	L	M	100-Yr	M-N	Roads Utilities Pumps	Natural levee subsiding; saltwater intrusion killing live oaks on ridge. Limited
None	Low	Low	None to Low	L	M	100-Yr	VH	Roads Utilities	Wetland restoration; Degraded ecological value
Schools, churches, fire stations	None	None	None	NA	NA	100 & 500-Yr	L	Levees Roads Utilities pumps	Area of intense development; cultural resources
None	Very High	None	Moderate	NA	H	NA	NA	None	Private oyster leases; proposed borrow areas for restoration dredge material
Breton National Wildlife Refuge	Very High	None	Moderate	C	H	NA	NA	None	Conservation & restoration of islands and shoals for storm surge barrier; important wildlife habitat;

Shoreline Erosion Saltwater Intrusion      C- Critical      M - Moderate      L- Low  
 NA - Not applicable  
 100-Yr &/or 500-Yr      Soil Subsidence Potential      VH - Very High      H - High      M - Moderate  
 L - Low      N - None

FEMA Flood Zone

## **Fastlands/Uplands EMUs**

Two EMUs, the Urbanized EMU (Unit 13) and the Semi-Urbanized EMU (Unit 3), qualify as fastlands/uplands because they are enclosed by publicly maintained flood protection levees. Portions of two other EMUs, the upper half of the MRGO spoil (Unit 10) and four areas of the Lower Urbanized EMU (Unit 11) also qualify as fastlands/uplands because they are protected by smaller, publicly maintained back levees. The Urbanized Area EMU (Unit 13) includes the leveed Mississippi River natural levee lands stretching southeastward from the St. Bernard-Orleans Parish boundary at Arabi to Poydras. The vast majority of this unit consists of commercial, residential and industrial developments. The Semi-Urbanized Area EMU (Unit 3) includes the leveed Bayou Terre aux Boeufs ridge stretching eastward from Poydras to Verret. The leveed portions of the Semi-Urbanized Levee (Unit 11), located on portions of the Bayou La Loutre ridge east of Verret, and the Bayou Terre aux Boeufs ridge, south of Reggio, are mapped as fastlands because they have publicly maintained levees and pumps to prevent tidal flooding. The boundaries of fastlands were determined using digital 7.5-min USGS topographic maps, 2005 Digital Orthophoto Quarter Quads (LSU-DGA 2007), a digital file of fastlands prepared by the Louisiana Department of Natural Resources and information on flood protection levees and pump stations and flood gates (Coastal Protection and Restoration Authority [CPRA] 2011).

## **Transition Area EMUs**

### ***Subsiding Natural Levees***

Transition areas are generally considered to be former uplands (e.g., natural levees of the Mississippi River and its distributaries over 5 feet in elevation) that are in transition to wetlands, primarily as a result of subsidence. These lands are better drained than adjacent wetlands and are outside flood protection levees. Their location is difficult to designate on maps because of their narrow, linear shape and continuing subsidence. Transition areas, involving subsiding natural levee ridges, were mapped in the Semi-Urbanized Levee EMU (Unit 11) based on information derived from the 1988/90 habitat maps, USGS 7.5-min. topographic maps and color infrared aerial photographs (USGS 2008) for St. Bernard Parish.

### ***MRGO Spoil***

St. Bernard Parish also has a non-traditional transition area within the MRGO Spoil EMU (Unit 10). The area was primarily marshland and water until the MRGO was constructed and dredged material (i.e., spoil) was deposited inside retention levees to elevations as high as 16 feet. A hurricane flood protection levee fronts Unit 10 on the north side of the MRGO from Bayou Bienvenue to a point on the MRGO north of the community of Verret where the levee turns south to connect to the back protection levee (Chalmette Loop) at Verret. Other segments of EMU 10 from the vicinity of Shell Beach to the vicinity of Lake Machias are outside publicly maintained levees but have elevations in excess of 5 feet, one criterion for designation as an upland. Up until the MRGO was de-authorized in 2009, these areas were subject to receiving dredged material derived from maintenance of the MRGO channel.

Portions of the spoil areas are well-drained, and natural succession toward upland or natural levee vegetation is occurring. Sections of Unit 10 at Shell Beach are being developed as recreational/camp communities. Water trapped on other sections of the MRGO spoil has supported development of fresh marsh habitat. The section of this unit adjacent to the MRGO and inside the flood protection levee makes it a prime candidate for a future growth corridor that could include industrial, commercial, and recreational residential development. Other portions of EMU 10 lying outside of the flood protection levees will transition into a forest habitat; subside back into wetland habitat or as is the case near Shell Beach, be developed as recreational communities or other water-oriented development uses. Thus the MRGO Spoil Unit, with its distinguishing man-made origins, size and characteristics, is considered to be a fastland in the levee protected areas and a special type of transition area in the area located east of the flood protection levee.

## **CONSISTENCY WITH STATE PROGRAM**

The parish's CZMP is designed to enable the parish and its CZAC to review projects of local concern that could negatively impact wetlands and water bodies in the parish, as well as comment on permit applications for projects of greater than local concern (e.g., state and federal projects). Activities in wetlands EMUs and fastlands/uplands and transition EMUs that have the potential to impact wetlands and coastal waters are reviewed under the local CZMP. The parish relies on federal, state, and local laws and regulations to achieve its goals and implement its policies. Continued implementation of the St. Bernard CZMP will be consistent with the policies and objectives of the State of Louisiana Coastal Restoration Management Act (SLCRMA), as amended, and the state guidelines and the local program shall be interpreted and administered consistently with such policies, objectives and guidelines. The following sections contain descriptions of the 15 EMUs and their associated goals and permissible uses. Table 6-2 identifies the 15 units and summarizes environmental data that may be useful in the decision-making process.

## **UNIT 1 - BIENVENUE - PROCTOR POINT MARSH**

### **Geomorphology**

This 25,700-acre unit is part of the interdistributary marsh-estuary system that borders the south shore of Lake Borgne. Construction of the MRGO severed this unit from the expansive wetlands to the southwest. Marine processes (saltwater intrusion and tidal surge) associated with the MRGO and Lake Borgne heavily influenced the area's geomorphologic processes until the MRGO was dammed at the eastern end of this EMU in 2010. The unit has three geologic faults located east of Proctor Point and is experiencing intermediate rates of subsidence (1.1 – 2 feet per century).

### **Soils**

The majority of the soils in this EMU are Clovelly muck and Lafitte muck. The surface soils to approximately 50 and 53 inches deep, respectively, consist of herbaceous organic material overlying very fluid clayey alluvium and clay to a depth of approximately 70 and 80 inches,

respectively. A small expanse of Fausse clay saline soil is found on the north side of Bayou La Loutre. This soil formed in a backswamp environment which is now very slightly-to-moderately saline.

### **Vegetation and Wildlife**

The brackish-to-saline marsh and estuary system provides habitat for crabs, shrimp, oysters, and a variety of fishes. The marsh habitat grades from brackish near Bayou Bienvenue to saline along the MRGO Canal and the eastern end of the unit. The saline marsh areas of the unit are less suitable habitat now than prior to construction of the MRGO for the species that produce fur hides such as nutria, raccoons, muskrat, and alligators. Migratory birds and waterfowl also use this area.

### **Hydrology**

Under natural conditions, tidal channels leading from Lake Borgne alternately flooded and drained the marsh. With the MRGO construction, the original drainage pattern changed drastically. The MRGO cut through many of the existing tidal bayous, disrupting water circulation, increasing salinity, and creating great fluctuations in water levels. Fall surface water salinities increased to 15 ppt near Shell Beach and 10 ppt at Proctor Point. With closure of the MRGO at the Bayou La Loutre ridge, there has been a blockage of the salt water wedge up the MRGO channel and salinities have decreased northwest of the dam. The future salinity regime in the area will be influenced by closure of the MRGO and proposed freshwater diversions at Violet and in the upper Pontchartrain Basin.

### **Cultural Resources**

There are 22 archaeological sites recorded in this unit: 16SB39, 16SB40, 16SB43, 16SB44, 16SB47, 16SB65, 16SB66, 16SB69, 16SB71, 16SB74, 16SB75, 16SB76, 16SB91, 16SB132, 16SB140, 16SB148, 16SB149, 16SB150, 16SB151, 16SB152, 16SB153, and 16SB154. Two sites are both historic and archaeological: Battery Bienvenue (16SB84) and Fort Proctor (Fort Beauregard) (16SB83). For additional information on these sites, refer to the Cultural Resources section in Chapter 2.

### **Land Use**

The Bienvenue-Proctor Point Marsh EMU is located north of the MRGO Spoil Area (Unit 10). In 2010, the USACE completed a storm surge barrier in the western end of this unit from the hurricane flood protection levee on the MRGO to the levee near the Michoud Canal north of the GIWW. The unit has a high value as an estuarine nursery area and is used by recreational and commercial fishermen. There were approximately 940 acres of private oyster grounds and 315 acres of public grounds recorded in the eastern portion of this unit in 2007 and 2006, respectively. This EMU contained 14 drilled oil and gas wells in 2010. Despite a considerable loss of land in this EMU, approximately 8,800 acres between 1932 and 2008, these wetlands continue to serve as a buffer against tropical storm systems coming across Lake Borgne. Restoration and flood protection projects have been or are being

constructed in this EMU to restore marsh, stop storm surge, and retard shoreline erosion along Lake Borgne.

## **Transportation**

There are no roads or railroads in this EMU. Bayou Bienvenue, Bayou Yscloskey, Bayou St. Malo, Bayou La Loutre and a section of the MRGO above the dam are the main channels used by recreational boaters and commercial vessels.

## **Unique Ecological Features**

Privately leased oyster beds and primary fish and shellfish nursery grounds for blue crab, croaker, menhaden, and brown and white shrimp are located in the eastern part of the unit and along the fringes of Lake Borgne. The parish supports conservation and restoration of wetlands in this unit.

## **Environmental Considerations**

The soils in this area have very high subsidence potential, if drained, and they undergo regular tidal flooding, in addition to being within the 100-year flood zone. Shoreline erosion along the MRGO and Lake Borgne and interior marsh breakup has been extensive (approximately 8,800 acres between 1932 and 2008), as a result primarily of initial dredging of the MRGO and subsequent bankline and shoreline erosion associated with ship-generated waves on this canal.

## **Goals**

The management unit goals are based on the unique environmental characteristics of this unit and include the following:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Reduce shoreline erosion and maintain shoreline integrity of Lake Borgne using site-appropriate measures (i.e., living shoreline features, rock riprap, marine mattresses, oyster reefs, oyster shell-filled wire-mattresses, etc.).
4. Repair breaches with rocks and create marsh behind the rocks, using dredged material from Lake Borgne, the GIWW and pumped in, slurried dredge material from the Mississippi River, along the north bank of the MRGO as

outlined in *Coast 2050: Toward a Sustainable Coastal Louisiana* and subsequent state approved restoration and flood protection plans.

5. Support state acquisition of oyster leases in southern lobes of Lake Borgne as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana* and subsequent restoration and flood protection plans. Support state and federal programs regarding oyster lease renewals and fishermen compensation in areas of coastal restoration projects.
6. Maintain the Lake Borgne Landbridge (all of EMU 1) to maximize its marsh habitat as a fisheries nursery ground and a storm surge buffer.
7. Conserve natural habitats.
8. Support enhancement of habitat diversity including restoration or creation of maritime forests where appropriate (i.e., Bayou La Loutre ridge between MRGO and Bayou St. Malo).
9. Encourage increased marsh productivity by supporting existing and proposed efforts to retard shoreline erosion and restore wetlands with input to adaptive management of existing projects and input to authorized and proposed projects.
10. Sustain seabird and wading bird rookeries.
11. Develop and implement outfall management plan to compliment operation of freshwater siphon and/or future diversion structure at Violet Canal.
12. Promote recreational and commercial fishing.
13. Promote development of recreational opportunities.
14. Protect cultural resources where possible or undertake appropriate mitigation for unavoidable adverse impacts.

### **Permissible Uses**

The permissible uses are those uses which shall be undertaken in Management Unit 1, but which shall require a permit pursuant to federal, state or local regulations. The list is not all inclusive.

- MRGO mitigation in St. Bernard Parish
- Wetland restoration and shoreline protection
- Flood protection features designed to sustain and/or restore habitat
- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Shallow draft navigation

- Archaeological and historic site preservation
- Recreational campsite development
- Coastal restoration and flood protection projects

## **UNIT 2 - CENTRAL WETLANDS**

### **Geomorphology**

This 22,000 acre-unit includes the northern flanks of the Mississippi River and Bayou La Loutre natural levees in St. Bernard Parish. The unit is located between the urbanized, semi-urbanized, and transition units (Units 3, 11, 13) and the MRGO spoil area (Unit 10). Prior to construction of the MRGO, this EMU contained extensive areas of cypress backswamp grading into fresh and intermediate marsh toward Lake Borgne. Since the construction of the MRGO, these wetlands have converted to flats, open water and brackish marsh due to saltwater intrusion. Subsidence within the EMU is classified as intermediate (1.1 to 2 feet per century.)

### **Soils**

This area contains swamp soils (Barbary clay and Fausse clay, saline) near the back flood protection levee which have organic matter from one to several feet deep overlying firm to semi-fluid clays. There are also marsh soils (Clovelly muck and Lafitte muck) along the northern fringes of the unit that consist of peat and muck.

### **Vegetation and Wildlife**

The vegetation and wildlife habitats in this unit were impacted significantly by construction of the MRGO. Only 93 acres of forest, primarily baldcypress, remained in 1995 from the 8,379 acres that were present in 1956. Fresh marsh covered 95 acres in the vicinity of the outfall area for Pump Station No. 4 in 1995 in contrast to the 6,918 acres present in 1956. Low salinity intermediate-to-brackish marsh comprised 4,928 acres of the unit in 1956. By 1995 brackish marsh had increased to 16,494 acres. Destruction of the freshwater swamp and marsh habitat resulting from saltwater intrusion via the MRGO also attributed to changes in the wildlife composition of this area, most notably a decrease in the population of fur-bearing animals. While nutria, raccoon, and muskrat are still present, they are not as abundant as before the MRGO was dredged. Likewise, decreasing numbers of waterfowl and migratory birds utilize the wetlands and water bodies within this EMU.

### **Hydrology**

The natural hydrology of this area consisted of shallow, sinuous tidal channels that connected marsh and backswamp areas to Lake Borgne. Construction of navigation and drainage canals (i.e., Forty Arpent Canal and MRGO) and associated spoil banks altered this drainage system. Furthermore, shallow open water area increased from 1,732 acres in 1956 to 4,815 acres in 1995, largely as a result of saltwater intrusion and fresh marsh deterioration in the northwestern part of the unit. At the present time, this unit has water exchange connections

with Lake Borgne via the Lake Borgne Canal (Violet Canal) Bayou Dupre, Bayou Bienvenue, and Bayou Yscloskey - Shell Beach Bayou. Fresh water reaches the unit from rainfall and point discharge sources located at the Violet Siphon and Pumping Stations Nos. 3, 4, 5, and 7. After construction of the MRGO, fall surface water salinities reached the 5 to 10 ppt range instead of a pre-canal range of less than 2 ppt. With closure of the MRGO at the Bayou La Loutre ridge and implementation of proposed freshwater diversions and discharge of treated waster water into the northern reaches of the EMU, it is anticipated that the pre-canal salinity range can be re-established.

### **Cultural Resources**

There are three archaeological sites in this unit: 16SB67, 16SB89, and 16SB100. One of these sites, the Lake Borgne Canal Redoubt (16SB89) is also an historic site. It is reported to have been built by Andrew Jackson as part of a defense measure for New Orleans.

### **Land Use**

The larger, northwestern portion of the Central Wetlands EMU is bounded by two partially developed and leveed EMUs (Urbanized Area Unit 13 and Lower Urbanized Levee Unit 3) and the MRGO Spoil Area EMU (Unit 10). The smaller, elongated southeastern segment of EMU 2 is confined by EMU 10 on the north and EMU 11 (Semi-Urbanized Levee) on the south. The area serves as an estuary and provides fishing and hunting opportunities to commercial and recreational interests. Seventeen oil and gas wells had been drilled in the unit as of 2010. A small recreational camp community is located along Bayou Dupre near the MRGO. Additional recreational and business/commercial developments are located along the east side of LA 47 (Paris Rd) between Chalmette and Bayou Bienvenue. There are two marinas (Chalmette Marina and Gulf Outlet Marina) along the east side of LA 47 near Bayou Bienvenue.

### **Transportation**

Smaller draft commercial and recreational boats use the interior channels of this EMU while larger vessels navigate the Lake Borgne Canal - Bayou Dupre channel, Bayou Bienvenue and Bayou Yscloskey. This EMU contains no roads or railroads, except LA 47 on the western perimeter and LA 46 which crosses the southern segment of the EMU to connect Alluvial City and Shell Beach.

### **Unique Ecological Features**

This EMU contains all seven of the scenic streams designated in St. Bernard Parish: 1) Bayou Dupre, 2) Lake Borgne (Violet) Canal, 3) Bashman Canal, 4) Terre Beau Bayou, 5) Pirogue Bayou, 6) Bayou Bienvenue and 7) Bayou Chaperon. This area is a primary estuarine nursery ground for various species of fish, shrimp and crabs.

## **Environmental Considerations**

This management unit has been modified greatly by human activity, as well as by natural processes that have resulted in conversion of freshwater marsh and swamp/bottomland hardwood habitats to more saline marsh habitats and open water. The unit lost approximately 2,700 acres of land between 1932 and 2008. Drainage and pipeline canals are major man-made features that have modified substantially the hydrologic regime. Subsidence is in the intermediate range and flooding potential is very high. Management considerations include both this unit's natural function as part of the Lake Borgne estuarine system and its potential socioeconomic function because of its location inside the hurricane protection levee system and juxtaposition to the developed corridor in EMUs 13, 3 and 11.

## **Goals**

The management unit goals are based on the unique environmental characteristics of this unit and include the following:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Create hydrologic and edaphic conditions in the EMU favorable for re-establishment of fresher marsh and swamp habitats through: (a) operation of the existing Violet Canal Siphon; (b) freshwater discharge via drainage pumps; (c) discharge of treated wastewater via pumps; (d) development of interior freshwater routing system throughout the EMU and (e) introduction of additional freshwater and sediment from the Mississippi River via a siphon/pump station facility.
4. Manage the use of currently available freshwater resources through the assimilation of treated wastewater, input of storm water from forced drainage, and optimal retention of fresh water.
5. Restore natural drainage patterns, where practicable, using measures that modify existing channelized drainage and promote sheet flow across wetlands.
6. Restore freshwater marsh, cypress swamps and bottomland hardwood forests using dredged material from appropriate sources (i.e., Mississippi River, GIWW, MRGO, Lake Borgne or maintenance dredging of upper end of Violet Canal) to elevate substrate sufficiently for natural re-establishment or planting

of marsh and tree vegetation using proven planting methods and herbivory control.

7. Increase biodiversity and sustainable recreational opportunities, such as hunting, fishing, canoeing/kayaking and wildlife observation, through restoration of freshwater marsh and swamp habitat.
8. Control herbivory and wetland plant loss through support of trapping and participation in the state of Louisiana's Coastwide Nutria Control Program.
9. Achieve multiple-use management with limited and appropriate commercial and recreational infrastructure development.
10. Enhance the Violet Canal and LA 47 (Paris Road) corridor as recreational and ecotourism-based avenues into the interior wetlands and water bodies and for marinas, boat launches and safe harbors for recreational boaters and commercial fishermen.
11. Promote conservation and sustainability of natural resources.
12. Manage the hydrologic regime (water levels, duration of flooding and salinity) in suitable areas for enhancement of waterfowl and fishery resources.
13. Improve habitat for furbearers and other animals by reducing and controlling salinity levels to sustain vegetation productivity along a fresh-to-intermediate wetland gradient.
14. Sustain remaining cypress trees and restore stands of cypress trees lost to saltwater intrusion by elevating substrate with dredge material and planting more salt-tolerant cypress seedlings.
15. Promote recreational use and associated, appropriately located recreationally related development, including ecosystem education programs, ecosystem and nature tours, water quality enhancement and wetland restoration demonstration projects and fishery enhancement programs.
16. Develop a safe harbor for commercial and recreational interests south of the MRGO Spoil EMU 10 in the vicinity of Bayou Dupre and the MRGO floodgate.

### **Permissible Uses**

The permissible uses that may be undertaken in Management Unit 2 may require a permit pursuant to federal, state or local regulations. The list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation

- Recreational site and infrastructure development
- Residential and commercial development along LA 47 corridor
- Coastal restoration and flood protection projects

## **UNIT 3 - LOWER URBANIZED LEVEE**

### **Geomorphology**

This 8400-acre unit encompasses the natural levee ridge created by Bayou Terre aux Boeufs when it was a major distributary channel of the Mississippi River. Three geological faults have been identified in the area; one extending from northwest to southeast just west of community of St. Bernard, another aligned in a southwest-northeast direction from St. Bernard to Lake Borgne west of the community of Verret, and the third extending in an east-west direction along the Forty Arpent Canal from Caernarvon to just west of Verret. Subsidence within this unit is stable to low.

### **Soils**

The major soil types in this EMU are primarily mineral clays and loams. The soils on the higher elevations of the natural levee are primarily Cancienne silt loam, Cancienne silty clay loam, Cancienne and Schriever frequently flooded and Vacherie silt loam, gently undulating. Soils at the base of the levee grading into the swamp consist of Schriever silty clay loam, Schriever clay and Barbary clay.

### **Vegetation and Wildlife**

The 3,344 acres of forest habitat present in 1995 consisted mainly of natural levee vegetation. Live oaks, pecan and hickory are common on the higher elevations, while the lower-lying, less well-drained areas contain water oak, sycamore, black willow, wax myrtle, dwarf palmetto, and bald cypress. Approximately 656 acres of fresh marsh remained in the southern portion of the EMU along the Forty Arpent Canal in 1995. A variety of wildlife species use the upland, bottomland hardwood swamp forests and freshwater wetlands, including deer, rabbits, squirrels, raccoons, opossums, alligators, furbearing animals, waterfowl, migratory songbirds, raptors and colonial nesting birds.

### **Hydrology**

The almost completely filled channel of Terre aux Boeufs, one of the Mississippi River's abandoned distributary systems, is a relic hydrologic feature of the unit. Man-made drainage canals now convey runoff from the ridge north and south to the Forty Arpent Canal where water is discharged from the unit via Pump Station 5 and Pump Station 8. Of the 8,400 acres in the unit, approximately half (3,867 acres) on the highest elevation of the natural levee are outside of the 100-year flood zone.

## **Cultural Resources**

There are four archaeological sites in this unit: 16SB86, 16SB106, 16SB122, and 16SB146, of which 16SB86, the Kennilworth Plantation, is also designated as an historic site. Other historic sites in the unit include: Old St. Bernard Courthouse, Overseer's House of Sebastopol Plantation, St. Bernard Cemetery and Contreras Plantation. The Los Islenos Heritage and Multicultural Park, which includes the Los Islenos Museum, is located in the community of St. Bernard.

## **Land Use**

The Lower Urbanized Levee EMU 3 is basically an extension of the Urbanized Area EMU 13 and is bounded by wetland dominated EMU 2 (Central Wetlands) and 4 (Lake Lery). This EMU has the same types of land use and development as the more urbanized and denser populated Urbanized Levee EMU 13, but to a much lesser extent. Land uses include: medium and light density residential, commercial, industrial development; agriculture and pasture; recreational based activities and public facilities. The unit had 21 oil and gas wells recorded as of 2010 and one named field, Kenilworth, developed in 1939.

## **Transportation**

The EMU is bisected by two major highways: Old St. Bernard Highway (LA 46) and Judge Perez Drive (LA 39). All other local roads extend from these two state highways. Louisiana Highway 46 is a designated scenic byway and the parish favors enhancement of this corridor with roadside parks, historical tours, and historical interpretations. The Louisiana Southern Railroad runs along the western edge of this EMU into Plaquemines Parish. Service was discontinued on a branch track between Poydras and Toca but the right of way is retained.

## **Unique Ecological Features**

Because EMU 3 is among the highest elevated land in St. Bernard Parish, it serves as a prime development corridor for future growth in the parish. The scenic character of the natural levee ridge, with its stately live oak trees, resulted in LA 46 being designated as a scenic byway.

## **Environmental Considerations**

Soil subsidence is a problem in the low, less well-drained backslope areas of EMU 3. Flooding, mainly from intense rainfall, occurs frequently in some areas even though the unit is leveed and pumped. The USACE initially established a minimum reservoir level of 0.0 feet NGVD, but after Hurricane Katrina increased the allowable drawdown level to -1.0 feet NGVD which significantly increases reservoir capacity of the forced drainage system. The USACE also made provisions that allow the -1.0 feet current standard to be exceeded prior to preparing for incoming storm events. With further urbanization there are also issues of waste disposal, sewage disposal, and water pollution that need to be addressed.

## Goals

The goals, as follow, are based upon the environmental characteristics of the unit.

1. Support low-density residential and multiple-use commercial and business development that is sustainable within the environmental setting.
2. Preserve remnant wetlands at the base of the natural levee ridge as a transition zone between more elevated and densely developed urban areas and flood protection levees.
3. Support recreational and tourism oriented facilities and activities along the LA 46 Scenic By-Way.

## Permissible Uses

The permissible uses are those that may be undertaken in this unit, but which may require a permit pursuant to federal, state or local regulations. The list is not all inclusive.

- Medium-low-density residential development
- Commercial and industrial development
- Conservation of forestlands
- Agriculture
- Archaeological and historic site preservation
- Transportation corridor development
- Utility corridor development
- Recreational development
- Hunting and trapping
- Oil and gas development

## UNIT 4 - LAKE LERY MARSH

### Geomorphology

This 19,300-acre unit consists of marshlands that formed in an interdistributary basin between the Mississippi River distributary channels during the St. Bernard Delta lobe growth. The east trending Bayou La Loutre carried the main flow of the Mississippi River with Bayou Terre aux Boeufs serving as a significant distributary. There are three faults in this unit. One fault extends east-west through the center of Lake Lery and across Bayou Terre aux Boeufs. The other two long faults parallel each other in a northwest-southeast direction with one extending from north of St. Bernard to south of Delacroix and the other from Verret through Reggio into Breton Sound. The rate of subsidence is intermediate, ranging from 1.1 to 2 feet per century.

## **Soils**

The soils in this EMU are about equally divided between Clovelly muck extending outward from the base of the subsided Bayou Terre aux Boeufs natural levee and the Lafitte muck which extends northward from Lake Lery. These soils are underlain by slightly firm to semi-fluid gray clays.

## **Vegetation and Wildlife**

The marsh environment is rather homogeneous with the most abundant species being three-cornered grass and wiregrass. The estuarine water bodies provide nursery habitat for fish, crabs, and shrimp, and oysters in the southeastern portion of the unit. There were approximately 173 acres of leased oyster grounds in the area in 2007. However, operation of the Caernarvon Freshwater Diversion structure makes this EMU unsuitable for further expansion of oyster growing areas. Both commercial and game fish species inhabit this area along with wading birds, alligators, and other reptiles. Commercial fur-bearing animals such as muskrat, nutria, and raccoons are still abundant. Operation of the Caernarvon Freshwater Diversion structure has restored intermediate marsh habitat throughout the unit and enhanced freshwater conditions in the northwestern portion of the unit to the extent that the area supports excellent freshwater fishing, especially for LDWF-stocked Florida bass. Wintering waterfowl concentrations have increased also with operation of the diversion and habitat has improved for the American alligator.

## **Hydrology**

Lake Lery is the dominant water body in the unit. The natural drainage patterns of the marsh have been modified by drainage canals, pipeline canals, and flood protection levees along the northern perimeter of the unit. Operation of the Caernarvon Freshwater Diversion structure introduces substantial amounts of fresh water into the unit to the extent that saltwater intrusion is being reversed. The diversion also delivers sediments into the natural system as 250,000 tons of fine silts and clays annually flow through the diversion structure. If optimally managed for diverting available sediments during periods of peak river flow, considerably more sediments are available. Governmental agencies estimated that approximately 750,000 tons of sediments were diverted through the structure in 2009.

## **Cultural Resources**

There are two recorded archaeological sites in this unit, Kenilworth Canal 16SB41 and Eighty Arpent Canal 16SB59. These sites are shell midden sites associated with past settlements by Native Americans on the former Mississippi River distributaries.

## **Land Use**

The Lake Lery Marsh EMU is an important estuarine area within the Caernarvon Freshwater Diversion outfall area. The area has become a very popular recreational fishing and hunting area as a result of the reintroduction of fresh water and the growth of freshwater game fish,

such as the Florida strain of large mouth bass and higher concentrations of wintering waterfowl. Shellfish production can be expected to decline as a result of operation of the Caernarvon Freshwater Diversion structure. There were 20 recorded oil and gas wells as of 2010 and numerous pipelines in the unit.

## **Transportation**

There are no roads or railroads in this EMU; thus, restricting primary transportation modes to boats. Commercial and recreational vessels can reach the area through Bayou Mandeville lying east of Big Mar, Lake Lery and Bayou Terre aux Boeufs. A series of relict drainage canals radiating northward from Lake Lery provide access throughout much of the marsh between the northern flood protection levee and Lake Lery.

## **Unique Ecological Features**

This EMU is a primary nursery ground for shrimp, crabs and fish. With freshwater diversion, the area once again supports freshwater fishing and large concentrations of wintering waterfowl.

## **Environmental Considerations**

Flooding and subsidence are environmental constraints to development. Marsh loss has been extensive in this unit, especially in the eastern section. Overall, the unit lost approximately 6,600 acres of land between 1932 and 2008, with the most rapid land loss occurring during Hurricane Katrina. Operation of the Caernarvon Diversion is designed to reverse wetland loss in the northwestern portion of the unit.

## **Goals**

The suggested goals are based upon the environmental characteristics of the unit, and are as follows:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Restore and maintain the marshes north of Lake Lery.
4. Increase wildlife and freshwater fisheries productivity and improve waterfowl concentration areas through wetland and aquatic habitat restoration and enhancement.

5. Promote recreational and commercial fishing and hunting opportunities, including recreational freshwater fisheries activities.
6. Restore and maintain fresh-to-intermediate wetlands through support of adaptive management of the Caernarvon Freshwater Diversion Outfall including: increasing sediment introduction, directing sheet and channel flow throughout area and increasing freshwater retention time within the unit.
7. Prevent saltwater intrusion and tidal scouring in adjacent wetlands by blocking canals and rig cuts, where appropriate and practicable.
8. Restore and protect northern shoreline of Lake Lery from erosion.
9. Promote commercial harvests of freshwater catfish.

### **Permissible Uses**

These uses may be undertaken, but may require a permit pursuant to federal, state or local regulations. This list is a guide and not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historic site preservation
- Coastal restoration and flood protection projects

## **UNIT 5 - BAYOU TERRE AUX BOEUFFS WETLANDS**

### **Geomorphology**

This 46,700-acre unit is part of the low-lying, interdistributary basin located between the natural levees of Bayou La Loutre and Bayou Terre aux Boeufs. The area was created through deltaic deposition of the Mississippi - St. Bernard Delta Lobe. There are two parallel, northwest-southeast trending faults in the area that are extensions of the faults in the Lake Lery EMU. One fault runs through the western part of the unit east of Delacroix and the other runs from Reggio through Lake Jean Louis Robin. The rate of subsidence is intermediate, ranging from 1.1 to 2 feet per century.

### **Soils**

The soils around the perimeter of the EMU at the base of the Bayou Terre aux Boeufs and Bayou La Loutre ridges are Clovelly muck, while the interior of the basin contains Lafitte muck. The northeastern third of the EMU contains Bellpass muck and Timbalier muck. These soils are primarily organic peat and muck several feet deep, overlying slightly firm to semi-fluid gray clay.

## **Vegetation and Wildlife**

The marshes of this unit are brackish-to-saline and consist of three-cornered grass, oystergrass (smooth cordgrass), saltgrass (saltmarsh grass), wiregrass and black rush. The brackish marsh zone has expanded eastward since the Caernarvon Freshwater Diversion structure became operational and the saline marsh zone has narrowed to become a fringe marsh along the open embayments on the eastern end of the EMU. Some of the fisheries resources commonly found in this area are red drum, croaker, lined sole, spot, spotted seatrout, marsh clams, oysters, shrimp, and crabs. Waterfowl is abundant seasonally and fur-bearing animals, such as nutria, mink, and muskrat, inhabit the western and northern perimeters of the unit.

## **Hydrology**

Tidal processes dominate the hydrology of this unit with many tidal channels meandering through the marsh. Typical tidal bayous, such as Middle Bayou, serve the water exchange between the marshes and lakes. Fall surface water salinities reached from 10 to 15 ppt post-construction of the MRGO. However, salinities have been reduced with operation of the Caernarvon Freshwater Diversion structure to the extent that the salinity zone most favorable to oyster production (5 ppt to 15 ppt) has been shifted eastward to encompass an area from just north of Lake Jean Louis Robin (5 ppt) in EMU 5 to the eastern edge of Lake Fortuna (15 ppt) in EMU 6 (LA Dept. of Natural Resources, Coastal Restoration Div. & USGS National Wetlands Research Center, Coastal Restoration Field Office [LDNR-CRD & USGS-NWRC-CRFS] 2001). The unit also receives some freshwater discharge directly from pumps at the base of back tidal levees along the southern and eastern sides of Unit 11.

## **Cultural Resources**

This unit contains six archaeological sites consisting primarily of Native American mounds and shell middens: 16SB26, 16SB28, 16SB48, 16SB58, 16SB78, and 16SB93. Site 16SB93 is also a nineteenth century historic site. These sites are all subsiding, eroding rapidly, or have been damaged by dredging operations.

## **Land Use**

The location of the Bayou Terre aux Boeufs Wetlands EMU in the south-central portion of the parish enables these marshes to serve as a storm buffer for the developed portions of the parish in Units 3, 11, and 13. These wetlands also provide estuarine functions and waterfowl habitat and are used by recreational and commercial fishing and hunting interests. The EMU contained approximately 1,548 acres of leased oyster grounds in 2007. There were 29 recorded oil and gas wells in the unit as of 2010 and two named fields, Bayou Lery developed in 1976 and Hopedale Lagoon developed in 1974.

## **Transportation**

Bayou Terre aux Boeufs is the largest navigation corridor in the EMU, but a multitude of the EMU's bayous and lakes are easily navigated by commercial and recreational boaters. There are no roads or railroads in this EMU.

## **Unique Ecological Features**

This area is a primary nursery ground for shrimp, crabs, fish and other species of aquatic organisms. There are also privately leased oyster grounds in this unit. Grounds in the southeastern portion of the EMU have been enhanced by the Caernarvon Freshwater Diversion Project. The northern portion of this unit adjacent to the natural levees of Bayou Terre aux Boeufs and Bayou La Loutre provide suitable habitat for the American alligator.

## **Environmental Considerations**

Marsh deterioration and land loss due to the processes of subsidence, erosion and saltwater intrusion are major problems. Storms and hurricanes have exacerbated erosion processes by opening marsh areas and enlarging lakes and ponds. These processes, in the absence of the former sediment deposition and land building processes, have contributed to land loss. Between 1932 and 2008, this unit lost approximately 6,147 acres of wetland, with the most rapid land loss occurring during Hurricane Katrina.

## **Goals**

The management goals are based upon the unique environmental characteristics of the unit and include the following:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Restore and maintain the Breton Sound Marshes.
4. Maintain brackish-to-saline marsh habitat zones.
5. Conserve natural habitats, especially waterfowl concentration areas.
6. Promote recreational and commercial fishing and hunting activities.
7. Reduce saltwater intrusion.
8. Reduce shoreline erosion.
9. Maximize benefits of the Caernarvon Freshwater Diversion using adaptive management of freshwater outfall and enhancement of Mississippi River sediment introduction into the EMU.
10. Promote recreational and commercial fishing and hunting opportunities.

## **Permissible Uses**

Permissible uses are those uses which may be undertaken in this environmental management unit, but which may require a permit pursuant to federal, state or local regulations. This list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Recreational development
- Coastal restoration and flood protection projects

## **UNIT 6 - LAKE LA FORTUNA**

### **Geomorphology**

This 49,000-acre unit represents the distal portion of the Mississippi River - Bayou Terre aux Boeufs distributary system. Although much of the former marshland area is now submerged, there are still remnants of the channels and natural levees that were once predominant in the region. There are three geological faults along the southwestern perimeter of the EMU. The rate of subsidence is intermediate, ranging from 1.1 to 2 feet per century.

### **Soils**

Submerged marsh soils, mud, and shells characterize the bottoms of the lakes and bays. These marsh soils are composed primarily of organic clays, silty clays, and peat. The four soil types in the unit include: Bellpass muck, Scatlake mucky clay, Timbalier muck and Aquent, dredged and frequently flooded. The Aquent are derived from dredging of the MRGO and are contained within the spoil retention area along the south side of the MRGO.

### **Vegetation and Wildlife**

Oystergrass and saltgrass are the dominant vegetation within the saline marsh habitat. Many waterfowl and wading shorebirds are found in this area either as permanent inhabitants or as transients during migratory seasons. Ten active seabird and wading bird colonies were recorded in this EMU in 2008. The most abundant wildlife species include saltwater fish and shellfish such as fringed flounder, spot, anchovy, spotted seatrout, menhaden and oysters. The oyster habitat in this EMU is regarded as some of the best in the parish as well as the state.

### **Hydrology**

Tidal action dominates the hydrologic system of this environmental management unit. The large bodies of water, such as Lake Machias and Lake La Fortuna, act as transitional areas between the inland marshes and the Breton Sound. Salinity increased in response to

construction of the MRGO and fall surface salinities exceeded 15 to 25 ppt in parts of this EMU. The Caernarvon Freshwater Diversion has lowered these higher salinity ranges and improved oyster growing conditions. The post-Caernarvon diversion salinity regime of 5 ppt paralleling the northern perimeter and 15 ppt along the EMU's southern perimeter is within a range that is most conducive to oyster production (LDNR-CRD & USGS-NWRC-CRFS 2001).

The complete or partial loss of the most eastward of the small marsh islands in the EMU, mostly as the result of Hurricane Katrina, have enlarged the openings into the former lakes and created large, shallow embayments with more direct hydrologic connections to the Breton Sound and the Chandeleur Sound. These islands once served to dissipate wave energies by breaking waves that cross the Chandeleur Sound and the Breton Sound. By shortening fetch distances across open water, the outer islands provided protection to the more fragile wetlands, located landward. Without these islands, accelerated shoreline loss along the adjacent marshes can be expected.

### **Cultural Resources**

There are seven archaeological sites in this management unit, all of which are prehistoric: 16SB2/3, 16SB12, 16SB27, 16SB29, 16SB33, 16SB57, and 16SB61. Site 16SB33 is sinking. Site 16SB12 is a wave-washed midden, and the other sites are reworked beach deposits. An excellent example of a subsurface archaeological site in a wetland area is 16SB12, the Mulatto Bayou Site. A canal was dredged through the site, exposing large quantities of materials, including human and animal skeletal remains, wooden implements, and pottery which dated back 1,000 years.

### **Land Use**

Lake La Fortuna is bounded by Bayou Terre aux Boeufs Wetlands (EMU 5), Bay Boudreau - Bay Eloi (EMU 9), MRGO Spoil Area (EMU 10) and the Chandeleur Sound (EMU 15). Despite significant land loss, this EMU continues to provide estuarine functions including oyster production. The unit had approximately 14,730 acres of leased oyster grounds in 2006 and 18,112 acres of oyster seed grounds in 2007. The area is also heavily utilized for recreation. There were 190 recorded oil and gas wells in the unit in 2010. The unit contains three fields, Lake Fortuna, Lake Calebasse and Chandeleur Sound Block 73, developed in 1953, 1978 and 1964, respectively. A portion of the outer MRGO channel extends through the eastern part of this EMU and is used by local boat traffic.

### **Transportation**

There are no major navigation corridors in this EMU. Smaller, natural waterways are used by the oil and gas industry to access well and production facilities. There are no roads or railroads in this EMU.

## **Unique Ecological Features**

This EMU had the second largest number of active seabird and wading bird colonies in St. Bernard Parish in 2008. Five colonies were exclusively Forester's terns, while the five remaining colonies included a variety of other species: laughing gull, snowy egret, tricolored heron, black skimmer, roseate spoonbill and American oystercatcher. The area is also a primary fish and shellfish nursery ground. Commercial oyster production in the unit has increased significantly since the implementation of the Caernarvon Freshwater Diversion structure. Virtually all of the water bottoms within the western half of the EMU are leased for private commercial oyster production while the eastern half is a designated public oyster ground.

## **Environmental Considerations**

Between 1932 and 2008, this unit lost approximately 5,159 acres of wetlands largely as a result of marine erosion processes, storm generated waves, and subsidence. Channelization for pipeline canals, oil and gas exploration and dredging of the MRGO also adversely impacted the marsh area, further exposing marsh edges to erosion from wave actions associated with winds and boat wakes. In the absence of shoreline protection measures along remaining marshland and marsh restoration, the unit's interior lakes will become larger and eventually open directly into the Breton Sound and the Chandeleur Sound.

