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COASTAL ZONE MANAGEMENT PROGRAM UPDATE

TO THE

THE PLAQUEMINES PARISH COASTAL ZONE MANAGEMENT PROGRAM

PLAQUEMINES PARISH
DEPARTMENT OF COASTAL ZONE MANAGEMENT

U.S. FISH AND WILDLIFE SERVICE/ PLAQUEMINES PARISH
PROJECT NO. F12AF70162

EVANS-GRAVES ENGINEERS, INC. PROJECT NO. 2011-21-770

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September 2013

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CHAPTER 1. SUMMARY OF LOCAL COASTAL ZONE MANAGEMENT (CZM) PROGRAM

Introduction

The Coastal Zone Management (CZM) Program for Plaquemines Parish defines the Parish's role in the decision-making processes regarding the uses and activities affecting coastal resources. The local CZM program is consistent with the State of Louisiana's Coastal Resources Management Act, as amended, and the state guidelines. The program was developed with the input of the CZM advisory committee comprised of representatives for the citizens and special interest groups, parish administrative personnel, and the public. This Coastal Zone Management Program Update is an update to the program which was approved by Plaquemines Parish Council in 2000.

Information on the parish's physical and cultural resources and socio-economic conditions are identified in Chapters 2 and 3, respectively. The environmental problems and socio-economic conditions that could result in resource use conflicts are presented in Chapter 4. The description of the environmental and socio-economic conditions and potential resource user conflicts are identified in order to provide a basis for developing management goals, objectives, policies, and priorities of use for coastal resources. These goals, objectives, policies, and priorities of use provide the guidelines for decision-making on local coastal use permit applications and development of comments on permit applications for uses of greater than local concern.

An overview of the federal and state CZM programs presented in Chapter 5 provides a context in which to understand the components and scope of the parish's local CZM program. Chapter 6 summarizes the parish-wide CZM goals and objectives and contains basic environmental data and management guidelines (goals, objectives, policies, and priorities of use) for smaller geographical areas or environmental management units (EMUs) (Figure 1.1). The EMUs have similar physiographic characteristics, hydrologic regimes, and geomorphic landforms (i.e., natural levees and waterways) that distinguish them and make them susceptible to environmental management. Chapter 7 describes the administration of the local CZM Program. Chapter 8 provides an overview of the public and government involvement in the original CZM Program and this Update, including a transcript of the public hearing as well as responses to comments received for the Draft Plan Update. The CZM Program implementation ordinance approving the local CZM program Update is in Appendix A.

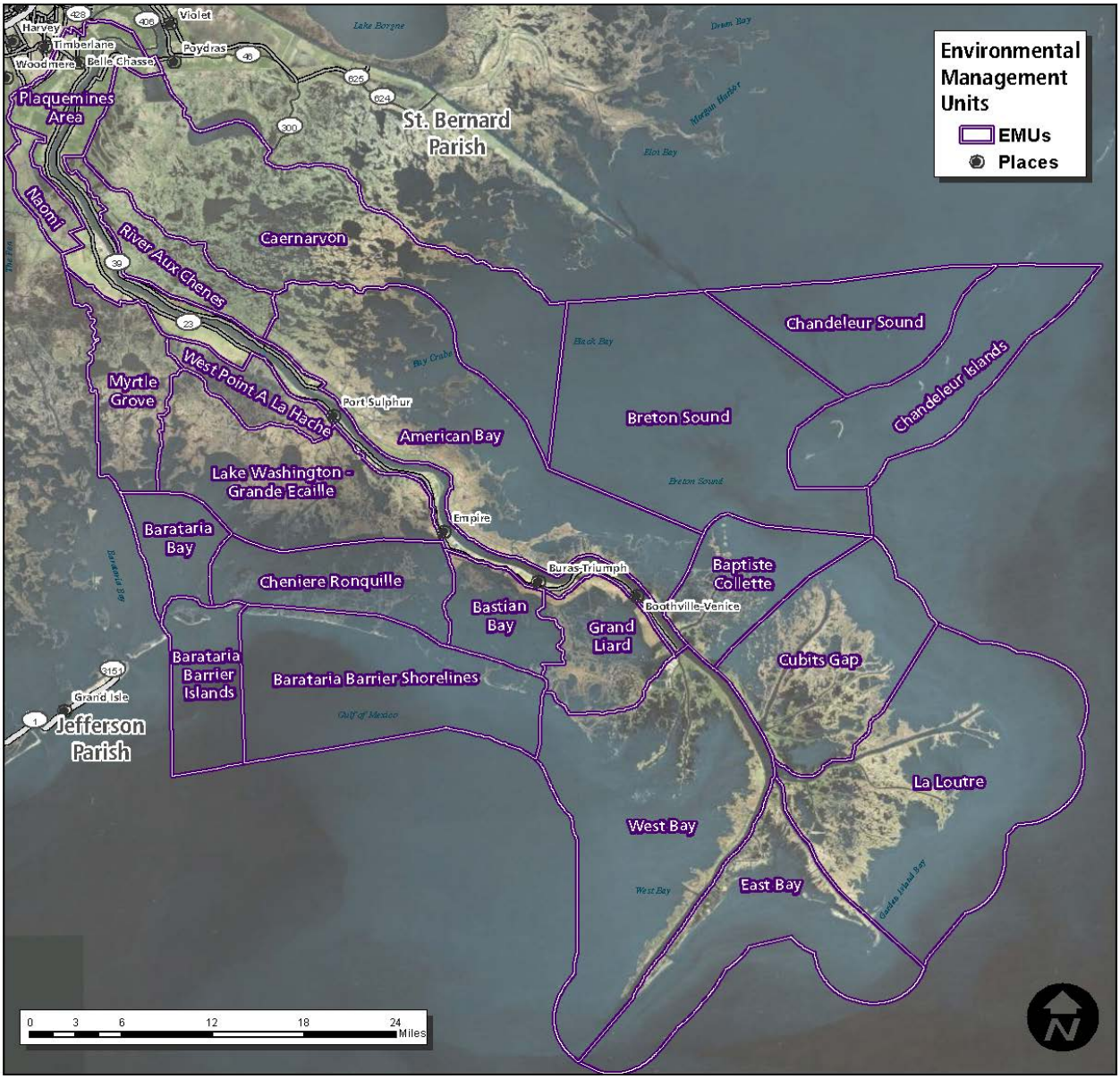

Fig. 1.1 Plaquemines Parish Environmental Management Units (EMUs)

Source: Louisiana Department of Natural Resources, Coastal Management Division

Environmental and Socio-economic Setting

Plaquemines Parish, located in the Mississippi River Deltaic Plain Region of southeast Louisiana, covers approximately 1,643,824 acres out to the state-federal demarcation line. The parish is bordered on the south by the Gulf of Mexico and on the west, north and east by Jefferson Parish, Orleans Parish, and St. Bernard Parish, respectively. The parish's landmass developed during two phases of delta building and the St. Bernard Delta lobe active between 4000 and 1800 years ago and the Plaquemines/Balize or Plaquemines/Modern delta lobes active since approximately 1000 years ago. Major landforms include: natural levee uplands adjacent to the Mississippi River and its distributaries, wetlands (swamps, bottomland hardwoods, and fresh-to-saline marshes), fastlands (low-lying land separated from adjacent wetlands by man-made levees), sandy barrier islands, and beaches.

As of 1998, 23 percent (approximately 376,447 acres) of the parish was land and 77 percent (approximately 1,267,377 acres) was water. The majority of the land area was in saline, brackish and intermediate marsh (60 percent) and fresh marsh (15 percent). The remaining 25 percent of the land area consisted of swamp/bottomland forest and scrub/shrub habitat (six percent), upland forest and scrub/shrub habitat (seven percent), agriculture/pasture (six percent), developed area (three percent), shore/flat/beach (one percent) and inert/barren upland/other (less than one percent). The parish contains ten major soil associations that correspond to four major physiographic features or human impact: 79.5 percent in marsh and swamp soils (Balize-Larose, Kenner-Allemands, Clovelly-Lafitte-Gentilly, Bellpass-Timbalier, and Scatlake), eight percent in natural levee soils (Sharkey-Commerce and Convent-Commerce-Sharkey), six percent in former swamp and marsh soils (Harahan-Westwego-Rita), and six and a half percent in spoil or sandy ridges (Aquents and Felicity).

Major water bodies include the Mississippi River and its three distributary channels (Southwest Pass, South Pass, and Pass a Loutre), several major crevasse channels (Grand Pass, Main Pass, and Baptiste Collette Bayou), relict distributary channels, marsh drainage channels and numerous interior lakes, bays and sounds (Breton and Chandeleur). Construction of artificial levees along the Mississippi River, to Point a la Hache on the East Bank and Venice on the West Bank, has diminished freshwater input to adjacent wetlands and water bodies during flood stages. Approximately 460,000 cubic feet per second of freshwater is discharged through the six major distributary and crevasse channels of the lower birdfoot delta. However, siphons (White's Ditch, Bayou Lamoque), pumps (16 pumps in 13 drainage districts), and a major freshwater diversion structure (Caernarvon) put freshwater into some non-leveed areas of the parish, when these features are activated. The Pointe a la Hache Relief Outlet south of Pointe a la Hache also allows freshwater overflow from the Mississippi River to American Bay during flood stages on the river.