## **Goals**

The management unit goals are based upon this unit's unique characteristics and are as follows:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
  1. Restore and sustain marsh habitat.
  2. Conserve natural aquatic habitats with emphasis on commercial and recreational fishing, especially the sustainability of oyster growing areas.
  3. Reduce erosion by stabilizing marsh shorelines using appropriate and viable techniques such as bioengineered oyster reefs, living shorelines, rocks, etc.
  4. Sustain marsh islands that support active seabird and wading bird colonies.
  4. Utilize freshwater resource from Caernarvon Freshwater Diversion Project by developing outfall management plan.

## **Permissible Uses**

Permissible uses which may be carried out in this management unit, but which may require a permit pursuant to federal, state or local regulations, are listed below. The list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Recreational development
- Coastal restoration and flood protection projects

## **UNIT 7 - LOWER LA LOUTRE WETLANDS**

### **Geomorphology**

This 26,100-acre management unit encompasses the wetlands lying directly below the large concave bend in Bayou La Loutre. The unit's origin and development are associated with the Mississippi River - St. Bernard Delta progradation processes. Since abandonment of the old channel of Bayou La Loutre by the Mississippi River, the deltaic plain has been tilting toward the east and subsiding. The subsidence and gradual invasion of marshes by saline Gulf waters are the dominant physical processes in this unit. Subsidence in the EMU is intermediate and ranges from 1.1 to 2.0 feet per century.

### **Soils**

The surface soils are organic peats and mucks overlying slightly firm to semi-fluid silty clays and sands. Fausse clay, saline soils characterize the Bayou La Loutre ridge and marsh complex. Grading southward from the ridge on the east are Scatlake mucky clays and on the west are Bellpass muck. Soils in the southern half of the EMU consist of Timbalier muck.

### **Vegetation and Wildlife**

Brackish-to-saline marsh grasses dominate the area with wiregrass, three-cornered grass, oystergrass, saltmarsh grass, and black rush being the predominant species. Some of the fish species common to the unit are spot, croaker, menhaden, striped sole and southern flounder. Shrimp, oysters, and marsh clams are also very common. Waterfowl, wading birds, and fur-bearing animals are also present in this environmental management unit.

### **Hydrology**

When Bayou La Loutre carried the major flow of the Mississippi River into this region, it built the marshes of St. Bernard Parish outward toward the Gulf of Mexico through distributary channel deposition. With construction of the MRGO the dominant hydrologic pattern became tidal exchange between Lake Borgne and the Chandeleur Sound, through sinuous channels and bayous connected to the eastern end of Bayou La Loutre. Fall surface

water salinities in the EMU increased to around 20 ppt after dredging of the MRGO. Blockage of the MRGO at the Bayou La Loutre ridge prevents a direct connection between the eastern reach of the MRGO channel and Bayou La Loutre. However, higher salinities can still enter the EMU via numerous canals and natural waterways, as well as Bayou La Loutre through numerous former drainage canals that connect to the bayou. Coastal restoration plans under consideration by the USACE, as mitigation for environmental damages associated with construction of the MRGO, and plans presented in the State of Louisiana's 2007 restoration plan include freshwater diversion from the Mississippi River via a channel in the vicinity of Violet to Bayou La Loutre to sustain existing brackish marsh habitat and preclude further expansion of saline marsh habitat.

### **Cultural Resources**

There are five archaeological sites in this unit, all of which are prehistoric sites: 16SB68, 16SB77, 16SB79, 16SB98, and 16SB142. Two sites are classified as both archaeological and historic, the Bayou La Loutre Cemetery (16SB90) and nineteenth century homes in the vicinity of the MRGO (16SB92).

### **Land Use**

The Lower La Loutre Wetlands EMU abuts the middle lower portion of the MRGO Spoil Area (EMU 10) on the southwest and is also bounded on the north and east by EMUs 1, 8, and 9. In the past, the ridge portions of this EMU were used for agriculture; but farming was abandoned in the early twentieth century due to the cumulative results of subsidence, soil oxidation, and the invasion of marine processes. The northern portion of the EMU adjacent to Bayou La Loutre was planned as a major reclamation project in the early twentieth century and an intricate network of drainage canals was dredged. However, reclamation never occurred and the canals were abandoned. One of the east-west trending canals, Baker's Canal, is used now as a short-cut for boats wishing to avoid traveling around the big bend in Bayou La Loutre. The area currently serves as an important estuary with high levels of recreational use. There were 23 recorded oil and gas wells in the unit as of 2010. The unit contained 2,760 acres of leased oyster grounds in 2007.

### **Transportation**

A small portion of the MRGO located in this EMU remains open to boat traffic but only as far north as the dam that is constructed in the MRGO at the south ridge of Bayou La Loutre. Larger commercial and recreational vessels navigate on Bayou La Loutre, whose south bank defines the northern boundary of the EMU, while smaller boats utilize the shallow canals, lakes, and tidal channels to fish, shrimp and harvest oysters in the waterways of this unit. This EMU contains no roads or railroads.

### **Unique Ecological Features**

In addition to leased private oyster grounds, the area is a primary fish and shellfish estuarine nursery ground. The unit contains the easternmost extent of the subsiding Bayou La Loutre

ridge that still supports very small remnants of the formerly extensive live oak natural levee forest. There are numerous archaeological sites located along the natural levee.

## **Environmental Considerations**

Human impact upon this management unit can be seen clearly on aerial photographs. Canals for reclamation related drainage purposes, transportation, and oil and gas exploration have contributed to the problems of land loss, subsidence, and saltwater intrusion. The MRGO has contributed significantly to the direct and indirect loss of wetlands in this unit, which totaled 2,750 acres between 1932 and 2008.

## **Goals**

The management unit goals are as follows:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Stabilize shoreline along the north bank of the relict MRGO channel using rocks and rebuild marsh behind the rock revetments.
4. Maintain brackish-to-saline marsh zones for support of commercial seafood harvesting and recreational fishing activities.
5. Require maintenance of existing water control structures in pipeline canals to decrease saltwater intrusion.

## **Permissible Uses**

Permissible uses in this unit may require a permit pursuant to federal, state or local regulations. This is not an all inclusive list.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Shallow draft commercial and recreational traffic
- Archaeological/historical site preservation
- Coastal restoration and flood protection projects

## **UNIT 8 - BILOXI MARSH**

### **Geomorphology**

This 78,000-acre unit was formed by delta deposition along the perimeter of the distributary channels of the Mississippi River – St. Bernard Delta Lobe. Erosion processes associated with the degradational cycle of this delta have diminished the area and uniformity of the marsh surface. There are a series of faults in Lake Borgne and two faults extend into the unit with one fault traversing the entire EMU in a northwest to southeast direction. Subsidence is low at 0 to 1 feet per century.

### **Soils**

The soils of this unit are predominantly organic peats and mucks overlying slightly fluid to semi-fluid gray clays. The six soil types include: Fausse clay, saline and Clovelly muck along the Bayou La Loutre natural levee and Bellpass muck, Lafitte muck, Timbalier muck and Scatlake mucky clay in the marshes north of the subsided levee.

### **Vegetation and Wildlife**

The EMU contains a brackish marsh core that borders Lake Borgne north of Bayou St. Malo and a perimeter saline marsh on its northern and eastern sides. In the brackish marshes, wiregrass is the dominant species, while in the saline marshes, oystergrass (aka smooth cordgrass) is the dominant species, with blackrush and wiregrass extensive in some areas. Fish common to this unit include spotted seatrout, spot, Atlantic croaker, black drum, and red drum. The fur-bearing animals present in this unit are generally located in the brackish marshes on the interior and western side of the unit. The area still supports wintering waterfowl.

### **Hydrology**

The area contains an extensive network of small bayous that convey estuarine waters through the marsh between Lake Borgne on the west and the larger water bodies of Bayou Boudreau, Drum Bay and the Chandeleur Sound on the east. The management unit also contains numerous estuarine lakes interconnected by tidal channels. Fall surface water salinities were in the 10 to 20 ppt range after construction of the MRGO conveyed higher salinity waters from the gulf into Lake Borgne, Bayou La Loutre, and Bayou St. Malo. Closure of the MRGO with a dam at the south ridge of Bayou La Loutre has prevented the saltwater wedge from moving directly into Lake Borgne and the EMU via Bayou La Loutre. Freshwater diversion plans proposed under coastal restoration and MRGO mitigation plans by the State of Louisiana and the USACE, respectively, would reduce salinity levels further within the EMU with a target low salinity of 7.0 ppt in May and a high not to exceed 17.0 ppt in September (USACE 2010a:1-26). The entire unit is in the 100-year floodplain.

## **Cultural Resources**

The 22 recorded archaeological sites found in this unit consist of shell middens, shell mounds, or earth mounds: 16SB9, 16SB49, 16SB50, 16SB51, 16SB52, 16SB53, 16SB54, 16SB55, 16SB60, 16SB62, 16SB63, 16SB64, 16SB70, 16SB73, 16SB80, 16SB125, 16SB127, 16SB128, 16SB129, 16SB130, 16SB131, 16SB143. Of all of the sites in this unit, only the Magnolia Mound Site (16SB49) is included on the National Register of Historic Places.

## **Land Use**

The 39,583-acre Biloxi Wildlife Management Area (WMA), owned by the Biloxi Marsh Land Corporation and leased to and managed by the LDWF, covers a substantial portion of the this unit. The WMA provides public access for recreational fishing, hunting and other outdoor related activities but can only be reached via boat. Commercial fishing for crabs, shrimp and fish also occurs in this EMU. There were approximately 3,770 acres of leased oyster grounds and 276 acres of public oyster grounds recorded in this unit in 2007 and 2006, respectively. The unit had 51 recorded oil and gas wells as of 2010 and one field, Bayou Biloxi, which was first developed in 1963.

## **Transportation**

Transportation in this EMU consists primarily of commercial and recreational traffic using navigable natural waterways and dredged canals. There are no roads or railroads in the unit.

## **Unique Ecological Features**

Le Petit Pass, located on the northern tip of this unit, is an important deep migratory pass for the many estuarine fish and shellfish larvae ingressing to Lake Borgne. Three small islands in the northeast section of the EMU were named the Isle au Pitre Unit LA-01 and designated as part of the John H. Chafee Coastal Barrier Resources System in 1990. The LA-01 unit contains 5,029.6 acres of which 12.8 acres are designated as fastland (i.e., land above mean high tide) and the rest open water (USFWS 2008b:D-108). The entire EMU is also a primary fish and shellfish estuarine nursery ground. Leased oyster grounds are located in the unit and in Lake Borgne adjacent to this management unit. Peak geese and duck concentrations are found here during fall and winter. The parish supports conserving and restoring wetlands in the unit because of its prime fisheries, oyster, fur-bearing animal and waterfowl habitats.

## **Environmental Considerations**

This EMU is under continuous attack from marine erosion forces. Water bodies are constantly enlarging through edge erosion, especially during severe climatological events. Natural subsidence of the marsh surface, while low, is another environmental consideration. Between 1932 and 2008, the unit lost approximately 7,102 acres of wetlands.

## **Goals**

The following suggested goals are based upon the unique environmental characteristics of the area:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Maintain shoreline integrity of Lake Borgne using appropriate stabilizing materials.
4. Nourish and restore marsh with dedicated sediment delivery from the Mississippi River or other sources with the least adverse environmental impacts.
5. Conserve natural habitats with emphasis on waterfowl management and commercial and recreational fishing.
6. Request that the LDWF prepare and implement an updated management plan for the Biloxi Wildlife Management Area.
7. Support habitat management and restoration measures proposed by private landowners.

## **Permissible Uses**

Although this list is not all inclusive, the following permissible uses may be undertaken in the area, but may require a permit pursuant to federal, state or local regulations.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Recreational development
- Coastal restoration and flood protection projects

## **UNIT 9 - BAY BOUDREAU – BAY ELOI**

### **Geomorphology**

This 182,000-acre unit is the outer perimeter of the Mississippi River – St. Bernard Delta Complex and is characterized by geomorphic features and patterns representative of a drowning marsh. Round lakes are eroding into open bays, and double row islands are all that remain to indicate the location of the old distributary channels. The area has a low subsidence rate of 0 to 1 feet per century north of Bayou La Loutre and an intermediate rate of 1.1 to 2 feet per century south of the bayou. A long fault extends in a northwest to southeast direction from Lake Borgne through the central portion of the unit into the Chandeleur Sound.

### **Soils**

The marsh areas are composed of organic clays, silty clays, and peats with fine sand underneath some areas. Shell reefs found here are mainly composed of oysters in a matrix of silt and clay. Almost all of the area consists of Scatlake mucky clay with only a small area of Timbalier muck south of Bayou Boudreau.

### **Vegetation and Wildlife**

The EMU is entirely within a saline marsh zone dominated by oystergrass (smooth cordgrass). Saltmarsh grass and blackrush are also present. On the larger islands, usually on the Chandeleur Sound side of the unit, large expanses of black mangrove can be found. Many fish species are abundant in the area, including Atlantic croaker, red drum, black drum, spot, striped mullet, bay anchovies, menhaden, sand seatrout, and scaled sardines. Marsh clams, oysters, and large quantities of brown shrimp inhabit the estuaries. The unit contained the largest number of active seabird and wading bird colonies in St. Bernard Parish in 2008. Eleven bird species were recorded within the 21 colonies: laughing gulls, brown pelicans, black skimmers, Forester's terns, tricolored herons, snowy egrets, little blue herons, white ibises, royal terns, sandwich terns, and American oystercatchers.

### **Hydrology**

One of the most interesting hydrologic features of this unit is the partially drowned or drowned remains of the natural levees of the old Bayou La Loutre channel on both sides of Fishing Smack Bay. Tides dominate the hydrology of the whole region and what were once freshwater distributary channels are now estuarine tidal channels. These tidal channels and passes are often deeper than the 3 – 6-foot deep lakes and bays because they are subjected to more rapid currents and stronger scouring action.

Fall surface water salinities in the unit were around 25 ppt by the end of the twentieth century. Freshwater diversion plans contained in the State of Louisiana's integrated restoration and hurricane protection program and the USACE's (2010a) MRGO Ecosystem

Restoration Study are designed to lower salinity ranges within the unit to restore and sustain the ecosystem's overall health and oyster production. The USACE's plan to establish the "Chatry Line," (an isohaline denoting salinities conducive to commercial oyster production) along the general boundary between the Biloxi Marsh EMU 8 and Lower La Loutre Wetlands EMU 7 on the west and the Bay Boudreau - Bay Eloi EMU 9 on the east would lower salinities with a target low of 7.0 ppt in May and a high not to exceed 17.0 ppt in September.

### **Cultural Resources**

There are 33 recorded prehistoric archaeological sites in this management unit including shell middens and wave-washed beach deposits: 16SB1, 16SB5, 16SB6, 16SB7, 16SB10, 16SB11, 16SB13, 16SB16, 16SB17, 16SB20, 16SB21, 16SB22, 16SB24, 16SB30, 16SB31, 16SB32, 16SB35, 16SB36, 16SB37, 16SB56, 16SB72, 16SB97, 16SB103, 16SB126, 16SB133, 16SB134, 16SB135, 16SB136, 16SB137, 16SB138, 16SB139, and 16SB141. Two of these site numbers 16SB11 and 16SB13 represent the same site. The fact that over 25 percent of the unit's recorded sites has been obliterated by wave action is a strong indication that the untold numbers of sites that existed previously may have been inundated or washed away before the relatively recent days of archaeological site recordings (Gagliano et al. 1978).

### **Land Use**

Commercial oyster production, fishing, shrimping, and recreational activities make this EMU an important and economically valuable estuarine complex. The unit contained 625 recorded oil and gas wells as of 2010 and eight named fields that were developed between 1953 and 1998: Chandeleur Sound Block 71, Lake Athanasio, Half Moon Lake, Stuards Bluff East, Eloi Bay, Treasure Bay, Bayou Loutre and Chandeleur Sound Block 25. Approximately 54,491 acres of leased oyster grounds and 49,744 acres of public oyster grounds were recorded for the unit in 2007 and 2006, respectively.

### **Transportation**

Surface transportation in this EMU primarily consists of commercial and recreational vessels that ply the deeper tidal channels, bays and lakes. A segment of the MRGO remains open along the southern boundary of the unit but Bayou La Loutre is the only large waterway providing access between the Chandeleur Sound and Gulf of Mexico and interior camps, fishing villages and docking facilities. There are no roads or railroads in this EMU.

### **Unique Ecological Features**

Many of the distinct and important islands and points of land once located in this EMU have eroded into open water with some disappearing since the St. Bernard Parish CZMP document was initially prepared in 1982. These former landmarks include: Door Point, Little Raccoon Island, Mitchell Key, Elephant Island, Wild Goose Island, Point Lydia, Rawhead Island, Grassy Island, Coon Nest Island, Point Eloi, and Deadman's Island. Moreover, an undetermined number of unnamed landmasses were lost or reduced in size during the same time period.

As noted previously, the unit contains the largest number (21) of active seabird and wading bird colonies with eleven bird species in St. Bernard Parish in 2008. The unit also contains the largest concentration of privately leased oyster grounds (54,491 acres) in the parish. Deep passes in the unit (Deep Pass, Grand Pass, Three Mile Pass, and Nine Mile Pass) are important migratory pathways for many estuarine fish and shellfish larvae. The EMU contains the second largest number of prehistoric archaeological sites (33) in the parish.

## **Environmental Considerations**

Submergence of the wetlands (through land subsidence and sea level rise) and marsh edge erosion by waves are the predominant natural processes affecting the area. Between 1932 and 2008, the unit lost approximately 21,582 acres of land. Many archaeological sites are being eroded or are already submerged. Interior embayments are increasing in size and depth and in the absence of effective shoreline protection measures along the eastern perimeter of the unit these embayments will merge into the Chandeleur Sound in the future.

Larger volumes of higher salinity waters are moving further inland as the land erodes, and the oyster grounds are threatened by oyster drill predation and disease that accompany the higher salinities. Proposed freshwater diversions, marsh restoration using dredged material and shoreline stabilization using bioengineered oyster reefs and other shore protection measures have been proposed to offset the detrimental consequences of these natural land loss processes.

## **Goals**

The following suggested management unit goals are based upon the unique environmental characteristics of the area:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Restore selected areas of marshland along eastern and northern perimeter of the EMU.
4. Stabilize eastern perimeter marsh islands with appropriate shoreline protection measures while striving to enhance biodiversity of the marsh and estuarine habitats.
5. Stabilize shoreline along the north bank of the relict MRGO channel using rocks.

6. Create marsh on north side of relict MRGO channel with delivery of dedicated sediment.
7. Enhance wilderness character of the EMU by limiting construction.
8. Preserve integrity of water bottoms and seagrass beds by opposing dredging in the vicinity of North Island, Freemason Island, and New Harbor Island.
8. Encourage potential for freshwater diversion and utilize the resulting freshwater to combat saltwater intrusion.
9. Conserve natural habitats with emphasis on commercial and recreational fishing.

### **Permissible Uses**

These permissible uses are not all inclusive. The uses in this unit may be undertaken but may require a permit pursuant to federal, state or local regulations.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Recreational development
- Coastal restoration and flood protection projects

## **UNIT 10 - MRGO SPOIL AREA**

### **Geomorphology**

This 15,700-acre unit encompasses the dredged material retention area constructed to contain excavated material from the initial dredging and subsequent maintenance dredging of the MRGO. The portion of the Chalmette Hurricane Protection Levee within St. Bernard Parish was constructed and is maintained on the northern side of the unit from Bayou Bienvenue southeastward to a point north of Verret where the levee turns south to Verret then west to the community of Caernarvon on the border with Plaquemines Parish. Parallel, non-maintained retention levees continue southeastward from a point north of Verret on both sides of this EMU to the vicinity of Lake Machias. A parallel, non-maintained back retention levee also extends from Bayou Bienvenue and Verret. The EMU is within a zone of intermediate subsidence with a rate of 1.1 to 2.0 feet per century. Two southwest-northeast trending faults cross the unit north of the community of Verret.

### **Soils**

The soils in this EMU represent an inverse version of the surface and subsurface soils of an undisturbed geologic core taken in a natural wetland environment. The material deposited from the initial excavation of the 36-foot deep MRGO channel is composed of old

distributary basin fill and tidal flat clays. The natural soil substrate underlying this deposited dredge material consists of organic peats and mucks. The soil association for the unit is classified as Aquents, dredged, frequently flooded.

## **Vegetation and Wildlife**

Where dredged material deposition from maintenance dredging has ceased, the spoil banks become colonized by plant species characteristic of higher, better drained sites, but tolerant to brackish water spray conditions. These re-vegetated areas contain a variety of species including wax myrtle, baccharis, black willow, hackberry and many herbaceous perennials and annuals. Portions of the unit that contain water for extended periods of time now support freshwater marsh habitat. Small mammals, such as swamp rabbits, nutria, muskrats, armadillo, northern raccoon, Virginia opossum, and a variety of birds use this upland habitat that is somewhat isolated from frequent human disturbance.

## **Hydrology**

This spoil retention area altered the former natural drainage patterns and hydrologic regimes of the surface marsh areas through which it traverses. There are pockets of freshwater trapped on the spoil banks because of rainfall, poor drainage, and impermeable soils. Despite the high elevation of the northern half of the unit, FEMA still classifies the entire unit as being within the 100-year floodplain. A flood control gate is located on Bayou Dupre at the hurricane protection levee. Southeast of the hurricane protection levee, the EMU is cut by several channels including a pipeline canal at a processing facility on the Bayou La Loutre ridge, Bayou Yscloskey at Shell Beach and Bayou La Loutre.

## **Cultural Resources**

There are two recorded archaeological sites in this unit 16SB95 (Pearstein, an historic site dating to the nineteenth century on the south bank of Bayou La Loutre) and 16SB99 (the Shell Beach Railroad, a nineteenth century historic site at Shell Beach). Both sites were covered by deposition of material dredged from the MRGO.

## **Land Use**

The Chalmette Hurricane Protection Levee constitutes the northern edge of the EMU between Bayou Bienvenue and the point where the levee turns south toward the community of Verret. This levee, constructed by the USACE and maintained by the Lake Borgne Basin Levee District, provides hurricane protection to most of the residents of the parish. Floodgates in Bayous Bienvenue and Dupre are left open to provide drainage and access for boaters and marine organisms, but are closed prior to tropical storm events.

Four small portions of the EMU have been developed outside of the hurricane flood protection levee. The community of Shell Beach relocated from the Lake Borgne waterfront to the MRGO spoil retention area on the east side of Bayou Yscloskey when the MRGO was dredged. Proctor Point, a private, upscale, camp community with a canal system that

provides access to the MRGO, is located on the east side of Bayou Yscloskey north of Shell Beach. Across from Proctor Point, on the west side of Bayou Yscloskey, another camp community with canal access to MRGO, Fort Beauregard, is being developed. The Breton Sound Marina complex, a small community within the EMU on the north side of Bayou La Loutre is comprised of small commercial businesses that serve the oilfield and commercial and recreational fishing industries. The remainder of the EMU contains scrub/shrub, forested and grassland/marsh habitat that is used by private property owners for hunting and ATV use. Two other areas of camp development include camps built along the north bank of the New Canal east of the Violet Canal and camps along Horseshoe Canal west of Bayou Dupre. The unit had 14 recorded oil and gas wells as of 2010, and one field, Stuards Bluff, developed in 1968.

Part of the massive linear spoil area, created by the initial dredging and enlarged through maintenance dredging of the MRGO and within the hurricane flood protection levee, is suitable as a component of St. Bernard Parish's future growth corridor. Consolidation, compaction, and oxidation of dredged soils over a relatively long period of time have rendered the elevated site suitable for development. Much of this unit is over 15 feet higher than the surrounding marshland, making it relatively less susceptible to flooding. Long-term land use potentials for portions of this EMU include water-oriented commercial, industrial and campsite development.

### **Transportation**

Roads within this EMU include two highways (LA HWY 46 [Yscloskey Highway] and HWY 624) and short, local roads that serve the two previously discussed developments of Proctor Point and Fort Beauregard. There are no railroads in this EMU.

The development potential of this EMU would be contingent on the design and realization of a road system that would provide effective movement of traffic.

### **Unique Ecological Features**

There are no designated special or unique ecological features in this environmental management unit.

### **Environmental Considerations**

Because a part of this EMU has been identified as a potential future development corridor, it is important that planning and zoning measures be adopted that would not only ensure orderly growth, but reduce unavoidable impacts to the environment as well as ensure that the development is storm-hardened and sustainable. Development of the MRGO Spoil Area created 2,545 acres of land in this area between 1956 and 1990. However, there was a loss of approximately 514 acres between 1932 and 2008.

## Goals

The following suggested goals are based upon the unique characteristics of the spoil area:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Utilize a multiple-use master plan approach for development of the EMU.
4. Promote multiple-use water-dependent recreational and commercial development.
5. Support comprehensive bank stabilization measures along the EMU perimeter.
6. Encourage establishment of live oak forest on selected portions of the EMU, where most appropriate, to promote habitat diversity.

## Permissible Uses

The permissible uses are those uses that may be undertaken in this unit but which may require a permit pursuant to federal, state or local regulations. The list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Commercial, residential, and recreational development
- Port and industrial water-dependent development
- Coastal restoration and flood protection projects

## UNIT 11 - SEMI-URBANIZED LEVEE

### Geomorphology

This 5,100-acre unit was once the distributary channel - levee complex of the Mississippi River that branched eastward and now forms the Bayou Terre aux Boeufs and Bayou La Loutre natural levee - channel complexes. This EMU has an intermediate subsidence rate ranging from 1.1 to 2.0 feet per century. Two faults cross the unit, one in a northwest to southeast direction southwest of Reggio and another in a northwest to southeast direction north of Delacroix.

## **Soils**

The soil on the higher portion of the natural levee extending from Verret east to Hopedale and south to Reggio is Cancienne silty clay loam. Schriever silty clay loan soil is present on the backslopes of the natural levee ridge. Clovelly muck is present in the lowest lying portions of the EMU.

## **Vegetation and Wildlife**

The typical natural levee vegetation on the slightly lower, less well-drained ridges consists primarily of water oak, sycamore, and black willow. The understory shrubbery is characterized by dwarf palmetto, blackberry, elderberry, and deciduous holly. The forested sites support deer, small mammals and a variety of song birds.

## **Hydrology**

The basic hydrologic structure of this unit is characterized by the old abandoned distributary channels of the Mississippi River. Both Bayou La Loutre and Bayou Terre aux Boeufs once transported large amounts of fresh water and sediments to the delta front. Now, these channels are tidal streams possessing saltwater wedges during periods of low precipitation. Man-made ditches drain water from the developed, higher portions of the natural levee areas toward the back flood (tidal) protection levees where tidal pumps discharge the water into the flanking marshes. There are seven tidal pump stations along the low-lying back levees; three along the Bayou La Loutre ridge (Florissant North, Florissant South and Alluvial City) and four along the Bayou Terre aux Boeufs ridge (Reggio, Jack's Canal, Wood Lake and Delacroix). Man-made ditches in the marshes on the north side of the EMU indicate previous efforts to drain and reclaim the marshes for agriculture. All of the EMU is within the 100-Year Floodplain.

## **Cultural Resources**

There are twelve archaeological sites within this EMU: 16SB8, 16SB38, 16SB42, 16SB45, 16SB46, 16SB81, 16SB82, 16SB87, 16SB88, 16SB94, 16SB121 and 16SB166. Two of the archaeological sites are also historical sites (16SB87 Proctor Sugar Mill and 16SB88 De La Ronde Plantation). Other historical sites include Solis Plantation House and Ducros Museum. The ruins of the Proctor Sugar Mill (16SB87) and the Solis Plantation House mark the site where sugar was first granulated in Louisiana. The Proctor Sugar Mill, visible from HWY 624, was one of the first sugar mills in the state, but all that remains is the smoke stack. The archaeological sites 16SB8, 16SB38, 16SB42, 16SB45, 16SB46, and 16SB81 consist of shell mounds, earth mounds, and shell middens.

## **Land Use**

Land use in this EMU includes low-density residential, commercial, and industrial development, agriculture, public facilities and forested lands. Flood protection is provided to

a limited extent with tidal levees and pumps. There were six marinas/boat launches within this EMU as of 2010; three along the Bayou La Loutre ridge and three along the Bayou Terre aux Boeufs ridge. This unit had 11 oil and gas wells recorded as of 2010 and one field, Hopedale Lagoon, North developed in 2006. The parish favors creation of recreational opportunities in the unit, including camp rentals, boat launching facilities and commercial dockage. Louisiana Highway 46 is a designated scenic highway and the parish favors additional enhancement of roadside parks, historical tours and historical interpretation.

## **Transportation**

Two main highways, LA HWY 46 (St. Bernard HWY) and HWY 300, are located in the Semi-Urbanized Levee EMU and they are connected to short local streets. There are no railroads in the EMU. At one time, a railroad extended to Reggio, but it is no longer in use.

## **Unique Ecological Features**

The road network in this EMU enables travelers to see the processes and the results of subsidence and saltwater intrusion in an abandoned delta environment. While a few live oaks remain on the higher parts of the ridge within the tidal flood protection levees, lines of dead live oak outline the subsided natural levees and show the process of marsh vegetation taking over the former live oak forest habitat.

## **Environmental Considerations**

This unit is entirely within the FEMA designated 100-year flood plain. The natural levee ridges are slowly subsiding due to natural processes, and land loss is occurring at the base of the natural levees along the levee-flank depressions where there is saltwater intrusion. Between 1932 and 2008, the unit lost approximately 144 acres of land. A water control structure installed at Hopedale as a CWPPRA project (PO-24 Hopedale Hydrologic Restoration) and repaired in 2007 as a FEMA project (PW-8743) helps alleviate the potential for flooding due to storm surge in part of the inhabited area.

## **Goals**

The following management unit goals are based upon the characteristics of the environmental management unit:

1. Promote continuation of “rural” character by discouraging large-scale developments that are subject to storm surge.
2. Maintain area as transition zone between leveed area and wetlands.
3. Conserve upland woodland habitat for wildlife and recreation and encourage restoration or establishment of live oak forests.
4. Promote protection from saltwater intrusion through structural measures such as ring levees, dams and flap gates in strategic locations.

5. Restore and enhance interior marshes through sediment input and freshwater discharge.
6. Obtain assessment of existing and future development needs through stakeholder input.
7. Support concept of this EMU as a growth area for future water-dependent development, as demand warrants.
8. Develop commercial/recreational marina-safe harbor complex.
9. Consider development of a comprehensive plan for zoning wetlands.
10. Identify economic development programs for further consideration.
11. Identify funding sources and development of plans to take advantage of potential funding opportunities associated with offshore oil and gas activities.
12. Establish and/or adopt hurricane recovery and oil spill cleanup protocols.

### **Permissible Uses**

The permissible uses are uses that may be undertaken in this unit, but which may require a permit pursuant to federal, state or local regulations. This list is not all inclusive.

- Oil and gas activities
- Residential and commercial development
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Coastal restoration and flood protection projects

### **UNIT 12 - MODIFIED WETLANDS**

#### **Geomorphology**

This 2,600-acre unit was originally a freshwater backswamp that developed in an upper interdistributary basin of the Mississippi River – St. Bernard Delta Lobe. It has been significantly modified by leveeing, dredging, saltwater intrusion, and land filling and is no longer representative of a natural habitat. Most of the unit is now in open water with a substrate containing the stumps of former cypress trees. A large, inactive landfill occupies a portion of the site west of LA HWY 47 near its juncture with the flood protection levee. Another closed landfill extends along the western border of this unit from Bayou Bienvenue to the flood protection levee. The EMU has an intermediate subsidence rate of 1.1 to 2 feet per century. A northwest-southeast trending fault bisects the unit.

## **Soils**

Most of the EMU consists of open water. The remaining surface soils vary from organic peats and mucks to pumped-in sand fill. In some places, especially near Parish Road (LA HWY 47), the organic peats and mucks are 10 to 15 feet deep. The inactive landfill on the western side of the unit is covered with Aquests, dredged, frequently flooded. Lafitte muck soils are present on the remaining fragments of marsh in the northern half of the unit.

## **Vegetation and Wildlife**

This unit was once a freshwater swamp and marsh environment, which served as a habitat for wildlife typical of such an environment. Human alteration of the landscape changed this unit to the extent that it is now mostly open water of lower quality with some aquatic plants, and small flood-tolerant shrubs. Estuarine organisms can enter the area via Bayou Bienvenue.

## **Hydrology**

The hydrologic pattern has been modified greatly by drainage that lead to soil compaction and subsequent flooding upon abandonment of the drainage operations. The EMU's hydrologic system no longer functions as a natural backswamp system. The unit receives freshwater discharge from Pump Station Number 1, 2 and 6. Water exchange through tidal channels was once active in this environment, but Bayou Bienvenue is now the only major tidal channel connecting this unit to Lake Borgne. Water exchange has been impaired through impoundments, yet fall surface water salinities reach 10 ppt via Bayou Bienvenue. Closure of the MRGO with a dam south of Bayou La Loutre is expected to reduce salinities. Proposed coastal restoration plans are designed to restore the freshwater marsh and swamp hydrology by discharging treated wastewater effluent directly into the area. The entire 2,600-acre unit, except for 56 acres of the closed landfill site, is within the FEMA designated 100-year flood zone.

## **Cultural Resources**

There are no known archaeological or historical sites in this unit.

## **Land Use**

The southern portion of this EMU, consisting of two rectangular ponds, is the result of a failed reclamation project. The tidally influenced ponds provide estuarine functions and are utilized for shrimping by commercial and recreational fishermen. Commercial and recreational fishermen also use the small expanses of wetlands located in the northern portion of the unit. Several telecommunication tower facilities are located on the west side of Paris Road (LA HWY 47). Two oil and gas wells had been drilled in the unit as of 2010.

## **Transportation**

Paris Road (LA HWY 47) is situated along the eastern boundary of the EMU. A few local roads extend from Paris Road westward onto the abandoned landfill site. There are also roads on the abandoned landfill on the western boundary of the EMU. There are no railroads in this EMU. Bayou Bienvenue, the northern boundary of the unit as well as the boundary between St. Bernard Parish and Orleans Parish, is used by fishermen and recreational interests.

## **Unique Ecological Features**

There are no unique ecological features in this unit.

## **Environmental Considerations**

Since the beginning of the twentieth century, this unit has been slowly deteriorating as a result of human modifications, most of which are irreversible without large scale restoration efforts. The unit lost approximately 1,807 acres of land between 1932 and 2008. The soils and subsurface conditions present severe constraints for future development. The parish has considered acquiring the closed landfill west of LA HWY 47 and developing a recreational area there as well as creating wetland islands north of this site along the west side of the highway. Other proposed state and federal coastal restoration plans include pumping in dredged fill material and planting vegetation to restore the freshwater marsh and cypress forest.

## **Goals**

The following suggested management unit goals are based upon the unique environmental characteristic of the unit:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Maintain EMU as buffer zone between other wetland zones and developed leveed areas.
4. Plan for possible development adjacent to LA 47 as future needs warrant.
5. Restore forested areas using dredged fill and planting trees.
6. Support recreational development.

## **Permissible Uses**

The permissible uses are those uses that may be undertaken in this management unit, but which may require a permit pursuant to federal, state or local regulations. This list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Urban runoff and treated wastewater discharge
- Coastal restoration and flood protection projects

## **UNIT 13 - URBANIZED AREA**

### **Geomorphology**

This 12,600-acre unit consists of the east bank natural levee ridge of the Mississippi River. It was created by overbank flooding of the Mississippi River during St. Bernard delta progradation and during flood stages when layers of sediment were deposited adjacent to the main channel. Natural levee elevations approach 15 feet in the northern portion of the unit, but elevations and levee width decrease seaward. The EMU also contains batture along the Mississippi River east bank and that portion of the Mississippi River out to the boundary with Orleans Parish. Subsidence rates in the unit are classified as stable to low. A long fault traverses the unit in a northwest to southeast direction extending from north of Chalmette through Violet to St. Bernard in EMU 3 and southeast past Delacroix in EMU 11.

### **Soils**

This EMU contains the greatest variety of soil types of all the units in St. Bernard Parish. The soils consist mostly of a silt loam or silty clay loam surface and a silty clay loam subsoil. The natural levee soils include Cancienne silt loam, Cancienne silty clay loam, Cancienne and Schriever soils, frequently flooded and Vacherie silt loam, gently undulating. Backswamp derived soils include: Harahan clay, Harahan clay, frequently flooded, Schriever silty clay loam, Schriever clay and Westwego clay.

### **Vegetation and Wildlife**

Most of the previously existing natural hardwood forests have been cleared for agriculture/pastureland or development. The remaining forests are on the lower-lying, poorly drained base of the natural levee and consist of trees such as live oak, pecan, American elm, hickory, and green ash. Fauna native to this habitat include deer; small mammals such as Virginia opossum, squirrels, and raccoons; and a variety of song birds and wading birds.

### **Hydrology**

The basic hydrologic system in this unit is the Mississippi River channel on the west side of the unit and natural and man-made channels draining the backslopes of the natural levee.

Pump Station Numbers 1, 2, 3, 4, 6 and 7 discharge drainage water into wetlands north of the unit. The potable freshwater formerly under the unit at depths ranging from 100 to 900 feet has been replaced by saline water as a result of saltwater intrusion into the aquifer. About half (6,507 acres) of this 12,598-acre unit is within the FEMA designated 100-year flood zone.

### **Cultural Resources**

There are 20 archaeological sites in this unit, all of which are identified as being in the historic period: 16SB101, 16SB102, 16SB104, 16SB105, 16SB107, 16SB108, 16SB109, 16SB110, 16SB111, 16SB112, 16SB113, 16SB114, 16SB115, 16SB116, 16SB117, 16SB118, 16SB119, 16SB124, 16SB145 and 16SB147. Site 16SB105 is the Lake Borgne Canal Lock. The Chalmette National Historic Park (16SB147) is both an archaeological site and an historic site on the National Register of Historic Places. It is a unit of the Jean Lafitte National Historical Park and Historic District and includes the National Military Cemetery, Chalmette Monument, earthworks from the Battle of New Orleans in 1815 and the Rene Beauregard Plantation House built in 1832. Other historic sites in EMU 13 are the LeBeau House, the George Villere House, the Old Arabi Historic District, and the Friscoville Street Historic District.

### **Land Use**

The Urbanized Area EMU is the most densely populated of the three natural levee dominated EMUs (Units 3, 11 and 13). Land use includes residential, commercial, industrial and recreational developments. The EMU also contains public facilities, agriculture/pastureland, and open land. One marina at the Violet Canal and the majority of the parish's public parks and playgrounds are in this unit. Louisiana Highway 46 is a designated Scenic Highway that traverses scenic and historic areas of the parish. St. Bernard Parish supports enhancement of roadside park facilities, historical tours and historic interpretation along this route. As of 2010, 23 oil and gas wells had been drilled in this unit and one field, Kenilworth, Northwest had been developed in 2006.

### **Transportation**

The EMU contains several major thoroughfares including LA HWY 30 (Judge Perez Highway), LA HWY 46 (St. Bernard Highway) and LA HWY 47 (Paris Road). The AGS Railroad Company and Louisiana Southern, both subsidiaries under the Norfolk Southern Corporation, provide Class I freight rail carrier service to the parish within this EMU. The AGS Railroad runs from the Orleans-St. Bernard Parish line to Chalmette where it services slips and dock facilities along the Mississippi River. The Louisiana Southern runs from the Orleans-St. Bernard Parish line along the Mississippi River into Plaquemines Parish.

### **Unique Ecological Features**

The Violet Siphon, which was designed to deliver Mississippi River water into the deteriorating wetlands of EMU 2 (Central Wetlands), is located in this unit. The siphon has

not always been operated as designed due to frequent filling of the sediment trap at the siphon outfall and issues related to potential contamination of the river sediments and dredging and relocating this fill material. As of 2010, the siphon was currently operating under the control of the Lake Borgne Levee District with operation and maintenance funded by the LDNR-OCPR. Proposed coastal restoration plans are considering whether to upgrade the Violet Siphon - Violet Canal to introduce more fresh water and sediment into the parish's wetlands and estuaries or to dredge another canal through this EMU. One unique natural ecological feature in this EMU is a stately collection of very old and historic live oaks, The Pakenham Oaks, located in the Chalmette area.

## **Environmental Considerations**

Portions of this management unit are subject to flooding during periodic heavy rainfall when the drainage canals and pumps are challenged to remove water from the area quickly. Presently, six pump stations (Pump numbers 1, 2, 3, 4, 6 and 7) discharge drainage water over the back hurricane protection levee into the Central Wetlands EMU 2.

Sewage and waste disposal are other major problems in the urbanized areas of this densely populated part of St. Bernard Parish. After Hurricane Katrina the wastewater treatment system was restored and reconfigured to use treated wastewater to provide fresh water and nutrients to restore wetlands within the Central Wetlands. Wastewater from the Frazendville Plant goes to the Dravo plant where it is upgraded and pumped to the Munster plant for disinfectant and discharge into EMU 2. Water from the restored Riverbend Oxidation Pond continues to be discharged into EMU 2 by the E. J. Gore Pumping Station. The Violet Wastewater Treatment Plant was not re-activated after Hurricane Katrina and it now pumps wastewater to the Munster Plant for treatment and subsequent discharge into EMU 2.

## **Goals**

The goals are based upon the environmental characteristics of the unit, and are as follows:

1. Promote urban development consistent with existing parish zoning ordinances and sound urban planning.
2. Upgrade and maintain sewage treatment systems and discharge treated waters to wetlands as source of freshwater and nutrients to sustain restored marsh and swamp habitat.
3. Encourage tree planting to improve forested habitat in appropriate areas.

## **Permissible Uses**

Permissible uses are those uses that may be undertaken in this unit. Under normal conditions these uses do not require a local coastal use permit because they occur in a fastland/upland area. This list is not all inclusive.

- Oil and gas activities
- Recreational development

- High-density residential development
- Industrial development
- Commercial development
- Transportation corridor
- Disposal of solid waste
- Agriculture
- Archaeological and historic preservation

## UNIT 14 – LAKE BORGNE

### Geomorphology

This 234,000-acre unit includes all of Lake Borgne, a portion of the Mississippi Sound within Louisiana and a large island, Half Moon Island, which was previously labeled Grand Island on USGS topographic maps. Lake Borgne was part of the Gulf of Mexico prior to the St. Bernard deltaic cycle. As the delta lobe extended eastward, Lake Borgne was cut off from the gulf and became a marginal deltaic basin with relatively shallow water depths. In the late nineteenth century, the eastern end of Lake Borgne was separated from the Mississippi Sound by a series of islands (Le Petit Pass Island, Round Island, Half Moon Island, Grassy Island) stretching from Malheureaux Point to Heron Bay Point, Mississippi. The islands were separated by a series of deep passes, the deepest of which were Le Petit Pass (37 to 52 feet deep) between Malheureaux Point and Le Petit Island and a 30-foot deep pass between Lower Point Clear and Grassy Island. The eastern boundary of the Lake Borgne EMU that is in Mississippi Sound extends from Isle Au Pitre north to the Louisiana - Mississippi boundary at a point west of Cat Island. In the late nineteenth century, the eastern boundary was characterized by a series of east-west trending shoal areas separated by deeper passes. South Shell Bank Flats was located immediately north of Isle Au Pitre and a north-south trending series of low islands labeled South Shell Bank fronted the east side of an extensive natural oyster growing area known as Cabbage Reef. All of the islands, except Half Moon Island and a very small remnant of Grassy Island, have eroded and the extensive natural oyster reefs have been dredged.

### Soils

Soils underlying Lake Borgne are not classified by the USDA because they, like other subaqueous soils, are not capable of supporting terrestrial plant growth and agricultural and forest production. Generally, the soils in the unit are alluvial in origin and are characterized as smectites (e.g., clay minerals). These soils have a fairly heavy mineral content with a high expansive clay component.

The majority of Lake Borgne bottom sediments consist of clayey silt. A wide wedge of sandy silt extends into the lake between the Rigolets and Unknown Pass and a smaller wedge fronts Chef Menteur Pass. Silty sand wraps around Proctor Point and is present at several other sites along the shore on the west side of the lake and near Turkey Bayou. Other small areas of sediment along the Lake Borgne shore include silty clay and silt (Barrett 1971) (Figure 6-1).

## **Vegetation and Wildlife**

Lake Borgne is an important estuarine system that supports commercial fishing for shrimp, crabs and oysters. The lake is also a destination for recreational fishermen in pursuit of spotted sea trout, red and black drum, and seasonal fish such as tripletail. The USFWS has designated all of Lake Borgne as critical habitat for Gulf sturgeon. With increases in lake salinity following construction of the MRGO, larger expanses of firmer substrate along the shore of the two lobes of the lake have been leased to as private oyster grounds. The LDWF reserved most of the remaining portion of this EMU as public oyster grounds. Half Moon Island is the only land mass in the EMU and it is covered by saline marsh vegetation.

## **Hydrology**

Tidal processes dominate the hydrology of the Lake Borgne unit but water elevation, salinity and circulation are also influenced by winds, precipitation and freshwater discharge from the upper Pontchartrain Basin, Pearl River and bayous in coastal Mississippi, and gulf coastal currents. Higher salinity waters from the Gulf of Mexico and the Chandeleur Sound enter the lake via major tidal passes north of Isle Au Pitre and Malheureaux Point. While the dam on the MRGO channel south of Bayou La Loutre now prevents saline tidal waters from moving into the lake directly via the MRGO, tidal movement still introduces higher salinity waters via Bayou La Loutre, Bayou St. Malo, Bayou Yscloskey and numerous bayous in the Louisiana or Biloxi Marshes between Lake Borgne and the Chandeleur Sound.

Freshwater discharge from the Pearl River and the upper Pontchartrain Basin mixes with the more saline waters of the Chandeleur Sound and this mixing produces an estuarine zone within the lake where salinity ranges vary seasonally. By the 1990s, surface fall salinity ranged from 10 ppt in the middle of the lake to 20 ppt on the eastern side near Isle Au Pitre. In the spring, surface salinity was reduced to 5 ppt or less in the majority of the lake and only reached 10 ppt near Isle Au Pitre (Plate 9, Orlando et al. 1993).

In addition to damming the MRGO channel at the south ridge of Bayou La Loutre to stop saltwater intrusion via the channel, other proposed measures for reducing salinities in the lake include introduction of more fresh water via a diversion in the vicinity of Violet and in the upper reaches of the Pontchartrain Basin near Blind River. The objective of these diversions is to establish a salinity zone (e.g., “the Chatry line”) from the MRGO channel northward through Bay Boudreau into the Mississippi Sound at Cat Island that would consist of an average low salinity of 7.0 ppt in May and an average high salinity not to exceed 17.0 ppt in September (USACE 2010a). Maintenance of this salinity regime would restore Lake Pontchartrain to a lower salinity estuary and support continued oyster production in the Biloxi Marshes.



Figure 6-2. Sediment type distribution in Lake Borgne and selected water bodies in St. Bernard and Orleans Parish (after Barrett 1971).

## **Cultural Resources**

There are five recorded archaeological sites in this unit: 16SB20, 16SB21, 16SB73, 16SB85, and 16SB123. All of these sites have a commonality of their locations being on land prior to shoreline erosion along Lake Borgne.

Site 16SB85, Martello Castle, is one of the most notable archaeological sites in the parish. The castle was also referred to as Tower Dupre and was an historic military, masonry structure constructed in the nineteenth century. The castle was reduced to a brick rubble pile by Hurricane Katrina in 2005.

## **Land Use**

Lake Borgne is currently used for oil and gas exploration and production activities, commercial and recreational fishing, oyster production and transient marine traffic. There were approximately 9,670 acres of private oyster grounds and approximately 182,335 acres of public oyster grounds recorded in this EMU in 2007 and 2006, respectively. The unit had 124 oil and gas wells recorded as of 2010 and three fields, Lake Borgne (1951), Shell Point (1952) and Rigolets (1975).

The John H. Chafee Coastal Barrier Resources System (CBRA) Unit LA-02 Grand Island (i.e., Half Moon Island), Louisiana was designated in 1990. The CBRA area consists entirely of 6,013.6 acres of open water and associated aquatic habitat surrounding the two islands with a 2.4 mile shoreline within the interior of the unit. The name of the larger of the two islands, Grand Island, was changed to Half Moon Island on the 1994 USGS topographic map *Saint Joe Pass*. A portion of the water bottom within the designated boundary of the CBRA Unit LA-01 Isle au Pitre is also in the Lake Borgne EMU. The land portion of Unit LA-01 is in EMU 9 and the eastern portion of the water bottom is in EMU 15. The total area of Unit LA-01 encompasses 5,029.6 acres of which 12.8 acres are marsh land within EMU 9.

The USACE's (2010b) tentatively selected restoration alternative described in the Draft MRGO Ecosystem Restoration Study and DEIS has identified the southern reaches of Lake Borgne as a primary source of dredge fill material for numerous marsh and swamp restoration plans in the vicinity of the MRGO in St. Bernard Parish. However, the parish has opposed using dredged material from Lake Borgne as a source of sediment, preferring to obtain the material from the Mississippi River (Taffaro 2011).

## **Transportation**

Approximately one mile of the Gulf Intracoastal Waterway (GIWW) is located between the Rigolets and the territorial waters of St. Tammany Parish in the northwestern portion of the EMU. The GIWW is the southern, protected marine route that accommodates intrastate and interstate marine traffic. There are no roads or railroads in this unit.

## **Unique Ecological Features**

There was one seabird and wading bird colony recorded on Grand Island (Half Moon Island) in this EMU in 2008. The nesting birds included Forester's tern, laughing gull, snowy egret, tricolored heron and white ibis. This EMU is a prime habitat for shrimp, crabs, oysters and fish. The area is also designated as critical habitat for the Gulf sturgeon.

## **Environmental Considerations**

Land loss, primarily due to shoreline erosion, between 1932 and 2008 totaled approximately 3,637 acres. This measured land loss occurred primarily between 1932 and the date of topographic maps (1970s and early 1980s) used to denote the EMU boundaries in the first draft update of the CZMP document (CEI and Coastal Zone Advisory Committee 2001). The loss reflects the fact that the EMU boundary for adjacent EMUs was delineated in 2000 on USGS topographic maps prepared when the shoreline had already retreated from where it had been in 1932.

While land loss primarily affects the adjacent EMUs (Bienvenue-Proctor Point Marsh and Biloxi Marsh), shoreline stabilization involving placement of rock structures would require dredging to reach the project site and placement of rocks or other stabilization features in Lake Borgne in front of the marsh being protected. The preferred alternative identified in the USACE's draft MRGO Ecosystem Restoration Study and DEIS also proposes using the southern reaches of Lake Borgne as a source of dredge fill material to restore wetlands in several other EMUs adversely affected by the MRGO.

## **Goals**

The suggested goals are based upon the environmental characteristics of the unit, and are as follows:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Conserve the quality of natural estuarine habitats, including water bottoms, with emphasis on support for recreational and commercial fishing activities.
4. Conserve natural habitats, especially waterfowl concentration areas.
5. Support stabilization of shorelines on adjacent EMUs and in Orleans Parish.

6. Create living shorelines and oyster reefs for shoreline stabilization that also promote biodiversity, including re-establishment of submerged aquatics between the shore protection features and the adjacent marsh.

### **Permissible Uses**

These uses may be undertaken, but may require a permit pursuant to federal, state or local regulations. This list is a guide and not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing activities
- Oyster production on public and private grounds
- Archaeological and historical site preservation
- Coastal restoration and flood protection projects

## **UNIT 15 – CHANDELEUR SOUND AND ISLANDS**

### **Geomorphology**

This 656,000-acre unit lies between the mainland marshes of St. Bernard and the Gulf of Mexico territorial waters of the United States. The Chandeleur Sound is the Mississippi River Delta's largest barrier-built estuary and the Chandeleur Islands arc marks the seaward extent of the St. Bernard delta complex (Williams et al. 1992). The islands are the oldest transgressive barrier island complex in Louisiana. The sound and the islands were formed over the past 1500 years as a result of abandonment and degradation of the St. Bernard Delta that was initiated when the Mississippi River shifted its channel to its current position and began building the Plaquemines - Balize delta. When the Mississippi River shifted course and the amount of sediment being distributed to the St. Bernard delta decreased and eventually ceased, subsidence and marine erosional processes (e.g., waves, tides, winds, etc.) became the dominant processes. Reworking of delta front sediments and longshore transport of these materials formed the barrier islands. Subsidence and erosion in interior wetlands landward of the delta front caused lakes to enlarge into bays that were connected to the Gulf of Mexico by tidal passes. The bays eventually merged to form the large, relatively shallow Chandeleur Sound in St. Bernard Parish and the Breton Sound, located primarily in Plaquemines Parish.

Land areas within this EMU consist of the Chandeleur Islands, several small island remnants behind the Chandeleur Islands (North Islands, New Harbor Islands, Freemason Islands) and several small islands (Bush Island, Martin Island, Comfort Island) that have been distanced from the Bay Boudreau - Bay Eloi EMU 9 by shoreline erosion. The rock jetty along the south side of the MRGO channel, small areas of marsh south of the rocks and the MRGO channel also extend through the southwestern section of this EMU.

The northern reach of the Chandeleur Islands was wider, slightly higher in elevation and less fragmented than the southern reach. Historically, the islands consisted of sand beaches, vegetated sand dunes, back-barrier marshes and shallow shoals that supported extensive

submerged aquatic vegetation. However, the entire island chain experienced extensive land loss in the first decade of the twenty-first century due to a series of severe hurricanes. Under natural delta degradational processes and in the absence of coastal restoration measures (e.g., dredge material deposition, vegetation planting, dune fencing, and shoreline protection measures), these islands will disappear and be replaced by shallow shoals. The Chandeleur Sound will then become part of the Gulf of Mexico.

## **Soils**

The subaqueous soils underlying the Chandeleur Sound are of alluvium origin and are characterized as smectites. They are described as having a fairly heavy mineral content with a high percentage of expansive clay. The marsh soils of the remaining islands scattered within the sound are Scatlake mucky clay. The Chandeleur Islands are composed of Felicity, loamy fine sand, frequently flooded soils.

## **Vegetation and Wildlife**

The dominant vegetation associated with elevated, sandy dunes include sea oats, wiregrass, bitter panicum, seashore dropseed and beach morning glory. Saline marshes on the lee side of the barrier islands are dominated by oystergrass, saltgrass and saltwort with fringing expanses of black mangrove. Other shrubs present on the islands include wax myrtle and baccharis (groundsel bush). The shallows adjacent to the islands support turtle grass, shoal grass, widgeon grass and manatee grass. The natural vegetation communities have been severely degraded by the passage of hurricanes in the early twenty-first century, with Hurricane Katrina destroying up to 80 percent of the pre-Katrina land area, especially the vegetated dunes and marshes on the lee side of the island chain.

The islands are an important migratory stopover site for many birds crossing the Gulf of Mexico. According to the USFWS (2011a) 23 species of seabirds and shorebirds use the islands and 13 species nest on the islands. The islands provide nesting and migratory habitat for endangered avian species that include the piping plover and snowy plover, a winter migrant. Historically, the Chandeleur Islands were prime nesting habitat for the now federally delisted brown pelican. The federally listed threatened Gulf sturgeon and loggerhead sea turtle, as well as the state restricted harvest diamondback terrapin use the sound. The loggerhead sea turtle was reported to have nested on the Chandeleur Islands many years ago. Other federally listed threatened or endangered sea turtles that are likely to use the waters of the sound and Gulf of Mexico east of the Chandeleur Islands include: green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), hawksbill sea turtle (*Eretmochelys imbricata*) and leatherback sea turtle (*Dermochelys coriacea*) (USACE 2010: 3-102). The extensive seagrass beds behind the Chandeleur Islands are important feeding areas for wintering canvasback ducks, lesser scaup and red head ducks. The endangered manatee, an infrequent visitor to coastal Louisiana, would also feed on these extensive seagrass beds. Mammals that inhabit the islands include raccoons, nutria and rabbits.

There were 10 active seabird and wading bird colonies on the islands in this EMU in 2008. These colonies included 12 species: laughing gull, roseate spoonbill, tricolored heron, white ibis, black-crowned night heron, brown pelican, black skimmer, royal tern, sandwich tern, Forester's tern, great egret, and gull-billed tern.

The Chandeleur Sound provides important habitat for commercial aquatic species, including gulf menhaden, blue crabs and brown and white shrimp and recreational species that include spotted sea trout, red drum and black drum.

### **Hydrology**

Tidal processes dominate the hydrology of this unit with water moving through the sound via tidal passes through the islands and on the northern and southern ends of the Chandeleur Islands. With erosion of the Chandeleur Islands, there is now a greater expanse of the sound directly connected to the Gulf of Mexico. When the MRGO channel was maintained to its authorized depth of 38 feet in the southern part of this EMU prior to 2006, the navigation channel was a conduit for unimpeded tidal movement and higher salinities from the Gulf of Mexico through the sound and into the interior reaches of St. Bernard Parish. Average water depths in the sound are 3 to 5 meters (m) (9.84 to 16.4 feet) and average salinity is 27 ppt. The spring surface salinities are lower and vary from 15 to 25 ppt, while fall surface salinities reach 30 ppt or higher (Orlando 1993). Proposed coastal restoration plans would lower salinity ranges in the sound through implementation of freshwater diversions in the vicinity of the Violet Canal, the upper Pontchartrain Basin and through adaptive management of the Caernarvon Freshwater Diversion structure (USACE 2010b, CPRA 2007, LCWCRTF & WCRA 1998).

All of the Chandeleur Sound and Islands are within the 100-year floodplain.

### **Cultural Resources**

This unit contains twelve archaeological sites that were originally located on natural levees within the eastern perimeter of the St. Bernard Delta: 16SB10, 16SB16, 16SB19, 16SB22, 16SB25, 16SB32, 16SB34, 16SB103, 16SB120, 16SB135, 16SB136, and 16SB139. Site 16SB25 is on the Chandeleur Islands and Site 16SB19 is near the remnants of Freemason Islands. Most of these sites are pre-historic and are located on the western perimeter of the EMU. These sites have either been eroded or are in the process of being eroded. While not recorded on the National Register of Historic Places, the Chandeleur Lighthouse, constructed on the north end of the island chain in 1895, was an historic structure that served as a daytime navigation aid to mariners prior to being destroyed by Hurricane Katrina in 2005.

### **Land Use**

There were 1,042 acres of private oyster leases and 450,090 acres of public oyster grounds recorded in this EMU in 2007 and 2006, respectively. The private leases are in the northwestern part of the EMU adjacent to the extensive leases found in the vicinity of Grand

Pass and Drum Bay in EMU 9. This unit had 554 oil and gas wells recorded as of 2010 and 30 fields developed between 1954 and 2005. The fields include: Main Pass Blocks 4, 6, 10 and 11; Breton Sound Blocks 1, 2, 12 and 16; Chandeleur Sound Blocks 8, 15, 26, 28, 31, 32, 35, 41, 51, 52, 54, 58, 67, 68 and 69; and Chandeleur Sound Addition Blocks 27, 28, 41, 43, 51 and 63; and Chandeleur Sound West Block 28. There is an extensive network of oil and gas transmission pipelines in the EMU.

The Chandeleur Islands in St. Bernard Parish and Breton Island in Plaquemines Parish were designated as part of the Breton National Wildlife Refuge (NWR) in 1904 (USFWS 2011a, 2008a, 2006). The refuge is the second oldest of the nation's 551 refuges and encompasses approximately 13,000 acres in St. Bernard and Plaquemines Parishes with the common parish boundary lying roughly in the middle of the refuge, between the shoals of the eroded Stake and Curlew Islands. President Theodore Roosevelt designated the area as a refuge in order to eliminate human-induced impacts to the islands' birds and their nesting activities. Breton Island and Chandeleur Islands are federally owned and North Island, Freemason Island, Curlew Islands and Gosier Islands are state owned lands that are managed as part of the Breton NWR (USFWS 2006). The Breton NWR was added to the National Wilderness Preservation System in 1975.

Commercial and recreational fishing are allowed within the waters of the Chandeleur Sound and Islands EMU 15. However, land use on the remaining islands within this EMU are restricted to surf fishing from the islands, wildlife viewing and photography, with restrictions placed on these activities during the bird nesting seasons. Camping on the islands is no longer allowed because of the severe loss of land and potential adverse impacts on wildlife and on natural restoration of dunes and vegetation.

The Breton NWR, including all the islands within the Chandeleur Sound and Islands EMU, are designated as unit LA-03P within the John H. Chafee Coastal Barrier Resources System (USFWS 2008b).

## **Transportation**

There are no roads or railroads in this unit. The former channel of the MRGO extends through the southwestern corner of the unit and is used by vessels working the sound or traveling to the Gulf of Mexico. There are numerous pipelines in the unit transporting oil and gas from wells within the unit and from offshore wells.

## **Unique Ecological Features**

Historically, these islands were the second largest brown pelican rookery in the northern Gulf of Mexico and the site of the reestablishment of brown pelicans after they were extirpated in Louisiana by DDT during the mid-twentieth century (USFWS 2008a). The Chandeleur Islands and surrounding waters include a diverse number of habitats such as dunes, beaches, wetlands, mudflats and submerged aquatic seagrass beds that are critical for support of migratory songbirds, wintering birds and waterfowl, nesting shorebirds and wading birds, estuarine organisms and threatened and endangered species. The islands are the only

recorded nesting site of the loggerhead sea turtle in Louisiana. The USFWS considers the beaches of these islands a critical habitat for wintering piping plovers. The Breton NWR is identified as a Globally Important Bird Area by the American Bird Conservancy in association with the Nature Conservancy (USFWS 2008a). The Chandeleur Islands and Sound are also the first line of defense against storm surges moving from the Gulf of Mexico into the lower Lake Pontchartrain Basin.

## **Environmental Considerations**

Environmental considerations for use and conservation of the habitats within this EMU include habitat destruction and land loss associated with tropical storms, subsidence, sea level rise and oil and gas development (e.g., emplacement of pipelines and exploration and production facilities and oil spills). The 2010 British Petroleum Maconda Well blowout in the Gulf of Mexico exposed the habitats in this EMU and adjacent EMUs to oil contamination as well as adverse impacts from clean-up methods. There is currently a moratorium on oil and gas activities within the boundaries of the Breton NWR.

A study, conducted by the USGS and the University of New Orleans and released in 2010, indicates that there were 10,990 acres of emergent land in the Chandeleur Islands in 1855. After Hurricane Katrina in 2005, the emergent land in this EMU had been reduced to 1,162 acres.

The USFWS (2008a) recently completed a management plan (*Comprehensive Conservation Plan, Delta and Breton Sound National Wildlife Refuges, St. Bernard and Plaquemines, Louisiana*) that identified four major goals for the refuges:

- Manage, conserve and, if feasible, restore the physical and ecological functions of barrier island habitats for fish and wildlife resources.
- Manage, conserve, and protect coastal fish and wildlife species with special emphasis on migratory birds, colonial nesting waterbirds, and threatened and endangered species.
- Provide the public with quality recreational activities, environmental education, interpretation, and outreach opportunities that lead to enjoyment and greater understanding of, and appreciation for, fish, wildlife and barrier islands.
- Provide sufficient administration and protection to conserve trust resources on Breton NWR.

The USFWS specifically desires to: (1) provide sanctuary for nesting and wintering seabirds, (2) protect and preserve the wilderness character of the islands, and (3) provide sandy beach habitat for a variety of wildlife species (USFWS 2011a, <http://www.fws.gov/breton/>). All of the federally owned lands, except North Breton Island in Plaquemines Parish, were designated the Breton Wilderness in 1975 (Public Law 93-632), thus limiting the range of actions that can be taken to restore and enhance the islands within the NWR. However, the

USFWS is working with other agencies, state and local governments and non-profit organizations to rebuild and re-vegetate the islands as detailed in their 2008 Comprehensive Conservation Plan. In general, these restoration plans would focus on natural processes, including introduction of dredged material to the islands, as opposed to using rocks or other hard structures to stabilize the barrier islands, planting vegetation on the backbarrier marshes and sand dunes, and constructing sand fences to trap wind blown sand and elevate the sand dunes. In the past, material from maintenance dredging of the MRGO has been used to introduce sediment to islands near the MRGO.

## Goals

The management goals based upon the unique environmental characteristics of the unit are:

1. Support restoration strategies identified in the State of Louisiana's 2007 *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast* and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
2. Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in *Coast 2050: Toward a Sustainable Coastal Louisiana*.
3. Promote restoration and maintenance of the Chandeleur Islands using appropriate measures that have the least adverse environmental impacts.
4. Promote restoration and maintenance of North Island, Freemason Island and New Harbor Island.
5. Promote restoration and maintenance of smaller islands used by shore and wading bird for nesting.
6. Support efforts to identify and quantify currently unknown/undetermined sand sources in the Chandeleur Sound and offshore that can be used for barrier island restoration.
7. Conserve natural habitats.
8. Reduce shoreline erosion
9. Promote recreational and commercial fishing activities.
10. Promote and support recreational activities within the Chandeleur Sound and Chandeleur Islands.

## **Permissible Uses**

Permissible uses are those uses which may be undertaken in this environmental management unit, but which may require a permit pursuant to federal, state or local regulations. This list is not all inclusive.

- Oil and gas activities
- Recreational and commercial fishing and hunting activities
- Archaeological and historical site preservation
- Recreational development
- Activities in Breton National Wildlife Refuge that are sanctioned by operations and policies of the refuge.

# PROGRAM ADMINISTRATION



**Yscloskey and Shell Beach area looking  
north toward MRGO and Lake Borgne  
(J. Arnold, CEI, 2009)**

## **CHAPTER 7** **PROGRAM ADMINISTRATION**

### **INTRODUCTION**

Administration of the St. Bernard Parish Coastal Zone Management Program (CZMP) is the responsibility of the Department of Community Development (DCD), which includes the Office of Coastal Zone Management (OCZM), the Office of Safety and Permits (OSP) and the Office of Planning and Zoning (OPZ). The Director of DCD and staff handle the daily business of administering the overall CZMP including grant matters, developing and negotiating contracts, accounting for expenditures, and, in general, performing such duties as are necessary for the efficient implementation of the program. The OCZM processes applications for local coastal use permits and serves as a liaison between St. Bernard Parish and all state and federal coastal wetlands regulatory agencies.

### **DUTIES OF THE LOCAL ADMINISTRATOR**

Within the DCD-OCZM, the Coastal Zone Management Administrator (local administrator) is the professional charged with implementing and administering the Local CZMP in accordance with the conditions specified in the CZMP and "An Ordinance Implementing the Updated Coastal Zone Management Program For St. Bernard Parish and Providing for the Regulation and Control of Coastal Uses of Local Concern," hereafter referred to as "the Ordinance" (Appendix B). The responsibilities of the local administrator include assisting applicants, where necessary, to submit coastal use permit (CUP) applications to the Louisiana Department of Natural Resources, Office of Coastal Management (LDNR-OCM) for determination if the activity or use is of local concern, processing the CUP applications at the local level, presenting the applications to the Coastal Zone Advisory Committee (CZAC), notifying applicants of decisions, and reviewing field monitoring for compliance. Monitoring of permitted activities is performed by the environmental staff of the DCD during the course of their normal duties. Monitoring helps ensure that permit conditions are being followed and that the conditions actually result in lowered adverse environmental impacts. A detailed itemization of the duties of the local administrator is included in Article 5 of the Ordinance (Appendix B).

### **DUTIES OF THE LOCAL COASTAL ZONE ADVISORY COMMITTEE**

The local CZAC is a group of designated individuals representing coastal area user groups and possessing a knowledgeable of the parish's coastal resources, environmental conditions and potential conflicts. The CZAC members are appointed by the St. Bernard Parish Council and the Parish President and approved by the Council. There are no term limits for the CZAC.

Local CUP applications are advertised and publicly presented to the CZAC for comment. The CZAC, in its advisory capacity, provides assistance to the local administrator by reviewing and commenting on CUP applications and other matters of concern to the parish's CZMP. The CZAC may recommend additional performance standards for the purpose of

placing special conditions on local permits. While the local administrator is not legally bound to strictly adhere to the CZAC's recommendations or decisions, the committee's purpose is to serve as a sounding board for, and provide input to, the local administrator particularly on complex or technical issues. Local CUP decisions rendered by the CZAC are forwarded to the Parish Council for final determination. Upon approval by the Council, the local CUP is forward to the St. Bernard Parish Port, Harbor and Terminal District (SBPPHTD) for further review and potential addition of compliance conditions to the permit. Coastal related decisions and recommendations are ultimately made by the local administrator, DCD, and the Parish Council, but are solidified by CZAC guidance and support. The duties of the CZAC are presented in detail in Article 6 of the Ordinance for Implementation of the CZMP (Appendix B).

## **COASTAL USE PERMIT ADMINISTRATION**

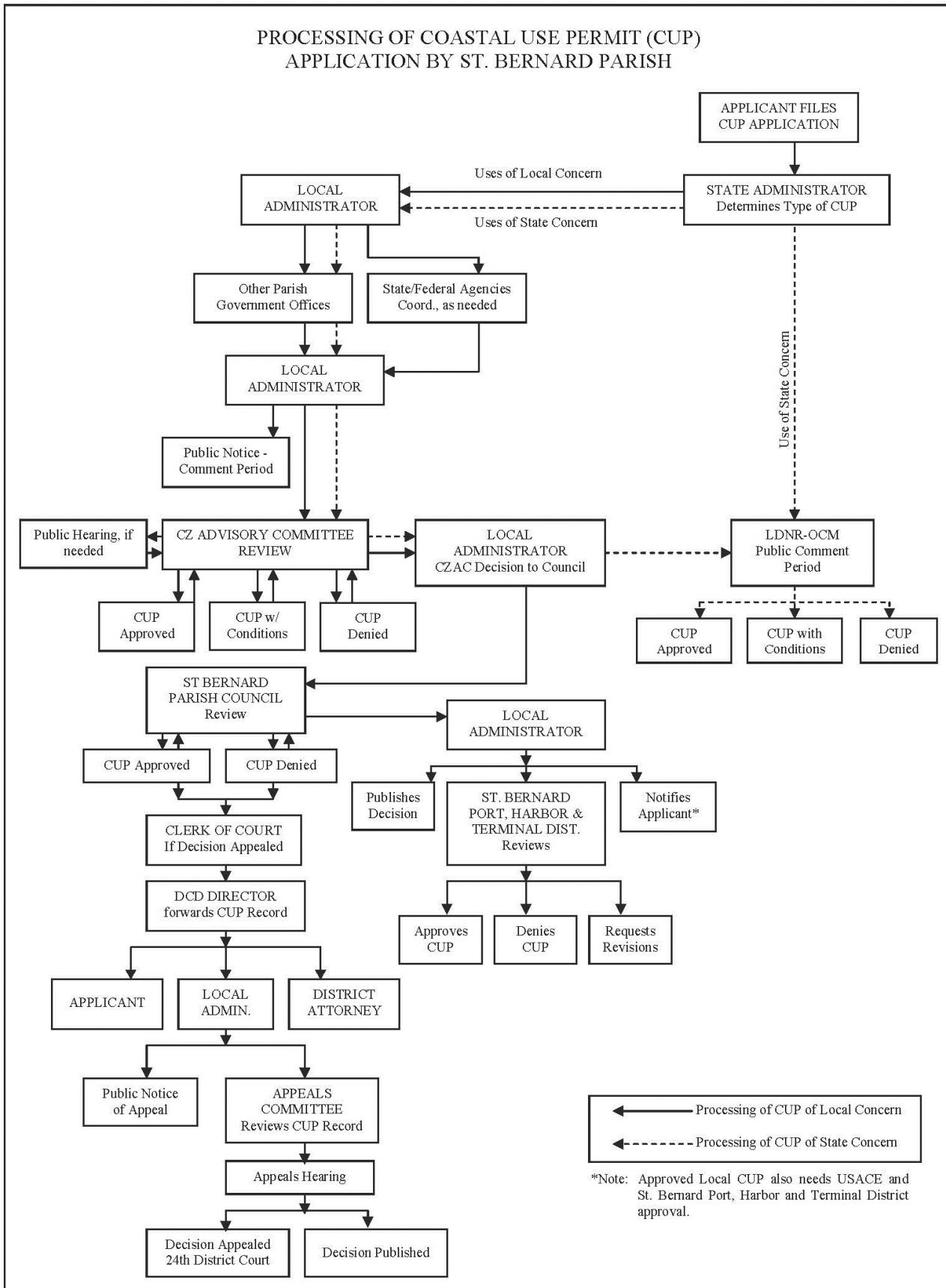
The administration of the local CUP process is a major element of the state and local CZMP and is detailed in Article 7 of the Ordinance. It includes the timely review and evaluation of local CUP applications and determination that proposed activities are consistent with the goals and objectives of EMUs in which they are located. The local administrator must also determine the appropriateness of special conditions being added to the permit and the possible use of variances as detailed in Article 8 and after-the-fact permit authorizations as described in Article 9.

### **General**

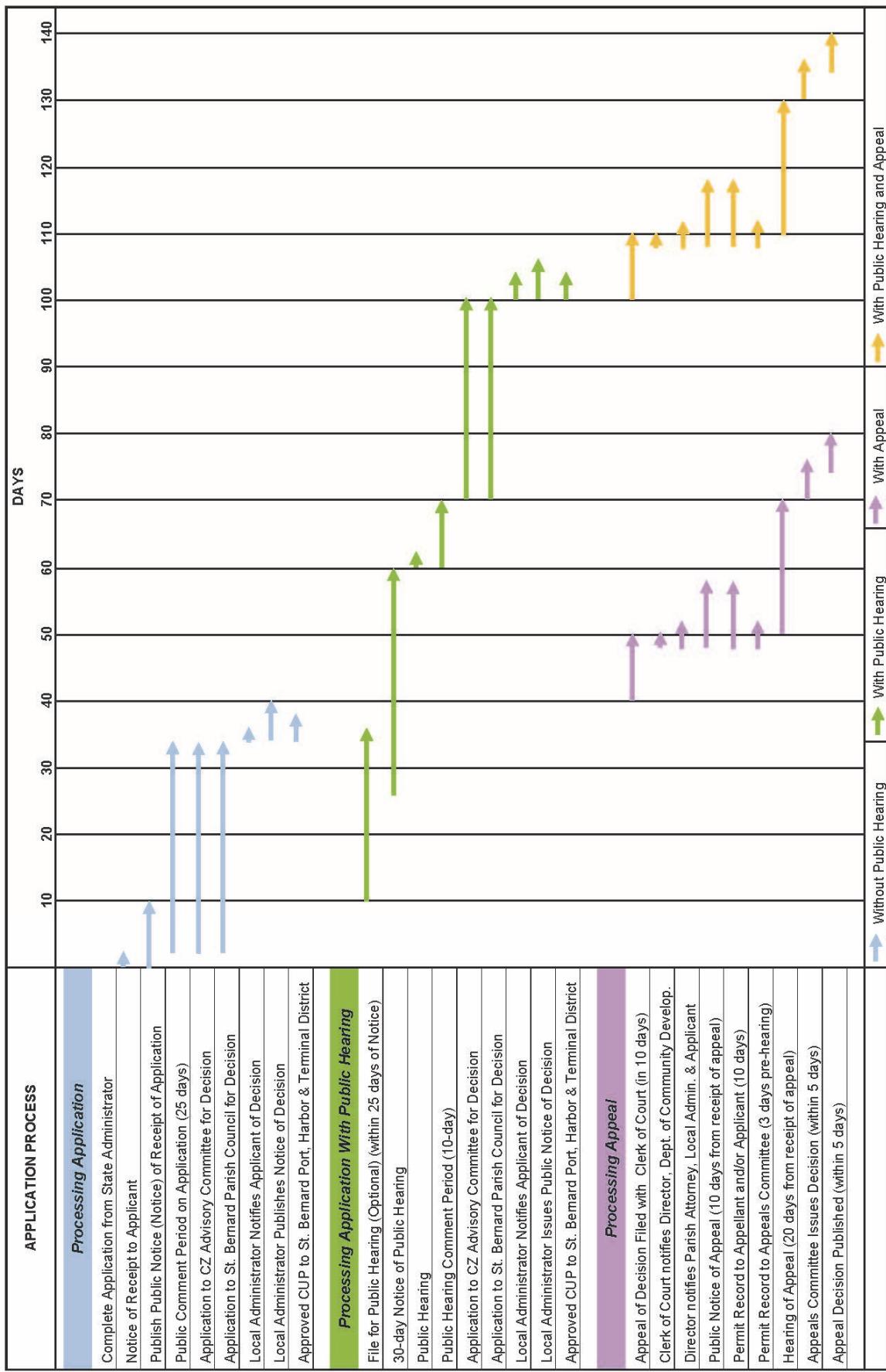
Authority for the issuance of local CUP derives from the Ordinance (Appendix B) and the State and Local Coastal Resources Management Act of 1978 (Act 361 of 1978 as amended). The permit procedure, as outlined in the Ordinance, is illustrated in Figure 7-1. The timeline for processing a permit application is shown in Figure 7-2.

Permits are required for uses of local concern that occur in areas below the five-foot topographic contour, and certain activities inside leveed areas and/or above the five-foot contour if they are deemed to have impacts to coastal waters outside of the upland or fastland area as defined in the State and Local Coastal Resources Management Act of 1978 (Act 361 as amended) and by the state program (See Appendix A for "Definitions"). As stated in Article 7 of the Ordinance, uses of local concern include, but are not limited to:

- 1) Privately funded projects that are not uses of state concern
- 2) Publicly funded projects that are not uses of state concern
- 3) Maintenance of uses of local concern
- 4) Jetties or breakwaters
- 5) Dredge or fill projects not intersecting more than one water body
- 6) Bulkheads
- 7) Piers
- 8) Camps and cattlewalks
- 9) Maintenance dredging



**Figure 7-1. Local Coastal Use Permit Flow Chart.**



**Figure 7-2. Time Line For Processing Local Coastal Use Permit.**

- 10) Private water control structures less than \$15,000 in cost
- 11) Uses on cheniers, salt domes, or similar land forms
- 12) Any other coastal uses which directly and significantly affect coastal waters, and are in need of coastal management but are not uses of state concern and which should be regulated primarily at the local level. The St. Bernard Parish Council shall have the power to add other coastal uses to this list as recommended by the DCD-OCZM and the CZAC, subject to the approval of the Secretary.

An applicant can apply for a local CUP online using the LDNR SONRIS online permit application system or equivalent application system in place at the time of the permit application. The local administrator can advise the applicant on how to apply for the local CUP and what information is required for the “Joint Permit Application” form. The CUP application is reviewed by the state administrator (LDNR-OCM) who works with the permit applicant to ensure that the application is complete pursuant to Article 7 of the Ordinance. If the state administrator determines that the proposed activity or use is of local concern, the complete application is forwarded to the local administrator for processing at the local level and to the U.S. Army Corps of Engineers, New Orleans District. The local administrator notifies the applicant upon receipt of the local CUP application and publishes the notice of the application in the local official newspaper. There is a 25-day comment period for local CUP applications.

The DCD-OCZM Coastal Use Permit (CUP) Checklist requires the following information for processing a local CUP:

1. Complete St. Bernard Parish CUP application:
  - a. Applicant Information
  - b. Agent/Contact Information
  - c. Project Description, Location with Section, Township and Range, Total Project Cost, and Wetland Acreage Impacted
  - d. Applicable Signatures
2. Complete copy of Joint Permit Application (LA DNR/CMD and USACE) for proposed project
3. Topographic Map of Location
4. Construction Drawings

The information on total project cost and wetland acreage impacted is required for processing a local CUP because this information determines the permit application fee as defined in Article 7 of the Ordinance. The local CUP fee is assessed by the CZMA at the time of their review of the permit application.

A local CUP shall contain conditions described in L.A.C. 43:1723(C)(9) and any other conditions designated in the Ordinance and by the local administrator in compliance with the local CZMP, the guidelines and the Act. The permit holder has two (2) years to initiate the non-continuing use from the date of issuance with five (5) years for completion from date of issuance. The local administrator may extend the permit term for initiation for an additional

two (2) years. The term for a CUP for a continuing use shall be five (5) years from the date of issuance. Renewal of the permit will require a new application. The terms of compliance for a local CUP are described in Article 8 of the Ordinance. The local administrator, with concurrence of the majority of the CZAC, may also grant a variance from the parish's CZMP when: (1) the project site is subject to exceptional circumstances that warrant recognition and special provision and (2) granting of a variance poses no detriment to the coastal zone. However, the CUP variance shall be treated as any other permit.

Activities that do not normally require a CUP (L.A.C. 43:1,723(B) et al.), except under conditions specified in clauses listed in Article 8 of the Ordinance, include the following:

- Agriculture, forestry, and aquaculture activities on lands consistently used in the past for such activities;
- Hunting, fishing, trapping, and the preservation of scenic, historic, and scientific areas and wildlife preserves;
- Normal maintenance or repair of existing structures including emergency repairs of damage caused by accident, fire or other elements;
- Construction of a residence or camp;
- Construction and modification of navigation aids such as channel markers and anchor buoys;
- Activities which do not have a direct and significant impact on coastal waters.

Uses or activities occurring in areas 5 feet or more above mean sea level or in fastlands do not require a coastal use permit unless it is determined that the uses or activities have a direct and significant impact on coastal waters. Procedures for determining whether activities in such areas require a permit are listed in Article 8 of the Ordinance.

## **Uses of Local Concern**

For uses of local concern, the staff of the DCC-OCZM will conduct an environmental review of the permit application (See Figure 7-1 and Figure 7-2) and process the permit application. The permit review procedure, pursuant to Article 8 of the Ordinance, requires actions to be taken within specified time frames:

- Publish notice of pending local CUP within 10 days of receipt of complete application from state administrator;
- Determine whether there is a need for a public hearing on the application and if so, holding Public Hearing within 30 days of publication of public hearing notice in official journal publication;
- Review of application by local administrator, DCD, CZAC, and Parish Council;
- Submittal of Council approved local CUP to St. Bernard Port, Harbor and Terminal District (SBPHTD) for review and action
- Notify permit applicant of Council's decision, within 30 days of public notice or 15 days of closing of record of public hearing;
- Assess mitigation consistent with Louisiana Coastal Resources Programs and the attendant regulations and guidelines.

In general, a local CUP permit application can be processed within forty to fifty days. Having a public hearing on the application can add fifty to seventy days to the time required to obtain a decision on the application.

The permit review will also be in accordance with the local CZMP and will ensure that the activity represented by the permit application is consistent with all pertinent parish policies, goals (including environmental management unit goals for the site of the proposed activity or use), and performance standards. The CZAC reviews and makes recommendations on local CUP applications to the DCD-OCZM. The DCD-OCZM shall then grant, deny, or grant with conditions, the permit based on the recommendations of the environmental staff and CZAC and forward the local CUP application to the Council for final determination. An appeal of the final decision to approve, approve with conditions, or deny a permit application for use of local concern can be made by any person adversely affected by the decision, any landowner in, or resident of St. Bernard Parish and any government authority may request an administrative appeal of the local administrator's decision.