The prevention of freshwater, nutrients and sediment input to marshes during Mississippi River flooding; saltwater intrusion via deep man-made channels; and sea level rise have contributed to the inland movement of non-fresh marsh zones in Breton Basin and Barataria Basin and increased rates of land loss in Plaquemines Parish.

Other factors contributing to land loss include dredging of rig access and pipeline canals and navigation channels; erosion caused by wind and wave action; compaction of sediments and subsidence associated with faults and withdrawal of hydrocarbons and produced waters; and overgrazing by animals (e.g., herbivory).

The rate of subsidence is very high in the active delta (over 3.5 feet per century) and high (2.1 – 3.5 feet per century) in the centrally located portions of the parish. Between 1956 and 2006, Plaquemines Parish lost approximately 248.7 square miles – or 159,168 acres of land, at an overall rate of approximately 3,183 acres per year. Figure 1.2 illustrates the extent of land loss from 1932-2009. Land loss shown for the period 2004-2009 was largely due to impacts of Hurricanes Katrina, Rita, Gustav and Ike.

The more serious environmental problems confronting the parish are subsidence of the upland/fastland areas, transition areas and wetlands (Figure 1.3 shows the various land uses and classifications in the parish); the shift in salinity zones in wetlands outside the flood protection levees; and loss of coastal wetlands and barrier shorelines These problems directly affect the ability of the citizens of Plaquemines Parish to continue living and working in the area and are related to:

- regional subsidence and sea level rise,
- local subsidence related to compaction of fastland soils upon drainage
- erosion of barrier islands and barrier shores
- canal construction and other sub tidal excavations (i.e., deepening of navigation channels and excavation of borrow areas),
- loss of fresh-to-intermediate salinity marshes through saltwater intrusion, erosion, and/or submergence,
- Widening of tidal passes and drainage routes due to current scour, boat wakes, and wind-induced waves; and increasing tidal envelope with corresponding reduced fresh water retention in upper Barataria and Breton hydrologic basins.
- Hurricane Katrina in 2005 scoured extensive areas of interdistributary marsh. Hurricane Isaac's impacts are still being evaluated at the time of this report.
- Advisory Base Flood Elevations published by FEMA have been raised affecting homeowners.

Plaquemines Parish had a population of 25,575 people in 1990 which increased slightly to 26,757 in 2000, but declined to 23,042 by 2010 primarily due to population loss after Hurricane Katrina. As of 2010 the population in Plaquemines Parish is 23,042 people and the population percent change from 2000 to 2010 is -13.9%. The 30-year period from 1960 to 1990, showed a relatively small population growth of 12 percent.

This population is concentrated along the narrow, natural levee ridges of the Mississippi River and leveed fastland area. Approximately 90 percent of the population is located on the west bank of the Mississippi River. Over 50 percent of the population is concentrated in the northwestern part of the parish in the Belle Chasse area. Other major communities on the west bank are Port Sulphur, Empire, Buras, and Venice. The parish courthouse is located in Pointe a la Hache, on the east bank of the Mississippi River.

Two highways located along the crest of the Mississippi River natural levees (LA HWY 39 on the east bank and LA HWY 23 on the west bank) connect communities on each side of the river. Two public ferries (Belle Chasse to Scarsdale and West Pointe a la Hache to Pointe a la Hache) provide the only means of transportation between the east and west bank within the parish.

The economy of the parish is centered primarily on the hydrocarbon and river-based industries. Over 73 percent of the parish work force was employed in five major industries in 2010: services (25.6 percent), transportation (15.8 percent), retail trades (6.8 percent), manufacturing (10.5 percent), and construction (14.8 percent). The parish is expected to continue to provide support for the nationally important oil and gas activities in the nearshore and offshore continental shelf (OCS) areas of the central Gulf of Mexico.

The northwestern portion of the parish will continue to attract businesses, government facilities, and residential/commercial development. There appears to be sufficient land within the leveed (fastland) portions of the parish to accommodate future residential, commercial, and industrial development. However, upgrading of infrastructure (i.e., roads, railroads, and port facilities) may require construction in corridors along the backside of the leveed areas, either inside or outside of the levee system to protect people and infrastructure inside fastland areas from flooding.

The abundant natural resources in the wetlands and water bodies of Plaquemines Parish have provided economic revenue in terms of recreational and commercial activities. Local businesses (marinas, boat launches, fishing charter and guide services, motels, restaurants, stores, etc.) benefit from the large number of sport fishermen who operate out of the parish. Commercial fisheries and aquacultural production in Plaquemines Parish totaled $69,604,214 in 2010, with the major value being in shrimp, menhaden, other finfish and oysters.