### **Uses of State Concern**

Upon receipt of a CUP application from the Secretary (i.e., state administrator) for a use of state concern, the local administrator will review the proposed activity for consistency with the parish's CZMP, including the goals and policies on a parish-wide basis and within the environmental management unit where the proposed activity is located. The local administrator may solicit additional input from appropriate parish officials and the local CZAC. The local administrator may also request that the state administrator hold a public hearing where there is significant opposition to a proposed activity, the elective representatives or other local authorities request a hearing or where there are significant economic, social or environmental issues. Based on the results of the permit application review with regard to the local program and comments received, the local administrator may submit comments to the state administrator on behalf of St. Bernard Parish. These actions will constitute a basis for determination of consistency with the approved St. Bernard Parish CZMP as required by Act 361 as amended.

Uses of state concern include but are not limited to:

- 1) Any dredge or fill activity that intersects with more than one water body
- 2) Projects involving use of state owned lands or water bottoms
- 3) State publicly funded projects
- 4) National interest projects
- 5) Projects occurring in more than one parish
- 6) All mineral activities, including exploration for, and production of, oil, gas and other minerals, all dredge and fill uses associated therewith, and all other associated uses
- 7) All pipelines for the gathering, transportation or transmission of oil, gas and other minerals
- 6) Energy facility siting and development
- 7) Uses of local concern that may significantly affect interests of regional, state, or national concern.

## **MITIGATION**

Mitigation is an additional element associated with issuance of a CUP. Mitigation is defined as “all actions taken by a permittee to avoid, minimize, restore, and compensate for ecological values lost due to a permitted activity.”

The Parish will require mitigation for coastal wetland losses, caused by permitted activities, consistent with the requirements of the Louisiana Coastal Resources Program (LCRP) and the attendant regulations and guidelines. The St. Bernard Parish CZMP requires that the determination of mitigation requirements for permitted activities, as well as the appropriateness of mitigation proposals to offset losses, be based on loses/gains of wetland habitat values, measured by the same method utilized by the Louisiana Department of Natural Resources.

## **ADMINISTRATIVE APPEAL OF LOCAL COASTAL USE PERMIT DECISIONS**

### **Scope**

The regulations given in this section, and detailed in Article 11 of the Ordinance, shall govern the administrative appeals process for decisions of the local administrator regarding permit applications for uses of local concern. Decisions of the state administrator regarding permit applications for uses of state concern shall be subject to appeal pursuant to the provisions of Act 361 as amended, and the regulations adopted pursuant thereto. The appeals process provided for herein is limited to uses of local concern regulated by the parish's approved CZMP.

### **Notice of Appeal**

The applicant for a local coastal use permit; the owner of the property affected by a local coastal use permit decision; any affected federal, state, or local agency; or any other person who perceives himself or herself to be adversely affected by a local coastal use permit decision may request an Administrative Appeal of a permit decision made by the local administrator. A permit decision shall be subject to appeal/reconsideration by the St. Bernard Parish Coastal Zone Management Program Appeals Committee (hereafter referred to as the CZMP Appeals Committee), if Notice of Appeal is filed in writing within ten (10) calendar days following public notice of a permit decision by the local administrator.

### **Filing of Appeal**

Four (4) complete copies of the Notice of Appeal shall be sent by the appellant via certified mail to the St. Bernard Clerk of Council, 1201 West Judge Perez, Chalmette, LA or hand-delivered to the Clerk of Council Office located at 1201 West Judge Perez and shall include:

- 1) Copy of the permit decision being appealed and a copy of the permit application public notice;

- 2) Written description of how the appellant believes the decision to be contrary to the law or how he or she is adversely affected by the decision;
- 3) Written description of the how appellant would like the decision revisited (e.g., via modifications to the permit or via permit revocation);
- 4) Complete name, address, and phone number of the appellant and, if applicable, the appellant's legal representative; and
- 5) Statement that the appellant has read the Notice of Appeal and believes the contents to be accurate, followed by the appellant's signature and that of the his legal representative, if any.

The Clerk of Council shall immediately notify the director of DCD (hereafter known as the director) that a Notice of Appeal has been received and shall, within three (3) days, provide three (3) copies of the Notice of Appeal to the director. The director shall serve as the parish agent responsible for coordinating and scheduling hearings by the CZMP Appeals Committee. The director shall forward complete copies of the Notice of Appeal to the parish attorney, to the local administrator and to the permittee; and shall notify the state administrator and all parties of record that a Notice of Appeal has been received.

### **Stay of Proceedings**

A Notice of Appeal shall stay all proceedings in furtherance of the action being appealed, unless the local administrator certifies to the CZMP Appeals Committee, by reason of facts stated in a written certificate, that a stay could cause imminent peril of life or property. In cases where the local administrator fails to stay proceedings, those proceedings may be stayed by a cease and desist order issued by the Parish of St. Bernard or by a restraining order issued by the Twenty-fourth Judicial District Court for the Parish of St. Bernard in accordance with law.

### **Grounds for Appeal**

Issues raised during the application process constitute the sole grounds for appeal except for allegations of the following:

- 1) The decision or determination is clearly contrary to the law or the evidence before the local administrator;
- 2) The appellant has discovered, since the decision or determination, evidence important to the issues which he could not, with due diligence, have presented to the local administrator prior to the decision;
- 3) There is a showing that issues not previously considered, through no fault of the appellant, should be considered in the decision-making process; or

- 4) There is justification for further consideration of the issues and the evidence in the public interest.

The Notice of Appeal shall set forth the grounds that justify such action. Nothing in this Section shall prevent the reopening or appeal of a decision or determination in accordance with other applicable statutory provisions or at any time on the grounds of fraud, perjured testimony, or fictitious evidence. The appeal shall be limited to those grounds upon which it was granted, and the CZMP Appeals Committee may adopt regulations for the orderly consideration and disposition of appeal petitions.

### **Jurisdictional Determination**

The parish attorney, or his designee, shall review any Notice of Appeal and advise the director, within five (5) days, whether any such appeal is within the jurisdiction of the CZMP Appeals Committee.

### **Notice of Appeal Hearing**

Within thirty (30) days of the filing of the Notice of Appeal, written notice shall be given to the appellant, the permittee and each party of record that the appeal has been denied on the basis of non-jurisdiction or that an appeal hearing has been scheduled. The appeal hearing shall be held within sixty (60) days of the filing date of the Notice of Appeal. The director shall establish the date, time and location of the hearing.

At least thirty (30) days prior to the date on which the appeal hearing will be held, public notice of the hearing shall be given in the official journal of St. Bernard Parish and the appellant, the permittee and each party of record shall be provided notice of the appeal hearing by certified mail. Public notice shall also be posted at the location of the hearing at least twenty-four (24) hours prior to the start of the hearing.

### **Administrative Appeals Hearing**

The CZMP Appeals Committee shall render the final decision on the Notice of Appeal deemed to be within its jurisdiction by the parish attorney. The appeal hearing shall be open to the public.

The acting chairman of the CZMP Appeals Committee may administer oaths whenever applicable. Any party may appear in person, by agent, or by attorney at the appeal hearing to produce any competent evidence on its behalf. The CZMP Appeals Committee, however, shall not be bound by legal rules of evidence.

The CZMP Appeals Committee may examine witnesses regarding their testimony and may request documentation or testimony from witnesses to collaborate evidence or testimony presented at the hearing. The local administrator or his representative shall produce papers, correspondence, and records requested by the CZMP Appeals Committee and shall present at the hearing when requested by the CZMP Appeals Committee. The burden of proof shall be on the appellant.

A verbatim transcript of all testimony presented at the appeal hearing shall be prepared and,

in addition to exhibits and documents introduced, shall constitute the record. The CZMP Appeals Committee shall make findings of fact and a decision based upon the record.

### **Decision of the CZMP Appeals Committee**

The concurring vote of a majority of CZMP Appeals Committee's voting members hearing the appeal shall be necessary to reverse any order, requirement, decision, and/or determination of the local administrator, or to decide in favor of the appellant on the issue set forth in the Notice of Appeal.

The acting chairman of the CZMP Appeals Committee shall, within five (5) days of the hearing, issue a written decision setting forth the rationale and fundamental facts underlying the decision. A copy of the CZMP Appeals Committee's decision shall be provided to each of the parties of record by the director and public notice of the decision shall be given in the official journal of St. Bernard Parish within ten (10) days of the date on which the written decision is rendered. Public notice of the CZMP Appeals Committee's decision shall constitute final action on the Notice of Appeal.

### **Composition and Ethics of the CZMP Appeals Committee**

The CZMP Appeals Committee shall be composed of nine (9) voting members. Each member of the Parish Council shall appoint one (1) member and the Parish President shall appoint two (2) members. All members shall be subject to the approval of the Parish Council and the terms of the members shall end at the expiration of the term of the Council that appointed the membership. If any vacancy occurs on the committee, the vacancy shall be filled for the un-expired term in the same manner in which the position was previously filled.

The DCD-OCZM shall serve as the office of primary responsibility for, and the focal point for inquiries or actions concerning, the CZMP Appeals Committee.

Any voting member of the CZMP Appeals Committee shall withdraw from any adjudicative proceedings in which he or she cannot accord a fair and impartial hearing or consideration.

Any person may request the disqualification of a voting member of the CZMP Appeals Committee based upon the presumed inability or failure of the member to make a fair and impartial decision by filing an affidavit with the Parish Attorney identifying the alleged basis for disqualification. The issue shall be heard and determined promptly by the Parish Attorney, or his designee. Upon the disqualification of a voting member, the remaining voting members of the CZMP Appeals Committee shall hear and/or render a decision on the Notice of Appeal.

### **Judicial Review**

The decision on the Notice of Appeal may be reviewed by the Twenty-fourth Judicial District Court in and for the Parish of St. Bernard provided that the appropriate legal proceedings are filed within thirty (30) days of the public notice of the Administrative Appeal Decision and

only by a party who participated in the appeals process.

Nothing in this provision shall impede other authorized means for review.

## **PERFORMANCE STANDARDS FOR USES OF STATE AND LOCAL CONCERN**

Performance standards are designed to minimize impacts and utilize best management practices and do not specifically prohibit activities. Performance standards for uses of state concern, in addition to applicable LDNR-OCM standards, are among the criteria St. Bernard Parish may request the state to consider in making decisions on permit applications for uses of state concern. It is these standards, in conjunction with the parish's goals, policies and permissible uses identified for the parish and its environmental management units, which the staff will use when submitting their environmental review comments to the state on application for uses of state concern.

### **Pipeline Regulations**

#### *Pipeline Codes*

In addition to the specific requirements set forth in this section, all plans, specifications, materials, and the installation of any pipeline for which a coastal use permit is required shall comply with all current and applicable federal and state pipeline regulations.

#### *Road Crossings*

Any pipelines emplaced under parish roads shall have an earth covering a minimum of three (3) feet deep. If excavations are required, they shall be tamped in 6-inch layers and backfilled. Pipelines constructed under hard-surfaced, parish-owned roads will be encased, as required, under current and applicable federal and state pipeline regulations. The Director of the Department of Public Works shall review and provide recommendations regarding all pipeline crossings of parish roads. Adequate drainage shall be maintained at all times during the installation, operation, and maintenance of pipelines. Markers will be installed to mark the location of all pipelines on parish roads and rights-of-way or other public projects and/or lands.

#### *Water Crossing and Burial Depths*

Pipelines crossing a drainage ditch, canal, bayou, lake, bay or sound under the jurisdiction of the Parish Council will be laid under the following specifications when water depth is:

• 0.0 feet to six (6) feet	6 feet of sediment cover
• over six (6) feet to ten (10) feet	4 feet of sediment cover
• over ten (10) feet	3 feet of sediment cover

Markers will be installed to mark the location of any such pipeline crossing in such a way as not to constitute a hazard to navigation.

In no event will a pipeline be emplaced on the top of the water bottom of an existing natural

waterway, drainage or navigable canal. Crossings of such waterways are permitted if pipelines are buried to the above-specified depths. No pipelines will be emplaced in a manner that will obstruct or deter navigation and/or drainage. Existing pipelines that are determined by the environmental staff to impede drainage or threaten navigation safety must be corrected at the expense of the pipeline owner. Under no circumstances will a pipeline be "grandfathered in" with the waiving of the pipeline owner's obligation to take corrective action.

### ***Levee Crossings***

Any pipeline that crosses a levee within the jurisdiction of the Parish Council will be constructed in accordance with the current applicable regulations and specifications of all applicable federal, state, and local public agencies.

### ***Required Annual Inspections***

The owner of any pipeline and related structures constructed hereunder will conduct an annual inspection as may be required under applicable federal codes. Upon completion of the inspection, the owner of the pipeline will notify the Parish Council in writing that this inspection has been made and include the results of said inspection.

### ***Completion of work***

After a pipeline is installed, the land over the pipeline corridor will be restored to its natural, pre-emplacement condition to the greatest extent possible. Where natural re-vegetation will occur with little or no erosion in the interim, it will be acceptable to utilize this method on completion of said pipeline. Where pipelines are constructed in wetlands or other sensitive areas, the following wetlands regulations will apply.

### ***Wetland Regulations***

- 1) Pipelines will be sited to minimize disruption of wetlands. Existing pipeline corridors will be used where feasible. When pipeline canals must be dug, backfilling with dredged material is required to restore the marsh to as near its natural state as possible.
- 2) The emplacement of a pipeline utilizing directional boring technology is preferred because of the reduced impacts to the environment. The push ditch or shove technique of laying pipeline is acceptable; however, exceptions to this policy should be granted only if the applicant shows that the pipe diameter is too large to be laid with the push ditch method.
- 3) Bulkheads composed of clam or oyster shell rip-rap, wood pilings, or concrete mats are required at all natural waterway crossings. Bulkheads must be constructed across pipeline canals at their junction with lake or bay shorelines or at navigable waterways. When constructed in the marsh, the length of the

bulkhead extending into the marsh on either side of the canal must be at least one half the width of the canal. These bulkheads must be maintained and inspected annually. Repair work will be the responsibility of the corporation that initially constructed the bulkheads, or the corporation that currently owns the pipeline. The Parish Council will be notified at the time of inspection and will provide a parish inspector on maintenance inspections.

- 4) The parish has the prerogative to suggest a different route for a proposed pipeline if the alignment crosses certain wetland areas where the parish does not wish to have pipelines installed. Areas to be avoided may include beaches, barrier islands, oyster beds, beds of submerged aquatic vegetation, prime waterfowl and furbearing animal marsh habitat, archaeological or historical sites, endangered species' habitats, forested ridges, or other sensitive or unique areas of significant ecological value that the parish may identify. Normal surface tidal flow should not be altered by any construction work referred to hereinabove. The CZAC will review all proposed pipeline routes upon submittal of the permit application and make recommendations to the Administrator with copies their recommendations to the Department of Public Works and Parish Council.
- 5) Any oil spills or leaks must be reported to the applicable federal and state agencies including the St. Bernard Parish CZMP Administrator.
- 6) All construction debris shall be removed from the construction site(s) when dredging is complete; junk and "hookers" that have become lodged in the bottom of waterways will be removed or clearly marked as navigational hazards.
- 7) Maximum access to the pipeline during construction and maintenance activity will be limited to an area 100 feet on either side of said pipeline's centerline.

### **Drilling and Wellsite Development Standards**

Directional drilling and the use of existing waterways are strongly encouraged by the parish as alternatives to dredging new rig access canals and slips. St. Bernard Parish fully supports the LDNR-OCM's practice of conducting geological reviews early in the permitting process to determine the suitability of directional drilling as a preferable alternative to an oil and gas operator's well access proposal that may destroy wetlands or other important habitat. St. Bernard Parish requests adequate notice from the LDNR-OCM regarding all applicable geological reviews in order to have the opportunity for local representation at these meetings.

Access to drilling sites will be by the shortest possible route, except where said routes cause disruption, disturbance, or damage to wetlands within the parish, to flora or fauna, or to oyster leases or other pre-existing activities and land uses. In such cases, an alternate route may be used which minimizes the above noted disturbance or damage where possible, or, if acceptable to all parties, mitigating agreements may be made.

Access will be at high tide to minimize dredging. The use of shallow draft drilling barges, to the maximum extent possible, is encouraged. Access by board road will be encouraged and is the preferred method of reaching drilling sites in wetlands.

Any dredging or filling that is required will be executed according to the policies discussed in a following section titled “Dredging and Filling Standards.”

During operations at all well sites in the parish, all sanitary sewage, garbage, trash, and other refuse should be deposited at approved offsite locations and shall be in compliance with all applicable provisions of the state health code. No sewerage, refuse, litter, or other foreign substance will be deposited, discharged, or otherwise placed in the wetlands or waters of the parish unless adequate treatment is provided according to the provisions of the state health code for such substances.

### **Board Road Conditions**

The use of board roads has declined in recent years, but board roads remain viable access routes to new well locations and wells that require work-over operations in some locations. These board roads are to be installed such that sheet flow and water circulation are maintained, and toxic substances or pollutants are not allowed to enter into wetland habitats.

- 1) Culverts will be placed where streams and sloughs are crossed by the roadway embankment and at other locations to promote or maintain sheet flows. The maximum spacing between culverts will be 500 feet. The openings of the culverts must be maintained in order to facilitate free flow of water.
- 2) Contents of mud pits and other drilling residues will be removed from the site and disposed of in a lawful manner when drilling operations have been completed.
- 3) Ring levees will be degraded by restoring the material with which they were built into the areas from which the material was removed, and the area leveled to as near pre-project conditions as practicable after mud pits have been cleaned.
- 4) Broken boards and other extraneous construction materials will be removed from the site when the road is abandoned by the permittee. All plastic sheeting will be removed from areas of the roadway from which the boards are removed.
- 5) No hydrocarbons, substances containing hydrocarbons, drilling mud, drilling cuttings, and toxic substances will be allowed to enter adjacent waterways and wetlands.
- 6) The road fill placed in wetlands will be degraded when the location is abandoned. The material will be deposited into the borrow areas or ditches,

and the area restored to as near pre-project conditions as practical using the material available in the road fill.

- 7) Should changes in the location or the section of the existing waterways, or in the generally prevailing conditions in the vicinity, be required by the public interest in the future, the applicant will make such changes in the project concerned or in the arrangement thereof, as may be necessary to satisfactorily meet the situation and the permittee will bear the cost thereof.

## **Dredging and Filling Standards**

All dredging activities will be conducted in such a manner as to minimize environmental impacts. Best Management Practices will be incorporated into dredging projects to reduce or minimize turbidity and the loss of sediments, especially through rainfall events. A non-inclusive listing of Best Management Practices includes:

- 1) Earthen Dike: An embankment to prevent overflow or to regulate water levels.
- 2) Silt Fence: Filter fabric stretched between entrenched posts for use as sediment barrier.
- 3) Hay Bale Dike: Temporary sediment barrier consisting of hay bales supported by entrenched posts.
- 4) Temporary Sediment Basin: Temporary ponding area with controlled stormwater release structure formed by constructing an embankment across a drainage way.
- 5) Temporary Swale: Temporary excavated drainageway designed to prevent runoff from entering disturbed area by intercepting and diverting it to non-disturbed area.
- 6) Temporary Sump Pit: Temporary pit used to trap and filter water for pumping to suitable discharge area.
- 7) Turbidity Screen: Filter fabric placed in water to reduce turbidity. These screens are often required near oyster beds or in other sensitive areas where turbid water can be detrimental.

Spoil banks and other deposits of fill will be configured and constructed at the proper elevation conducive for adequate drainage and re-vegetation. Dredging projects should be designed to safeguard natural water flow patterns with measures taken to avoid impoundments. The deposition of fill material will be used to restore or create wetlands to the maximum extent feasible. In cases where dredging occurs in open water and wetland creation/restoration is impractical, the dredged material will be cast instead of stockpiled to ensure that water depths will decrease by no more than 0.5 feet and not create a hazard to navigation.

Wherever the permitted dredging of a canal in wetlands exacerbates saltwater intrusion, such dredged areas will be sealed, plugged, or otherwise restricted from such intrusion at the completion of operations serviced by the canal that is created.

## **Seismic Standards**

### *Compliance Inspectors*

All permitted seismic operators shall have a compliance inspection plan in place prior to initiation of seismic activities. The purpose of the compliance inspection plan is to minimize unavoidable damages in wetlands and other sensitive habitats. Compliance inspectors must be qualified to perform the work and may be contracted directly by the seismic operator or employed by the affected landowner(s). Compliance inspectors ensure that the following operating criteria are followed and all damages (except *di minimus*) are reported to the appropriate parties.

### *Explosive Standards*

Explosive charges in excess of fifty (50) pounds should not be used except with written authorization from the Parish Council. When requests for the use of such charges are needed, the size of charges to be used, and the depth at which they are to be suspended or buried should be included. Should multiple charges be used, the total amount of explosive should not exceed fifty (50) pounds without the above information submitted to the CZMP Administrator.

No part of the charge will be above the minimum depth. Minimum required depth of charges shall be as follows for shots detonated in holes:

• 1 pound or less*	10 feet below the bottom
• over 1 pound up to 2 pounds	25 feet below the bottom
• over 2 pounds up to 5 pounds	40 feet below the bottom
• over 5 pounds up to 20 pounds	60 feet below the bottom
• over 20 pounds up to 30 pounds	70 feet below the bottom
• over 30 pounds up to 40 pounds	100 feet below the bottom
• over 40 pounds up to 50 pounds	120 feet below the bottom

\* Charges of one (1) pound or less may only be used in upland areas. In addition, the hole must be tamped before shooting and the charge must be shot on the same day it is placed.

These minimum depths will not apply to trial charges and charges for determining condition of the weathering layer; provided that such charges are not over five (5) pounds and not fired more than absolutely necessary.

### ***Pipe Standards***

The following standards will apply to pipelines:

- 1) All pipe used in geophysical operations that is installed at least six (6) feet below the bottom or water bed must be removed by the party using such pipe before the shotpoint location is abandoned.
- 2) All parties using pipe must have clearly stamped at each end of each joint the name or abbreviation of the name of the company using the pipe.
- 3) All pipes, buoys, and other markers used in connection with seismic work will be properly flagged in the daytime and lighted at night according to the navigation rules of the U.S. Coast Guard.

### ***Discharge and Transportation of Explosives***

No explosives will be discharged within 1,000 feet of a fishing boat operating in the lakes, bays, sounds, or other waters within the gulfward boundary of the State of Louisiana, inside the Parish of St. Bernard, as shown by Acts 32 and 33 of the 1954 Louisiana Legislature, without notice being given to the operators of such boats so that they may move from the area.

No shooting will be allowed in heavy fog due to potential danger to boats in close proximity.

The use, transportation, and storage of dynamite, caps, and any other type of explosives will be in accordance with all applicable federal, state, and parish regulations.

Persistent gas and waterspouts caused by drilling or shooting operations of seismic crews will be stopped by permittee as soon as possible after they occur.

No explosives will be discharged within two-hundred and fifty (250) feet of any oyster reef or bed approved by the LDWF.

### ***Operation of Equipment***

Equipment will be operated in the following manner:

1. All seismic equipment is to use no more of the surface of the property than is reasonably required.
2. All equipment is to be operated in the least environmentally damaging and safest manner possible.
3. All vehicles shall use waterways when possible when conducting the seismic operations. No shortcuts shall be made to get from one point to the other. Waterways will always be used when possible.

4. Airboat Operations:

- a) Travel routes – Airboats will enter and exit through existing waterway routes wherever available to minimize environmental damage. Airboat turns will be made with extreme care to avoid damage to marsh and injury to life.
- b) Receiver line passes – Restricted to ten (10) passes. Airboats are required to widen receiver lines if they are becoming seriously impacted. Receiver lines are not to be used as a means of navigating the survey.
- c) Shot Line passes – Restricted to six (6) passes. Airboats will support the drilling equipment on the shot lines. Airboats will transport supplies, equipment and personnel in order to reduce passes by the drilling equipment. Unnecessary running on the shot lines is not allowed. Shot lines are not to be used as a means of navigating the survey.
- d) Surveying – Airboats will be used for surveying and clearing right-of-way corridors through trees.
- e) Recording – Airboats will be used for installing, repairing, shooting and removing all recording equipment.
- f) Damage Repair – Airboats will be used for transporting equipment and personnel wherever possible to repair any damage sites.
- g) Lubricant – Only vegetable oil or other non-toxic substances will be used to lubricate airboat hulls.

5. Marsh Buggy Operations:

- a) Shot line Passes – Restricted to one (1) pass. Double-tracking will not be allowed.
- b) Restrictions – Marsh buggies cannot be used for surveying, laying out of receiver lines or shooting charges unless approved by compliance inspector.
- c) Travel Routes – Marsh buggies will enter and exit through waterway routes wherever possible to minimize environmental damage. Marsh buggy will be towed in water wherever possible to prevent excessive tracking. Marsh buggy operations will be pre-planned with the compliance inspector to protect sensitive areas and minimize detrimental environmental impact.

6. Swamp Buggy Operations:
  - a) Surveying – In areas with dense stands of trees, swamp buggies may be used to survey in receiver and shot lines. Only one (1) pass will be allowed on each line while surveying.
  - b) Drilling – Swamp buggies will only be used to tow a drill boat during the drilling operations. Only one (1) pass will be allowed during drilling unless there is a re-drill or unusual circumstances; such exceptions to be approved by the compliance inspector.
  - c) Restrictions – Swamp buggies cannot be used for the laying out of receiver lines or shooting charges unless approved by compliance inspector.
  - d) Travel Routes – Swamp buggies will enter and exit through waterway routes wherever available to minimize damage.
7. Damage prevention operations:
  - a) Crossings – At levee or bank crossings where repeated access into interior areas are required, crossing ramps made of plywood, PVC or other suitable materials will be required.
  - b) Avoidance – All cypress and tupelo gum over 6-inch diameter-at-breast-height (dbh) will be avoided and tracked around, whenever possible.
  - c) Routes – All equipment will remain on waterway routes, wherever possible, to access the day's 3-D operations.
8. Any airboat which becomes stuck in mud or upon marsh or which becomes inoperable while upon the marsh shall be left in place until such removal can be planned to minimize damage to the marsh.
9. Airboats may be removed by use of a tow rope attached to vessels in nearby waterways.
10. No wetland areas shall be traversed unless it is reasonably necessary for conducting project related work.
11. No activities will be allowed within five hundred (500) feet of all animal houses, dens, nests and lairs (except nutria), including but not limited to muskrat houses, alligator nests and holes and bird rookeries and resting areas, as located and identified by the landowner or the compliance inspector.
12. All alligator nests will be appropriately marked at the time of their sighting to prevent further disturbances.

13. The grantee will be responsible for properly marking any equipment or materials utilized in the project to prevent and reduce potential navigation hazards for various user groups in the area.
14. All vessels shall proceed at a speed such as to minimize damage to life and property. Speed shall be reduced to minimal speeds at certain points deemed critical by the compliance inspector.
15. All equipment shall be in first class running condition and each shall carry, at a minimum, the following:
  - a) Registration papers,
  - b) Fire extinguishers of appropriate type and number,
  - c) Life jackets of appropriate type and number,
  - d) Trash bags and garbage containers, and
  - e) Radio communications equipment operating on the same frequency as that which seismic operator provides to compliance inspector.
16. No vessel or equipment having fuel, oil or hydraulic leaks shall be knowingly brought upon or operated upon any property within the seismic operation.
17. Each airboat, vessel and marsh buggy shall have oil absorbent pads and/or oil absorbent booms available to contain and clean up spills of hydraulic oil or other fluids.
18. Each vessel and airboat shall carry oil absorbent pads and each crew shall clean any spills of hydraulic fluids on or within the vessel so that such material does not become part of the bilge that is pumped overboard.
19. Grantee shall maintain waste and refuse containers on all vessels and equipment and shall use its reasonably best efforts to ensure that it does not spill or deposit garbage, litter, cans, bottles, paper, fuels, oil, lubricants, chemicals, crude, saline, saltwater, brine, drilling mud, mud, fill, pipe, string, wires or any other material whatsoever on the Grantor's property or waterway thereon.
20. The compliance inspector shall have the right but not the obligation to reasonably request an inspection of vessels, equipment and operations for compliance.
21. Prior to commencement of operations, the seismic operator will meet with the compliance inspector for the purpose of planning the operations to minimize damage.

### ***Protection of the Environment***

Surveys are to be conducted by seismic personnel to provide maximum feasible protection to the environment except where mutually agreeable mitigating arrangements have been made for specific damages.

No explosives will be discharged in the vicinity of an active bird rookery or nesting area, nor within the perimeter of a feeding or nesting area of any other species which is considered endangered or threatened, without the prior written approval of the LDNR-OCM, the LDWF, National Marine Fisheries Service (NMFS) and the USFWS. Copies of these approvals will be provided to the DCD-OCZM.

Operations should not disturb any natural or man-made channel or land ownership markers. Personal permission to access property is required from each landowner or lessee on whose land a survey is planned.

Survey crews are to remove all right of way or other markers of any kind, pipes, trash, litter, and any other foreign objects from the sites of their operations upon completion of operations. Garbage, litter, and sewerage are to be stored according to the provisions of the health code of the State of Louisiana and regularly disposed of during operations at a state-inspected disposal site.

## **ENFORCEMENT AND MONITORING**

### **General**

Article 12 of the Ordinance details the procedures for monitoring and enforcement of the conditions of a permitted activity of local concern and for notifying the state administrator regarding actions of state concern. Monitoring and enforcement of permit requirements under the local CZMP would also include activities that are being undertaken without the required permit or that are in violation of the conditions of the permit. The DCD-OCZM has primary authority under the ordinance for monitoring and enforcement of uses of local concern and strives to correct deficiencies in site compliance whenever possible through this procedure. Inspectors from the DCD inspect permitted operations to determine that the activity is being conducted in accordance with the permit and any conditions that are part of the permit. The environmental staff assists by reviewing activities encountered during the course of their normal duties. Observations regarding activities that directly impact coastal waters are reported to the DCD-OCZM for verification as to whether the activity is permitted and whether it is a state or local concern. Possible violations may also be reported to the local administrator by other agencies, individuals or groups.

If the observed activity affecting coastal waters is a state concern, the violation is reported to state and federal agencies for action. A non-permitted activity of local concern or a local CUP non-compliance issue is addressed by the local administrator as defined in Article 12 of the Ordinance. The DCD-OCZM has the authority, under the Ordinance, to revoke or suspend permits; order a permittee to cease all activities; and may assess any and all

appropriate fines for violations of a local CUP. The recipient of a cease and desist order may challenge the validity of the order in the St. Bernard Parish District Court. Either the DCD-OCZM or the Parish Council can refer violations to the parish's District Attorney for prosecution. Consequences for violating the State and Local Coastal Zone Management Programs are set forth in La.R.S. 49:214.36(E)-(N) and Article 12 of the Ordinance.

### **Activities Above the + 5-Foot Contour or in Fastlands**

Under normal conditions, activities occurring at or above the + 5-foot contour or in fastlands do not require a permit. However, if it can be demonstrated by the DCD-OCZM that the activity will have a direct and significant impact on areas which do require permits, such as wetlands or coastal waters, then a permit will be required. This demonstration will generally involve a showing that the impacts extend beyond the project site and are somehow carried to wetlands and coastal waters. The carrier mechanism generally involves water (e.g., effluent from the project) or air (e.g., air emissions). Specific examples are the location of a major facility, such as a power plant, a refinery or chemical plant in fastlands or above the +5-foot elevation, which discharges effluents into the water or air which then impacts wetlands or coastal waters.

## **IMPLEMENTATION**

### **General**

Although the permit procedure outlined above constitutes a major means of implementation of the goals and policies of the St. Bernard Parish CZMP, there are other avenues that will be pursued by the DCD-OCZM and its staff.

### **Funding Uses**

Foremost among these additional avenues is the use of CZMP funding for various activities designed to strengthen the program. These activities include, but are not limited to:

- 1) Studies and reports on various aspects of parish coastal zone management and resource use planning,
- 2) Interagency coordination, including the funding of personnel in other parish agencies, to implement portions of the program,
- 3) Agency personnel and public education,
- 4) Implementation of special area management plans,
- 5) Contract personnel, should the need for such expertise arise,
- 6) Staff in-house projects designed to improve an element of the program, and
- 7) Routine staff administration.

### **Consistency**

Another means for CZMP implementation lies in the use of consistency (as contained in the state and federal CZM Acts) to require that state and federal activities and projects, as well as proposed activities under permit review by state and federal agencies, be consistent with the

goals and policies of the St. Bernard Parish CZMP. The review for consistency, conducted by state and federal agencies, requires that the parish's CZMP document, including all goals, policies, and standards, be considered by the state and federal agencies involved in project planning and permit application review. Achieving consistency with the parish's CZMP may require that the state or federal agencies provide modification or mitigation as part of the proposed project. Consistency review will, at a minimum, require notice to the DCD-OCZM by the lead state or federal agency as to how the proposed project or activity has achieved consistency. A copy of the consistency statement submitted to the state should be forwarded by the state administrator to the local administrator.

## **SPECIAL AREAS**

### **Introduction**

Special Areas are defined by the Louisiana Coastal Zone Management Program in section L.R.S 49:214.29 as:

...areas within the coastal zone which have unique and valuable characteristics requiring special management procedures. Special areas may include important geological formations, such as beaches, barrier islands, shell deposits, salt domes, or formations containing deposits of oil, gas or other minerals; historical or archaeological sites; corridors for transportation, industrialization or urbanization, areas subject to flooding, subsidence, salt water intrusion or the like; unique, scarce, fragile, vulnerable, highly productive or essential habitat for living resources; ports or other developments or facilities dependent upon access to water; recreational areas; freshwater storage areas; and such other areas as may be determined pursuant to this Section.

Guidelines provide that any person or government body can nominate a Special Area in the coastal zone providing that it can be demonstrated that the area has unique and valuable characteristics that require special management procedures (OCZM-NOAA & LA Coastal Resources Program-LDNR 1980:Appendix C4). These guidelines allow for an administrative review of proposed Special Areas by the local administrator. The Parish Council may, after public hearings, determine whether or not to designate an area as a Special Area. The guidelines and priorities of uses adopted by the local administrator for a designated Special Area must be sent to the LDNR-OCM for review. In the event the Parish Council and the LDNR-OCM are unable to agree on a set of guidelines and priorities of uses for a designated Special Area, final resolution will be determined by the Governor.

An incentive for the designation of Special Areas lies in Section 214.29(E) of the Act that states:

The secretary is authorized to assist approved local programs and state and local agencies carrying out projects consistent with the guidelines, related to the management, development, preservation, or restoration of specific sites

in the coastal zone or to the development of greater use and enjoyment of the resources of the coastal zone by financial, technical, or other means, including aid in obtaining federal funds.

### **St. Bernard Parish Designation Procedure**

Any person may nominate an area for designation as a Special Area by sending to the DCD-OCZM a statement in writing giving the area to be nominated, along with a map, the reasons for nomination, and how the area should be managed. The DCD-OCZM may also nominate an area.

Upon receipt of a nomination, the CZAC will determine the following:

- 1) Is the area in the coastal zone;
- 2) Does the area have unique and valuable characteristics;
- 3) Does the area require special management procedures different from the normal coastal management process; and
- 4) Is the area to be managed for a purpose of regional, state, or national importance.

If the responses to items one through four are affirmative, the DCD-OCZM will develop a concise statement containing the following:

- 1) Discussion of the area nominated; including, for example, its unique and valuable characteristics; its existing uses; the environmental setting; its history; and the surrounding area
- 2) Reasons for the nomination; such as any problems needing correction, anticipated results, need for special management, and need for protection or development
- 3) Social, economic, and environmental impacts of the nomination
- 4) A map showing the area nominated
- 5) Reasons why the area nominated was delineated as proposed and not greater or lesser in size or not in another location
- 6) Proposed guidelines and procedures for management of the area, including priorities of uses
- 7) Explanation of how and why the proposed management program would achieve the desired results
- 8) How and why the designation of the area would be consistent with the state coastal management program and any affected local programs
- 9) Why and how the designation would be in the best interest of the state.

The statement on the proposed Special Area, with nomination, will be sent to the Parish Council for their consideration. Notice of the Parish Council's consideration of the nomination will be published ten (10) days prior to the Parish Council meeting. If the Parish Council approves the nomination, it will be sent to the local administrator for review pursuant to Special Area Guidelines (Appendix C4 of the Louisiana Coastal Resources Program Final EIS).

St. Bernard Parish does not have any designated Special Areas at this time. The parish reserves the right to nominate a Special Area in the future.

## **PROCEDURES FOR THE CONSIDERATION OF USES OF GREATER THAN LOCAL BENEFIT OR IMPACTS**

### **Introduction**

Many activities and uses that occur in St. Bernard Parish are of a magnitude such that they are of interest and concern to regional, state, and federal governmental entities. These activities have benefits or impacts which extend beyond parish boundaries and which may have overlapping local, regional, state, and/or federal jurisdiction and responsibilities.

While parish governing bodies will require full consultation and consideration in the implementation of such uses and activities, they recognize other agency responsibilities and jurisdictions.

The uses being discussed here generally fall into three categories: national interest, state interest, and uses of regional benefit (URB).

National interests are expressed in congressional legislation and are thoroughly defined in Chapter VI of the Louisiana Coastal Resources Program (LCRP) Final Environmental Impact Statement (EIS). These interests are generally expressed in terms of the affected resource and are:

- Air and Water Quality
- Wetlands and Endangered Species
- Flood Plains and Barrier Islands
- Historic and Cultural Resources
- Fisheries and Other Living Marine Resources.

Uses of state concern are clearly expressed in SLCRMA. Act 361, as amended. Examples of uses of state concern are presented in a previous subsection on “Uses of State Concern.”

Uses of Regional Benefit are those that affect more than one parish or state and generally include the following facilities or activities:

- Interstate natural gas transmission pipelines.
- Major state or federal transportation facilities such as highways and expressways.
- Major state or federal transportation facilities such as deepwater ports and navigation projects.
- Public wildlife and fisheries management projects.
- Public utility or cooperative energy generating plants.
- State parks and beaches and other state-owned recreational facilities.

## Requirements

Act 361, as amended, requires that local programs have “special procedures and methods for considering uses within special areas, uses of greater than local benefit, and uses affecting the state and national interest”(Section 213.9C(3)(c)). The purpose of the requirement can be traced to a goal of the Act, “...to ensure that appropriate consideration is given to uses of regional, state, or national importance, energy facility siting and the national interest in coastal resources” (Section 213.8(c)(12)). The requirement also has roots in the Federal Coastal Zone Management Act (CZMA) which states, “Prior to granting approval, the Secretary will also find that the program provides...for a method of assuring that local land and water use regulations within the coastal zone do not unreasonably restrict or exclude land and water uses of regional benefit” (Section 306(e)(2)).

The intent of this requirement is to ensure that local programs have procedures that give adequate consideration to regional, state, and federal activities and not arbitrarily restrict such uses. This does not mean that local governments must acquiesce to regional, state, or federal entities, but rather they give objective and comprehensive consideration to the proposed activities or use before arriving at a decision.

## INTERAGENCY COORDINATION

The appropriate local, state, and federal public agencies review public works and other projects proposed by the parish prior to issuance of the appropriate regulatory authorizations. It is the intent of the St. Bernard CZMP to coordinate, as early as possible, in agency planning to ensure that parish concerns are addressed at an early stage of project planning. In this manner, consistency of an agency's proposed activity with the St. Bernard Parish CZMP will be much easier to achieve than later in the review process.

To achieve this goal of early coordination of multi-agency jurisdictions and projects, the DCD-OCZM hereby requests that all agencies undertaking activities which may affect or impact St. Bernard Parish notify the DCD-OCZM of their intentions, uses, or projects, and actively involve the parish in agency planning.

An integral part of the parish's first approved CZMP (Coastal Environments 1982b), was the St. Bernard wetland management plan (Wicker et al. 1982), a strategy to arrest deterioration of the wetlands through structural and nonstructural measures. A portion of this plan was implemented in the early 1980s with input from federal and state resource agencies. Through time, other portions of the plan were incorporated into CWPPRA projects. In the late 1990s, components of the plan were considered consistent with state coastal management goals and incorporated into strategies described in *Coast 2050: Toward a Sustainable Coastal Louisiana* (LCWCRTF & WCRA 1998). As an example, the successful construction and management of the Violet Siphon in the late 1980s resulted in the call for a larger structure in *Coast 2050: Toward a Sustainable Coastal Louisiana*.

The deauthorization of the MRGO and implementation of subsequent coastal restoration and flood protection projects may initiate new economic development activities by the St.

Bernard Port, Harbor and Terminal District (Port) in an effort to offset activities formerly associated with the MRGO navigation. A Memorandum of Understanding between the Parish Council and Port could be implemented even though the activities would fall under L.R.S.49:214.32, Subpart C, Louisiana Coastal Zone Management Program which states, “Deep water port commissions and deep water port, harbor, and terminal districts, as defined in Article 6, Sections 43 and 44 of the Louisiana Constitution in 1974, shall not be required to obtain coastal use permits. Provided, however, that their activities shall be consistent to the maximum extent practicable with the state program and affected approved local programs.” This memorandum would facilitate coordination during early planning stages and thereby achieve consistency requirements.