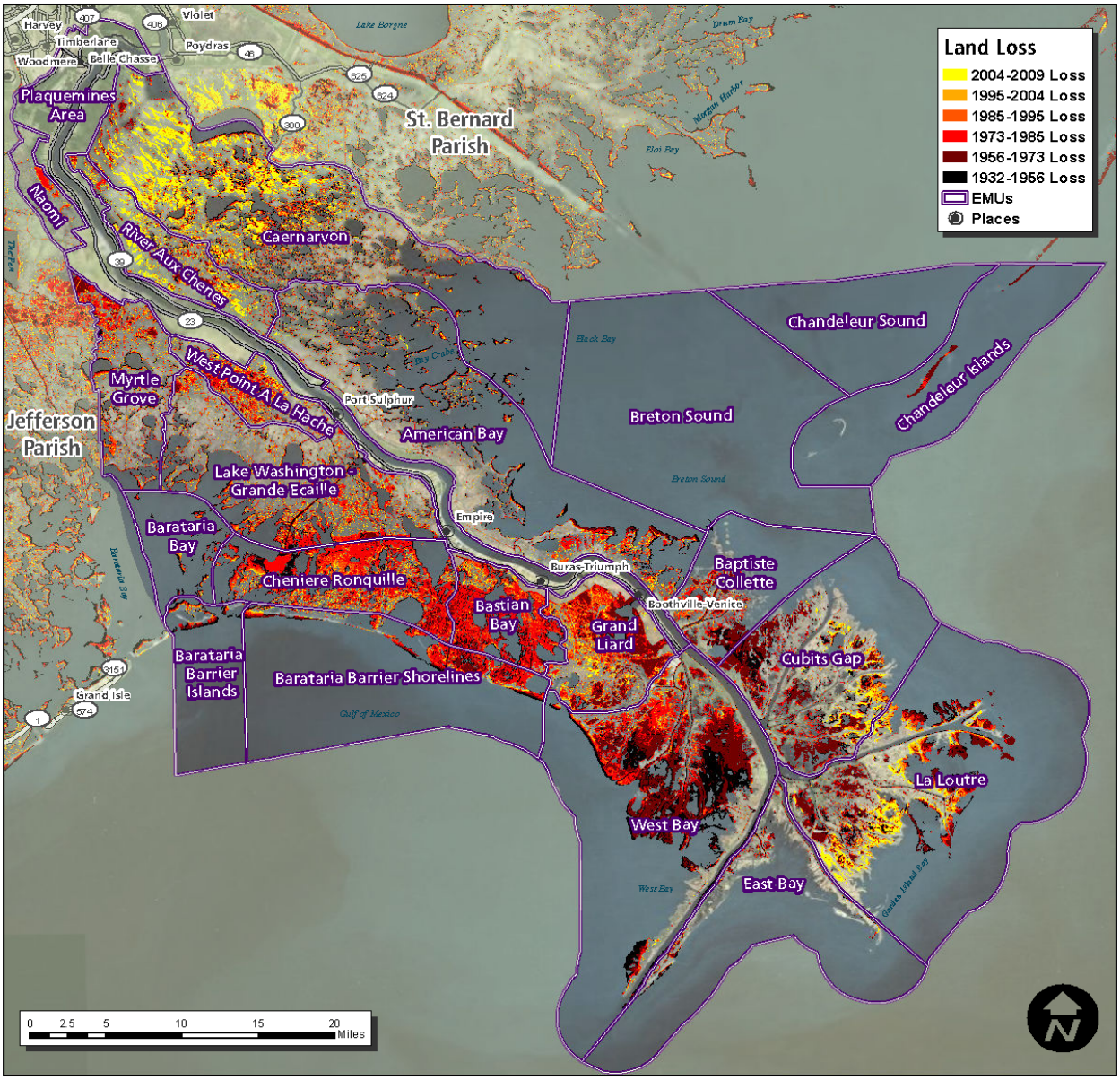

Fig. 1.2 Plaquemines Parish Land Loss, 1932 – 2009

Source: U.S. Geological Survey

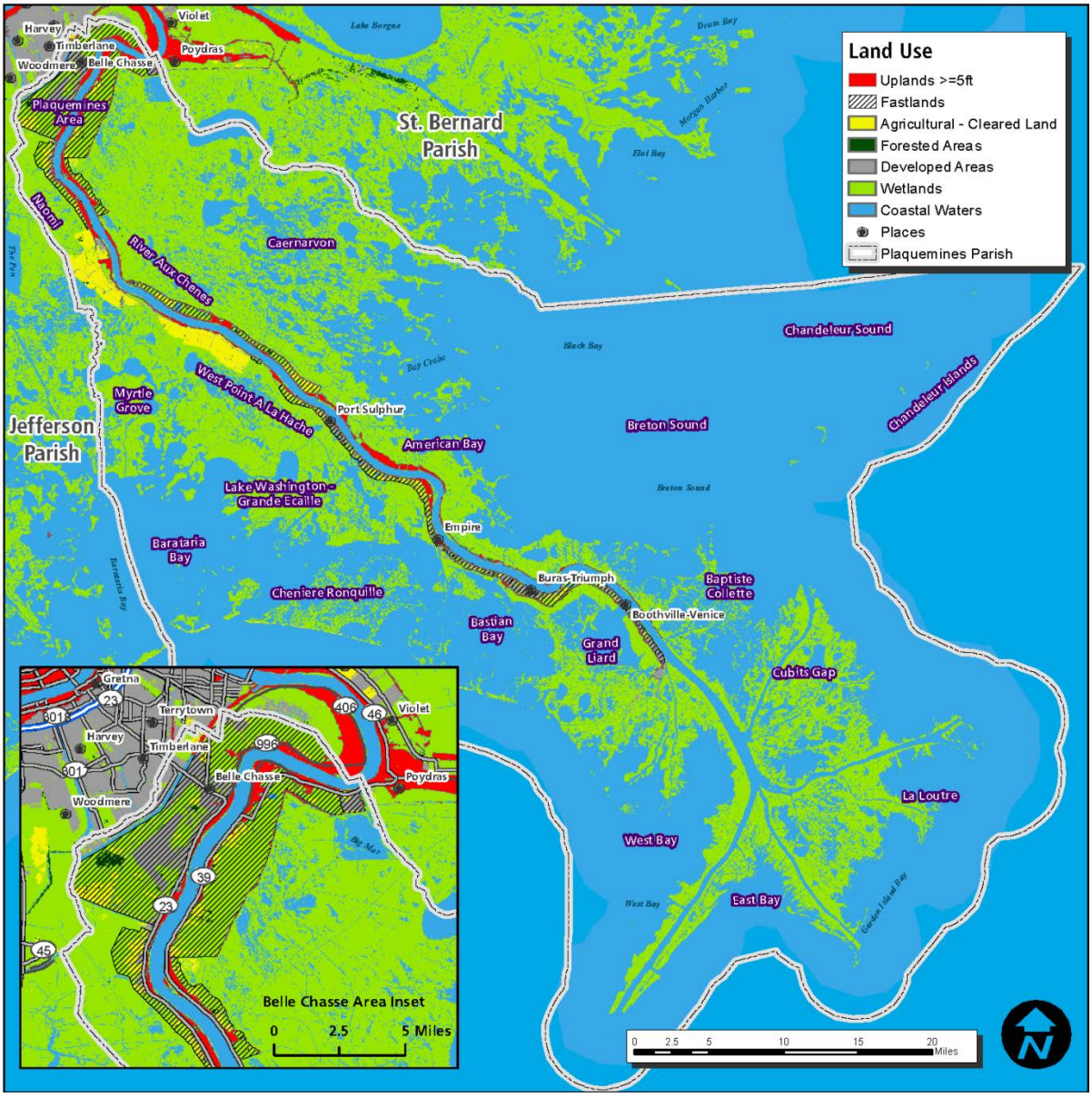

Fig. 1.3 Plaquemines Parish Land Use and Habitat Areas

Sources: Plaquemines Parish, LSU LiDAR; National Oceanic and Atmospheric Administration - Coastal Change Analysis Program

Plaquemines Parish Strategic Implementation Plan

The Plaquemines Parish Strategic Implementation Plan (PPSIP) focuses on strategies to achieve a sustainable coast. The objective of the PPSIP is formulated on a Multiple Lines of Defense strategy by combining levee protection with coastal restoration. This plan will accomplish its goals by implementing the use of coastal land features, like barrier islands, land ridges, forested wetlands, and marsh. These are resources recognized for their value in decreasing the impact of coastal storms. By protecting the coast of Plaquemines, the parish will be able to justify reducing the Advisory Base Flood Elevations (ABFE) published by FEMA.

PPSIP partnered with the Coastal Hydraulics Laboratory (CHL) located in Vicksburg, Mississippi. CHL will model specific restoration projects to investigate how effective they are from storm surge impacts. Computer model analysis will provide valuable data that can be used to establish how FEMA will determine the Base Flood Elevations (BFE). The advantage of BFE vs. ABFE is that BFE is a favorable level of risk. For instance, BFE protection is for the 100 year flood having a 1% probability of occurring or exceeded in a given year.

The underlying reason for generating the PPSIP is from the devastation of Hurricane Katrina. Storms from the last decade provided an insight to what happens as a result of altering the path of the Mississippi River for flood protection. The rate of coastal land loss has increased exponentially as a result. Evidence shows there is a need for large scale coastal restoration. PPSIP is based on a blueprint of six components of coastal restoration: Use of Mississippi River Sediment, Diversions, Collaborative and Coordinated Restoration Activities, Storm Surge Computer Modeling, Restoration Implementation Scenarios and Base Flood Elevation Maps. The river sediment that is wasted into the Gulf can be a valuable resource utilized for restoring the coast. According to the U.S. Department of the Interior, the river transports approximately 436,000 tons of sediment per day and 159 million tons of sediment per year. The need to cultivate the depleted wetlands with sediment is necessary to achieve coastal restoration. Creating adequate diversions for the marshland will be a primary task to nurse shrinking marsh. Consideration to wildlife threatened and endangered species, fish and cultural resources will require special permits. As a result, some habitats may be impacted depending on the size of the restoration project. Substantial investments will have to be coordinated with the U. S. Army Corps of Engineers (USACE) and the Coastal Protection and Restoration Authority of Louisiana (CPRA). Storm Surge Computer Modeling applications will be analyzed for flood protection and restoration projects. Hydrologic models can provide valuable results that will prioritize and optimize the best scenario for executing a master plan. In the development of the PPSIP, three possible plans are outlined pending funding. Plan A would expand current projects that can be completed in a shorter time period. Plan B is a moderate approach with more funding opportunities and times of construction between 5 to 10 years. Plan C would require the most funding and time commitment exceeding 10 years, including 100 year flood protection for present-day areas and reduction of Base Flood Elevations. The Coastal Restoration Plan will employ the Multiple Line of Defense strategy with an emphasis to Plaquemines Parish and taking advantage of the existing environment like barrier islands, wetlands, ridges and marsh in addition to levees.

Plenty of programs have been implemented to re-establish eroding and subsiding wetlands. Some of the more sizable approaches to restoring and elevating landforms include: "(1) hydraulically dredging sediment from the Mississippi River channel and transporting it as slurry through pipes to designated restoration areas, (2) directing sediment-laden fresh water through water control structures built at the Mississippi River into adjacent eroded area, and (3) creating uncontrolled freshwater and sediment diversions along passes in the lower, active delta. The creation and maintenance of wetland vegetation communities associated with desirable landforms, including bottomland hardwoods, swamps, marshes, ponds, lakes and bays, requires specific salinity ranges that can only be achieved through hydrologic management of freshwater flow to offset saltwater intrusion derived from gulf waters via tidal movement or storm surge (PPSIP, p.12)."

PPSIP's goal of protection is to break up the parish into environmental management zones. "Plaquemines Parish can be divided into four major environmental zones for the purpose of coastal restoration and flood protection planning based on present man-made landscape features, natural landforms, elevation, habitat type and environmental processes, especially with regard to hydrologic processes, salinity, landform condition and susceptibility for management. The four major environmental zones are Fastland, Upper Delta, Middle Delta and Balize Delta. Smaller management subunits allow for a sequential implementation of more specific allocation of land use planning and habitat management practices (PPSIP, p.12)."

"A Fastland is a selected area on the natural levees on the east and west side of the Mississippi River that has been enclosed by levees and put under forced drainage to support human habitation and development. On the west bank the Fastland runs from the Plaquemines-Orleans Parish line to Venice and include the New Orleans Naval Air Station, and the communities of English Turn, Belle Chasse, Concession, Cedar Grove, Oakville, Live Oak, Ollie, Naomi, Alliance, Myrtle Grove, Diamond, Socola, Happy Jack, Potash, Port Sulphur, Nairn, Empire, Sunrise, Buras, Triumph, Boothville and Venice. On the east bank the Fastland extends from the Plaquemines-Orleans Parish line at English Turn bend in the Mississippi to just south of Pointe a la Hache and contain the communities of Braithwaite, Stella, Dalcour, Greenwood, Bertrandville, Willis Point, Belair, Phoenix, Davant, Point a la Hache, and Bohemia. The east bank Fastland is shorter in extent than the west bank; is less densely populated and more sparsely developed than the west bank, resulting in a distinctive rural character (PPSIP, p.19)."

"The Upper Delta flanks both sides of the Fastland Corridor from Braithwaite to the vicinity of Port Sulphur and is characterized by subsided, abandoned Mississippi River distributary channels and natural levees and subsided, abandoned agriculture areas outside of the back protection levees. By the latter half of the twentieth century, subsidence and saltwater intrusion had destroyed virtually all of the hardwood vegetation on the natural levee ridges and the cypress swamps flanking the back protection levees and converted the fresh-to-intermediate marshes to predominantly broken expanses of brackish marsh riddled with marsh drainage and relic distributary channels. This area also contains an extensive network of pipeline canals, rig access canals and historic drainage ditches extending across the Upper Delta from the Fastland to area oil and gas fields and/or open waters of bays and the Gulf of Mexico. Loss of forest habitat and solid expanses of marsh have resulted in the inhabited Fastland Corridor and back protection levees being subjected to more direct exposure to higher energy storm surge and wave action.

Hurricane Katrina in 2005 scoured extensive areas of interdistributary marsh located between the subsided relic Mississippi River distributary and crevasse splay levees in the Caernarvon Diversion Outfall area south of Braithwaite. Water levels in the resultant elongated shallow ponds are approximately + 1 ft (USACE, SLD 2003), while the abandoned natural levee ridges have elevations of +2.5 to +3 ft. West of the Mississippi River, the marsh elevations are approximately +2.5 ft. (PPSIP, p.19)."

The Construction of Caernarvon in 1991 and Davis Pond in 2002, both freshwater diversions, created sediment into the Upper Delta Unit reducing salinity levels in the upper extents. These diversions purpose was to introduce fresh water for oysters in the lower basins and sustain fresher habitats in the uppers ends of the basins. "There are plans to implement outfall management strategies for the Caernarvon and Davis Diversion structures to introduce more sediment throughout the deteriorated wetlands to promote wetland restoration through vegetation growth and sediment accretion. These and other wetland restoration and hydrologic management features could provide the foundation on which to restore the bottomland hardwood and swamp vegetation and provide additional levels of flood protection (PPSIP, p.20)."

"In the Middle Delta the Mississippi River, leveed natural levee (e.g., fastland) and fringing marsh are very narrow in contrast to the Upper Delta and Active Delta. The former solid expanse of marshland interspersed with wetlands and distributary channel levees separating the higher natural levee and Fastland from the open Gulf have degraded, submerged, or disappeared since the middle of the twentieth century. The wetland loss problem is particularly acute on the west side of the corridor where gulf beaches and barrier islands have become exceedingly narrow and segmented and interior marshes have reverted to large open bays. The famous Bastian Bay – Adams Bay oyster grounds area, which historically was a mix of brackish-to-saline marsh and enclosed bays sheltered from the gulf by a rim of small sandy barrier islands, is now almost entirely one large embayment (PPSIP, p.20)."

"On the east side of the Mississippi River, the wetland apron was never as broad as on the west side of the river, but it has also been dramatically degraded in numerous places. The Middle Delta is also transected by an enormous array of submerged pipelines and rig access canals whose spoil banks are often the only remnants of remaining marsh. The relic marshes are saline except for those located adjacent to the levees between the Buras-Triumph area to Venice which range from fresh-to-brackish as a result of freshwater discharge from the Mississippi River via passes on the west and crevasse splays on the east. A LiDAR (USACE, SLD 2003) derived transect extending from Scofield Barrier Island on the west to the Mississippi River natural levee-crevasse splays-marsh complex on the east shows a vast expanse of open water from the approximate +2.5 ft high barrier island to the +2.5 ft high created marsh located at the back flood protection levee which is approximately +13.5 ft high. The west bank Mississippi River levee is approximately +14.6 ft high. There is no flood protection levee on the east bank and the overflowed natural levee is approximately +2.5 to +4 ft high. The crevasse splay marsh is approximately +1 ft high. The Fastland Corridor on this transects ranges in elevation from approximately -9 ft to +1 ft (PPSIP, p.21)."

"The Balize Delta, located southeast of Venice, is a broad, birdfoot-like feature consisting of the Mississippi River main channel, three major passes (Southwest Pass, South Pass and Pass a

Loutre) and four subdeltas that initiated as crevasses along the main Mississippi River channel and Pass a Loutre channel in the nineteenth century: West Bay (1838), Garden Island Bay (1891), Cubits Gap (1862) and Baptiste Collette (1874) (Coleman and Gagliano 1964). After a period of delta growth into the mid-twentieth century, these freshwater-to-intermediate wetlands and natural levees have rapidly deteriorated in the latter half of the twentieth century as a result of a number of processes including compaction, subsidence, shoreline erosion, shallowing of natural crevasse channels, oil and gas canal dredging, faults and natural and man-assisted transport of sediment (associated with navigation channel maintenance) into deeper waters of the Gulf of Mexico (PPSIP, p.21)."

"The Balize Delta is a freshwater wetland and the low-lying natural levees and canal spoil banks support salt-intolerant trees such as black willows and bald cypress. The marshes on both side of the Mississippi are approximately +1 to +2 ft high with the higher elevations being adjacent to distributary channels. The port of Venice located between Spanish Pass on the north and Grand Pass-Pass Tante Phine on the south consists of dredged slips, levees, marinas and filled areas with elevations ranging from + 3 to + 6 ft. Spoil banks along pipeline canals and dredged natural channels generally range in elevation from +2 to +5 ft in elevation (PPSIP, p.21)."

Coastal Master Plan

Loss of coastal wetlands in Louisiana has prompted state officials to release a $50 billion, 50 year plan to rebuild land and protect communities from storm surges. The Coastal Protection and Restoration Authority released a draft five-year master plan with detailed maps illustrating what the state's coastline will look like in 2061 if all of the proposed projects are built. Also, each project shows the cost associated with each project. The master plan is available at www.coastalmasterplan.la.gov. So far the state has lost 1,883 square miles of coastal wetlands in a period of 80 years. According to Coastal authorities if restoration projects are successful, the state will see more of an increase in land than lost by the year 2042. An estimated 859 square miles of new land will be built due to coastal restoration efforts.

The funding for the master plan will require fines from the 2010 Deepwater Horizon oil spill, federal offshore oil money, and congressional allotments for levee and restoration programs. The plan states that even with improvements to coastal communities the people living in these areas are still at risk from flooding and future land loss. Estimated damages are based on conservative scenarios for the strength of hurricanes and subsidence of soils and sea-level rise and on land loss rates ranging from 15 square miles to 51 square miles per year.

A public hearing on the proposed master plan was held in New Orleans on Monday January 23rd. The plan was criticized by fishers opposing large freshwater and sediment diversions, arguing that the fishing industry could be damaged. The plan offers hypothetical land building strategies sacrificing saltwater species. The Coastal Protection and Restoration Authority argue that large diversion projects are necessary and the plan makes a compelling case for including them. The master plan as presented, with freshwater and sediment diversions, will allow Louisiana to gain more land than it is losing by 2042 and to reach about 2.5 square mile of growth per year by 2061. Without those diversions, Louisiana will continue to lose land, ranging from 3.4 square miles per year to 23.7 square miles per year; according to the plan.

Plaquemines Parish feels that the application of large scale diversions is not the best method to counter the problem of extensive land loss. P.J. Hahn, director of coastal programs for Plaquemines Parish … "that the state should follow the restoration plan of [the] parish, which calls for a series of much smaller diversions -- an approach that advocates believe will have less of an impact on fishing (Times-Picayune, 2011)." Hahn has explained that the parish's plan is aware and is in favor of the demand for freshwater diversions and also supports habitat sustaining smaller diversions. Plaquemines is cognizant of the "no action" maps forecasting the fate of Plaquemines Parish if nothing is done. The parish is against the construction of large scale diversions that can weaken the remaining flood protection and the fishing industry in Plaquemines. The BP oil spill adversely affected the oyster industry. The Caernarvon Diversion was operated at a flow of 8,000 cubic feet per second as a preventative measure for the oil spill. The end result was that the oyster reefs were damaged and allowed invasive species into the area. As a result, a dead zone has developed in the Brenton/Chandeleur Sound and is now an area prone to more extensive hurricane damage. The state of Louisiana has suggested expanding the Caernarvon diversion to a flow of 250,000 cubic feet per second. A larger diversion may not necessarily be a better option. In addition, the Coastal Master Plan lists several projects that are divided between time intervals of 20 to 30 years to implement and there is no specific guidance as to how to construct the barrier island, sediment diversion associated with maintenance dredging, marsh and ridge restoration projects. In addition, Plaquemines Parish supports the idea of dedicated dredge specific projects that are designed for the Mississippi River/Louisiana coast (Hahn, 2012).