## **COASTAL ZONE MANAGEMENT ACT CONSISTENCY**

The Federal Coastal Zone Management Act of 1972 (the “Act”) (16 U.S.C. 33 § 1451, 1989) was enacted to promote coastal wetland protection and restoration within the United States coastal zone. Federal regulations were promulgated through the United States Secretary of Commerce, which delegated its administrative authority under the Act to the assistant administrator of the National Oceanic and Atmospheric Administration (NOAA) (15 C.F.R. 923, 930.1, 930.15-16, 1990). The Act enables states and local governments (i.e., parishes) to develop their own coastal zone management program, subject to federal approval.

Prior to enacting a coastal zone management program, a state government must submit a management program to the Secretary of the United States Department of Commerce for approval. The Act states that “any coastal state which has completed the development of its management program shall submit such program to the Secretary for review and approval pursuant to section 1455 of this title” (16 U.S.C. 33 § 1454, 1989). In 1978, Louisiana enacted the State and Local Coastal Resources Management Act (SLCRMA), and created the Louisiana Coastal Zone Management Program, which received federal approval in 1980.

Local governments also have authority to create a coastal zone management plan pursuant to the Act (16 U.S.C. 33 § 1455, 1989). Plans created by local governments must be approved by a federally authorized state program, and the local plan is subject to periodic review to ensure that its procedures are consistent with the state plan. St. Bernard Parish’s coastal zone management plan received federal approval in 1987.

In order to obtain a federal permit for activities affecting coastal wetlands, the applicant must ensure that proposed activities will be consistent with the state and local program possessing jurisdiction. Federal law requires that “any applicant for a required federal license or permit to conduct an activity, in or outside of the coastal zone, affecting any land or water use or natural resource of the coastal zone of that state shall provide in the application to the licensing or permitting agency a certification that the proposed activity complies with the enforceable policies of the state’s approved program and that such activity will be conducted in a manner consistent with the program” (16 U.S.C. 33 § 1456 (c)(3)(A), 1989). The state must notify the federal permitting agency whether they will allow or deny the applicant’s certification. The federal agency must not grant a permit until the application has been approved by the state.

Notwithstanding a state's finding that a proposed activity is inconsistent with its plan, an applicant may be granted an exemption if the Secretary of the U.S. Department of Commerce finds the proposed activity consistent with the objectives of the Act or otherwise necessary in the interest of national security. To find that a proposed activity is consistent with the objectives of the Act, the Secretary of the U.S. Department of Commerce must make several determinations, which include:

- (a) The activity furthers the national interest as articulated in §302 or §303 of the Act, in a significant or substantial manner,
- (b) The national interest furthered by the activity outweighs the activity's adverse coastal effects, when those effects are considered separately or cumulatively, and
- (c) There is no reasonable alternative available which would permit the activity to be conducted in a manner consistent with the enforceable policies of the management program. The Secretary may consider, but is not limited to, considering previous appeal decisions, alternatives described in state objection letters and alternatives and other information submitted during the appeal. The Secretary shall not consider an alternative unless the State agency submits a statement ... to the Secretary that the alternative would permit the activity to be conducted in a manner consistent with the enforceable policies of the management program (15 C.F.R. 930.121, 1990).

Furthermore, a permit activity is considered to be necessary in the interest of national security if "a national defense or other national security interest would be significantly impaired were the activity not permitted to go forward as proposed" (15 C.F.R. 920.122, 1990). The term "national security interest" is not defined in any statute or regulation, and such ambiguity may lead to uninhibited federal agency interpretation.

Second, the Act allows a state, pursuant to its federally approved coastal zone management program, to regulate "federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone" and such activity "shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs" (16 U.S.C. 33 § 1456 (c)(1)(A), 1989). Federal agency activities governed by this provision may become exempt if the President of the United States finds that such activity is in the paramount interest of the United States. However, the President can make this determination only after a federal court issues a final judgment, decree, or order that a federal agency activity is not in compliance with a state plan, and the Secretary of the Department of Commerce declares that mediation is not likely to result in compliance (16 U.S.C. 33 § 1456 (c)(1)(B), 1989).

Any exemptions identified within the Act can be challenged by a state or local government in a court of law, notwithstanding the Act's mediation provisions. Judicial review is always an option pursuant to the Code of Federal Regulations, which states that "the availability of the mediation services provided in this subpart is not intended expressly or implicitly to limit the parties' use of alternate forums to resolve disputes. Specifically, judicial review where

otherwise available by law may be sought by any party to a serious disagreement without first having exhausted the mediation process..." (15 C.F.R. 930.116, 1990). Therefore, if the federal government grants an exemption to an applicant or activity, the state or local authority will have an opportunity to challenge the exemption within the judicial system.

It is important to recognize over which activities state and local authorities have jurisdiction. Coastal use activities are regulated by the state or local government depending on the type of activity. State governments have jurisdiction over "uses of state concern" (R.S. 49:214.25(A)(1), which include but are not limited to: any dredge or fill activity which intersects with more than one water body; projects involving use of state owned lands or water bottoms; state publicly funded projects; national interest projects, projects occurring in more than one parish; all mineral activities, including exploration for, and production of oil, gas, and other minerals, all dredge and fill uses associated therewith, and all other associated uses; all pipelines for the gathering, transportation or transmission of oil, gas and other minerals; energy facility siting and development; and uses of local concern which may significantly affect interests of regional, state or national concern.

Local governments have jurisdiction over "uses of local concern" (R.S. 49:214.25[A][2]) which include, but are not limited to: privately funded projects which are not uses of state concern; publicly funded projects which are not uses of state concern; maintenance of uses of local concern; jetties or breakwaters; dredge or fill projects not intersecting more than one water body; bulkheads; piers; camps and cattlewalks; maintenance dredging; private water control structures of less than \$15,000 in cost; uses on cheniers, salt domes, or similar land forms.

Once a local coastal program has been approved by the Secretary of the Louisiana Department of Natural Resources, uses of local concern within the parish's coastal zone must be consistent with the parish coastal zone management plan and shall be subject to the issuance of coastal use permits by the local government (R.S. 49:214.28[H]). This oversight authority enables parishes to modify, suspend, revoke, or enforce (civil or criminal relief) coastal use permits for activities deemed local use (L.C.A. 43:1.723D). Such control enables a parish to only permit activities it deems beneficial, so long as it is in harmony with its coastal zone management plan. Parishes with a state approved coastal zone management plan can significantly impact how activities occurring within the parish boundaries affect the parish's economy, natural resource conservation, development, and stability. In other words, St. Bernard Parish has an opportunity to shape and modify its own coastal resources, social and economic identity, and direction for economic development and growth.

With regard to proposed federal actions, section 930.38(a) of the Code of Federal Regulations states that consistency determinations are required for "ongoing federal agency activities other than development projects initiated prior to management program approval, which are governed by statutory authority under which the federal agency retains discretion to reassess and modify the activity" and for "major, phased federal development project decisions described in §930.36(d) which are made following management program approval and are related to development projects initiated prior to program approval" (15 C.F.R. 930.38, 1990). However, the code addresses the latter determination requirement by stating

that “this provision shall not apply to phased federal decisions which were specifically described, considered and approved prior to management program approval (e.g., in a final environmental impact statement issued pursuant to NEPA).” Therefore, activities subject to NEPA and activities initiated prior to a state or local coastal zone management plan shall be deemed exempt from consistency determinations. Because the State of Louisiana and St. Bernard Parish have approved coastal management programs, proposed federal actions must be consistent with their programs.

Louisiana and St. Bernard Parish have the ability to modify or amend their coastal zone management plans to better address issues and needs that developed after their plan’s initial enactment or subsequent revision(s). This provision becomes paramount when considering changes over time in economies, social and natural environments, and the needs of the state or local government. The ability to modify a plan enables a government to adapt, thereby making governments better equipped to accomplish the Act’s goals and objectives.

Summarily, states and local governments with approved coastal management plans may, within their respective jurisdictions, grant or deny federal permits or federal activities. This can succinctly be described as a veto power. Certain exceptions to this general rule exist; however, the presumption is that the state or local government’s decision on the allowance of the activity is correct, and the federal agency must explain why the decision should be overturned. Nevertheless, if the situation progresses into the judicial system, the prior determination of the Secretary of Commerce will be given significant deference by the court and the state or local government will have to show the Secretary’s decision was “arbitrary or capricious” or as an “abuse of discretion” under administrative law principles. Notwithstanding certain exceptions to this general rule, this grant of authority to the states from the federal government gives them a very strong position from which to determine what activities will be allowed within their coastal zone.



8

# PUBLIC PARTICIPATION



**Rene Beauregard Plantation House (circa 1832)  
on Chalmette Battlefield grounds near the St. Bernard Port  
(K. Wicker, CEI, 2010)**

## CHAPTER 8

# PUBLIC PARTICIPATION

### PARTICIPATION IN PROGRAM DEVELOPMENT

St. Bernard Parish has been active in coastal resource planning since the inception of the local program component of Louisiana's Coastal Resources Management Program in late 1976. During the 1976-1977 fiscal year, the State of Louisiana began providing financial and technical assistance to local governments such as St. Bernard Parish to develop local CZMPs (U.S. Department of Commerce and LDNR 1980:87). Since that time, a citizen's advisory committee, currently known as the Coastal Zone Advisory Committee (CZAC), composed of a balance of conservation and development interests, has met regularly in open session to review local coastal use permit applications and coastal issues of concern to the parish. Through this mechanism, the parish governing body has ensured that all viewpoints are represented and heard. The public participation efforts of the parish are a model of local public involvement.

Numerous presentations and recommendations on coastal management matters to the Parish Council by the CZAC, consultants, state and local officials, and others in open session over the years have made CZMP an understood acronym in the parish. Federal and state coastal restoration and flood protection projects in or affecting St. Bernard Parish have been funded and implemented and have received widespread publicity since the 1970s. The DCD staff members have made many presentations to schools, civic organizations, and other parish agencies as part of their work schedules. Newspapers in the parish have routinely carried articles regarding CZMP-related activities. In recent years, the parish has created and maintained a Website documenting items of interest to the citizens of the parish, including the names of personnel contacts and activities of the Office of Coastal Zone Management (OCZM) within the DCD.

St. Bernard Parish developed their first Coastal Management Program document in 1982 under the guidance of the St. Bernard Parish Planning Commission with input from the members of the Commission, the Police Jury and the public during a public review process. The development of the program was financed in part by a grant from the U.S. Department of Commerce under the provisions of the Coastal Zone Management Act of 1972, as amended. The program was accepted by the LDNR and approved in 1987 by the Secretary of the Department of Commerce. In the year 2000, the parish received a grant from the U.S. Department of Commerce, NOAA and administered by the LDNR to update the CZMP document. A draft CZMP document was prepared for the St. Bernard Parish Government, under the direction of the DCD-OCZM and with the active participation of the St. Bernard Parish CZAC. The updated draft document was placed in the local libraries and St. Bernard Parish Government Administrative Office for public review and submittal of comments. A public hearing to present the updated program document and receive comments was advertised locally and held in St. Bernard Parish in January 2002. The St. Bernard Parish Council passed a Coastal Zone Management Ordinance (SBPC #607-02-05) on February 1, 2005. Hurricane Katrina in August 2005, disrupted the process for obtaining final approval of the updated CZMP from the LDNR and the Secretary of the U.S. Department of Commerce and NOAA.

As a result of Hurricane Katrina's widespread devastation of the parish's natural and socio-economic environments, St. Bernard Parish applied for and received a grant from the Coastal Impact Assistance Program (CIAP) in 2009 to update their approved CZMP document. As part of the updating process, a series of public meetings (Sept. 30, Oct. 30, Nov. 30, 2009; Jan. 21, Feb. 24, Mar. 4, Mar. 18, Mar. 31, Apr. 13, Apr. 28, 2010) were held with the CZAC and chaired by the local administrator of the parish's OCZM to review the 2001 draft CZMP; obtain comments on changes that were needed to update the document in terms of environmental and socio-economic conditions; environmental concerns; goals, policies and environmental management units and program administration and to review draft sections of the revised CZMP document as they were updated. Copies of the updated draft CZMP document, including descriptions of current environmental and socioeconomic conditions parishwide and by EMUs, descriptions of two additional EMUs and updated goals and policies, were presented for distribution to the CZAC Committee members, parish president and local administrator for review and comment at a public CZAC meeting on September 29, 2011. No comments were received in response to this review process. However, comments were received from the LDNR-OCM (Lovell 2011) as part of a preliminary, informal review of the draft CZMP document. These comments were addressed in the revised draft CZMP document that was distributed at an April 25, 2012 public meeting of the CZAC. Digital and hard copies of the CZMP document were also presented to the local administrator for distribution to the parish president, the director of the DCD, the parish council members, the local public library, the parish administrative office and uploading to the DCD-OCZM Website.

A public notice announcing the availability of the draft CZMP document for public review and a public meeting to receive comments on the document was published in the official parish newspaper, *The St. Bernard Voice*, on May 18 and May 25, 2012 (Appendix E). The local public meeting was held in the Parish Council chambers at the St. Bernard Parish Government Office Building at 8201 West Judge Perez Drive on June 18, 2012.

Only one comment was received during the public review period and local public meeting (May 18 through July 2, 2012) and this comment was addressed in the CZMP document (Appendix E). On August 21, 2012, the St. Bernard Parish Council adopted Resolution SBPC #968-08-12 supporting the updated St. Bernard Parish Coastal Zone Programmatic Document and approved its submittal to the LDNR-OCM for review and comment.

Copies of the draft CZMP document will be submitted to the LDNR-OCM for their review and comment. Any comments received from the LDNR-OCM will be addressed and the LDNR-OCM will advertise in the state's official newspaper that the final draft CZMP document is available for review and comment and that a Public Meeting will be held at the end of the 30-day review period. The LDNR-OCM has 90 days from the date of its public notice to approve or notify the parish of changes required. Any comments received during this review period and Public Meeting will be addressed in the CZMP document and a Final CZMP document will be submitted to the Secretary of the LDNR for approval and forwarding to NOAA for review and final approval by the Secretary of the Department of Commerce. The NOAA has a 30-day public notice period in which to receive comments. After NOAA approves the updated CZMP, St. Bernard can officially approve the updated CZMP, including the Coastal Zone Management Implementation Ordinance

## **CITIZEN PARTICIPATION UNDER AN APPROVED LOCAL COASTAL MANAGEMENT PROGRAM**

Citizen input into the future implementation of the St. Bernard Parish Local CZMP will occur primarily during CZAC meetings which are held monthly. The committee will be the initial public forum for planning activities, grant requests, and review of development plans as they relate to coastal management. The DCD-OCZM staff will present coastal-related planning and grant matters to the CZAC for their advice and will incorporate their suggestions into coastal management activities as much as is practicable.

Other forms of public participation will include notices and hearings pursuant to the permit procedure and the permit appeal process. In addition, the DCD-OCZM staff will report annually to the Parish Council on progress made under the local program.

Additional public education and feedback will occur through presentations to groups within the parish by the DCD-OCZM staff and by distribution of materials and reports to all concerned citizens, including postings on the parish's Website.



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located on the MRGO Channel near Shell Beach;  
Fort Proctor in the background  
(K. Wicker, CEI, 2010)**

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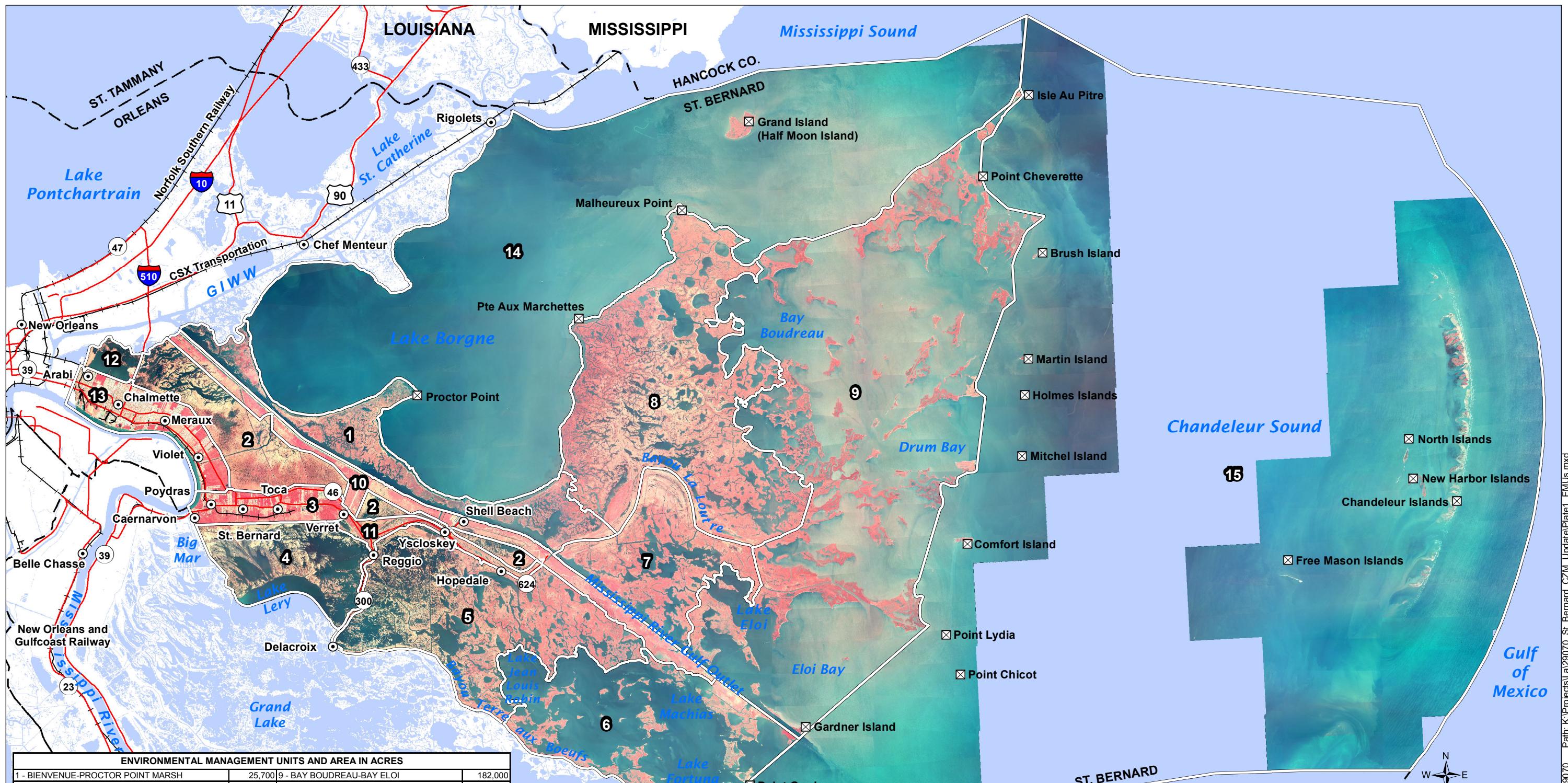
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## **PLATES**





St. Bernard Parish Government



COASTAL ENVIRONMENTS, INC.

BATON ROUGE, LA. 70802 225-383-7455

Sources:

Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007. 2008 USGS CIR DOQQs downloaded from LaCoast.gov and mosaicked by CEI.

Universal Transverse Mercator, Zone 15, NAD 83.

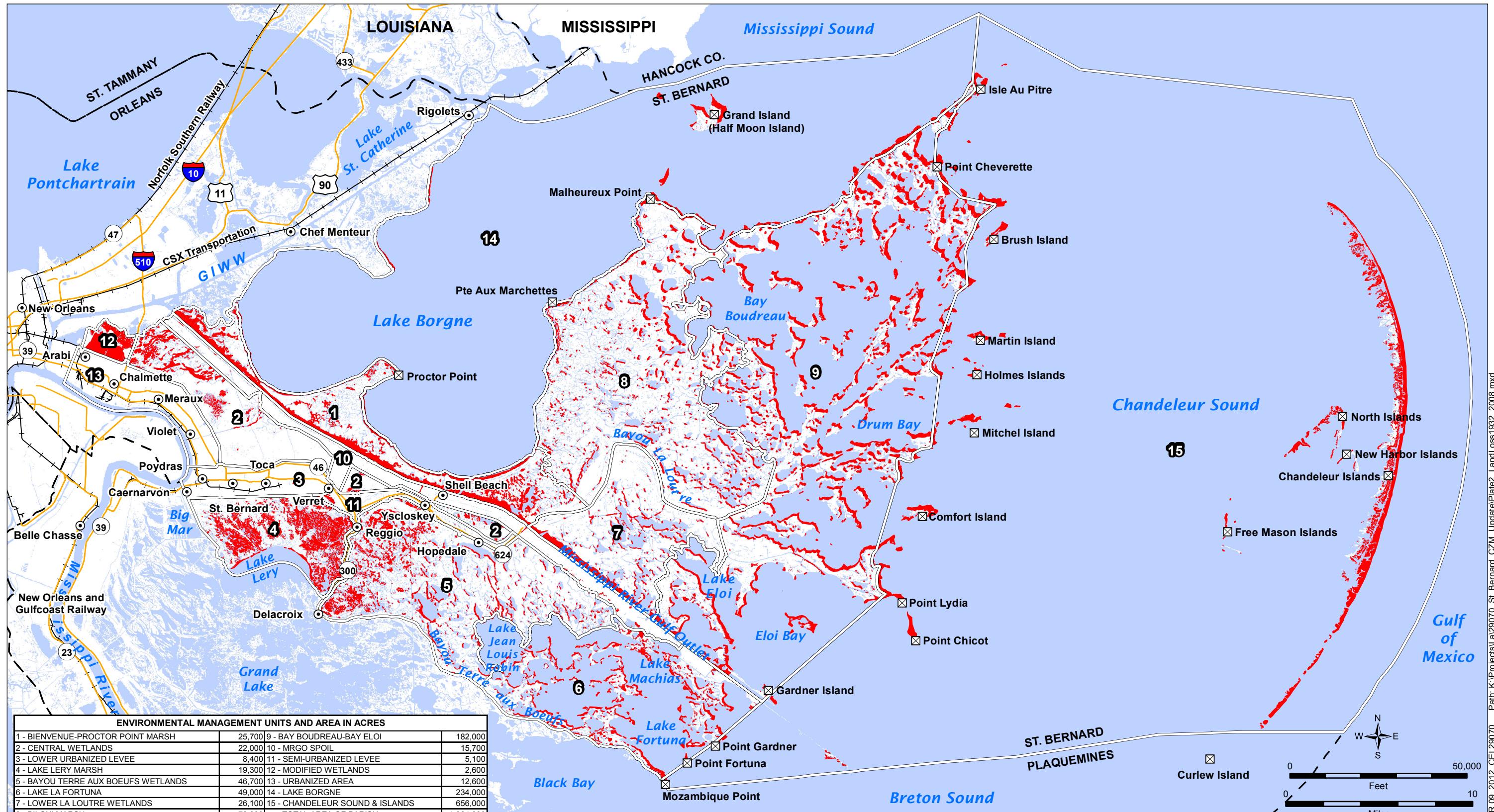
- City / Community
- ✓ Parish Boundary
- ☒ Place Name
- 1 Environmental Management Units
- ✓ Highway
- ✓ Railroad



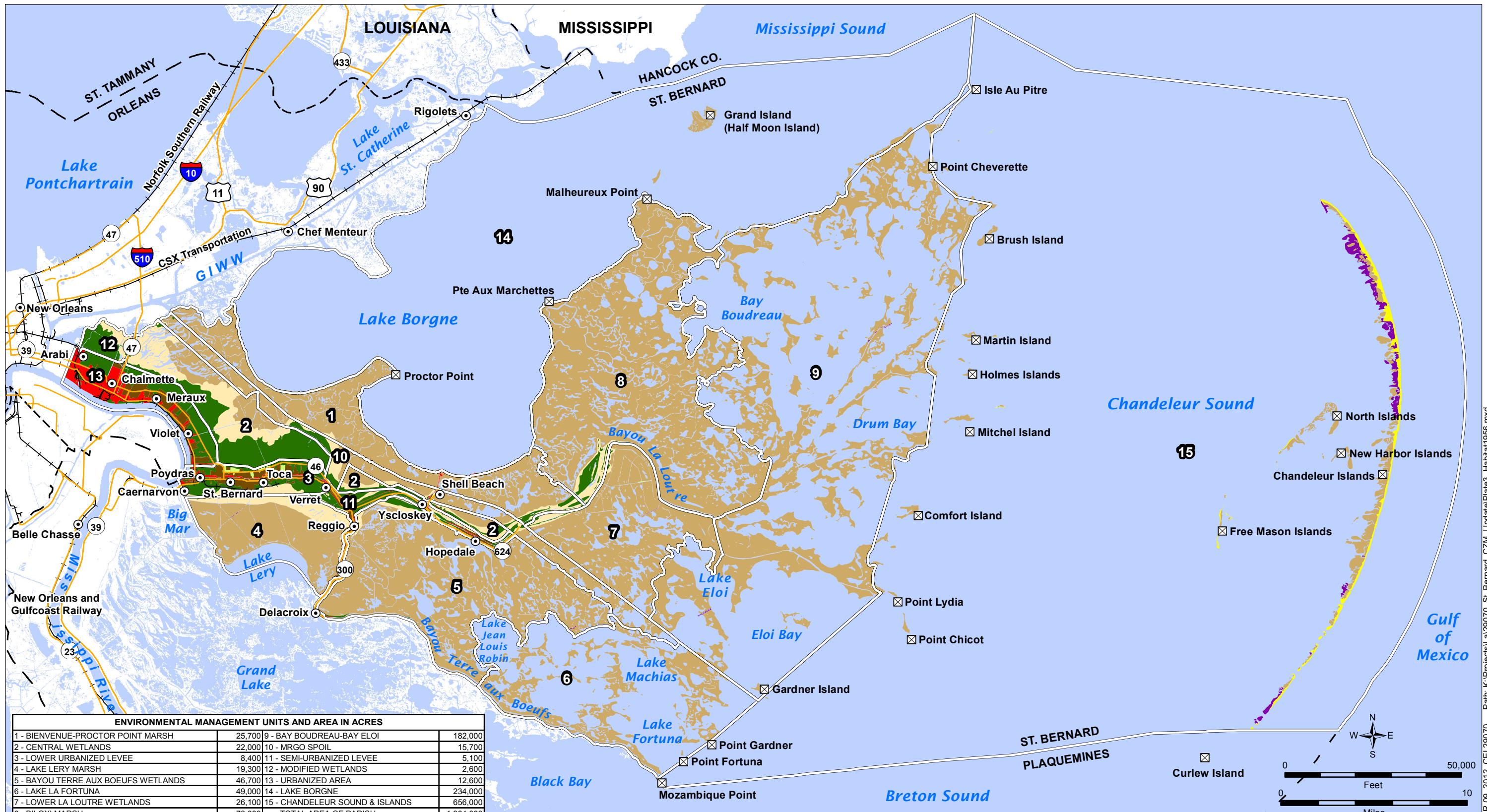
**ENVIRONMENTAL MANAGEMENT UNITS  
ST. BERNARD PARISH, LA**

Plate 1









St. Bernard Parish Government

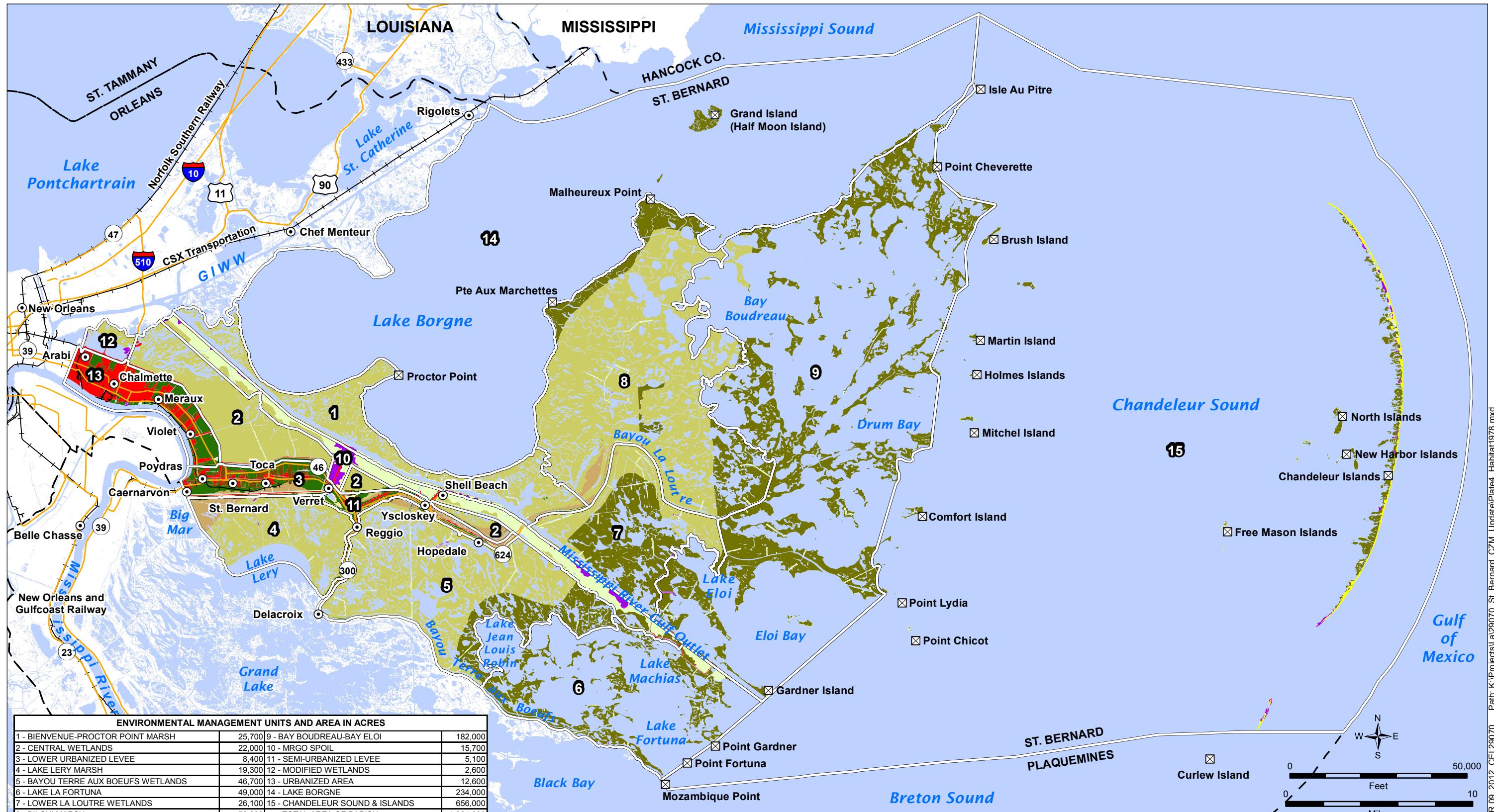
COASTAL ENVIRONMENTS, INC.  
BATON ROUGE, LA, 70802 ..... 225-383-7455

Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State,  
LSU Department of Geography and Anthropology, 2007.  
Habitat Data 1956: USGS-NWRC-BRPO 1996 CD.

Universal Transverse Mercator, Zone 15, NAD 83.

Plate 3





St. Bernard Parish Government

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Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007.  
Habitat Data 1978: USGS-NWRC-BRPO 1996 CD.

Universal Transverse Mercator, Zone 15, NAD 83.

- City / Community
- Place Name
- ~~~~ Highway
- ~~~~ Railroad
- Parish Boundary
- 1 Environmental Management Units

#### Habitat Type

- Developed
- Brackish Marsh
- Agriculture/Pasture
- Saline Marsh
- Forest
- Upland/Barren/Other
- Scrub/Shrub
- Shore/Flat/Beach
- Fresh Marsh
- Water
- Intermediate Marsh

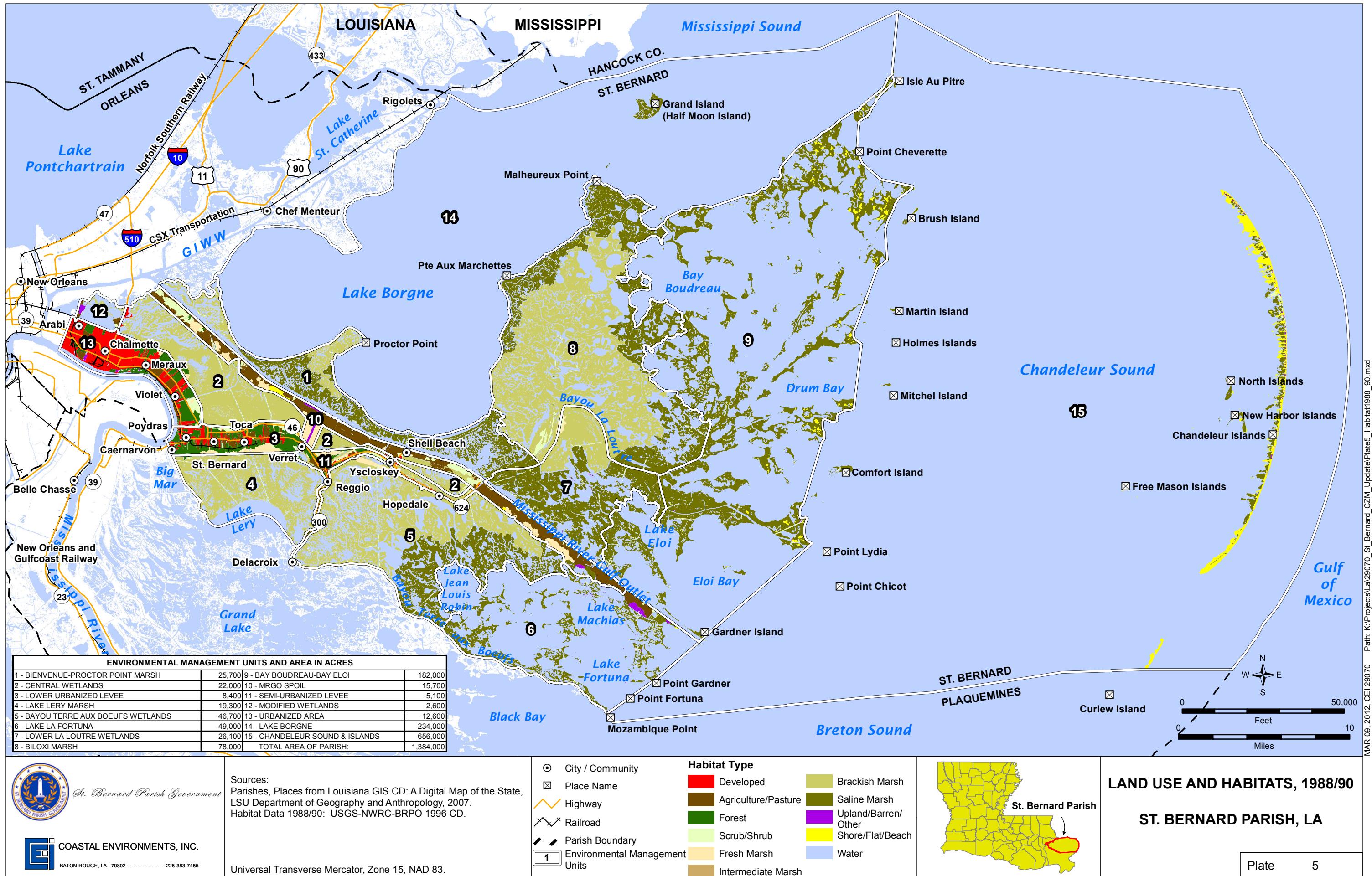


## LAND USE AND HABITATS, 1978

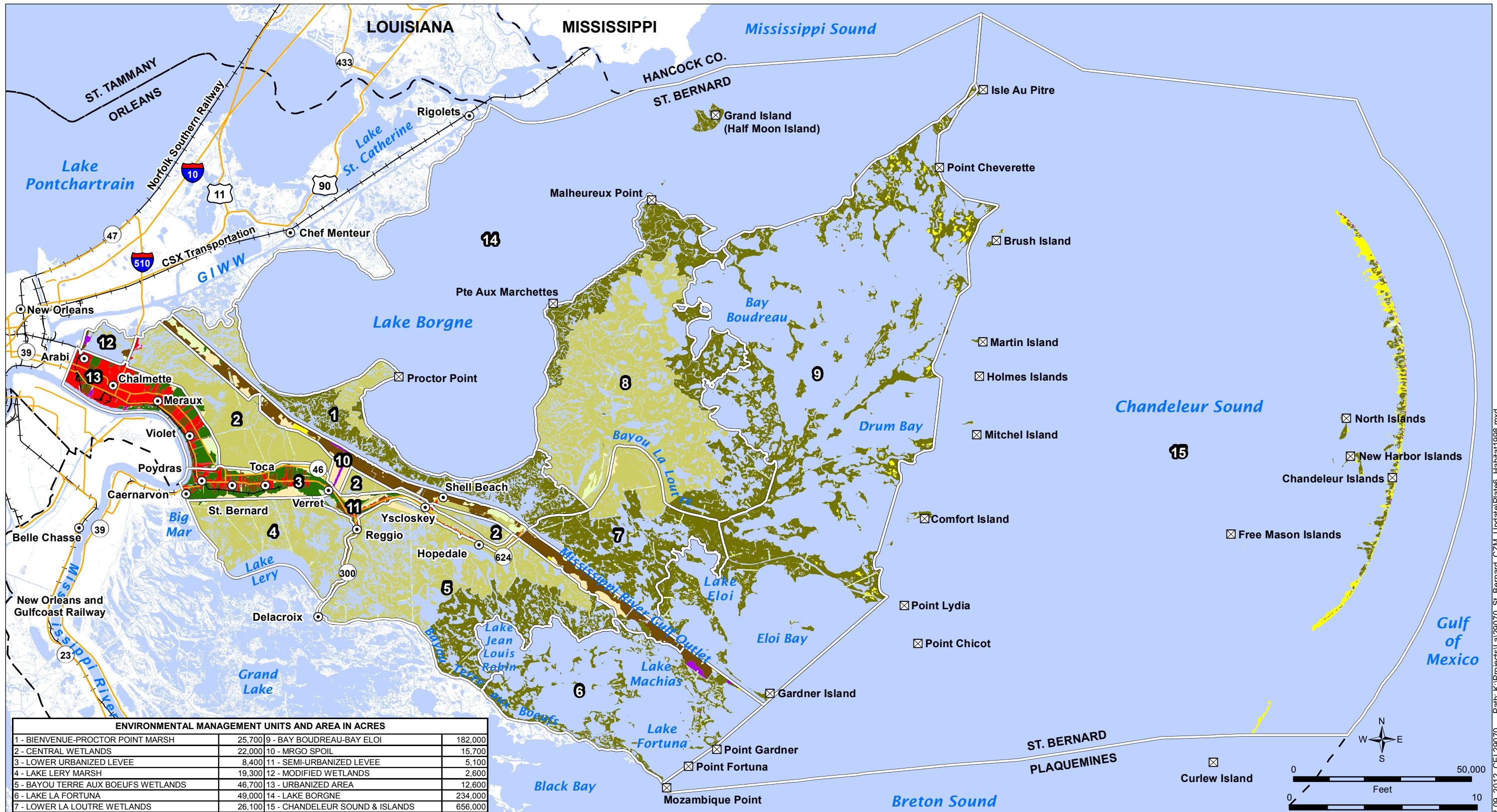
### ST. BERNARD PARISH, LA

Plate 4









St. Bernard Parish Government

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Sources:

Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007. 1992/93/95 Land Use and Habitat data from LA GAP CD, USGS NWRC, 1998.