Master Plan's approval in 2012

On May 22, 2012 the legislature approved the 2012 Master Plan for the Coast. Now Louisiana will be able to work towards sustaining the coast with a $50 billion 50 year plan. The Coastal Protection and Restoration Authority's plan received praise from the scientific community. Even though the plan is approved, financing the project is going to be a challenge. Louisiana is anticipating a portion of the total fines that BP is required to pay for the Clean Water Act violations during the Deepwater Horizon spill. Additional funds will come from available federal and state funds dedicated to coastal restoration projects under the Coastal Wetlands Planning, Protection and Restoration Act and in 2017. The Gulf of Mexico Security Act (GOMESA) will be contributing a portion of offshore energy royalties, another funding source that will contribute approximately $200 million to $300 million per year.

Resource User Conflicts

Utilization of resources and actions proposed for addressing some environmental problems related to subsidence, land loss and habitat change -- three of the parish's major environmental problems -- can result in conflicts among the various resource users. Examples of resources include: 1) wildlife, 2) fish and shellfish, 3) oil/gas/other minerals, 4) land, 5) water, and 6) archaeological and cultural sites. Conflicts arise when one person's use interferes with another person's use of the same resources or when actions taken to resolve environmental problems impact or preclude the use of existing resources, especially on a short-term basis.

Major uses of resources in Plaquemines Parish include: 1) fresh and estuarine water for commercial and recreational fishing (oysters, shrimp, crabs, finfish, etc.), 2) wetlands and forested habitat for hunting, 3) wetlands and water bodies for trapping, 4) oil/gas/other minerals extraction, 5) freshwater for residential/commercial/industrial use, 7) freshwater wetlands and ponds for crawfish farming, 8) land for agriculture/pasture/orchards and residential, campsite, commercial, and industrial development, 9) navigable waterways for commerce and recreation, 10) wetlands and waterways for non-extractive recreational uses such as boating, bird watching, swimming, etc., and 11) archaeological and cultural sites for tourism and cultural identity.

Plaquemines Parish has a long history of using its wetlands and water bodies as a source of both renewable and non-renewable resources. The parish also has a history of diverting fresh water from the Mississippi River for agricultural purposes or to enhance fisheries habitat and support this renewable resource based economy. While the uses for, and objectives of, implementing freshwater diversions have changed over time from agriculture to enhancement of wildlife and fisheries productivity, the parish has been proactive in using fresh water as a resource.

In recent years, the state and federal governments have proposed various types of coastal restoration programs under the CWPPRA and LCWCP programs for Plaquemines Parish, as well as the state master plan. These restoration projects include freshwater diversions, outfall management, crevasses, siphons, channel armoring and creative use of dredged materials.

The Coast 2050 Plan, developed by the Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority (LCWCRTF & WCRA), identified additional regional ecosystem strategies for the Region 2 area that encompasses Plaquemines Parish. Representatives of the parish participated in the formulation of the Coast 2050 Plan and the parish council voted to support the strategies proposed.

Strategies proposed in the Coast 2050 Plan for implementation in individual mapping units, or EMUs, in Plaquemines Parish include the following (recall Figure 1.1):

- Construct the most effective small diversions
- Delta building diversion at Myrtle Grove/Naomi
- Delta building diversion at American Bay
- Wave absorbers, Reef zones, as appropriate
- Controlled crevasses into Quarantine Bay
- Delta building diversion at Bastian Bay
- Delta building diversion at Benny's Bay (Baptiste Collette)
- Sediment trap for marsh creation
- Build and maintain delta splays
- Prevent loss of sediments into deep Gulf waters
- Extend barrier shoreline
- Preserve land bridge
- Maintain shoreline integrity
- Dedicated dredging (LCWCRTF & WCRA 1998a).

Maintenance and compatible multiple uses of the natural environment and fastland areas are essential to the future well being of the parish, as well as the other parts of Louisiana and even the United States. However, environmental problems have had and will continue to have impacts on both the socio-economic and renewable resource sectors of the parish in terms of: 1) allocation of resource use, 2) selection and implementation of coastal restoration/management programs to sustain natural resources and renewable resource production, and 3) accommodation/regulation of development and related activities.

Implementation of the stabilization/enhancement/restoration projects proposed by the CWPPRA, LCWCP, State Master Plan and other restoration programs can result in the following resource user conflicts:

- Displacement of salinity zones and relocations of current, commercial fishing locations
- Destruction of existing oyster beds by excessive sediment and freshwater flooding
- Destruction of existing oyster beds, oyster lease areas, and fishing areas by deposition of dredged material for wetland creation projects
- Closure of existing oyster bedding areas because of impaired water quality associated with freshwater diversions
- Siltation of canals and waterways used for navigation by commercial and sports fishermen and recreational interests as a result of freshwater and sediment discharge
- Questions of ownership and use of newly created land
- Appropriation of rights-of-way from private landowners for freshwater diversions, siphons, overflow areas that benefit the public
- Destruction of archaeological/historical/cultural sites.

Expansion of residential, industrial, and commercial development in upland/wetland areas may result in destruction of wetland habitat area or quality inside drainage districts, as well as adjacent wetlands as a result of construction, development of solid waste landfills, improperly treated wastewater seepage, or storm water discharges. While the coastal use permit process may limit the adverse environmental impact, projects with greater public good may result in unavoidable loss of wetlands and habitat for renewable resources. Demands for infrastructure improvements, such as levee relocations and upgrades, construction of port and harbor facilities, and construction of new transportation infrastructure to meet the demand of a growing population and industrial/port sector may also negatively impact wetlands. Wetland loss outside

the protection levees and development on upland/fastland sites can also destroy archaeological/historical/cultural sites.

Local Coastal Zone Management Program

Knowledge of existing environmental conditions and resource users and established goals, objectives, policies, and priorities of use for EMUs facilitates the decision-making process regarding coastal use permit applications on the local government level. This knowledge helps the parish to establish its position on activities requiring state and/or federal permits.

In addition to identifying goals and objectives for the entire parish, the CZM Program identifies goals, objectives, policies, and priorities of use for individual EMUs. In accordance with guidelines contained in the Louisiana coastal resources program (OCZM and LCRP 1980), the location of uplands/fastlands, transition areas, and wetlands were mapped (recall Figure 1.3).

In Plaquemines Parish, upland and fastland areas are grouped into one relatively contiguous EMU (Plaquemine Area) that encompasses the land between the Mississippi River flood control levees and the back levees of the drainage districts. For purposes of coastal use permit reviews, this EMU also includes the batture and Mississippi River between the flood protection levees. Transition areas are undergoing a change from upland to wetland conditions, primarily due to subsidence and hydrologic alternations, but still are better drained than wetlands. Transition areas are below 5 feet in elevation, outside protection levees, and generally consist of subsiding natural levees or flanks of the natural levees of the Mississippi River.

Transition areas were not subdivided into EMUs but were included within EMUs outside the upland/fastland EMU (Plaquemines Area).

The wetlands and water bodies of Plaquemines Parish that lie outside the flood protection levees were divided into EMUs that facilitate management of environmental processes and human activities. There are twenty-two EMUs in Plaquemines Parish, including the upland/fastland EMU (i.e., Plaquemines Area) (Table 1.1, recall Figure 1.1).

Table 1.1 Environmental Management Units in Plaquemines Parish.

American Bay	Cubits Gap
Baptiste Collette	East Bay
Barataria Barrier Islands	Grand Liard
Barataria Barrier Shorelines	La Loutre
Barataria Bay	Lake Washington/Grande Ecaille
Bastian Bay	Myrtle Grove
Breton Sound	Naomi
Caernarvon	Plaquemines Area
Chandeleur Islands	River aux Chenes
Chandeleur Sound	West Bay
Chenier Ronquille	West Pointe a la Hache

The goals, objectives, policies, and priorities of use are summarized in Tables 1.2, 1.3, 1.4, and 1.5. These tables are designed in a matrix format to identify the goals, objectives, policies, and priorities of use for each EMU.

The policies of the Plaquemines Local Coastal Management Program are consistent with the policies and objectives of the State and Local Coastal Resources Management Act (SLCRMA), as amended, and the state guidelines; the local program shall be interpreted and administered consistently with such policies, objectives, and guidelines.