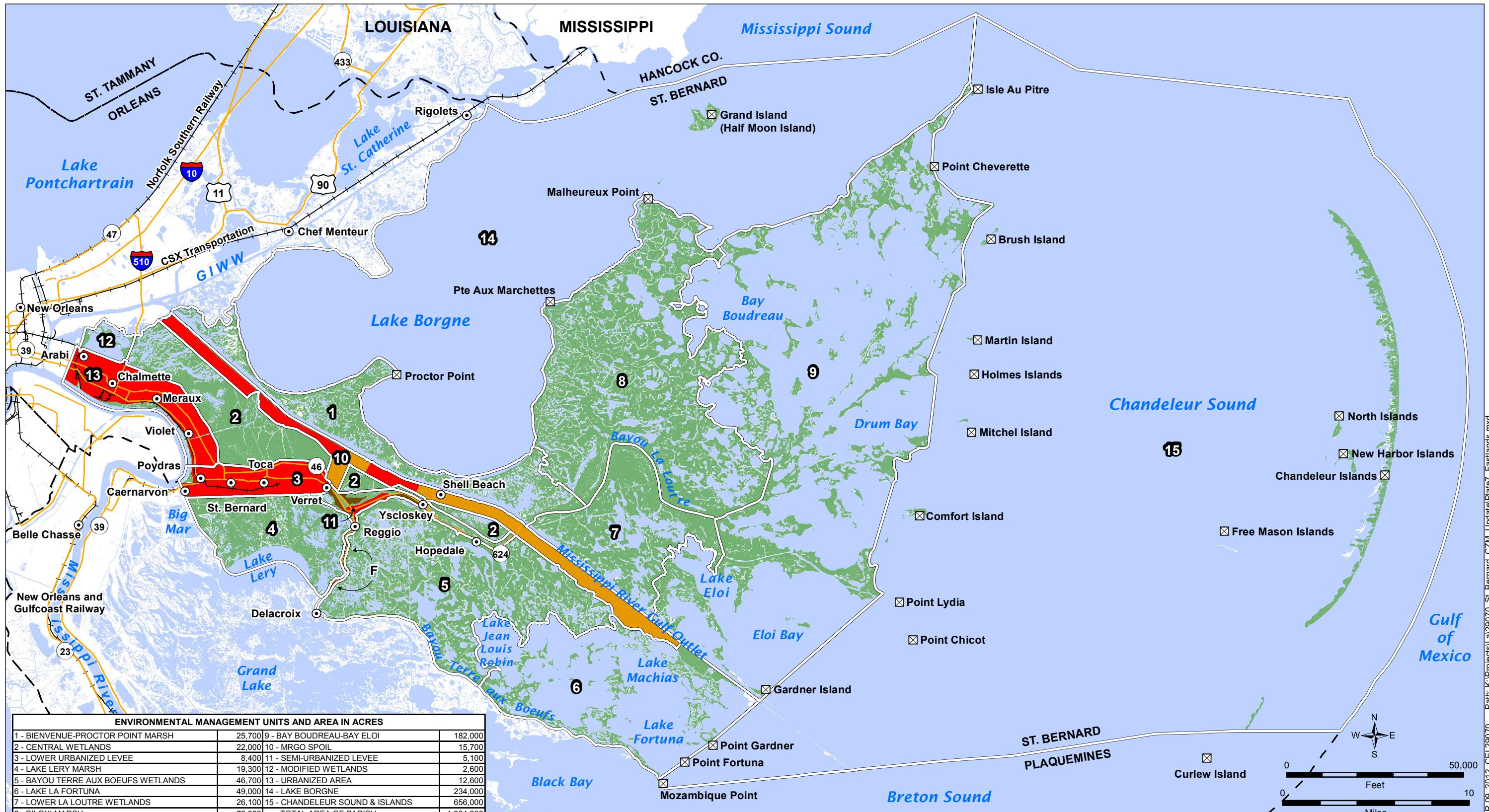
Habitat Type

● City / Community	Developed	Brackish Marsh
◻ Place Name	Agriculture/Pasture	Saline Marsh
~~~~ Highway	Forest	Upland/Barren/Other
~~~~ Railroad	Scrub/Shrub	Shore/Flat/Beach
~~~~ Parish Boundary	Fresh Marsh	Water
1 Environmental Management Units	Intermediate Marsh	



**LAND USE AND HABITATS,  
1992/93/95  
ST. BERNARD PARISH, LA**





St. Bernard Parish Government



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BATON ROUGE, LA. 70802 225-383-7455

Sources:

Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007.  
 EMU from St. Bernard CZ Advisory Committee, 1982, updated 2009.  
 Fastlands from LDNR, date unknown; Wetland Transition and MRGO Transition digitized by CEI 2001.

Universal Transverse Mercator, Zone 15, NAD 83.

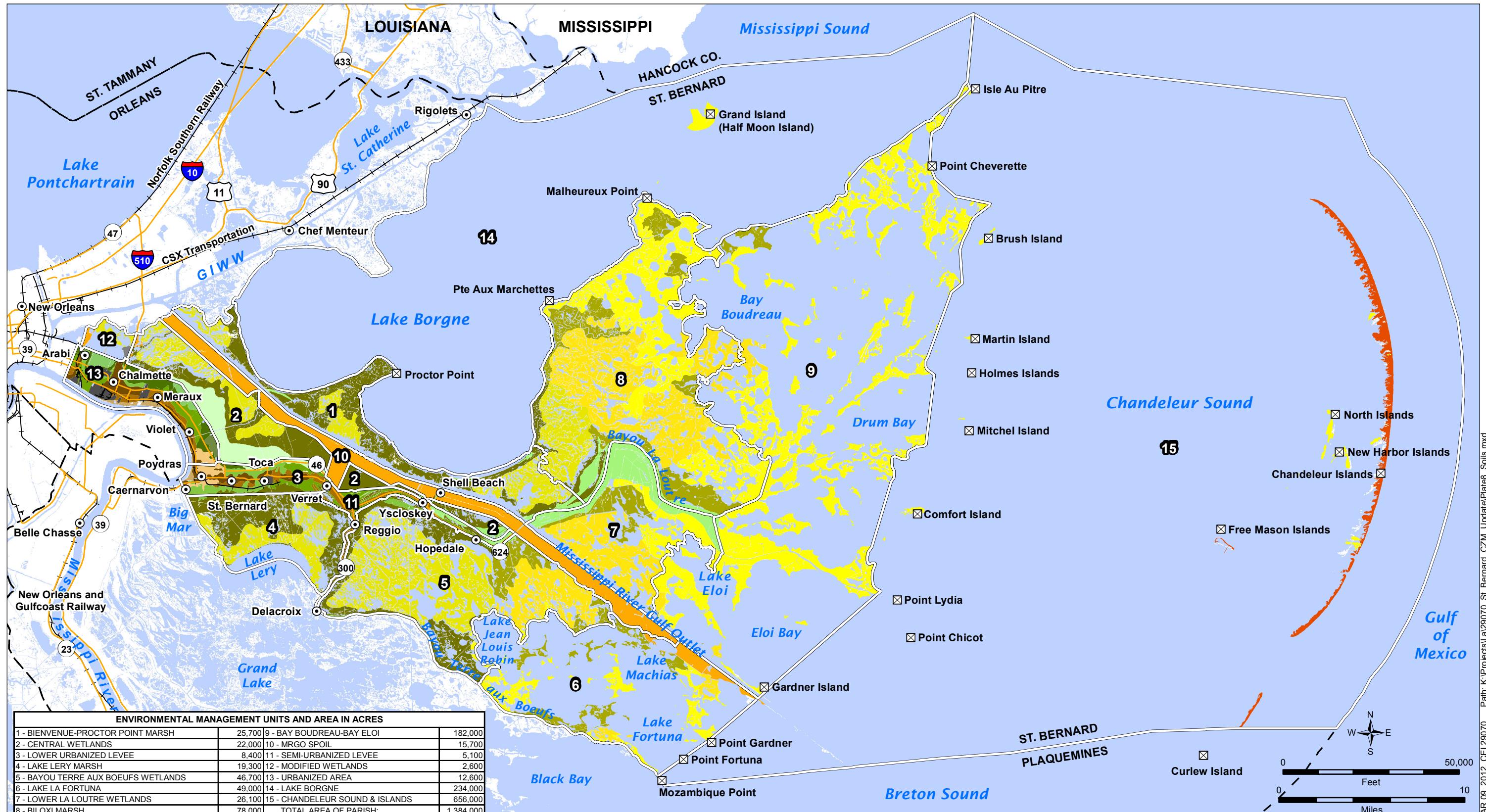
- City / Community
- Environmental Management Units
- ☒ Place Name
- MRGO Transition
- Highway
- Natural Levee Transition
- Railroad
- Fastlands/Uplands (F)
- Parish Boundary
- Wetlands



**FASTLANDS/UPLANDS  
TRANSITION AREAS,  
AND WETLANDS  
ST. BERNARD PARISH, LA**

Plate 7





### *St. Bernard Parish Government*

The logo for Coastal Environments, Inc. features a stylized blue 'E' and 'I' inside a blue square frame, with a smaller square above it.

COASTAL ENVIRONMENTS, INC.

BATON ROUGE, LA., 70802 ..... 225-383-7451

Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State  
LSU Department of Geography and Anthropology, 2007.  
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hurricane impacts in coastal Louisiana, 2004-2008: USGS  
Investigation Map 3080. 1932-2000 Land Loss from  
Barras, J.A., USGS NWRC.

Universal Transverse Mercator, Zone 15, NAD 83

ENVIRONMENTAL MANAGEMENT UNITS AND AREA IN ACRES		
1 - BIENVENUE-PROCTOR POINT MARSH	25,700	9 - BAY BOUDREAU-BAY ELOI
2 - CENTRAL WETLANDS	22,000	10 - MRGO SPOIL
3 - LOWER URBANIZED LEVEE	8,400	11 - SEMI-URBANIZED LEVEE
4 - LAKE LERY MARSH	19,300	12 - MODIFIED WETLANDS
5 - BAYOU TERRE AUX BOEufs WETLANDS	46,700	13 - URBANIZED AREA
6 - LAKE LA FORTUNA	49,000	14 - LAKE BORGNE
7 - LOWER LA LOUTRE WETLANDS	26,100	15 - CHANDELEUR SOUND & ISLANDS
8 - BILOXI MARSH	78,000	TOTAL AREA OF PARISH:
		1,384,000

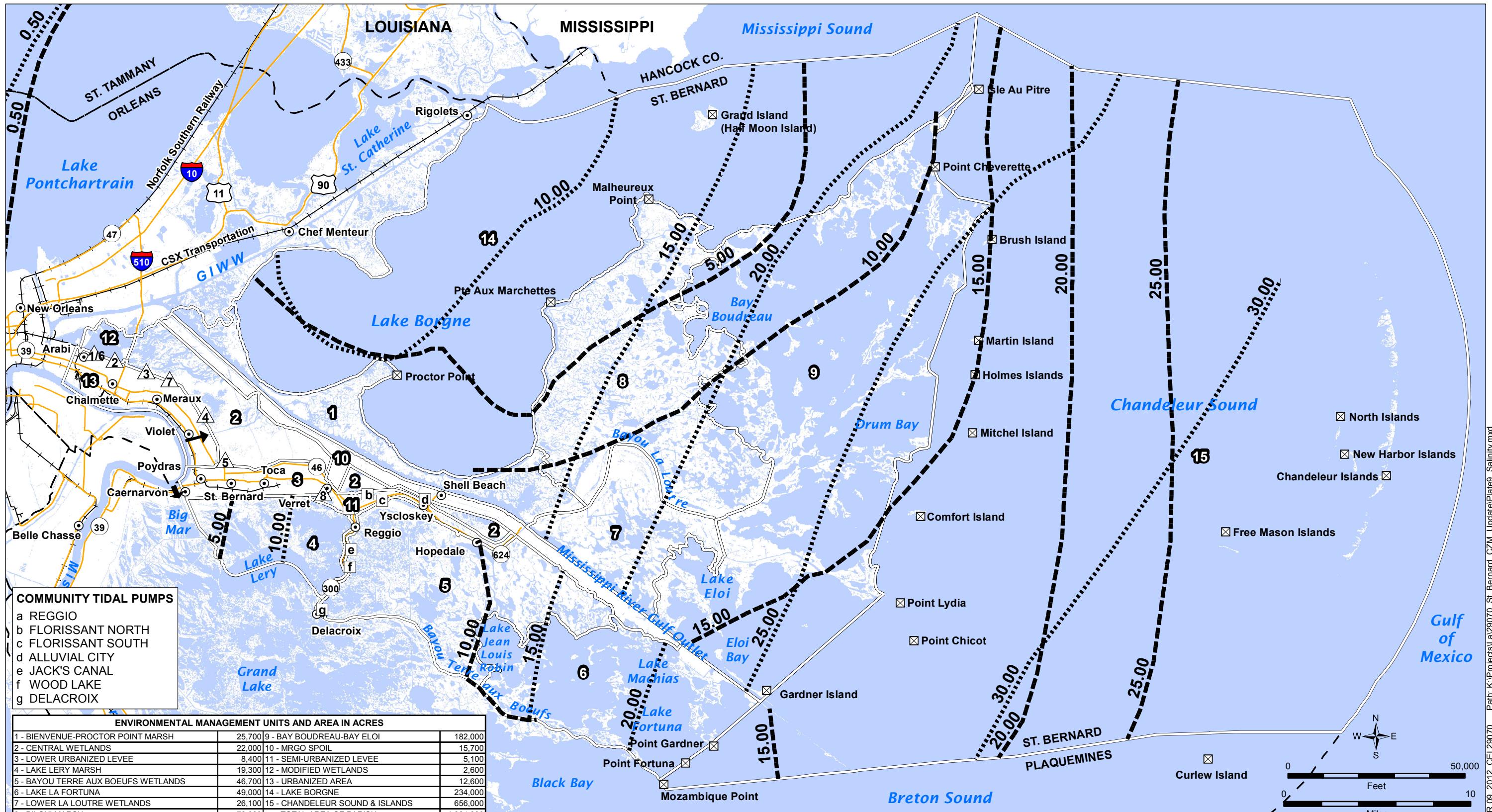
NATURAL LEVEE	BACKSWAMP
Cm, CANCIENNE SILT LOAM	Ha, HARAHAN CLAY
Co, CANCIENNE SILTY CLAY LOAM	Hf, HARAHAN CLAY, FREQUENTLY FLOODED
CS, CANCIENNE AND SCHRIEVER SOILS, FREQUENTLY FLOODED	Sh, SCHRIEVER SILTY CLAY LOAM
Va, VACHERIE SILT LOAM, GENTLY UNDULATING	Sk, SCHRIEVER CLAY
Ub, URBAN LAND	Ww, WESTWEGO CLAY
Dp, DUMPS	FA, FAUSSE CLAY, SALINE
AD, AQUENTS, DREDGED, FREQUENTLY FLOODED	BB, BARBARY CLAY
FE, FELICITY LOAMY FINE SAND, FREQUENTLY FLOODED	



## SOILS

ST. BERNARD PARISH, LA





St. Bernard Parish Government



COASTAL ENVIRONMENTS, INC.

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225-383-7455

Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007.  
EMU from St. Bernard CZ Advisory Committee, 1982, updated 2009.  
Pumps: St. Bernard Parish Government, 2009 and Lake Borgne Levee District, 2009.  
Salinity digitized from Orlando et al., 1993.

Universal Transverse Mercator, Zone 15, NAD 83.

- City / Community
- ☒ Place Name
- Yellow line Highway
- Black line Railroad
- Dashed line Parish Boundary
- 1 Environmental Management Units

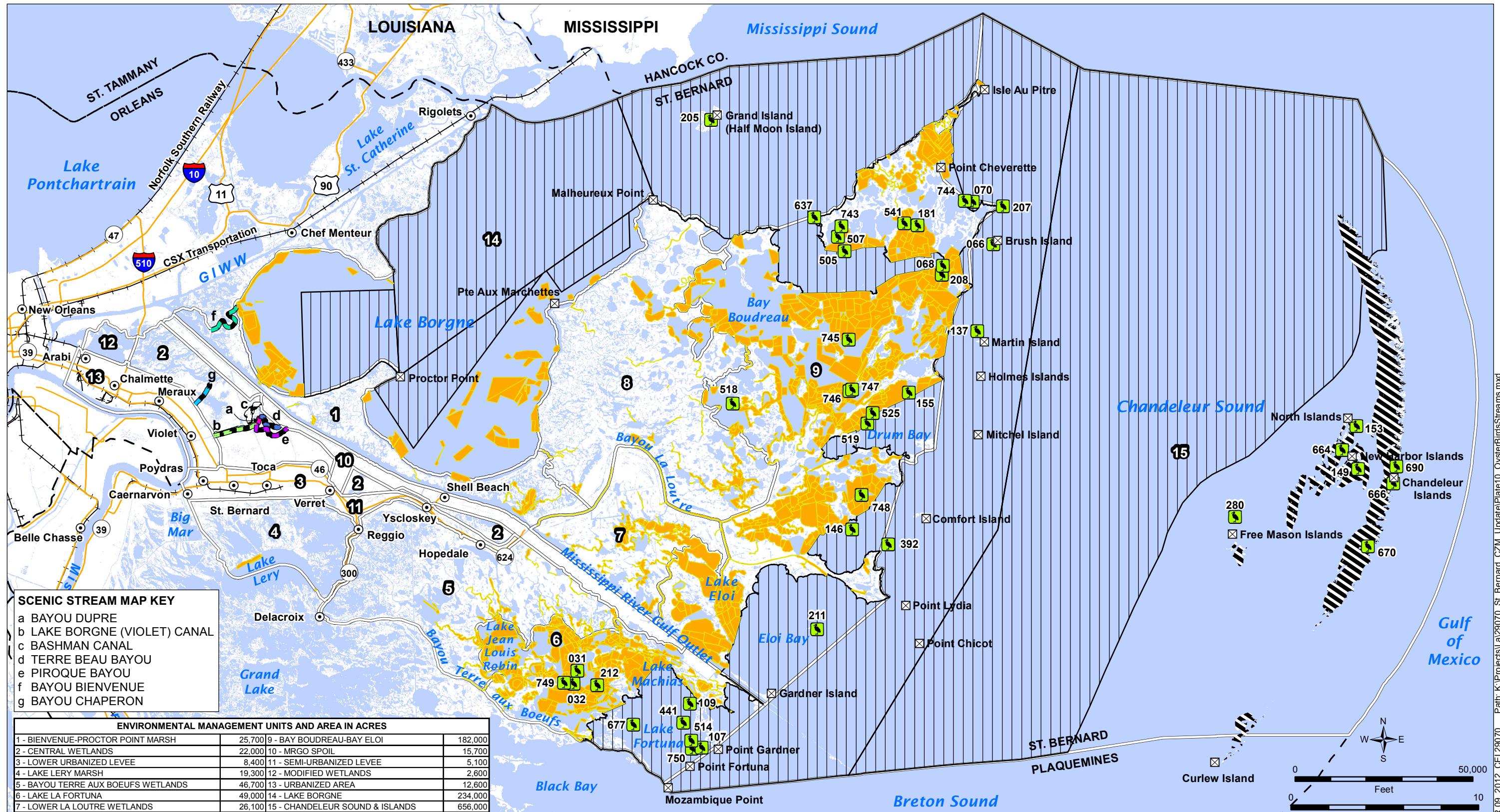
- a Tidal Levee Pump
- 1 Drainage District Pump
- Violet Siphon
- Caernarvon Diversion
- Dotted line Surface Fall Salinity (ppt)
- Diamond line Surface Spring Salinity (ppt)



### SALINITY (1990s) AND FRESHWATER DISCHARGES ST. BERNARD PARISH, LA

Plate 9





St. Bernard Parish Government

COASTAL ENVIRONMENTS, INC.  
BATON ROUGE, LA. 70802 ..... 225-383-7455

Sources:  
Parishes, Places (2007) Seagrass Beds (2001), Private Oyster Leases (2007), and Public Oyster Grounds (2006) from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007. Park boundaries from LDWF, 2001. Environmental Management Units from St. Bernard CZ Advisory Committee, 1982, updated 2009. Scenic Streams (2008); LDWF 2009; Seabird Colony (2008); LDWF, NHP 2010.

Universal Transverse Mercator, Zone 15, NAD 83.

- City / Community
- ☒ Place Name
- Parish Boundary
- Highway
- Scenic Stream

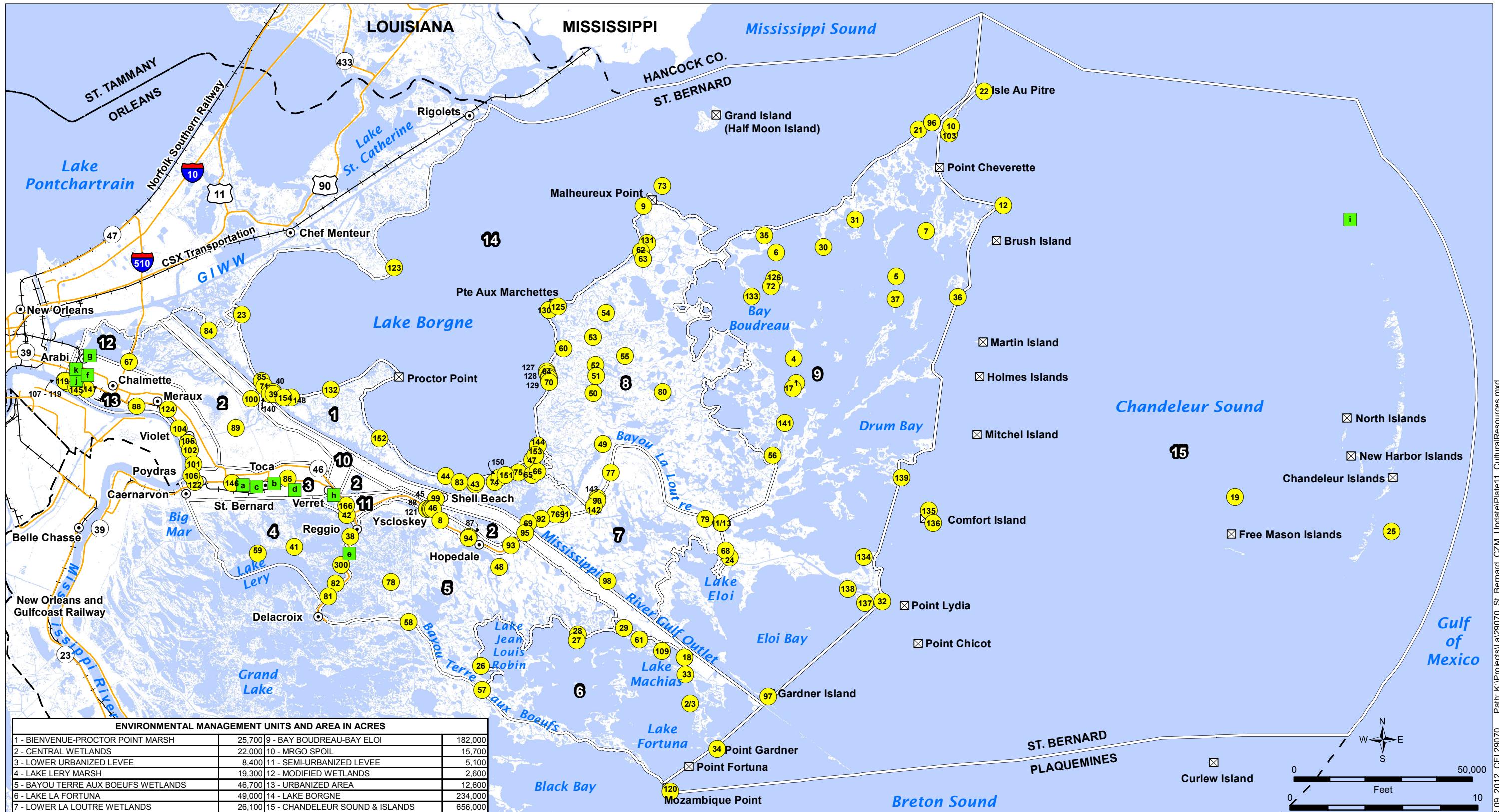
- Waterbird Nesting Colony
- Seagrass Beds
- Private Oyster Leases
- Public Oyster Leases
- Environmental Management Units



**OYSTER BEDS/GROUNDS,  
SEAGRASS BEDS, WATERBIRD  
COLONIES, AND SCENIC STREAMS  
ST. BERNARD PARISH, LA**

Plate 10





St. Bernard Parish Government

**COASTAL ENVIRONMENTS, INC.**  
BATON ROUGE, LA. 70802 ..... 225-383-7455

Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007.  
Historic/Archaeological Sites: Louisiana Division of Archaeology, 2009

Universal Transverse Mercator, Zone 15, NAD 83.

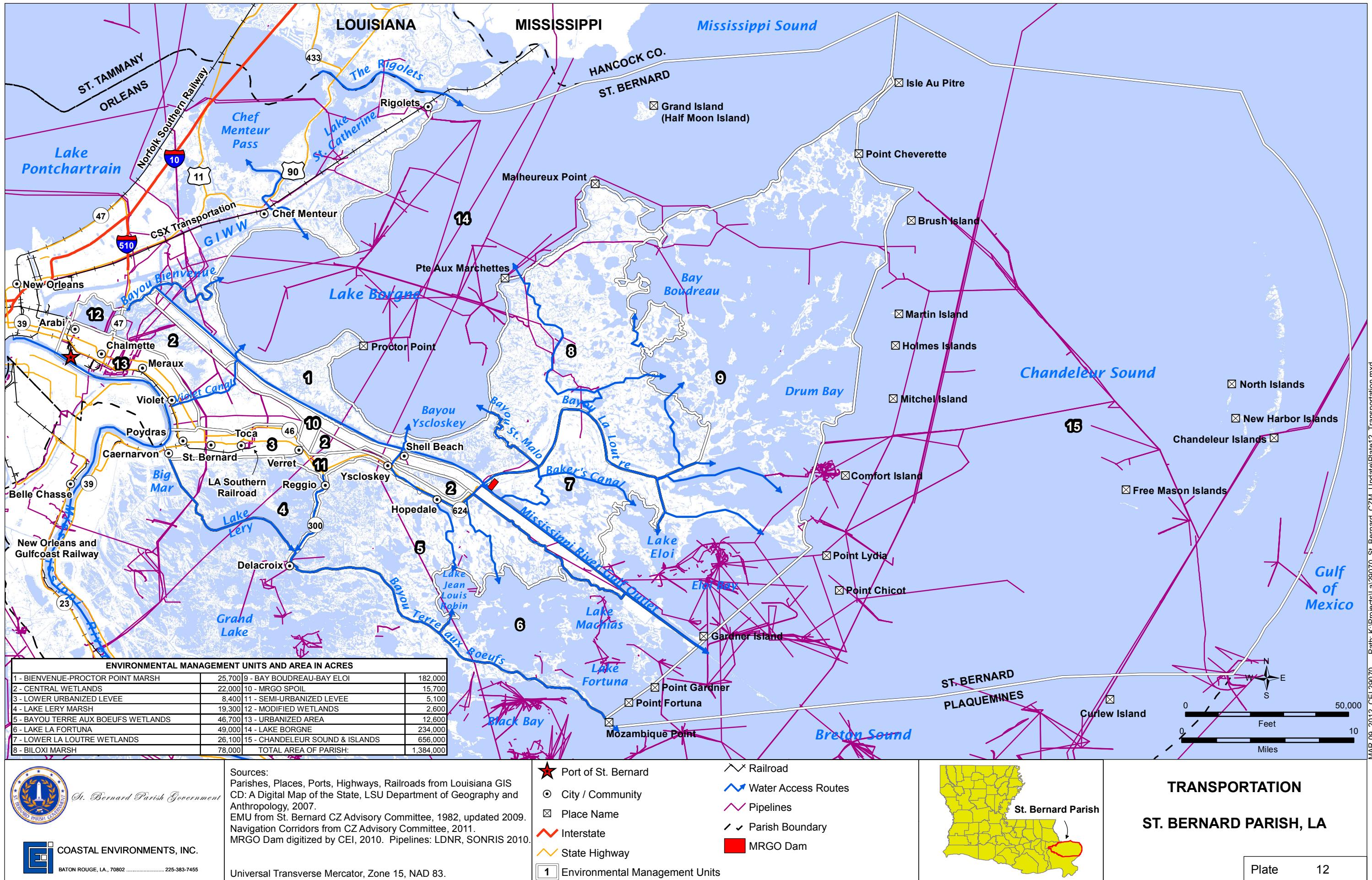
- City / Community
- Place Name
- ▲ Highway
- Railroad
- Parish Boundary
- a Historic Sites
- 3 Archaeological Sites
- 1 Environmental Management Units



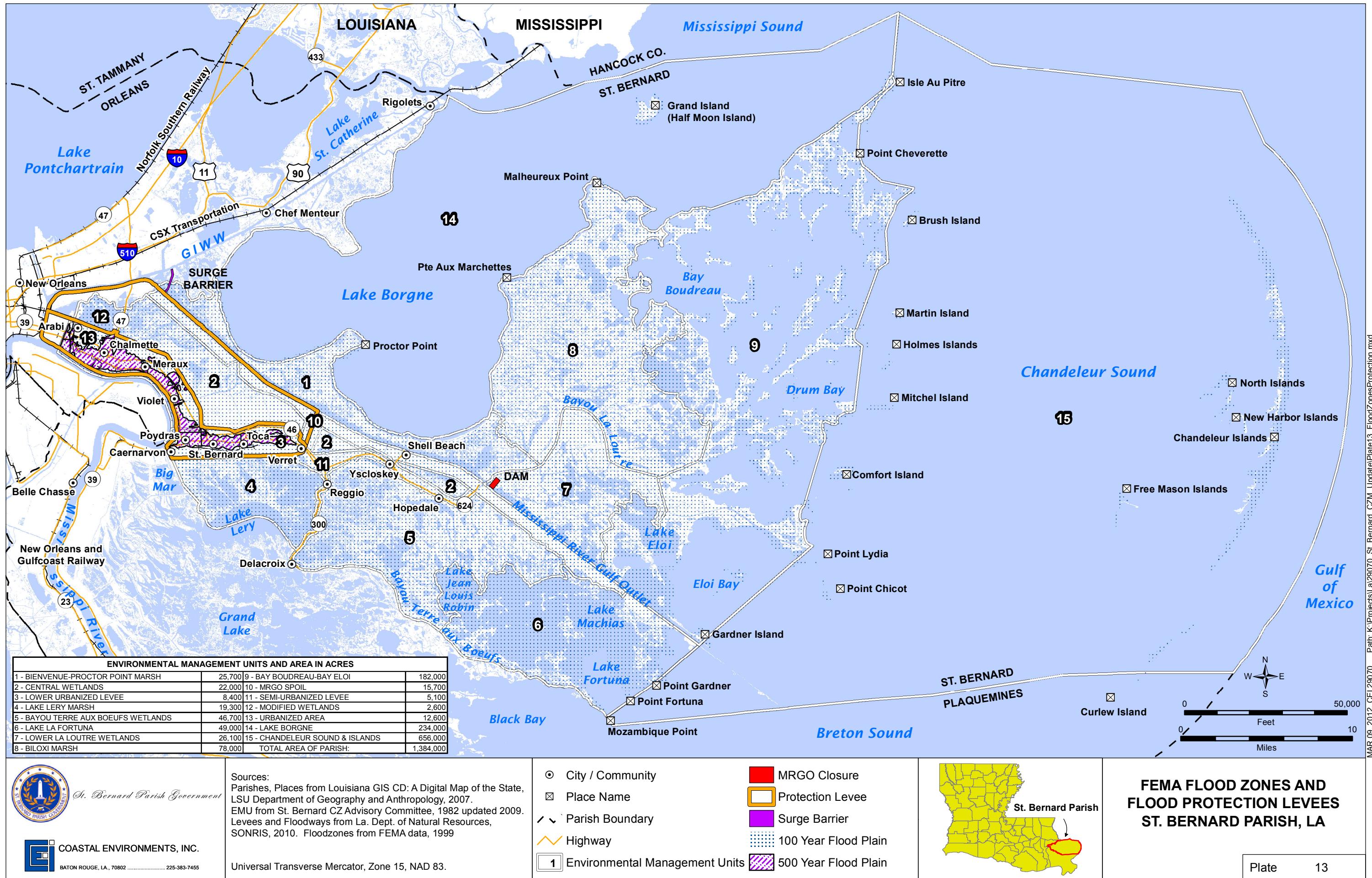
## CULTURAL RESOURCES ST. BERNARD PARISH, LA

Plate 11

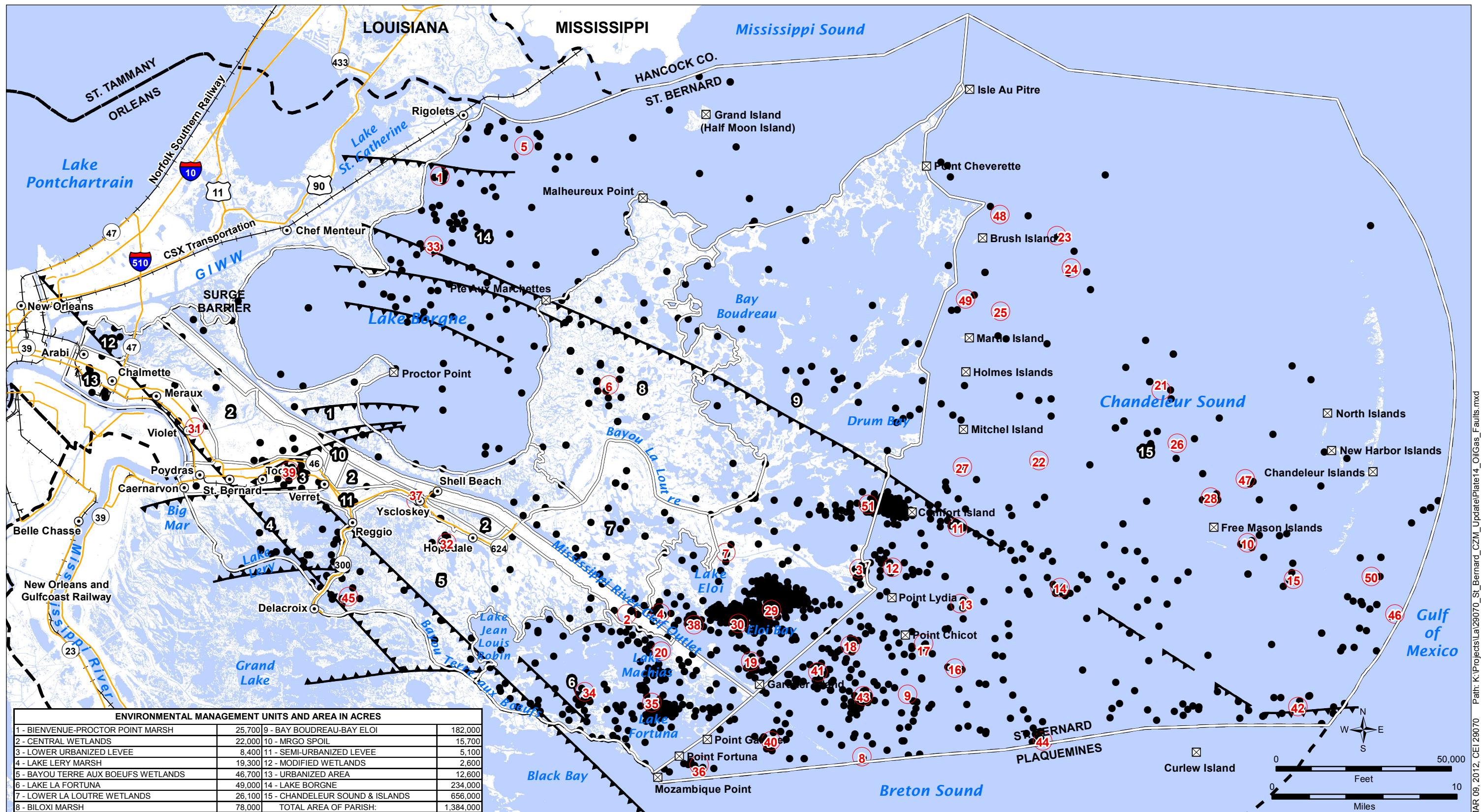












### St. Bernard Parish Government

The logo for Coastal Environments, Inc. features a stylized blue 'E' and 'I' intertwined, with a small square above the 'I'. To the right of the logo, the company name 'COASTAL ENVIRONMENTS, INC.' is written in a bold, black, sans-serif font.

Sources:  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State  
LSU Department of Geography and Anthropology, 2007.  
EMU from St. Bernard CZ Advisory Committee, 1982 updated 2007  
Oil and Gas Well/Field data from La. Dept. of Natural Resources  
SONRIS, 2010. Fault data from Gagliano et al., 2003.

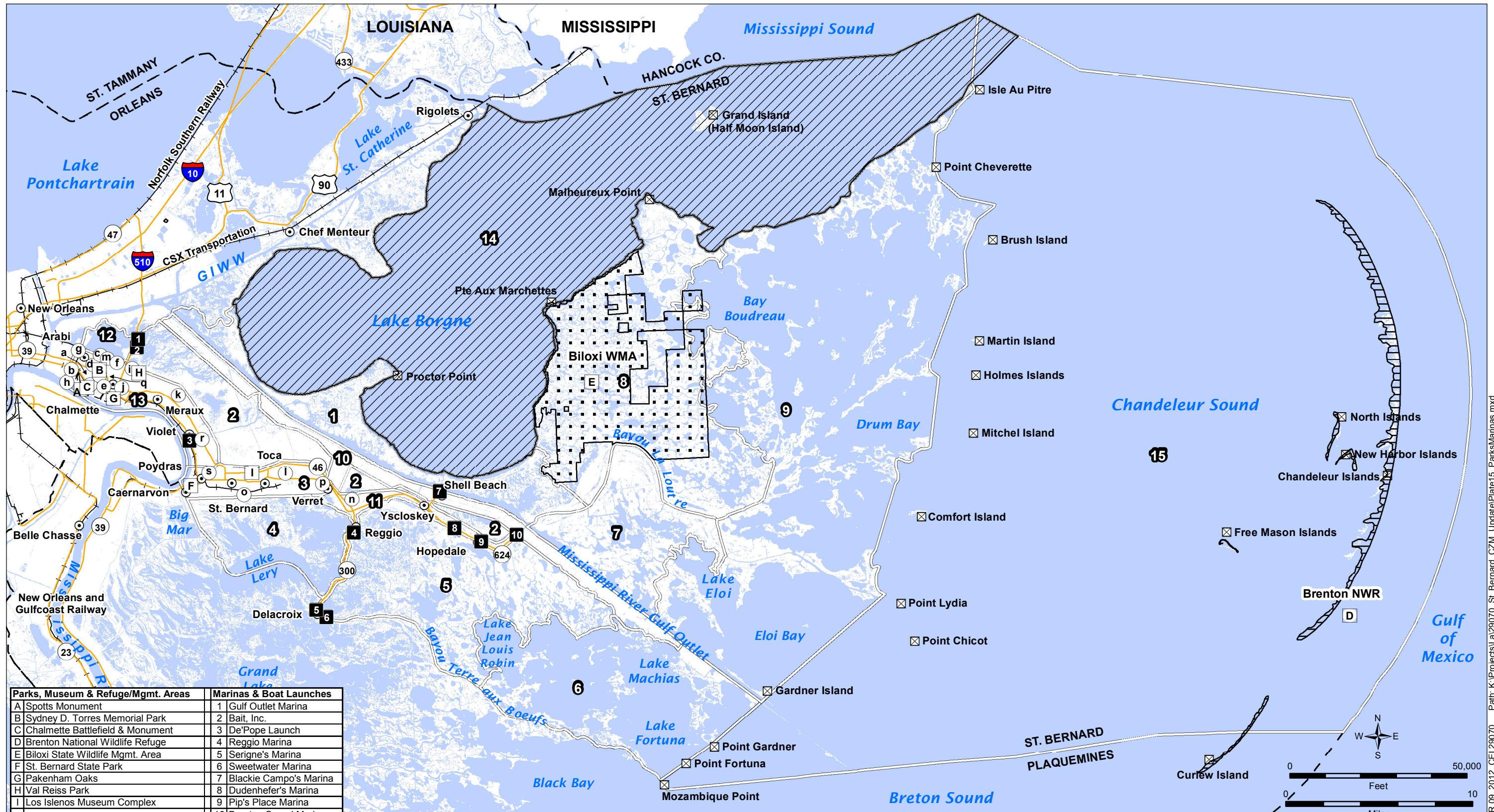
Universal Transverse Mercator, Zone 15, NAD 83.

- ⊕ City / Community
- ☒ Place Name
-   Parish Boundary
-  Highway



# OIL/GAS WELLS & FIELDS, AND FAULTS ST. BERNARD PARISH, LA





St. Bernard Parish Government

**COASTAL ENVIRONMENTS, INC.**  
BATON ROUGE, LA. 70802 ..... 225-383-7455

**Sources:**  
Parishes, Places from Louisiana GIS CD: A Digital Map of the State, LSU Department of Geography and Anthropology, 2007.  
Park boundaries from LDWF, 2001. Marina locations and Environmental Management Units from St. Bernard CZ Advisory Committee, 1982, updated 2009.

Universal Transverse Mercator, Zone 15, NAD 83.

- City / Community
- Place Name
- ~~~~ Highway
- ~~~~ Railroad
- Parish Boundary
- 1 Environmental Management Units

- 1 Marinas/Boat Launches
- a Small Parks/Playgrounds
- A Large Parks/Museum
- 14 Wildlife Management Area (WMA)
- 15 National Wildlife Refuge (NWR)
- 1 Critical Habitat Gulf Sturgeon



**PARKS, MARINAS, MUSEUMS AND WILDLIFE MANAGEMENT/REFUGE AREAS**  
**ST. BERNARD PARISH, LA**

Plate 15



## **APPENDIX A**

### **DEFINITIONS**



## Chapter 7. Coastal Management

### Subchapter A. Definitions

#### §700. Definitions

*Administrator*—the administrator of the Coastal Management Division of the Department of Natural Resources.

*Advanced Mitigation Project*—a project implemented to create, restore, protect, and/or enhance wetlands for the purpose of producing ecological values, measured as average annual habitat units or cumulative habitat units (advanced mitigation credits). Such projects must be approved by the secretary prior to implementation, and the advanced mitigation credits shall have limited utility for the purpose of compensating for the ecological values lost due to a permitted activity.

*Affected Landowner*—the owner of the land on which a proposed activity, which would result in an unavoidable net loss of ecological value, is to occur.

*Affected Parish*—the parish in which a proposed activity, which would result in an unavoidable net loss of ecological value, is to occur.

*After-the-Fact Permit*—a coastal use permit which is issued after the commencement of a use. Such a permit may only be issued after all legal issues resulting from the commencement of a use without a coastal use permit have been resolved.

*Alterations of Waters Draining in Coastal Waters*—those uses or activities that would alter, change, or introduce polluting substances into runoff and thereby modify the quality of coastal waters. Examples include water control impoundments, upland and water management programs, and drainage projects from urban, agricultural and industrial developments.

*Approved Local Program*—a local coastal management program which has been and continues to be approved by the secretary pursuant to 214.28 of the State and Local Coastal Resources Management Act (SLCRMA).

*Average Annual Habitat Unit*—a unit of measure of ecological value; average annual habitat units are calculated by the formula: (sum of cumulative habitat units for a given project scenario) / (project years).

*Beneficial Use of Dredged Material*—use of dredged material excavated and not replaced pursuant to a proposed activity for which a coastal use permit is required, so as to protect, create, or enhance wetlands; use of material dredged pursuant to an alternative dredging activity to protect, create, or enhance wetlands, so as to offset failure to use the dredged material from the proposed activity to protect, create, or enhance wetlands; or contribution to the Coastal Resources Trust Fund to replace, substitute, enhance, or protect ecological values, so as to offset failure to use the dredged material from the proposed activity to protect, create, or enhance wetlands.

*Beneficial Use of Dredged Material Plan*—(BUDM Plan) a document submitted to the secretary for approval as part of an application, specifying the beneficial use of dredged material proposed by the applicant.

*Best Practical Techniques*—those methods or techniques which would result in the greatest possible minimization of the adverse impacts listed in §701.G and in specific guidelines applicable to the proposed use. Those methods or techniques shall be the best methods or techniques which are in use in the industry or trade or among practitioners of the use, and which are feasible and practical for utilization.

*Coastal Use Permit*—a permit required by 214.30 of the SLCRMA. The term does not mean or refer to, and is in addition to, any other permit or approval required or established pursuant to any other constitutional provision or statute.

*Coastal Water Dependent Uses*—those which must be carried out on, in or adjacent to coastal water areas or wetlands because the use requires access to the water body or wetland or requires the consumption, harvesting or other direct use of coastal resources, or requires the use of coastal water in the manufacturing or transportation of goods. Examples include surface and subsurface mineral extraction, fishing, ports and

necessary supporting commercial and industrial facilities, facilities for the construction, repair and maintenance of vessels, navigation projects, and fishery processing plants.

*Coastal Waters*—those bays, lakes, inlets, estuaries, rivers, bayous, and other bodies of water within the boundaries of the coastal zone which have measurable seawater content (under normal weather conditions over a period of years).

*Coastal Zone*—the term *coastal zone* shall have the same definition as provided in 214.24 of the SLCRMA.

*Compensatory Mitigation*—replacement, substitution, enhancement, or protection of ecological values to offset anticipated losses of ecological values caused by a permitted activity.

*Conservation Servitude*—as defined at R.S. 9:1272(1), means a nonpossessory interest of a holder in immovable property imposing limitations or affirmative obligations the purposes of which include retaining or protecting natural, scenic, or open-space values of immovable property, assuring its availability for agricultural, forest, recreational, or open-space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, archaeological, or cultural aspects of unimproved immovable property.

*Contaminant*—an element causing pollution of the environment that would have detrimental effects on air or water quality or on native floral or faunal species.

*Corps*—the U.S. Army Corps of Engineers.

*Cumulative Habitat Unit*—a unit of measure of ecological value; for each time interval within the project years, cumulative habitat units are calculated by the formula:  $CHUs = (T_2 - T_1) \times \{[(A_1 \times HSI_1 + A_2 \times HSI_2) / 3] + [(A_2 \times HSI_1 + A_1 \times HSI_2) / 6]\}$ , where  $T_1$  = first year of time interval,  $T_2$  = last year of time interval,  $A_1$  = acres of habitat at beginning of time interval,  $A_2$  = acres of habitat at end of time interval,  $HSI_1$  = habitat suitability index at beginning of time interval, and  $HSI_2$  = habitat suitability index at end of time interval; the source of this formula is the U.S. Fish and Wildlife Service's Ecological Services Manual 102, Habitat Evaluation Procedures.

*Cumulative Impacts*—impacts increasing in significance due to the collective effects of a number of activities.

*Department*—the Department of Natural Resources.

*Development Levees*—those levees and associated water control structures whose purpose is to allow control of water levels within the area enclosed by the levees to facilitate drainage or development within the leveed areas. Such levee systems also commonly serve for hurricane or flood protection, but are not so defined for purposes of these guidelines.

*Direct and Significant Impact*—a direct and significant modification or alteration in the physical or biological characteristics of coastal waters which results from an action or series of actions caused by man.

*Dredge or Dredging*—(verb) the removal by excavation or any other means of native material, including soil, sand, mud, clay, and semisolid sediment, regardless of whether the material supports or is supporting vegetation, from any lands or water bottoms in the coastal zone of Louisiana.

*Dredged Material*—soil, mud, and/or other sediment that will be dredged pursuant to a proposed activity for which a coastal use permit or other authorization is required.

*Ecological Value*—the ability of an area to support vegetation and fish and wildlife populations.

*Endangered Species*—as defined in the Endangered Species Act, as amended, any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary of the U.S. Department of Interior to constitute a pest whose protection under the provisions of the Endangered Species Act, as amended, would present an overwhelming and overriding risk to man.

*Expectable Adverse Conditions*—natural or man-made hazardous conditions which can be expected or predicted to occur at regular intervals. Included are such events as 125 mile per hour hurricanes and associated tides, 100 year floods and reasonably probable accidents.

*Fastlands*—lands surrounded by publicly-owned, maintained, or otherwise validly existing levees or natural formations as of January 1, 1979, or as may be lawfully constructed in the future, which levees or natural formations would normally prevent activities, not to include the pumping of water for drainage purposes, within the surrounded area from having direct and significant impacts on coastal waters.

*Feasible and Practical*—those locations, methods and/or practices which are of established usefulness and efficiency and allow the use or activity to be carried out successfully.

*Federal Advisory Agencies*—include, but are not limited to, the U.S. Fish and Wildlife Service, the U.S. National Marine Fisheries Service, the U.S. Environmental Protection Agency, and the U.S. Natural Resources Conservation Service.

*Force Majeure*—an act of God, war, blockade, lightning, fire, storm, flood, and any other cause which is not within the control of the party claiming force majeure.

*Future with Project Scenario*—portrayal of anticipated changes to ecological values (i.e., habitat values and wetland acreage) throughout the project years in a situation where a given project would be implemented.

*Future without Project Scenario*—portrayal of anticipated changes to ecological values (i.e., habitat values and wetland acreage) throughout the project years in a situation where a given project would not be implemented.

*Geologic Review Procedure*—a process by which alternative methods, including alternative locations, for oil and gas exploration are evaluated on their environmental, technical, and economic merits on an individual basis; alternative methods, including alternative locations, of oil and gas production and transmission activities which are specifically associated with the proposed exploration activity shall also be evaluated in this process. These alternative methods, including alternative locations, are presented and evaluated at a meeting by a group of representatives of the involved parties. A geologic review group is composed, at a minimum, of representatives of the applicant, a petroleum geologist and a petroleum engineer representing the Coastal Management Division and/or the New Orleans District Corps of Engineers, and a representative of the Coastal Management Division Permit Section, and may include, but is not limited to, representatives of the Louisiana Department of Wildlife and Fisheries, the Louisiana Department of Environmental Quality, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. National Marine Fisheries Service, and the U.S. Environmental Protection Agency.

*Governmental Body*—any public department, agency, bureau, authority, or subdivision of the government of the United States or the state of Louisiana and shall include parishes and municipalities and subdivisions thereof and those governmental agencies constitutionally established.

*Guidelines*—those rules and regulations adopted pursuant to 214.27 of the SLCRMA.

*Habitat*—the natural environment where a plant or animal population lives.

*Habitat Types*—the general wetland vegetative communities which exist in the Louisiana Coastal Zone, including fresh marsh, intermediate marsh, brackish marsh, saline marsh, fresh swamp, and bottomland hardwoods.

*Holder*—as defined at R.S. 9:1272(2), means:

1. a governmental body empowered to hold an interest in immovable property under the laws of this state or the United States; or
2. a charitable corporation, charitable association, or charitable trust, the purposes or powers of which include retaining or protecting the natural, scenic, or open-space values of immovable property, assuring the availability of immovable property for agricultural, forest, recreational, or open-space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, archaeological, or cultural aspects of unimproved immovable property.

*Hurricane or Flood Protection Levees*—those levees and associated water control structures whose primary purpose is to prevent occasional surges of flood or storm generated high water. Such levee systems do not include those built to permit drainage or development of enclosed wetland areas.

*Hydrologic and Sediment Transport Modifications*—those uses and activities intended to change water circulation, direction of flow, velocity, level, or quality or quantity of transported sediment. Examples include locks, water gates, impoundments, jetties, groins, fixed and variable weirs, dams, diversion pipes, siphons, canals, and surface and groundwater withdrawals.

*Hydrologic Basin*—one of the nine general drainage areas within the Louisiana Coastal Zone as delineated on pages A-2 and A-3 of the Louisiana Coastal Wetlands Conservation and Restoration Plan, April 1990.

*Impoundment Levees*—those levees and associated water control structures whose primary purpose is to contain water within the levee system either for the prevention of the release of pollutants, to create fresh water reservoirs, or for management of fish or wildlife resources.

*Infrastructure*—those systems which provide needed support for human social institutions and developments, including transportation systems, public utilities, water and sewerage systems, communications, educational facilities, health services, law enforcement and emergency preparedness.

*In-Lieu Permit*—those permits issued in-lieu of coastal use permits pursuant to 214.31 of the SLCRMA.

*Levees*—any use or activity which creates an embankment to control or prevent water movement, to retain water or other material, or to raise a road or other lineal use above normal or flood water levels. Examples include levees, dikes and embankments of any sort.

*Linear Facilities*—those uses and activities which result in creation of structures or works which are primarily linear in nature. Examples include pipelines, roads, canals, channels, and powerlines.

*Local Government*—a governmental body having general jurisdiction and operating at the parish level.

*Local Program*—same as *approved local program*.

*Marsh*—wetlands subject to frequent inundation in which the dominant vegetation consists of reeds, sedges, grasses, cattails, and other low growth.

*Master Plan*—Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast, promulgated by the Coastal Protection and Restoration Authority pursuant to R.S. 49:213.1, et seq., as in effect on the date of submission of a complete application.

*Minerals*—oil, gas, sulfur, geothermal, geopressured, salt, or other naturally occurring energy or chemical resources which are produced from below the surface in the coastal zone. Not included are such surface resources as clam or oyster shells, dirt, sand, or gravel.

*Mitigation*—all actions taken by a permittee to avoid, minimize, restore, and compensate for ecological values lost due to a permitted activity.

*Mitigation Bank*—an area identified, with specific measures implemented to create, restore, protect, and/or enhance wetlands, for the purpose of producing ecological values, measured as average annual habitat units or cumulative habitat units (mitigation credits). Those credits may be donated, sold, traded, or otherwise used for the purpose of compensating for the ecological values lost due to a permitted activity.

*Off-Site*—not within or adjoining the area directly modified by the permitted activity and not directly related to implementation of the permitted activity.

*Oil, Gas and Other Mineral Activities*—those uses and activities which are directly involved in the exploration, production, and refining of oil, gas, and other minerals. Examples include geophysical surveying, establishment of drill sites and access to them, drilling, on site storage of supplies, products and waste materials, production, refining, and spill cleanup.

*On-Site*—within or adjoining the area directly modified by the permitted activity or directly related to implementation of the permitted activity.

*Overriding Public Interest*—the public interest benefits of a given activity clearly outweigh the public interest benefits of compensating for wetland values lost as a result of the activity, as in the case of certain mineral extraction, production, and transportation activities or construction of flood protection facilities critical for protection of existing infrastructure.

*Particular Areas*—areas within the coastal zone of a parish with an approved local program which have unique and valuable characteristics requiring special management procedures. Such areas shall be identified, designated, and managed by the local government following procedures consistent with those for special areas.

*Permit*—a coastal use permit, or an in-lieu permit.

*Permitting Body*—either the Department of Natural Resources or a local government with an approved local program with authority to issue, or that has issued, a coastal use permit authorized by the SLCRMA.

*Person*—any natural individual, partnership, association, trust, corporation, public agency or authority, governmental body, or any other legal or juridical person created by law.

*Project Years*—the anticipated number of years that the proposed activity would have a negative or positive impact on the ecological value of the site. Project years shall be 20 years for marsh habitats and 50 years for forested habitats, unless it is clearly demonstrated by the applicant and accepted by the secretary to be shorter in duration.

*Public Hearing*—a hearing announced to the public at least 30 days in advance, at which all interested persons shall be afforded a reasonable opportunity to submit data, views or arguments, orally or in writing. At the time of the announcement of the public hearing all materials pertinent to the hearing, including documents, studies, and other data, in the possession of the party calling the hearing, must be made available to the public for review and study. As similar materials are subsequently developed, they shall be made available to the public as they become available to the party which conducted the hearing.

*Radioactive Wastes*—wastes containing source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

*Residential Coastal Use*—any coastal use associated with the construction or modification of one single-family, duplex, or triplex residence or camp. It shall also include the construction or modification to any outbuilding, bulkhead, pier, or appurtenance on a lot on which there exists a single-family, duplex, or triplex residence or camp or on a water body which is immediately adjacent to such lot.

*Secondary Impact*—an impact which would:

1. result from the proposed activity;
2. cause significant modifications or alterations to the physical characteristics of acreage beyond the limit of the area depicted as being altered in the accepted permit application drawings; and
3. be identified and quantified by the secretary based on an evaluation of similar and previously implemented activities.

*Secretary*—the Secretary of the Department of Natural Resources, or his designee.

*Sediment Deposition Systems*—controlled diversions of sediment-laden water in order to initiate land building or sediment nourishment or to minimize undesirable deposition of sediment in navigation channels or habitat areas. Typical activities include diversion channels, jetties, groins, or sediment pumps.

*Shoreline Modifications*—those uses and activities planned or constructed with the intention of directly or indirectly changing or preventing change of a shoreline. Examples include bulkheading, piers, docks, wharves, slips, and short canals, and jetties.

*SLCRMA*—the State and Local Coastal Resources Management Act of 1978, Act 361 of 1978 as amended, R.S. 49:214.21-49:214.42.

*Spoil Deposition*—the deposition of any excavated or dredged material.

*State Advisory Agencies*—include, but are not limited to, the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Environmental Quality.

*Surface Alterations*—those uses and activities which change the surface or usability of a land area or water bottom. Examples include fill deposition, land reclamation, beach nourishment, dredging (primarily areal), clearing, draining, surface mining, construction and operation of transportation, mineral, energy and industrial facilities, and industrial, commercial, and urban developments.

*Third Party Right of Enforcement*—as defined at R.S. 9:1272.(3), means a right provided in a conservation servitude to enforce any of the terms granted to a governmental body, charitable corporation, charitable association, or charitable trust, which, although eligible to be a holder, is not a holder.

*Toxic Substances*—those substances which, by their chemical, biological or radioactive properties, have the potential to endanger human health or other living organisms or ecosystems, by means of acute or chronic adverse effects, including poisoning, mutagenic, teratogenic, or carcinogenic effect.

*Unavoidable Net Loss of Ecological Values*—the net loss of ecological value that is anticipated to occur as the result of a permitted/authorized activity, despite all efforts, required by the guidelines, to avoid, minimize, and restore the permitted/authorized impacts.

*Uplands*—lands 5 feet or more above sea level, fastlands, or all lands outside the coastal zone.

*Use*—any use or activity within the coastal zone which has a direct and significant impact on coastal waters.

*Waste*—any material for which no use or reuse is intended and which is to be discarded.

*Waste Disposal*—those uses and activities which involve the collections, storage and discarding or disposing of any solid or liquid material. Examples include littering; landfill; open dumping; incineration; industrial waste treatment facilities; sewerage treatment; storage in pits, ponds, or lagoons; ocean dumping and subsurface disposal.

*Water or Marsh Management Plan*—a systematic development and control plan to improve and increase biological productivity, or to minimize land loss, saltwater intrusion, erosion or other such environmental problems, or to enhance recreation.

*Wetlands*—

1. for the purposes of this Chapter except for §724, open water areas or areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions;

2. for the purposes of §724 (as defined in R.S. 49:214.41), an open water area or an area that is inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, but specifically excluding fastlands and lands more than 5 feet above sea level which occur in the designated coastal zone of the state. Wetlands generally include swamps, marshes, bogs, and similar areas.

AUTHORITY NOTE: Promulgated in accordance with R.S. 49:214.21-49:214.41.

HISTORICAL NOTE: Promulgated by the Department of Natural Resources, Office of the Secretary, LR 21:835 (August 1995), amended by the Office of Coastal Restoration and Management, LR 28:516 (March 2002), amended by the Department of Natural Resources, Office of the Secretary, LR 35:2183 (October 2009).

**APPENDIX B**

**COASTAL MANAGEMENT**

**IMPLEMENTATION ORDINANCE**



## DRAFT

EXTRACT OF THE OFFICIAL PROCEEDINGS OF THE COUNCIL OF THE PARISH OF ST. BERNARD, STATE OF LOUISIANA, TAKEN AT A REGULAR MEETING HELD IN THE COUNCIL CHAMBERS OF ST. BERNARD PARISH GOVERNMENT BUILDING, 8201 WEST JUDGE PEREZ DRIVE, CHALMETTE, LOUISIANA ON \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ AT \_\_\_\_\_ O'CLOCK \_\_\_\_.

On motion of \_\_\_\_\_, seconded by \_\_\_\_\_, it was moved to adopt the following ordinance:

ORDINANCE SBPC #\_\_\_\_\_

Summary No.\_\_\_\_\_

Introduced by:\_\_\_\_\_

Public Hearing Held:\_\_\_\_\_

AN ORDINANCE IMPLEMENTING THE UPDATED COASTAL ZONE MANAGEMENT PROGRAM FOR ST. BERNARD PARISH AND PROVIDING FOR THE REGULATION AND CONTROL OF COASTAL USES OF LOCAL CONCERN.

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### ARTICLE 1 PURPOSE

- 1.1 The St. Bernard Parish Coastal Zone Management Ordinance is hereby enacted. The purpose of this ordinance is to implement the updated Coastal Zone Management Plan that will maintain a balance between conservation and coastal use in St. Bernard Parish.
- 1.2 This ordinance is adopted pursuant to the State and Local Coastal Resources Management Act of 1978 (Act 361, as amended). This Act establishes the Louisiana Coastal Zone Management Program which allowed for a coastal use permitting system to be created at both state and parish levels of government. This ordinance ensures the continuation of a coastal use permitting system for St. Bernard Parish.
- 1.3 The Parish of St. Bernard does hereby certify that the updated Local Coastal Zone Management Program adopted pursuant to La.R.S. 49:213, its guidelines, rules and regulations, is consistent with the Louisiana Coastal Resources Program, its policies and

objectives, and that the Parish of St. Bernard Local Coastal Zone Management Program shall be interpreted and administered consistently with such policies, objectives, and guidelines.

## ARTICLE 2 DEFINITIONS

- 1.1 Unless specifically defined in this section, words and phrases in this ordinance shall be read as commonly used and to give this ordinance its most reasonable application.
- 1.2 Act means the State and Local Resources Management Act of 1978, Act 361 of 1978 as amended (SLCRMA) La.R.S.49:214.21 et seq.
- 1.3 After-the-Fact Permit means a coastal use permit issued after the commencement of an activity or use.
- 1.4 Aggrieved Party means any person who receives a decision adverse to their interests or proposed objectives.
- 1.5 Agricultural, Forestry and Aquaculture Activities means those activities that are common practice and incident to agriculture, forestry and aquaculture provided that the activity is one of an on-going basis; that do not require a permit from the U.S. Army Corps of Engineers; and that do not result in a new or changed use of the land. Examples include seeding, fence building, and harvesting.
- 1.6 Applicant means a landowner, person or company responsible for the proposed project.
- 1.7 Camp means a structure built and used for non-commercial and non-profit purposes and commonly referred to as “single family,” not multiple family dwellings and shall apply only to such structure built singly, by and for the owner/lessee of the land for the owner’s/lessee’s use and not to practices involving the building of more than one such structure as in subdividing, tract development, speculative building, or recreational community development and intended for periodic occupancy.
- 1.8 Closely-related actions mean those actions that:
  - 1.8.1. automatically trigger other actions which may require permits;
  - 1.8.2. cannot proceed unless other actions are taken previously or simultaneously; or
  - 1.8.3. are interdependent parts of a larger action and depend upon the larger action for their justification.
- 1.9 Coastal Use Permit or permit or CUP means those permits required by La.R.S. 49:214.30.
- 1.10 Coastal Waters means bays, lakes, inlets, estuaries, rivers, bayous and other bodies of water within the boundaries of the coastal zone.
- 1.11 Coastal Zone means that area described in La.R.S. 49:214.24.
- 1.12 Coastal Zone Management Program means the applicable laws, regulations, policies and guidelines developed by federal, state, and local government to implement the State and Local Coastal Resources Management Act of 1978, Act 361 of 1978 as amended.
- 1.13 Compensatory mitigation means replacement, substitution, enhancement, or protection of ecological values to offset anticipated losses of those values caused by a permitted activity.

2.14 Conservation Plan means the Louisiana Coastal Wetlands Conservation Plan which details the comprehensive effort of the state to offset losses of wetlands from development activity.

2.15 Continuing Uses are activities which by nature are carried out on an uninterrupted basis, examples include shell dredging and surface mining activities, projects involving maintenance dredging of existing waterways, and maintenance and repair of existing levees.

2.16 Cumulative Impacts means the influence on the environment resulting from the incremental effects of the activity when added to other past, present, and reasonably foreseeable future activities regardless of what agency or person undertakes those activities. Cumulative impacts may result from individually minor but collectively significant activity taking place over a period of time. “Secondary” impacts caused or enabled by a particular project are considered cumulative; including, but not limited to, increased development in an area where new sewers, roads, and other infrastructure have been built whether plans exist for this area at the time the infrastructure is built or not. Cumulative impacts to coastal zone resources may result from activity outside the coastal zone or from activity exempt under coastal zone permitting.

2.17 Department or DNR means Department of Natural Resources.

2.18 Direct and Significant Impact means an impact that alters the physical, hydrological, chemical, or biological characteristics of coastal waters as a result of an action or series of actions undertaken by man.

2.19 Emergency means a situation that poses an immediate threat to public safety, life, health or property and action in response to the threat cannot await the permitting process. Declaration of an emergency must come from a governmental body with authority to make such declarations and continues for the time that body specifies.

2.20 Environmental Management Unit or EMU means an area with certain distinguishing physical, hydrological, chemical, biological or cultural characteristics.

2.21. Exempted Use shall mean any use specifically listed in this ordinance as not requiring a permit.

2.22 Fastlands means lands surrounded by publicly-owned, maintained, or otherwise validly existing levees or natural formations as of January 1, 1979, or as may be lawfully constructed in the future, which levees or natural formations would normally prevent activities, not to include the pumping of water for drainage proposes, within the surrounded area from having direct an significant impacts on coastal waters.

2.23 Guidelines mean Louisiana Administrative Code (L.A.C.) Title 43, Chapter 7 Subchapter B entitled “Coastal Use Guidelines.”

2.24 Habitat means the natural environment where a plant or animal population lives.

2.25 Interested person means any of the following:

2.25.1 Any applicant, an agent or an employee of the applicant, or a person receiving consideration for representing the applicant, or a participant in a proceeding on the matter.

2.25.2 Any person with a financial interest in a matter before the appeals panel, or an

agent or employee of the person with a financial interest, or a person representing the person with a financial interest.

2.25.3 A representative acting on behalf of any civic, environmental, neighborhood, business, labor, trade, or similar organization who intends to influence the decision of the appeals panel on a matter before the appeals panel.

2.26 Levees mean any use or activity which creates an embankment to control or prevent water movement, to retain water or other material, or to raise a road or other linear use above normal or flood water levels. Examples include levees, dikes and embankments of any sort.

2.27 Local administrator means the St. Bernard Parish professional charged with implementing and administering this ordinance and the Local Coastal Zone Management Plan.

2.28 Local Coastal Zone Advisory Committee or Committee means the group of designated individuals, representing coastal area user groups.

2.29 Local Government means the St. Bernard Parish Council and Parish President.

2.30 Navigational Aids means buoys, marker piles, dolphins, piling, and/or pile clusters when in conformance with U.S. Coast Guard standards and do not involve dredge and fill activity.

2.31 Non-continuing Uses are activities which by nature are done on a one-time basis, examples include dredging access canals for oil and gas well drilling, implementing an approved land use alteration plan and constructing new port or marina facilities.

2.32 Normal Maintenance and Repair means activity taken to reasonably preserve the utility of a lawfully existing structure in active use for the year preceding the proposed activity. It does not include expanding an existing structure, dredging and filling, or altering the magnitude or function of the original structure.

2.33 Parish Coastal Zone Management Program means the compendium of laws, regulations and enforceable policies that comprise the Parish's state and federally approved Local Coastal Management Program.

2.34 Overriding public interest means that the public interest benefits of a given activity clearly outweigh the public interest benefits of compensating for wetland values lost as a result of the activity, as in the case of certain mineral extraction, production, and transportation activities or the construction of flood protection facilities critical for protection of existing infrastructure.

2.35 Permit means a coastal use permit.

2.36 Person means any individual, partnership, association, trust, public agency or authority, corporation, government body or any other legal or jurisdictional person created by law.

2.37 Public Hearing means a hearing announced to the public at least thirty (30) days in advance, at which all interested persons shall be afforded a reasonable opportunity to submit data, views or arguments, orally or in writing. At the time of the announcement of the public hearing all materials pertinent to the hearing, including documents, studies, and other data, in the possession of the party calling the hearing, must be made available to the public for review and study. As similar materials are subsequently developed, they shall be made available to the public as they become available to the party which

conducted the hearing.

2.38 Residence means structure built and used for non-commercial and non-profit purposes and commonly referred to as “single family”, not multiple family, dwellings and shall apply only to such structures built singly, by and for the owner of the land for the owner’s use and not to practices involving the building of more than one such structure as in subdividing, tract development, speculative building, or recreational community development and intended as a primary residence.

2.39 Residents mean both real persons and entities whose occupancy in St. Bernard Parish is intended to be of an on-going, primary nature. These include, but are not limited to, civic, environmental, neighborhood, business, labor, trade, or similar organizations or a legally recognized business entity.

2.40 Secretary means the Secretary of the Department of Natural Resources or his or her designee.

2.41 Special Management Areas means those portions of the coastal zone within St. Bernard Parish that require special management procedures due to certain unique and valuable characteristics. Examples include barrier islands, shell deposits, salt domes, archaeological sites, transportation corridors, endangered species habitat, ports, and recreational sites among others. These areas may be nominated by the Parish Council. Establishment of Special Areas shall be in accordance with L.A.C. 43:L§729 et al.

2.42 State Administrator means the Office of Coastal Management within the Louisiana Department of Natural Resources.

2.43 State Use or Uses of State Concern means those uses which directly and significantly affect coastal waters and which are in need of coastal management and which have impacts of greater than LOCAL significance or which significantly affect interests of regional, state, or national concern. Uses of state concern shall include, but not be limited to:

- (1) Any dredge or fill activity which intersects with more than one water body.
- (2) Projects involving use of state owned lands or water bottoms.
- (3) State publicly funded projects.
- (4) National interest projects.
- (5) Projects occurring in more than one parish.
- (6) All mineral activities, including exploration for, and production of, oil, gas, and other minerals, all dredge and fill uses associated therewith, and all other associated uses.
- (7) All pipelines for the gathering, transportation or transmission of oil, gas and other minerals.
- (8) Energy facility siting and development
- (9) Uses of LOCAL concern which may significantly affect interests of regional, state or national concern.

2.44 Supplemental material means any of the following or other, unlisted material deemed appropriate by the local administrator: a description of the physical, chemical, hydrological, biological, and cultural environment in which the activity is proposed to take place; a list of alternatives to the proposed activity including a “status quo” alternative; a complete description of expected consequences to the physical, chemical, hydrological, biological, and cultural environment; how any such impacts will be mitigated or offset including when these environmental benefits will be achieved, evidence to support the proposal’s intended results and how the projected results -- both positive and negative -- may be monitored in the future.

2.45 The Administration means the St. Bernard Parish Department of Community

Development-Office of Coastal Zone Management, the authority of general jurisdiction and operation at the parish level.

- 2.46 Uplands mean land that is five feet or more above sea level, fastlands, or all lands outside the coastal zone.
- 2.47 Use means any use or activity within the coastal zone which has a direct and significant impact on coastal waters.
- 2.48 Wetland means land that:
  - 2.48.1 has a predominance of hydric soil;
  - 2.48.2 is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
  - 2.48.3 under normal circumstances does support a prevalence of that vegetation.
- 2.49 Wetland functions means a service that wetlands perform, including flood water storage, flood water conveyance, ground water discharge, erosion control, wave attenuation, water quality protection, scenic and aesthetic use, food chain support, and habitat for fish, wildlife, invertebrates, and plants, among others.

### ARTICLE 3 **POLICIES**

- 3.1 The following policies are contained in the updated St. Bernard Parish Coastal Zone Management Program:
  - 3.2 Support restoration strategies identified in the State of Louisiana's 2007 Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast and subsequent state approved restoration and flood protection plans using measures appropriate for St. Bernard Parish.
  - 3.3 Support restoration strategies for Regions 1 and 2 of St. Bernard Parish as recommended in Coast 2050: Toward a Sustainable Coastal Louisiana.
  - 3.4 Support restoration programs that utilize the introduction of fresh water and sediment into wetlands.
  - 3.5 Support beneficial use of dredged material to create wetlands, barrier islands, and beaches, where practicable.
  - 3.6 Encourage use of appropriate bankline stabilization measures to retard wetland loss resulting from shoreline erosion by wind, wave and slumping actions.
  - 3.7 Support and encourage wetland management and restoration projects implemented by private landowners.
  - 3.8 Support state and federal wetland management and restoration projects in designated wildlife management areas.
  - 3.9 Encourage the locating of new pipelines in established pipeline corridors to the maximum extent practical.
  - 3.10 Encourage oil and gas exploration and production practices to be conducted in an environmentally sound manner and consistent with the CZMP and implementation ordinance.

- 3.11 Encourage oil and gas operating companies to incorporate wetland management and mitigation components in their operation plans that are consistent with state and local coastal management programs.
- 3.12 Support actions to restore and/or maintain barrier islands.
- 3.13 Oppose projects that damage barrier islands, beaches, wetlands, and other habitats where proposed project associated restoration or mitigation measures are inadequate.
- 3.14 Support reestablishment and/or relocation of productive oyster seed reefs that are impacted by government funded restoration projects (e.g., freshwater diversions, dredging and deposition of fill material) and man-made disasters such as oil spills.
- 3.15 Support efforts to improve water quality.
- 3.16 Support, enhance, encourage and protect multiple-use of resources consistent with maintenance and enhancement of renewable resources management and productivity, and the need to provide for economic and orderly growth and development, with minimization of adverse effects of one resource use upon another without imposing undue restrictions on any user.
- 3.17 Promote recreational activities in wetlands through the development of environmentally compliant support and staging facilities such as parks and boat launches.
- 3.18 Encourage the use of Best Management Practices during construction of development projects in upland and fastland areas in order to reduce adverse environmental impacts to adjacent wetlands.
- 3.19 Encourage avoidance of activities on upland and fastland areas that would have negative and unmitigated impacts on adjacent wetlands.
- 3.20 Establish separate guidelines for wetlands that recognize that:
  - 3.20.1 The wetlands of St. Bernard Parish, although part of a larger estuarine ecosystem, stretching from Lake Maurepas to the Chandeleur Islands, consist of a series of distinct geographic areas. These areas have been combined into appropriate environmental units to facilitate wetland management and habitat enhancement.
  - 3.20.2 Individual permissible uses for each wetland management unit are based on a balance of economic, environmental, and social priorities and needs.
  - 3.20.3 The primary goal for future use of parish wetlands is to maintain them in their natural condition and to restore, when possible, those areas that have deteriorated due to natural and human-induced actions. A major aspect of these restoration activities should be the preservation of the parish's archaeological and historical resources. Maximum use of the renewable and non-renewable resources of the wetlands is encouraged so long as high productivity is maintained and the ecological balance of the wetlands is not disrupted further.

#### **ARTICLE 4 MANAGEMENT GOALS**

- 4.1 The following management goals are contained in the updated St. Bernard Parish Coastal Zone Management Program:
- 4.2 Attain proper use of parish resources through a balance of conservation and development.
- 4.3 Identify natural habitats with unique characteristics and develop methods to maintain

them.

- 4.4 Determine the degree of development intensity suitable for all areas of the parish.
- 4.5 Enhance the biologically productive and physically protective aspects of the parish's wetland environment.
- 4.6 Enhance cultural and recreational opportunities in the parish by the development of ecologically sensitive facilities within the context of a comprehensive program.
- 4.7 Enhance the productivity, flood protection and water storage functions of St. Bernard Parish wetlands.
- 4.8 Protect stable wetlands, reduce land loss in deteriorating wetlands, and create and restore wetlands, where practicable.
- 4.9 Reduce shoreline erosion in order to preserve wetlands and preserve shallow estuarine areas and protect water-dependent development outside of fastlands.
- 4.10 Introduce fresh water and nutrients into wetland areas to restore and sustain natural habitats to the maximum extent practical.
- 4.11 Improve and maintain water quality.
- 4.12 Enhance multiple functions of wetlands through the restoration of fresh-to-saline gradients of surface water using hydrological management.
- 4.13 Reduce saltwater intrusion through the emplacement of plugs or water control structures at the ends of canals.
- 4.14 Protect water bottoms and associated biotic communities from damages induced by human activity, such as dredging.
- 4.15 Achieve environmentally sound oil and gas exploration and production practices that minimize environmental damage to wetlands and sensitive natural areas and contribute to the parish's efforts to maintain and restore wetlands, sensitive natural areas, and barrier islands.
- 4.16 Restore Chandeleur Barrier Island system through coastal restoration projects involving repair of breaches and creation of dunes for protection from storm surge and for wildlife habitat.
- 4.17 Maintain the extensive seagrass beds behind the Chandeleur Barrier Islands.
- 4.18 Restore wetlands, including marshes and where feasible cypress swamps, using freshwater diversions and dredged material near protection levees for additional protection from storms.
- 4.19 Restore forest habitats (freshwater swamps, maritime forests, live oak natural levee forests) throughout the parish for habitat diversity, use by migratory neotropical birds, recreation and storm surge protection.
- 4.20 Encourage participation in wetland conservation and restoration programs by landowners and public agencies.
- 4.21 Evaluate proposed development of wetland areas for non-wetland dependent uses and

require appropriate mitigation for unavoidable adverse impacts.

- 4.22 Support environmentally sound economic uses with special emphasis on sustainable multiple-use of waterfront areas.
- 4.23 Support orderly development with encouragement of land uses that are compatible with wetlands and aquatic habitats.

## **ARTICLE 5 DUTIES OF THE LOCAL ADMINISTRATOR**

- 5.1 The local administrator shall perform the following duties:
- 5.2 Manage the local Coastal Zone Management Program, as adopted by the St. Bernard Parish Government, and state and federally approved;
- 5.3 Issue, deny or modify CUPs consistent with the Coastal Zone Management Program for St. Bernard Parish;
- 5.4 Adopt any rules and regulations that are reasonable and necessary to carry out this ordinance in conformance with the generally established procedures for St. Bernard Parish rule making;
- 5.5 Conduct any investigation necessary to ascertain compliance with this ordinance;
- 5.6 Act as liaison for St. Bernard Parish to the U.S. Army Corps of Engineers, other parishes, and other state and local governmental entities relative to projects governed by this ordinance or the Act which are proposed to take place in or impact the coastal zone of St. Bernard Parish;
- 5.7 Review and comment upon uses of state concern, as defined in La.R.S.49:214.25 A (1);
- 5.8 Coordinate with the state administrator regarding receipt of a complete coastal use permit application for a use of local concern;
- 5.9 Maintain and hold open for public inspection records pertaining to this ordinance and activities governed by this ordinance;
- 5.10 Regularly update the Committee on actions taken by the local administrator;
- 5.11 Enforce this ordinance and the Act;
- 5.12 Request and receive the assistance of other officers and employees of the parish, when necessary to carry out these duties;
- 5.13 Consider written requests from St. Bernard Parish residents to add, modify, or delete local rules implementing this ordinance;
- 5.13 Submit regular reports as required by the Secretary; and
- 5.15 Implement this ordinance and the Act.
- 5.16 To avoid duplication, any of the local administrator's duties that are already performed by another St. Bernard Parish Office (i.e., Office of Safety and Permits and Office of Planning and Zoning in the Department of Community Development) may remain a responsibility of that office provided that a standardized method of communicating between that office and the local administrator exists.

## ARTICLE 6 DUTIES OF THE LOCAL COASTAL ZONE ADVISORY COMMITTEE

- 6.1 The Local Coastal Zone Advisory Committee shall:
- 6.2 Include representatives of various interest groups to encourage full use of the coastal resources while recognizing it is in the public interest of the people of the St. Bernard Parish Council or St. Bernard Parish to establish a proper balance between development and conservation;
- 6.3 Have its membership appointed by majority vote of the St. Bernard Parish Council;
- 6.4 Remove members only for good cause;
- 6.5 Have its public meetings organized by the local administrator who functions as a non-voting chair of the committee meetings;
- 6.6 Advise, comment, or make recommendations to the Parish Council on any coastal project, coastal activity, coastal development, or coastal use permit application;
- 6.7 Review and comment upon any proposed rules and regulations impacting the Coastal Zone;
- 6.8 Recommend to the Parish Council any modifications to this ordinance;
- 6.9 Review and comment upon any coastal use permit application at the request of the local administrator.

## ARTICLE 7 COASTAL USE PERMIT APPLICATIONS

- 7.1 Undertaking a use of local or state concern in the St. Bernard Parish coastal zone without a Coastal Use Permit or in violation of permit terms is unlawful. Activities listed under La. R.S. 49:214.34(A) are exempt from this ordinance, except when that particular activity would have direct and significant impact on coastal waters. These exceptions noted in the revised statutes must be described in a complete permit application to allow a determination of whether they have a direct and significant impact on coastal waters.
- 7.2 A coastal use permit shall be required for a coastal use of local concern, as defined in the State and Local Coastal Resources Management Act of 1978 (Act 361 of 1978 as amended). Uses or activities occurring in areas 5 feet or more above mean sea level or in fastlands do not require a coastal use permit, unless it can be shown that the use or activity has a direct and significant impact on coastal waters. Uses of local concern include, but are not limited to:
  - (1) Privately funded projects which are not a use of state concern,
  - (2) Publicly funded projects which are not uses of state concern,
  - (3) Maintenance of uses of local concern,
  - (4) Jetties or breakwaters,
  - (5) Dredge or fill projects not intersecting more than one (1) water body,
  - (6) Bulkheads,
  - (7) Piers,
  - (8) Camps and Cattlewalks,
  - (9) Maintenance dredging,
  - (10) Private water control structure less than \$15,000 in cost,
  - (11) Uses on cheniers, salt domes, or similar landforms,
  - (12) Any other coastal uses which directly and significantly affect coastal waters, and are in need of coastal management but are not uses of state

concern and which should be regulated primarily at the local level. The St. Bernard Parish Council shall have the power to add other coastal uses to this list as recommended by the Department of Community Development, Office of Coastal Zone Management and the Coastal Zone Advisory Committee, subject to the approval of the Secretary.

- 7.3 Separate applications shall be made for each unrelated, single action. Actions that are closely-related should be included in a single permit application.
- 7.4 Applications are to be submitted directly to the state administrator for initial review and determination of whether the proposed action is of state or local concern.
- 7.5 The local administrator will assist the applicant to the extent required to submit the permit application and any supplemental materials, on line or as a hard copy, to the state administrator for an authoritative determination as to whether or not a use is of state or local concern.
- 7.6 All applications shall be made on the form(s) prescribed by the Secretary, available through the St. Bernard Parish Department of Community Development, Office of Coastal Zone Management or on the Website of the Louisiana Department of Natural Resources.
- 7.7 Applications must include material required by L.A.C. Title 43 §723(C)(2), including, but not limited to, the following:
  - 7.7.1 The name, address, and telephone number of the applicant. If the applicant is not the owner of the property, written documentation that the owner has given the applicant authority to act on his or her behalf is required,
  - 7.7.2 A detailed description of the coastal use activity,
  - 7.7.3 Maps showing actual location, size and dimensions of the real property used and the access routes to be used, if relevant,
  - 7.7.4 Plans showing the exact location, size, and height of the buildings or structures to be developed,
  - 7.7.5 A list of all applications, approvals, and/or denials already made concerning the development to/by federal, state, or local agencies,
  - 7.7.6 A description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of the proposed coastal use,
  - 7.7.7 If the development involves dredging, a description of the type, quantity and composition of the dredged material, plats showing extent of dredge and fill, the method of dredging and disposal.
  - 7.7.8 Any other documentation required by the Local or State Administrator due to the particular nature of the project, and
  - 7.7.8 All required application fees.
- 7.8 Once the Secretary determines that an application is complete and involves a use or activity of local concern, the complete application is sent to the local administrator for processing and to the US Army Corps of Engineers, New Orleans District.

7.9 Upon a finding of no impact(s), the local administrator shall notify the project applicant proponent that the activity may proceed without a coastal use permit.

7.10 Upon a finding that direct and significant impacts(s) will result from the proposed activity, the application will proceed through the permit process of the St. Bernard Parish Department of Community Development, Office of Coastal Zone Management.

7.11 Application fees for local coastal use permits may be assessed according to a schedule prepared and posted by the local administrator.

7.12 The application fee is based on the estimated cost of the proposed coastal use and wetland area (acreage) of impact current at the time of the permit application:

CLASS	COST	IMPACT	FEES
I	< \$100K	< 1 acre	\$150
II	\$100K - \$200K	< 1 acre	\$500
III	> \$200K	or 1-3 acres	\$2,000
IV	N/A	3 – 10 acres	\$5,000
V	N/A	> 10 acres	\$10,000
Schedule of Fees as of June 1, 2008			

7.12.1 Class I (\$150) Coastal projects which cost less than one hundred thousand dollars (\$100,000) and impact less than one (1) acre of wetlands. Any coastal project that cannot otherwise be classified will be considered Class I.

7.12.2 Class II (\$500) Coastal projects which cost between one hundred thousand dollars (\$100,000) and two hundred thousand dollars (\$200,000) and impact less than one (1) acre of wetlands.

7.12.3 Class III (\$2,000) Coastal projects which cost *over* two hundred thousand dollars (\$200,000) *or* impact from one (1) to three (3) acres of wetlands. Class III projects also include all wells; well platforms; pipeline dredging; excavation; seismic exploration jobs; and any other well activity which has a direct and significant impact on the water bottom.

7.12.4 Class IV (\$5,000) Coastal projects which impact from three (3) to ten (10) acres of wetlands.

7.12.5 Class V (\$10,000) Coastal projects which impact greater than ten (10) acres of wetlands.

7.12.6 The term “impact” shall be interpreted to mean the following: *Direct and significant impact* means an impact that perceptibly or measurably alters the physical, hydrological, chemical, or biological characteristics of coastal waters as a result of an action or series of actions undertaken by man.

## ARTICLE 8 PERMIT APPLICATION REVIEW PROCESS

8.1 Application processing for a use or activity of local concern will begin when a complete application is accepted by the local administrator from the state administrator. The local administrator shall assign it a number and acknowledge its receipt by the submission of a permit application acknowledgement code sheet to the state administrator within two (2) days of receipt of the complete application.

8.2 Local Concern:

8.2.1 The local administrator shall, within 10 days of receipt of a complete application, make public notice in the official parish newspaper of the pending local use application in accordance with L.A.C. 43:1,723(C)(5).

8.2.2 The local administrator shall review the application for consistency with the

state and local coastal zone management program guidelines. Before expiration of the applicable 25-day public comment period, the local administrator shall:

- 8.2.2.1 forward copies of the local concern application to appropriate parish officials for comment.
- 8.2.2.2 solicit comments from the local Coastal Zone Advisory Committee members. The applicant or other agencies with expertise may be provided an opportunity to address issues raised in comments prior to the final permit decision.
- 8.2.2.3 make a determination regarding the appropriateness of calling a public hearing on the proposed local use based on the same requirements noted for state concerns or at the request of the applicant or a majority of the Coastal Zone Advisory Committee. To be considered, the request must be received within 25 days of the official journal publication. A decision to call a public hearing shall interrupt the timeline for deciding the appropriateness of issuing or denying the permit application, however, the hearing shall be scheduled in a prudent manner. Any documents, studies or other data in the applicant's possession relevant to the proposed use must be made available to the public for review, study, and duplication at least fifteen (15) days prior to the hearing. As additional materials are developed, they must also be made available. When appropriate, the local administrator shall hold a public hearing in accordance with the St. Bernard Parish's procedures governing public hearing within 30 days of Public Hearing Notice.
- 8.2.2.4 submit the local coastal use permit application to the St. Bernard Parish Council for review, after the Coastal Zone Advisory Committee approves the application.
- 8.2.2.5 immediately notify the permit applicant of the Council's approval, and that the approval is conditioned upon approval of the St. Bernard Port, Harbor and Terminal District and the US Army Corps of Engineers.
- 8.2.2.6 immediately issue Public Notice of Council's decision.
- 8.2.2.7 immediately send the local coastal use permit application that has been approved by the Council to the St. Bernard Port, Harbor and Terminal District (SBPHTD) for review. The SBPHTD directly notifies the applicant and the local administrator of their decision.
- 8.2.2.8 consider and address in writing each comment received on the application in the final permit decision;
- 8.2.2.9 include a short, plain statement explaining the basis for decision on each final permit decision;
- 8.2.2.10 either send a permit to the applicant or send notice of denial to the applicant within thirty (30) days of the giving of public notice or within 15 days after the closing of the record of a public hearing, if held, whichever is later and in accordance with L.A.C. 43:1723(C)(8); and
- 8.2.2.11 shall assess mitigation for coastal wetland losses, caused by permitted activities consistent with the requirement of the Louisiana Coastal

Resources programs and attendant regulations and guidelines, if applicable.

8.3 State Concern

8.3.1 Upon the receipt of an application deemed to be a state concern application by the Secretary, the local administrator shall review the proposed activity for consistency with their program guidelines and with the goals, objectives and policies developed for the environmental management units(s) in which the proposed activity would take place. Based on this review the local administrator shall:

8.3.1.1 forward copies of the state concern application to appropriate parish officials;

8.3.1.2 solicit comments from the Local Coastal Zone Advisory Committee and parish officials; and

8.3.1.3 request a public hearing when there is significant public opposition to a proposed use, or when there have been requests from legislators or local governments or other local authorities, or in controversial cases involving significant economic, social, or environmental issues.

8.3.2 The local administrator may:

8.3.2.1 submit comments to the state administrator regarding the application within twenty-five (25) days from the date of the official journal publication of the notice. Note: General permits have a shorter window of review time and the local administrator should forward comments in accordance with the specific general permit timelines.

8.3.2.2 assist the state administrator in the scheduling and location of requested public hearings.

8.4 Any person may obtain a copy of a local permit application and supporting documents by making a request to St. Bernard Parish Department of Community Development, or its successor and providing reasonable costs of copying, postage, and handling.

8.5 An issued local permit shall contain conditions described in L.A.C. 43:1723(C)(9) and any other conditions designated by parish ordinance and by the local administrator in compliance with the St. Bernard Parish Coastal Zone Management Program, the guidelines, and the Act.

8.5.1 The term of an issued permit shall be as follows:

8.5.1.1 Two (2) years to initiate the non-continuing use from the date of issuance with five (5) years for completion from date of issuance. The permit term for initiation may be extended for an additional two (2) years by the local administrator. The permit term for completion may not be extended.

8.5.2.2 The term of a coastal use permit for a continuing use shall be five (5) years from the date of issuance with no provisions for extension. Renewal may occur in the form of a new application.

8.5.2 Modification and suspension shall be allowed in accordance with L.A.C.

43:1.723(D)(1) & (2).

- 8.6 The local administrator's decision on a permit application is evidenced by his/her signature on issued permit or on the mailing of a letter notifying the applicant of the denial. Copies of the local program administrator's decision shall be mailed to the applicant by certified mail within three (3) days of the date the decision was made.
- 8.7 All permitting decisions made pursuant to this ordinance shall be published in the official St. Bernard Parish journal within ten (10) days.
- 8.8 Conditions and Compliance. By accepting the permit, the applicant agrees to the following:
  - 8.8.1 to act in accordance with the plans and specifications as contained in the approved application and in any associated compensatory mitigation plan required in the permit process;
  - 8.8.2 to comply with permit conditions imposed to ensure compliance with the Local Coastal Zone Management Program;
  - 8.8.3 to adjust, alter, or remove any structure or physical alteration if the local administrator and a majority of the Committee determine such action is necessary to achieve compliance with the Local Coastal Zone Management Program;
  - 8.8.4 to provide an acceptable surety bond, in an appropriate amount as posted by the local administrator, to ensure adjustment, alteration, or removal should the applicant fail to take such action when:
    - 8.8.4.1 The bond requirement will be a permit condition required prior to start of any construction.
    - 8.8.4.2 The amount of the bond shall be one tenth (1/10) of the estimated cost of the project.
    - 8.8.4.3 The bond shall be returned to the applicant promptly upon satisfactory completion of the project as documented upon inspection of the project by the authorized representative of the Parish and the subsequent determination that the work is in compliance with the terms of the permit.
    - 8.8.4.4 After failure to comply with all permit terms and conditions within a previous 36-month period the local administrator may enhance the bond requirement.
    - 8.8.4.5 After demonstrating repeatedly the good faith compliance with all permit terms and conditions of previously granted coastal use permits, an applicant may request that the local administrator waive the bond requirement or reduce the amount for future permits.
  - 8.8.5 to hold the state of Louisiana, St. Bernard Parish, and all officers and employees thereof harmless from any injury to persons or property resulting from actions undertaken to carry out the permit;
  - 8.8.6 to certify that the permitted activity and any required mitigation will be completed in accord with permit or permits, upon request of the local

administrator, provide certification from a licensed professional to that effect; and

8.8.7 to allow reasonable inspection of the project for purposes of monitoring and compliance inspections.

8.9 Variances

8.9.1 A variance from the Local Coastal Zone Management Program may be granted when the local administrator and a majority of the Coastal Zone Advisory Committee find that:

8.9.1.1 the property proposed as the site for the project is subject to exceptional circumstances that warrant recognition and special provision; and

8.9.1.2 the granting of a variance poses no detriment to the Coastal Zone.

8.9.2 For purposes of the Local Coastal Zone Management Program, a permit variance shall be treated as any other permit.

8.10 Activities not requiring a coastal use permit (L.A.C. 43:1,723(B) et al.)

8.10.1 General

8.10.1.1 The following activities normally do not have direct and significant impacts on coastal waters; hence, a coastal use permit is not required, except as set forth in the following clauses:

8.10.1.1 agricultural, forestry, and aquaculture activities on lands consistently used in the past for such activities;

8.10.1.2 hunting, fishing, trapping, and the preservation of scenic, historic, and scientific areas and wildlife preserves;