Table 1.2. Goals for Environmental Management Units in Plaquemines Parish.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
1	Reduce land loss, and where feasible, create new wetlands.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#
2	Maintain, protect, and/or restore barrier islands, headlands, and adjacent wetlands as hurricane buffer zones.			#	#					#													
3	Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.	#				#	#		#			#			#		#	#	#		#		#
4	Require mitigation measures where development activities adversely impact wetland and aquatic environments.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
5	Encourage land use compatible with wetland and aquatic habitats.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
6	Maintain, restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.	#				#	#	#	#		#	#			#		#	#					
7	Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
8	Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#

Table 1.2 Continued.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
10	Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
11	Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
12	Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct Corps to assist parish with regard to environmental protection.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
13	Encourage the USA Corps of Engineers and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
14	Restore and/or maintain wetlands at the base of the flood protection levees.	#					#		#			#			#		#	#	#		#		#
15	Utilize existing and newly created wetlands as storm buffer zones.	#	#	#	#	#	#		#			#	#	#	#	#	#	#	#		#	#	#
16	Maintain extensive sea grass beds.								#	#	#												
17	Maintain portions of EMU as estuarine nursery area.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#

Table 1.2 Continued.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
18	Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
19	Encourage wetland management and restoration of eroded wetlands, where practicable.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#
20	Prohibit future man-made cuts in barrier islands.			#	#					#													
21	Maintain wetlands and quality of water bodies for renewable resources.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
22	Modify jetties to facilitate sand transport along beach.				#																		
23	Restore and /or maintain islands supporting bird colonies, where practicable.	#	#	#	#	#	#	#		#	#		#	#		#						#	
24	Block all non-essential navigation passes to retard further erosion in area.						#											#					#
25	Protect the natural environment of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
26	Enhance the productivity of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
27	Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
28	Enhance wetlands and water quality, through surface water management of fresh water to maintain natural gradient of fresh-to-saline wetlands and water bodies.	#					#		#			#			#	#	#	#	#		#		#

Table 1.2 Concluded.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
29	Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.						#								#		#	#					
30	Sustain development and compatible land uses on uplands and fastlands.																			#			
31	Protect upland/fastland areas from flooding																			#			
32	Sustain agricultural land uses on uplands and fastlands.																			#			
33	Protect wetlands and water bodies in adjacent EMUs from adverse environmental effects related to land use in upland/fastland EMU.																			#			

Table 1.3 Objectives for Environmental Management Units in Plaquemines Parish.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
1	Remove remnant abandoned artificial levees to facilitate overflow of Mississippi River waters into adjacent wetlands, where beneficial.	#																					
2	Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
3	Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.	#					#		#			#			#		#	#	#		#		#
4	Encourage emplacement of major pipelines in established corridors.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
5	Allow and encourage environmentally sound mineral exploration and production.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
6	Conserve wetland habitat for both harvestable and non-harvestable renewable resources.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
7	Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.	#	#				#		#			#		#		#	#	#	#	#	#	#	#
8	Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
9	Encourage the U.S. Army Corps of Engineers to develop a systematic coastal restoration program to use Mississippi River water and sediment to create or enhance new wetlands and restore barrier islands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
10	Improve and maintain water quality compatible with designated uses.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Table 1.3 Continued.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
11	Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.		#	#	#					#													
12	Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.	#					#		#			#			#		#	#	#		#		#
13	Protect water bottoms and associated habitats from damage or destruction by man-made activities.	#	#			#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
14	Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
15	Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.	#					#	#				#		#	#		#	#	#	#	#	#	#
16	Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
17	Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.	#	#			#	#		#			#	#	#	#	#	#	#	#	#	#	#	#
18	Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.	#	#		#	#	#		#		#	#	#	#	#	#	#	#	#	#	#	#	#
19	Protect the natural state of the environment.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Table 1.3 Concluded.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
20	Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
21	Enhance productivity of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
22	Introduce fresh water and nutrients into the EMU.	#				#	#		#			#	#	#	#		#	#	#		#	#	#
23	Support environmentally sound economic use, especially with regard to waterfront areas.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
24	Prohibit development of wetland areas for non-wetland dependent uses.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
25	Delineate boundary between upland/fastlands and wetlands and support development in uplands/fastlands.																			#			
26	Ensure compliance with land use plans and zoning.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Table 1.4. Policies for Environmental Management Units in Plaquemines Parish.

NO.	POLICIES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
1	Major pipelines are to be constructed in established corridors, where practicable.	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
2	Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
3	Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.	#	#	#	#	#	#		#			#			#	#	#	#			#	#	#
4	Support wetland management and wetland restoration programs undertaken by landowners and public agencies.	#	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#		#	#	#
5	Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
6	Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.		#							#			#	#		#						#	
7	Support recreational use of areas through support of appropriate and environmentally compliant support facilities.	#	#				#		#			#	#			#	#	#	#	#	#	#	#
8	Inform the US Army Corps of Engineers and Congressional delegation of the parish policies regarding activities in the coastal zone.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Support actions to restore and/or maintain of barrier islands, headlands, and fringing wetlands, including closing barrier breaches.	#	#	#	#	#	#	#		#		#	#	#	#	#	#	#	#		#	#	#
10	Support establishment of major navigation routes and blockage of all non-essential man-made canals.	#	#	#	#		#			#		#			#		#	#	#		#	#	#

Table 1.4 Concluded.

NO.	POLICIES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
11	Support efforts to improve and maintain water quality compatible with designated uses.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
12	Support wetland restoration programs involving freshwater and sediment input into EMUs.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
13	Support use of dredged material to create wetlands, barrier islands, and beaches, where practicable.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
14	Oppose activities that damage integrity of barrier islands and beaches.			#	#					#													
15	Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetlands on-site or within the parish, preferably in same EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
16	Encourage utilization of Best Management Practices for development in upland/fastland areas in order to minimize detrimental environmental impacts on adjacent wetlands.																			#			
17	Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.	#	#						#				#			#	#	#	#		#	#	#

Table 1.5 Priorities of Use by Environmental Management Units in Plaquemines Parish.

No.	PRIORITIES OF USE	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe a la Hache
1	Commercial harvesting of renewable resources.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
2	Exploration and production of oil, gas, and other mineral resources.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
3	Fisheries and wildlife habitat.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
4	Restoration and enhancement of wetlands for storm buffer zone (Freshwater diversions).	#	#				#		#			#	#	#	#	#	#	#	#		#		#
5	Wetland restoration using MS River sediment (Crevasses/dredged material).	#	#				#						#	#		#		#	#			#	
6	Restoration and maintenance of barrier islands and beaches.			#	#					#													
7	Natural water bottoms and benthic communities.					#	#	#		#	#												
8	Recreational activities (sports fishing, boating, swimming, bird watching, etc.)	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Environmentally compatible development.														#					#		#	#
10	Aquaculture and farming of hide/furbearing animals.																			#	#		
11	Threatened & endangered species habitat and/or wildlife refuges.		#	#	#	#				#			#	#		#			#			
12	Residential, commercial, industrial, and port development/multiple use.																			#		#	
13	Tourism and Cultural Resources.		#						#	#		#	#	#		#		#		#		#	#
14	Freshwater management and enhancement of water quality.																	#	#	#			#

The Coastal Use Permit (CUP) system is a major mechanism for the parish to manage activities impacting the safety and well-being of its citizens and the normal functioning and conservation of its natural environment. Throughout the permit review process, the parish can evaluate a proposed activity and its environmental impact and either prohibit or condition the activity whenever practicable in order to lessen the environmental damage and/or lessen natural resource use conflicts. The types of CUPs pertaining to activities of local and state concern and the process, including time frame and applicable fees, used by the parish to implement the permit review and issuance process are described in detail in Chapter 7 Program Administration.

The major steps associated with the local CUP procedure are: 1) preliminary review of CUP application, 2) public notice and comment period, 3) public hearing, if needed, 4) compensatory mitigation, for unavoidable adverse impacts to wetlands, 5) CUP decision, and 6) CUP appeals process, if needed. Procedures associated with the CZM program once a permit is issued include: 1) local enforcement and monitoring of permitted activity, 2) submittal of project completion notice by permit holder, and 3) handling of permit violations, when applicable.

Another component of the local CZM Program is the development of procedures for nomination and management of activities in Special Areas. While Plaquemines Parish has not identified any Special Areas, it reserves the right to amend its CZM program to include management of Special Areas that could be identified in the future.

Coastal Use Permits

The State's approved CZM Program identifies two types of uses of the coastal zone that are subject to the Coastal Use Permitting Program: 1) uses of state concern and 2) uses of local concern (R.S. 49:214.25). Uses of state concern are defined as 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 include, but are not limited to:

- Any dredge or fill activity that intersects with more than one body of water
- Projects involving use of state owned land 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
- Uses of local concern which may significantly affect interests, or regional, state, or national concern

Uses of local concern are defined as those uses which directly and significantly affect coastal waters and which are in need of coastal management, but are not uses of state concern and which should be regulated primarily at the local level, if the local government has an approved CZM program. Uses of local concern 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.

Activities that do not require CUPs, except when the proposed activity would have direct and significant impact on coastal waters, include [as cited from L.A.C. 43:1,723(B)]:

1. General

a. 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:
   i. agricultural, forestry, and aquaculture activities on lands consistently used in the past for such activities;
   ii. hunting, fishing, trapping, and the preservation of scenic historic, and scientific areas and wildlife preserves;
   iii. normal maintenance or repair of existing structures including emergency repairs of damage caused by accident, fire, or the elements;

iv. construction of a residence or camp;
v. construction and modification of navigational aids such as channel markers and anchor buoys;
vi. activities which do not have a direct and significant impact on coastal waters.

b. Uses and activities within the special area established by R.S. 49:214.29(c) which have been permitted by the Offshore Terminal Authority in keeping with its environmental protection plan shall not require a coastal use permit.

2. Activities on Lands 5 Feet or More above Sea Level or within Fastlands

a. 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.

b. 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.

c. 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.

d. 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.

e. 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.

3. Emergency Uses

a. Coastal use permits are not required in advance for conducting uses necessary to correct emergency situations.

i. Emergency 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.

ii. 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.

b. 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.

c. 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.

4. Normal Maintenance and Repair

a. Normal repairs and the rehabilitation, replacement, or maintenance of existing structures shall not require a coastal use permit provided that:
   i. the structure or work was lawfully in existence, currently serviceable, and in active use during the year preceding the repair, replacement or maintenance; and
   ii. the repair or maintenance does not result in an encroachment into a wetland area greater than that of the previous structure or work; and
   iii. the repair or maintenance does not involve dredge or fill activities; and
   iv. the repair or maintenance does not result in a structure or facility that is significantly different in magnitude or function from the original.

b. 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.

c. 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.

5. Construction of a Residence or Camp

a. The construction of a residence or a camp shall not require a coastal use permit provided that:
   i. 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;

ii. 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.

b. 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.

6. Navigational Aids

a. The construction and modification of navigational aids shall not require a coastal use permit.

b. 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 State Coast Guard standards and requirements.

7. Agricultural, Forestry and Aquacultural Activities

a. Agricultural, forestry and aquacultural activities on lands consistently used in the past for such activities shall not require a coastal use permit provided that:

i. 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);
ii. the activity does not require a permit from the U.S. Army Corps of Engineers and meets federal requirements for such exempted activities; and
iii. 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.

b. The exemption includes but is not limited to normal agricultural, forestry, and aquacultural activities such as:
i. plowing;
ii. seeding;
iii. grazing;
iv. cultivating;
v. insect control;
vi. fence building and repair;
vii. thinning;
viii. harvesting for the production of food, fiber and forest products;

ix. maintenance and drainage of existing farm, stock, or fish ponds;
x. digging of small drainage ditches; or
xi. maintenance of existing drainage ditches and farm or forest roads carried out in accordance with good management practices.

8. Blanket Exemption. No use or activity shall require a coastal use permit if:

a. the use or activity was lawfully commenced or established prior to the implementation of the coastal use permit process;
b. the secretary determines that it does not have a direct or significant impact on coastal waters; or
c. the secretary determines one is not required pursuant to §723.G of these rules.

Local CUP Procedure

Preliminary Review of CUP Application

The processing of a coastal use permit application for activities of local concern is outlined in detail in Chapter 7. The following discussion presents a brief outline of the major steps associated with the local CUP Procedure. If a local concern, the CZM Administrator will review the application for completeness. The CUP application must be complete and the permit application fee must be paid before the processing of the application can continue. The application fee for a commercial project is $500 plus 0.1 percent of estimated project cost over $100,000. For a non-commercial project, the application fee is $50. If the application form and/or drawings contain significant deficiencies, the CZM Administrator may contact the applicant and schedule a meeting to discuss the necessary changes and/or return the application package to the applicant with a listing of deficiencies that need to be corrected before the application can be resubmitted as complete.

The CZM Administrator will review the CUP application in order to determine if a CUP is required. The Administrator shall report her findings to the Committee. If the Committee determines that the proposed project would have no direct and significant impact (NDSI) on coastal waters, a NDSI letter will be submitted to the applicant in lieu of a CUP. The CUP exemptions and NDSI determinations do not preclude applicants from obtaining other federal, state, and local permits and authorizations that may be required for their projects. If the Committee determines that a CUP is required, the CZM Administrator will coordinate the processing of the CUP application with other state and federal agencies and other branches of Plaquemines Parish Government, as needed. All CUP applications must be reviewed and either approved or rejected by the Committee.

Public Notice and Comment Period

A public notice will be placed by the CZM Administrator for publication in the official parish journal within 10 days after the CUP application has been determined to be of local concern and deemed complete. The notice will provide the public with a 25-day public comment period.

Public Hearings

The primary reason for conducting a public hearing is for the solicitation and procurement of additional information that can be used in the CUP decision process. If it is determined that a hearing is required, the CZM Administrator will be responsible for scheduling a time and location to hold the hearing. A public notice will be placed for publication in the official parish journal with a minimum of a 30-day notice of the hearing. The public notice period shall remain open from the initial start day of the 25-day public comment period, through the public hearing notification period, until 10 days after the public hearing has been conducted. All public hearings will be facilitated by the CZM Administrator, chairman of the Committee, or Parish President. All hearings shall be recorded with audiotape that becomes part of the CUP application file.

CUP Decisions

The CUP decision process involves consideration of the proposed activity, impacts of the project on human and natural resources, private and public benefits to be derived from the project, and possibly other factors. The time period required for issuance of a CUP will depend on: 1) the nature and complexity of the proposed activity; 2) the timeliness and content of additional information submitted by the applicant, if requested; 3) the submittal and acceptance of an appropriate mitigation plan, if required; 4) the need for a public hearing; and 5) possibly other factors.

All CUPs will be issued with standard conditions. Special conditions can be added to an individual CUP, as required. Copies of the vicinity map and plan and cross-sectional views from the application will be attached to, and made part of the CUP.

The CUP will be valid for a period of two (2) years. One two-year time extension may be granted for a CUP, but the applicant must request the time extension at least 20 days before the expiration date of the CUP.

The Plaquemines Parish Council will serve as the appeals board for reviewing decisions of the Committee.

Reconsiderations, judicial review

A decision or determination shall be subject to reconsideration if a petition for reconsideration is filed in writing with the CZM Administrator within ten days following public notice of a final coastal use permit or receipt of written notice of a determination.

A written brief pertaining to the appeal issues must be filed within 30 days after the notice of appeal is filed and must contain the following items:

- the CUP number,
- name of the applicant,

- brief description and location of the permitted activity,
- description of how the CUP is contrary to law and any issues providing grounds for appeal,
- statement of facts regarding the permit decision and any information that may be used to determine whether or not the decision to issue the CUP was supported by fact,
- statement regarding how the appellant would remedy the CUP (e.g., revocation, modification),
- statement from appellant that the contents contained in the written notice are believed to be true, followed by the party's signature and that of the party's legal representative, if applicable,
- The name, address, and telephone number of the appellant and, if applicable, the party's legal representative, and copy of the CUP being appealed.

Upon receipt of a complete appeal brief, the CZM Administrator shall notify the appellant by registered mail of said receipt. Any opposition or response to the appeal may be filed by any person. The opposition or response must be filed within 30 days after the appeal brief is filed.

The CZM Administrator shall provide copies of the appeal notice, appeal brief and oppositions to the applicant as well as to the Parish President, the Parish Administrator, members of the Plaquemines Parish Council, and other affected parties, if applicable. The CZM Administrator shall be responsible for scheduling an appeal hearing date that will constitute a special meeting of the council. The date, time, and location of the appeal hearing will be published in the official journal of the parish at least 25 days prior to the date of the hearing.

A quorum of Plaquemines Parish Council members must be present before the appeal hearing can begin, with the Council Chairman serving as meeting facilitator.

In the absence of the Council Chairman, the Vice Chairman will serve as meeting facilitator. The same protocol used for public hearings may be used for appeals hearings. The hearing will be audio taped in the event a transcript of the hearing is needed at a later date.

The Council may discuss the merits of the case after all parties have testified, convene in Executive Session, and/or adjourn and take the hearing under advisement.

The decision to uphold, modify, or overturn the Committee’s decisions to grant or deny the permit shall be made within 30 days of the date of the appeal hearing by a majority vote of the Council**.**

Any person authorized by R.S. 49 §214.35 to appeal a coastal use permit decision or any local government aggrieved by a final decision on approval of a local program may seek judicial review of that decision whether or not a petition for reconsideration has been filed under this Section. A preliminary, procedural, or intermediate action by the secretary or a determination of local or state concern under R.S. 49:214.30(C)(1) or of direct and significant impact under R.S. 49:214.34 is immediately reviewable if review of the secretary's final permit decision or action would not provide an adequate remedy or would inflict irreparable injury.

Proceedings for review may be instituted by filing a petition in the district court of the parish in which the proposed use is to be situated within thirty days after mailing of notice of the final decision by the secretary or, if reconsideration is requested, within thirty days after the decision thereon.

Judicial review shall otherwise be pursuant to the Louisiana Administrative Procedure Act, provided that all such cases shall be tried with preference and priority. Trial de novo shall be held upon request of any party.

Local Enforcement and Monitoring

The CZM Administrator will utilize available resources (e.g., Plaquemines Parish personnel) to inspect projects of Local Concern to ensure that such activities conform to their permit specifications and conditions in regards to environmental impacts.

Project Completion Notice

Upon completion of a project of Local Concern, the permittee has 30 days in which to file with the CZM Administrator a sworn declaration of completion. The declaration must contain the application and permit number and certify that the project has been completed in accordance with the plans and specifications in the approved permit.