8.10.1.3 normal maintenance or repair of existing structures including emergency repairs of damage caused by accident, fire, or the elements;

8.10.1.4 construction of a residence or camp;

8.10.1.5 construction and modification of navigational aids such as channel markers and anchor buoys;

8.10.1.6 activities which do not have a direct and significant impact on coastal waters.

8.10.2. Activities on Lands 5 Feet or More above Sea Level or within Fastlands

8.10.2.1 Activities occurring wholly on lands 5 feet or more above sea level or within fastlands do not normally have direct and significant impacts on coastal waters. Consequently, a coastal use permit for such uses generally need not be applied for.

8.10.2.2 However, if a proposed activity exempted from permitting in Subparagraph a, above, will result in discharges into coastal waters, or significantly change existing water flow into coastal waters, then the person proposing the activity shall notify the secretary and provide such information regarding the proposed activity as may be required by the secretary in deciding whether the activity is a use subject to a coastal permit.

8.10.2.3 Should it be found that a particular activity exempted by Subparagraph a, above, may have a direct and significant impact on coastal waters, the department may conduct such investigation as may be appropriate to ascertain the facts and may require the persons conducting such activity to provide appropriate factual information regarding the activity so that a determination may be made as to whether the activity is a use subject to a permit.

8.10.2.4 The secretary shall determine whether a coastal use permit is required for a particular activity. A coastal use permit will be required only for those elements of the activity which have direct and significant impacts on coastal waters.

8.10.2.5 The exemption described in this Section shall not refer to activities occurring on cheniers, salt domes, barrier islands, beaches, and similar isolated, raised land forms in the coastal zone. It does refer to natural ridges and levees.

#### 8.10.3 Emergency Uses

8.10.3.1 Coastal use permits are not required in advance for conducting uses necessary to correct emergency situations.

8.10.3.1.1 situations are those brought about by natural or man-made causes, such as storms, floods, fires, wrecks, explosions, spills, which would result in hazard to life, loss of property, or damage to the environment if immediate corrective action were not taken.

8.10.3.1.2 This exemption applies only to those corrective actions which are immediately required for the protection of lives, property, or the environment necessitated by the emergency situation.

8.10.3.2 Prior to undertaking such emergency uses, or as soon as possible thereafter, the person carrying out the use shall notify the secretary and the local government, if the use is conducted in a parish with an approved local program, and give a brief description of the emergency use and the necessity for carrying it out without a coastal use permit.

8.10.3.3 As soon as possible after the emergency situation arises, any person who has conducted an emergency use shall report on the emergency use to the approved local program or to the administrator. A determination shall be made as to whether the emergency use will continue to have direct and significant impacts on coastal waters. If so, the user shall apply for an after-the-fact permit. The removal of any structure or works occasioned by the emergency and the restoration of the condition existing prior to the emergency use may be ordered if the permit is denied in whole or in part.

#### 8.10.4 Normal Maintenance and Repair

8.10.4.1 Normal repairs and the rehabilitation, replacement, or maintenance of existing structures shall not require a coastal use permit provided that:

8.10.4.1.1 the structure or work was lawfully in existence, currently serviceable, and in active use during the year preceding the repair, replacement or maintenance; and

- 8.10.4.1.2 the repair or maintenance does not result in an encroachment into a wetland area greater than that of the previous structure or work; and
- 8.10.4.1.3 the repair or maintenance does not involve dredge or fill activities; and
- 8.10.4.1.4 the repair or maintenance does not result in a structure or facility that is significantly different in magnitude or function from the original.
- 8.10.4.2 This exemption shall not apply to the repair or maintenance of any structure or facility built or maintained in violation of the coastal management program.
- 8.10.4.3 Coastal use permits will normally authorize periodic maintenance including maintenance dredging. All maintenance activities authorized by coastal use permits shall be conducted pursuant to the conditions established for that permit. Where maintenance is performed which is not described in an applicable coastal use permit, it shall conform to this Section.

#### **8.10.5 Construction of a Residence or Camp**

- 8.10.5.1 The construction of a residence or a camp shall not require a coastal use permit provided that:
  - 8.10.5.1.1 the terms shall refer solely to structures used for noncommercial and nonprofit purposes and which are commonly referred to as "single family" and not multiple family dwellings;
  - 8.10.5.1.2 the terms shall refer solely to the construction of one such structure by or for the owner of the land for the owner's use and not to practices involving the building of more than one such structure as in subdividing, tract development, speculative building, or recreational community development.
- 8.10.5.1 The exemption shall apply only to the construction of the structure and appurtenances such as septic fields, outbuildings, walk-ways, gazebos, small wharves, landings, boathouses, private driveways, and similar works, but not to any bulkheading or any dredging or filling activity except for small amounts of fill necessary for the structure itself and for the installation and maintenance of septic or sewerage facilities.

#### **8.10.6 Navigational Aids**

- 8.10.6.1 The construction and modification of navigational aids shall not require a coastal use permit.
- 8.10.6.2 The term shall include channel markers, buoys, marker piles, dolphins, piling, pile clusters, etc.; provided that the exemption does not apply to associated dredge or fill uses or the construction of mooring structures, advertising signs, platforms, or similar structures associated with such facilities. All navigational aids constructed pursuant to this section shall conform to United States Coast Guard standards and requirements.

#### **8.10.7 Agricultural, Forestry and Aquacultural Activities**

8.10.7.1 Agricultural, forestry and aquacultural activities on lands consistently used in the past for such activities shall not require a coastal use permit provided that:

8.10.7.1.1 the activity is located on lands or in waters which have been used on an ongoing basis for such purposes, consistent with normal practices, prior to the effective date of SLCRMA (Act 361 of 1978);

8.10.7.1.2 the activity does not require a permit from the U.S. Army Corps of Engineers and meets federal requirements for such exempted activities; and

8.10.7.1.3 the activity is not intended to, nor will it result in, changing the agricultural, forestry, or aquacultural use for which the land has been consistently used for in the past to another use.

8.10.7.2 The exemption includes but is not limited to normal agricultural, forestry, and aquacultural activities such as:

8.10.7.2.1 plowing;

8.10.7.2.2 seeding;

8.10.7.2.3 grazing;

8.10.7.2.4 cultivating;

8.10.7.2.5 insect control;

8.10.7.2.6 fence building and repair;

8.10.7.2.7 thinning;

8.10.7.2.8 harvesting for the production of food, fiber and forest products;

8.10.7.2.9 maintenance and drainage of existing farm, stock, or fish ponds;

8.10.7.2.10 digging of small drainage ditches; or

8.10.7.2.11 maintenance of existing drainage ditches and farm or forest roads carried out in accordance with good management practices.

8.10.8 Blanket Exemption. No use or activity shall require a coastal use permit if:

8.10.8.1 the use or activity was lawfully commenced or established prior to the implementation of the coastal use permit process;

8.10.8.2 the secretary determines that it does not have a direct or significant impact on coastal waters; or

8.10.8.3 the secretary determines one is not required pursuant to §723.G of these rules.

## ARTICLE 9      AFTER-THE-FACT PERMITS

9.1 A landowner and/or responsible party shall have thirty (30) days from the date of a violation notice or emergency action to submit an after-the-fact permit application. After thirty (30) days, the local administrator shall proceed in accordance with the terms of the enforcement section of this ordinance

9.2 A coastal use permit may be issued as an after-the-fact permit under one of the following circumstances:

9.2.1 The activity was undertaken in response to an emergency and the St. Bernard Parish Local Administrator was notified of the activity;

9.2.2 The activity taken was in violation of the Local Coastal Zone Management Program but would likely have been permitted if the applicant had applied for a permit;

9.3 An after-the-fact permit may be limited in duration at the discretion of the local administrator but shall not exceed the time allocated for issuance of similar coastal use permits obtained through the normal process.

9.4 An emergency after-the-fact permit must be requested within ten (10) days of the activity subject to permitting, at which time the application will proceed as any other application.

9.5 When an after-the-fact permit is issued as part of an enforcement action, additional terms and conditions may be included at the discretion of the local administrator or Coastal Zone Advisory Committee as consideration of circumstances unique to the particular applicant including, but not limited to, posting of bonds to assure compliance and reporting requirements to monitor the project.

9.6 An applicant for an after-the-fact permit may be required to fulfill conditions in the permit despite completion of the activity or return the area to its pre-emergency state if the application is denied.

9.7 For purposes of the Local Coastal Zone Management Program, an after-the-fact permit shall be treated as any other permit.

9.8 A permit may be suspended for noncompliance or for violation of the permit and/or this ordinance. The permittee shall be notified of the suspension by the Department of Community Development, Office of Coastal Zone Management or its successor and the reasons for it, and be ordered to cease all activities authorized under the coastal use permit. The notice shall advise the permittee that he or she will be given ten (10) days from receipt of notice to respond to the reasons given for the suspension.

9.9 If the permittee fails to respond, his or her coastal use permit shall be revoked and he or she shall be notified of the revocation.

9.10 If the permittee responds to the suspension, the Department of Community Development, Office of Coastal Zone Management or its successor shall reinstate, modify, or revoke the permit within ten (10) days of receipt of the response. The permittee shall be notified of the action taken.

## ARTICLE 10 MITIGATION AND MITIGATION REQUIREMENTS

10.0 The Parish will require mitigation for coastal wetland losses, caused by permitted activities, consistent with the requirements of the Louisiana Coastal Resources Program (LCRP) and the attendant regulations and guidelines; and the Parish Coastal Zone Management Program will require that the determination of mitigation requirements for permitted activities, as well as the appropriateness of mitigation proposals to offset losses, be based on loses/gains of wetland habitat values, measured by the same method utilized by the Louisiana Department of Natural Resources.

## ARTICLE 11 APPEALS

- 11.1 Any person adversely affected by a permit decision, any landowner in, or resident of St. Bernard Parish and any government authority may request an administrative appeal of the local administrator's permit decision by filing a written notice with the St. Bernard Parish Clerk of Court within ten (10) days from Public Notice date of the decision.
- 11.2 Four (4) complete copies of the Notice of Appeal shall be sent by the appellant via certified mail to the St. Bernard Parish Clerk of Court or hand-delivered to the Clerk of Council Office. The Notice of Appeal shall include the following:
  - 11.2.1 copy of permit decision being appealed and a copy of the permit application public notice;
  - 11.2.2 written description of how the appellant believes the decision to be contrary to the law or how he or she is adversely affected by the decision;
  - 11.2.3 written description of how appellant would like the decision revisited;
  - 11.2.4 complete name, address and telephone number of appellant and, if applicable, the appellant's legal representative; and
  - 11.2.5 statement that appellant has read the Notice of Appeal and believes the contents to be accurate, followed by appellant's signature and that of his legal representative, if any.
- 11.3 The Clerk of Council shall immediately notify the Director of the Department of Community Development that a Notice of Appeal had been received and within three (3) working weekdays, provide three (3) copies of the Notice of Appeal to the Director who shall forward complete copies of the Notice of Appeal to the Parish Attorney, the local administrator, and the permit applicant, and notify the State Administrator and all parties of record that a Notice of Appeal has been received.
- 11.4 The local administrator shall provide a complete copy of the permit record to the permit applicant and to the appellant (if not the same) and any interested party within ten (10) days of the filing of the written Notice of Appeal. Copies shall be prepared and presented to the Appeals Committee at least three (3) days prior to the hearing of the appeal.
- 11.5 The written filing shall present grounds for reconsideration consistent with those provided by La. R.S. 49:214.35(B).
- 11.6 Reconsideration shall be limited to those grounds upon which the permit decision was granted except where fraud, perjured testimony or fictitious evidence are alleged and then proven. New evidence pertinent to the key issues upon which the permit decision was based that may not have been discovered before or during the application review process by using due diligence, or
- 11.7 The local administrator shall schedule a hearing of the appeal within twenty (20) days of receiving a proper request for an appeal and convening a review panel.
  - 11.7.1 Notice
    - 11.7.1.1 The local administrator shall promptly send each party of record the date, time, and location of the appeal by certified mail.
    - 11.7.1.2 The local administrator shall publish the date, time, and location of

any public appeal in the parish's official journal within 10 days of receipt of notice of appeal.

11.7.1.3 The local administrator shall require the appellant to post notification of the upcoming appeal on the proposed site of the activity at issue.

11.7.2 Review Panel

11.7.2.1 The Coastal Zone Management Program Appeals Committee hearing appeals of permit decisions on applications for a local coastal use permit in St. Bernard Parish shall be composed of nine (9), unbiased members as follows:

11.7.2.1.1 seven (7) members, one each appointed by a member of the Parish Council; and

11.7.2.1.2 two (2) members appointed by the Parish President.

11.7.2.2 Each member of the appeals panel has an equal vote and decisions shall be determined by majority rule.

11.8 The CZMP Appeals Committee shall issue a decision and state the reason or basis for its decision within five (5) days of the decision. This statement should be sufficient enough to enable a court to evaluate the rationale and fundamental facts underlying the decision.

11.9 The local administrator shall publish notice of the Appeals Committee decision within five (5) working weekdays of the decision.

11.10 The local administrator shall provide a verbatim transcript of the testimony at the appeal hearing. This transcript along with exhibits and documents introduced shall constitute the record.

11.11 The standard for review of the local administrator's decision by the CZMP Appeals Committee is whether the decision on the permit application was supported by substantial evidence, as defined in state law. See La. R.S. 49:964.

11.11.1 Nothing in this provision shall impede other authorized means for review. An applicant may seek judicial relief under La. R.S. 214.35(E) and (F).

11.12 Judicial review of the Appeals Committee's decision shall be based on the substantial evidence standard, as defined by state law. See La. R.S. 49:964.

11.13 The local administrator may establish a fee system to cover administrative costs associated with implementing the appeals process, including, but not limited to, reasonable charges for copies and postage.

ARTICLE 12 ENFORCEMENT

12.1. Each violation of an individually named condition of a permit or order and each day a violation continues constitute a separate violation. A fine of \$150.00, plus attorney and collection fees, per offense violation per day may be assessed by the local administrator, subject to the approval of the Coastal Zone Advisory Committee. Such fines will be in addition to fines imposed by other governmental agencies. Monetary proceeds from such fines will be placed into the St. Bernard Parish's General Fund.

12.2 Enforcement may be initiated in any of three ways:

- 12.2.1 Investigation and monitoring as a matter of course under La. R.S. 49:214.36(A);
- 12.2.2 Referrals from other agencies; or
- 12.2.3 Complaints from individuals or groups.

12.3 Investigation and Monitoring. Every effort is made to use the investigation and monitoring to correct deficiencies in site compliance whenever possible.

- 12.3.1 The inspection shall include a routine check-list, examination of specialized provisions in the permit, photographs, and notes or other documentation developed during the permit process.
- 12.3.2 During the course of inspections and monitoring, should the local administrator discover an activity which directly impacts coastal waters, a determination must be made as to whether the activity is a state or local use and whether the activity has been permitted.
  - 12.3.2.1 If the activity is a state concern, state and federal agencies shall be notified to handle the violation including, but not limited to contacting the state administrator and Louisiana Department of Natural Resources field investigator.
  - 12.3.2.2 If the activity is a non-permitted local concern, the local administrator shall prepare and send a letter of warning as described below and revert to the guidelines provided in the after-the-fact permit section of this ordinance.
  - 12.3.2.3 If the activity is a non-compliance issue related to a local concern, the local administrator shall prepare and send a letter of warning as described below. Should compliance fail to be achieved or if the inspecting official deems a violation serious enough to warrant enforcement -- considering the gravity of the violation and the permittee's compliance history -- the violation may be deemed either non-compliance or significant non-compliance.
    - 12.3.2.3.1 Significant non-compliance exists when the violation poses an imminent threat to the public welfare, is egregious in nature or results from action by a person that has been in violation of the Coastal Zone Management Program within the preceding one (1) year; in these instances, a cease and desist order shall be issued promptly by the local administrator.
    - 12.3.2.3.1 Non-compliance exists when the violation is of a minor nature or can be remedied without significant hardship; in these instances, a letter of warning shall be issued promptly by the local administrator.
- 12.3.3 A letter of warning describes the observations of the inspector, identifies the corrective actions that shall be taken to come into compliance, provides a date by which the actions must be made, identifies the provisions of the Coastal Zone Management Program in violation and is signed by the inspector. A letter of warning must be sent by certified mail to the permit applicant and/or the record owner of the property when no permit exists.

- 12.3.4 The inspector shall investigate the response. After examining the timeliness, completeness, documents, and any meetings or interviews necessary, the inspector determines whether or not compliance has been achieved.
- 12.3.5 The local administrator shall notify the state administrator, appropriate federal and state agencies, and, if applicable, the concerned citizen or group that made the complaint of any and all enforcement actions.
- 12.3.6 When compliance does not exist, the local administrator shall issue a cease and desist order and may assess any and all appropriate fines. If a cease and desist order has already been issued, the local administrator may suspend, revoke, or modify a coastal use permit or bring injunctive, declaratory or other actions necessary to enforce the ordinance.

12.4 Referrals from other agency officials

- 12.4.1 After receiving a referral of notice of a possible violation from a federal, state, local official, the local administrator shall promptly take whatever investigatory actions are necessary in order to ascertain whether or not a violation does in fact exist. The same process described above will be followed.
- 12.4.2 When a violation does not exist, the local administrator shall inform the agency official who made the referral of such in writing.

12.5 Complaints from concerned citizens or other group

- 12.5.1 After receiving a referral of notice of a possible violation from a concerned citizen or other group the local administrator shall promptly take whatever investigatory actions are necessary in order to ascertain whether or not a violation does in fact exist. The same process described above will be followed.

12.6 In addition to any other information required by St. Bernard Parish or State Law, a cease and desist order shall contain the following:

- 12.6.1 a concise statement of the facts alleged to constitute a violation;
- 12.6.2 a statement of the amount of the potential penalties for violating the cease and desist order;
- 12.6.3 a copy of the regulation, permit, order, statute or other legal provision applicable;
- 12.6.4 information enabling the recipient to contact the local administrator; and
- 12.6.5 information on how the recipient may obtain a hearing to contest the cease and desist order.

12.7 A recipient of a cease and desist order may challenge the validity of the order in the St. Bernard Parish District Court.

12.8 To perform the duties required under this ordinance, St. Bernard Parish Personnel may enter upon any land and make examinations in accord with La. R.S. 49:214.36 (A), and Article 8 of this ordinance, provided that:

- 12.8.1 a warrant is obtained, or

- 12.8.2 the examinations do not interfere with the use of the land by its owners or possessors; and
- 12.8.3 prior to inspection the owner or possessor of the land is informed that an inspection is to take place and allowed to accompany the inspector if they so desire.

12.9 Consequences for violating the State and Local Coastal Zone Management Programs are set forth in La.R.S. 49:214.36 (E) - (N).

12.10 Pursuit of remedies and enforcement actions taken under this ordinance in no way precludes seeking any other applicable remedy or enforcement action available.

#### ARTICLE 13 SEVERABILITY

13.1 This ordinance is severable. If any part is declared unconstitutional, the remainder of the ordinance shall not be affected.

#### ARTICLE 14 EFFECTIVE DATE

14.1 This ordinance shall be effective immediately upon approval of the updated St. Bernard Parish Coastal Zone Management Program by the Louisiana Department of Natural Resources.



## **APPENDIX C**

### **ST. BERNARD PARISH RESOLUTION APPROVING LOCAL COASTAL MANAGEMENT PROGRAM**





# St. Bernard Parish Council

8201 West Judge Perez Drive Chalmette, Louisiana, 70043  
(504) 278-4228 Fax (504) 278-4209  
[www.sbpgr.net](http://www.sbpgr.net)

#13

**Guy McInnis**  
*Councilman  
at Large*

**George Cavignac**  
*Councilman  
at Large*

**Ray Lauga, Jr.**  
*Councilman  
District A*

**Nathan Gorbaty**  
*Councilman  
District B*

**Richard "Richie" Lewis**  
*Councilman  
District C*

**Casey W. Hunnicutt**  
*Councilman  
District D*

**Manuel "Monty" Montelongo III**  
*Councilman  
District E*

**Roxanne Adams**  
*Clerk of Council*

EXTRACT OF THE OFFICIAL PROCEEDINGS OF THE COUNCIL OF THE PARISH OF ST. BERNARD, STATE OF LOUISIANA, TAKEN AT A REGULAR MEETING HELD IN THE COUNCIL CHAMBERS OF THE ST. BERNARD PARISH GOVERNMENT COMPLEX, 8201 WEST JUDGE PEREZ DRIVE, CHALMETTE, LOUISIANA ON TUESDAY, AUGUST 21, 2012 AT SEVEN O'CLOCK P.M.

On motion of Mr. Gorbaty, seconded by Mr. Cavignac, it was moved to adopt the following resolution:

## RESOLUTION SBPC #968-08-12

A RESOLUTION SUPPORTING THE UPDATED ST. BERNARD PARISH COASTAL ZONE PROGRAMMATIC DOCUMENT.

**WHEREAS**, St. Bernard and its residents have derived great benefit from the renewable resources of the Coastal Wetlands within the parish's boundaries since prehistoric times; and

**WHEREAS**, the impact of man's activities and natural forces have been demonstrated to be bringing about deleterious effect on said renewable resources when unmanaged; and

**WHEREAS**, the St. Bernard Parish Council, being aware of the deterioration of the wetlands, has actively pursued and utilized Federal, State and Local monies to plan for and implement management activities beneficial to the parish wetlands since 1976; and

**WHEREAS**, a draft of the updated St. Bernard Parish Coastal Zone Management Program Document was adopted as a Policy Statement by the St. Bernard Parish Council on August 21, 2012; and

**WHEREAS**, the State of Louisiana has had its Coastal Management Plan (as delineated by Act 361 of 1978 and amendments) approved by the Office of Coastal Management pursuant to Federal statutes and guidelines of its resources; and

**WHEREAS**, the St. Bernard Parish Council is desirous to fulfill its obligation to protect the health and welfare of its residents through wise multiple use management of its resources; and



# St. Bernard Parish Council

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**Guy McInnis**  
*Councilman  
at Large*

Page -2-  
Extract #13, continued  
August 21, 2012

**George Cavignac**  
*Councilman  
at Large*

**WHEREAS**, an updated draft document entitled St. Bernard Parish Coastal Zone Management Program has been prepared for the parish for submission to the State Administrator of the Louisiana Department of Natural Resources, Office of Coastal Management for the purpose of obtaining an approved updated local program, with all the benefits, authorities and obligations attached thereto; and

**Nathan Gorbaty**  
*Councilman  
District B*

**WHEREAS**, said updated program document contains policies, management goals and performance standards consistent with achieving protection and enhancement of the parish's wetlands and resources, securing the health and welfare of the citizens of the parish, and permitting multiple use management of parish resources,

**Richard "Richie" Lewis**  
*Councilman  
District C*

**NOW THEREFORE BE IT RESOLVED**, to adopt said updated St. Bernard Parish Coastal Zone Management Program Document as the Policy Statement of the St. Bernard Parish Council, and further

**BE IT FURTHER RESOLVED**, to continue implementation of said Coastal Zone Management Program upon renewed approval

**BE IT FURTHER RESOLVED**, to transmit said updated document to the State Administrator along with all comments, responses and amendments as generated at and from the required hearings for that purpose, and finally

**BE IT FURTHER RESOLVED**, to enjoin said State Administrator to review and grant the Parish of St. Bernard approval of the updated Program Document in continuation of the previously approved local program consistent with Federal and State laws, regulations and guidelines promulgated for the purpose of establishing Local Coastal Zone Management plans, authorities, administrative guidelines, permissible uses and performance standards.

The above and foregoing having been submitted to a vote, the vote thereupon resulted as follows:

**YEAS:** Lauga, Gorbaty, Lewis, Hunnicutt, Montelongo, Cavignac

**NAYS:** None

**ABSENT:** None



# St. Bernard Parish Council

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**Guy McInnis**  
*Councilman  
at Large*

Extract #13 continued  
August 21, 2012

**George Cavignac**  
*Councilman  
at Large*

The Chairman, Mr. McInnis cast his vote as YEA.

**Ray Lauga, Jr.**  
*Councilman  
District A*

And the motion was declared **adopted** on the 21<sup>st</sup> day of August, 2012.

**Nathan Gorbaty**  
*Councilman  
District B*

**Richard "Richie" Lewis**  
*Councilman  
District C*

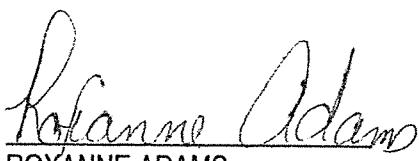
**Casey W. Hunnicutt**  
*Councilman  
District D*

**Manuel "Monty"  
Montelongo III**  
*Councilman  
District E*

## CERTIFICATE

I HEREBY CERTIFY that the above and foregoing is a true and correct copy of a motion adopted at a Regular Meeting of the Council of the Parish of St. Bernard, held at Chalmette, Louisiana, on Tuesday, August 21, 2012.

Witness my hand and the seal  
of the Parish of St. Bernard on  
this 21<sup>st</sup> day of August, 2012.



ROXANNE ADAMS  
CLERK OF COUNCIL



**APPENDIX D**

**GOVERNMENT MAPS COVERING**  
**ST. BERNARD PARISH**



**U. S. Geological Survey Topographic Quadrangles  
(1:24,000 scale)**

<b>Quadrangle Name</b>	<b>State No.</b>	<b>Quadrangle Name</b>	<b>State No.</b>
Alligator Point	192C	Lake Eugenie	198A
Belle Chasse	200C	Lena Lagoon	199D
Black Bay North	235B	Malheureux Point	193C
Cat Island, MS-LA	194B	Martello Castle	200B
Chalmette	200A	Mitchell Key	197A
Chef Menteur	191D	Morgan Harbor	198D
Delacroix	200D	New Harbor Islands	196C
Door Point	194C	North Islands	196A
East Chandeleur Light	194E	Oak Mound Bayou	198D
English Lookout, MS-LA	192B	Point Chicot	236B
False Mouth Bayou	192D	Pointe aux Machettes	199A
Isle au Pitre, MS-LA	194A	Rigolets	192A
Lake Athanasio	236A	Saint Joe Pass, MS-LA	
Lake Cuatro Caballo	235A	(Grand Island Pass)	193A
Lake Eloi	198C	Stake Islands	238A
		Three Mile Bay	193D

**U. S. Geological Survey Topographic Quadrangles  
(1:100,000 scale)**

<b>Quadrangle Name</b>	<b>Quadrangle Name</b>
Biloxi	Gulfport
Black Bay	North Islands

**U. S. Army District, Corps of Engineers, Vicksburg District  
Topographic Quadrangles  
(1:62,500 scale)**

<b>Quadrangle Name</b>	<b>Quadrangle Name</b>
Black Bay	New Orleans
Chef Menteur	Rigolets
St. Bernard	Yscloskey



**APPENDIX E**

**PUBLIC REVIEW**



# St. Bernard Voice A-9

## PUBLIC NOTICE

St. Bernard Parish, Government

The Coastal Management Advisory Committee (CMAC) of the St. Bernard Government Parish Government is updating the Parish's 1987 approved local Coastal Zone Management Program (CZMP) that provided for the recognition of the importance of, and the need for conservation and management of coastal resources. The program is currently administered at the local level in conjunction with the Louisiana Department of Natural Resources. The CMAC is requesting input from the public in updating this program by reviewing and providing comments on the Preliminary Draft CZMP document. A public hearing to discuss the program and document will be held on June 4, 2012 at 5:00 pm at the St. Bernard Parish Government Council Meeting Room, 8201 W. Judge Perez Drive, Chalmette, LA 70043

Copies of the preliminary draft CZMP document are available for review at the St. Bernard Parish Government office, Parish council office, and public library during regular working hours. The document will be available for review Monday thru Friday from 8:30 a.m. to 4:30 p.m. The document is also available for review at [www.sbpgr.net](http://www.sbpgr.net)

Prior to the public hearing, comments and/or questions regarding the document can be submitted in writing to:

William McCartney, IV  
Coastal Zone Management Administrator  
St. Bernard Parish Government  
Community Development Office  
Chalmette, LA 70043  
Fax (504) 278-4330

May 18, 2012

## B-2 The St. Bernard Voice PUBLIC NOTICES

Friday, May 25, 2012

## PUBLIC NOTICE

ST. BERNARD PARISH GOVERNMENT

The Coastal Management Advisory Committee (CMAC) of the St. Bernard Government Parish Government is updating the Parish's 1987 approved local Coastal Zone Management Program (CZMP) that provided for the recognition of the importance of, and the need for conservation and management of coastal resources. The program is currently administered at the local level in conjunction with the Louisiana Department of Natural Resources. The CMAC is requesting input from the public in updating this program by reviewing and providing comments on the Preliminary Draft CZMP document. A public hearing to discuss the program and document will be held on June 18, 2012 at 5:00 pm at the St. Bernard Parish Government Council Meeting Room, 8201 W. Judge Perez Drive, Chalmette, LA 70043

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St. Bernard Parish Government  
Community Development Office  
Chalmette, LA 70043  
Fax (504) 278-4330

May 18, 25, 2012



SIGN-IN SHEET

PUBLIC MEETING FOR ST. BERNARD PARISH COASTAL ZONE MANAGEMENT PROGRAM UPDATE

June 18, 2012

NAME	AFFILIATION	ADDRESS	TELEPHONE NUMBER
Charles Revlet	LDNR/OCM	Baton Rouge	225-342-0861
Yvonne Pace	LDNR/OCM	BR	225-342-7936
Ed Fike	Coastal Environment, Inc	1260 Main St Baton Rouge 70802	225-383-7455 x128
Karen Wicker	Coastal Environments, Inc	1260 Main St Baton Rouge, LA 70802	225-383-7455 x119
Bruce Kappel	11	2045 Lakeshore Dr Rm 443 MS 47 70122	225-892-3246
Andrew Bellu	SBP6	3286 605	504-439-0901
Candace Watkins	SBP6	8201 W. Judge Ken Chalmette, LA 70043	504-355-4427



COMMENT #1.

## Karen Wicker - FW: Coastal program document

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**From:** William McCartney <wmccartney@sbpg.net>  
**To:** Karen Wicker <KWicker@coastalenv.com>  
**Date:** 8/9/2012 3:45 PM  
**Subject:** FW: Coastal program document

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Mrs. Wicker,

This is the only submission of comments for the Coastal Zone Programmatic Document update.

Thank you,

William A. McCartney, IV, C.F.M.  
Coastal Zone Administrator / Case Manager  
St. Bernard Parish Government  
8201 W. Judge Perez Drive  
Chalmette, LA. 70043  
(504) 442-2426 cellular  
(504) 278-4303 office  
(504) 278-4298 facsimile  
[wmccartney@sbpg.net](mailto:wmccartney@sbpg.net)  
[www.sbpg.net](http://www.sbpg.net)



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**From:** Jerry Graves, Jr.  
**Sent:** Monday, July 23, 2012 11:41 AM  
**To:** William McCartney  
**Cc:** David Peralta; Candace B. Watkins  
**Subject:** Coastal program document

William:

I have reviewed the document and my only comment is that I would like to see more specific Restore Act information included. Although I am well-aware that even the State is a little unsure of how this is going to work, I still believe that we should have as much Restore Act information as possible included in the document.

Thanks.

Jerry

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RESPONSE TO COMMENT #1.

A discussion of the RESTORE Act and other funding sources for coastal restoration is included in Chapter 5 under "Coastal Restoration and Flood Protection."



**Prepared for:**

**St. Bernard Parish Government  
8201 W. Judge Perez  
Chalmette, LA 70043**

**Prepared by:**

**Coastal Environments, Inc.  
1260 Main Street  
Baton Rouge, LA 70802**

**Funding and Support Provided by:**

**U. S. Department of the Interior  
U.S. Fish and Wildlife Service  
Coastal Impact Assessment Program  
Washington, DC**

**Louisiana Department of Natural Resources  
Office of Coastal Management  
Baton Rouge, LA**

**2012**