Violations

Any person, department, agency, or corporation may report violations to the CZM Administrator. The first step taken by the CZM Administrator after notification is to contact the permittee and attempt to alleviate the problem. If the permittee is uncooperative and/or the violation is of a serious nature, the CZM Administrator must take the matter to the Committee and/or Plaquemines Parish Council. If the violation is not resolved at this stage, the violator can be prosecuted. At the court's discretion, conviction of a violation is punishable by a fine up to one hundred dollars ($100), imprisonment up thirty (30) days, and/or the project site restored to pre-project condition. For the purpose of assessing penalties, each day of the violation shall be deemed a separate offense.

Special Area Management

<u>Procedures for Consideration of Uses of Greater than Local Benefit or Impact</u>

Special Areas are defined as those areas that "must have unique and valuable characteristics, require special management procedures, and be managed for a purpose of regional, state, or national importance." Any person, local government, or state agency can nominate an area in the Coastal Zone for designation as a Special Area.

If the area is accepted by the Plaquemines Parish's CZM Advisory Committee as a Special Area, the LDNR-CMD shall assist the Governor in the appointment of a task force and provide assistance to the task force with the development of policy and guidelines for managing the Special Area.

Plaquemines Parish does not recognize a Special Area in the parish at this time. The parish may nominate one or more Special Areas in the future.

CHAPTER 2. ENVIRONMENTAL SETTING

Introduction

Plaquemines Parish, located in the southeastern part of Louisiana, is bounded by Jefferson Parish on the west, Orleans Parish on the north, St. Bernard Parish on northeast, and the Gulf of Mexico on the south and east. The land area of the parish, excluding the territorial waters within the State-Federal demarcation line, is located between N 28^{o} 55' and N 29^{o} latitude and W 88^{o} 58' and W 90 ^{o} 05' longitude. The parish, totally within the Louisiana Coastal Zone, lies astride the lowermost 100-mile reach of the Mississippi River and includes the extensive "birdfoot" delta created by the river. From the inland parish boundary to the State-Federal demarcation line in the Gulf of Mexico, Plaquemines Parish encompasses approximately 1,643,824 acres. Because of the irregular and dynamic nature of the parish's shoreline boundary, the exact area of the parish can not be measured easily.

The environmental setting of Plaquemines Parish greatly influences land use, demographics, distribution and utilization of natural resources, and potential resource user conflicts. In order to address environmental problems and resolve resource user conflicts through a CZM Program, the environmental setting must be characterized and the resources user conflicts and environmental problems must be identified. The following description of the parish's environmental setting includes information on geology, soils, climate, hydrology, vegetation and habitat change, wildlife and fisheries, threatened and endangered species, cultural resources, public infrastructure and recreation facilities, land use, and potential unique and particular areas.

The current environment in Plaquemines Parish has undergone changes due to natural disasters such as Hurricanes Katrina, Rita, Ike, Lily and Gustav; and most recently, Hurricane Isaac in 2012, whose impacts are still being evaluated at the time of this report. The Caernarvon diversion has changed the landscape too (see Fig 2.1); this project is located south of the Braithwaite and Caernarvon communities in Plaquemines Parish, Louisiana. The progress to date of the Caernarvon Diversion is the diversion structure has been operational since 1991 and the construction of the outfall management features was completed in September 2002 at a cost of $1.9 million. Hurricane Lily in October of 2002 severely damaged the interior marsh causing blockages in several of the channels located in the outfall area of the project management structures. Because of the Caernarvon diversion there is a significant reduction to spotted sea trout and oysters. The 2012 Coastal Master Plan calls for massive diversions that may affect the environment of Plaquemines.

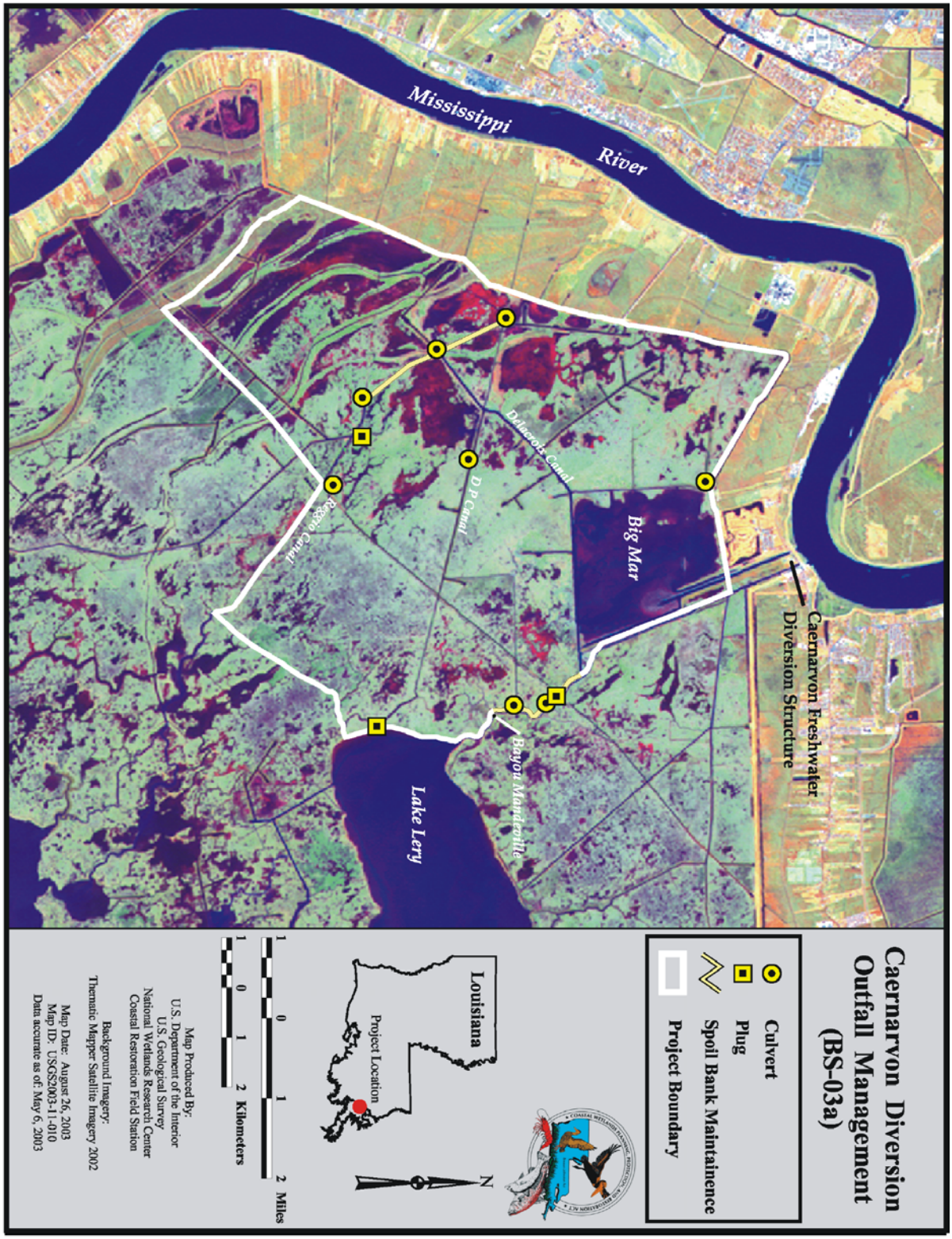

Fig. 2.1 Caernarvon Diversion
Sources: U.S. Department of Interior; U. S. Geological Survey

Geology

South Louisiana's vast deltaic plain was built during various phases of sedimentation as the main Mississippi River flow occupied successive channels. The land area of Plaquemines Parish was created in two general phases of delta building; one was associated with the St. Bernard delta lobe (active between 4000 and 1800 years ago) and one was associated with the most recent Plaquemines/Balize (or Plaquemines/Modern) delta lobes active since about 1,000 years ago (Saucier 1994) (see Figure 2.3). The older St. Bernard delta system also built the Bayou Terre aux Boeuf Ridge in St. Bernard Parish, Bayou Barataria Ridge in Jefferson Parish and several ridges (i.e., Tiger Ridge) in the northern part of Plaquemines Parish. Most of the parish, however, is younger than 1,000 years old.

Major landforms include: natural levee uplands adjacent to the Mississippi River and its distributaries; wetlands (swamps, bottomland hardwoods and fresh-to-saline marshes), "functional uplands" (e.g., fastlands that include former wetlands reclaimed with pumps and levees for agricultural, industrial, and urban use); and sandy barrier islands and beaches on both flanks of the active delta. There are nine salt domes in the parish, none of which exhibits surface relief: Stella, Lake Hermitage, Potash, Lake Washington, and Quarantine Bay. The sedimentary processes that created Plaquemines Parish also resulted in the formation of hydrocarbon deposits. Deposits of hydrocarbons are geologically associated with sands deposited by the Mississippi River (Fisk et al. 1954), salt domes (LGS 1980), and subsurface faults (Wallace 1966). Two of the nine subsurface salt domes have been mined for sulfur (Engineer Agency for Resources Inventories (EARI, 1973). The abundance of producing fields, both onshore and offshore, has resulted in the proliferation of oil and gas wells (Figure 2.2) and a dense network of oil and gas pipelines traversing the parish.

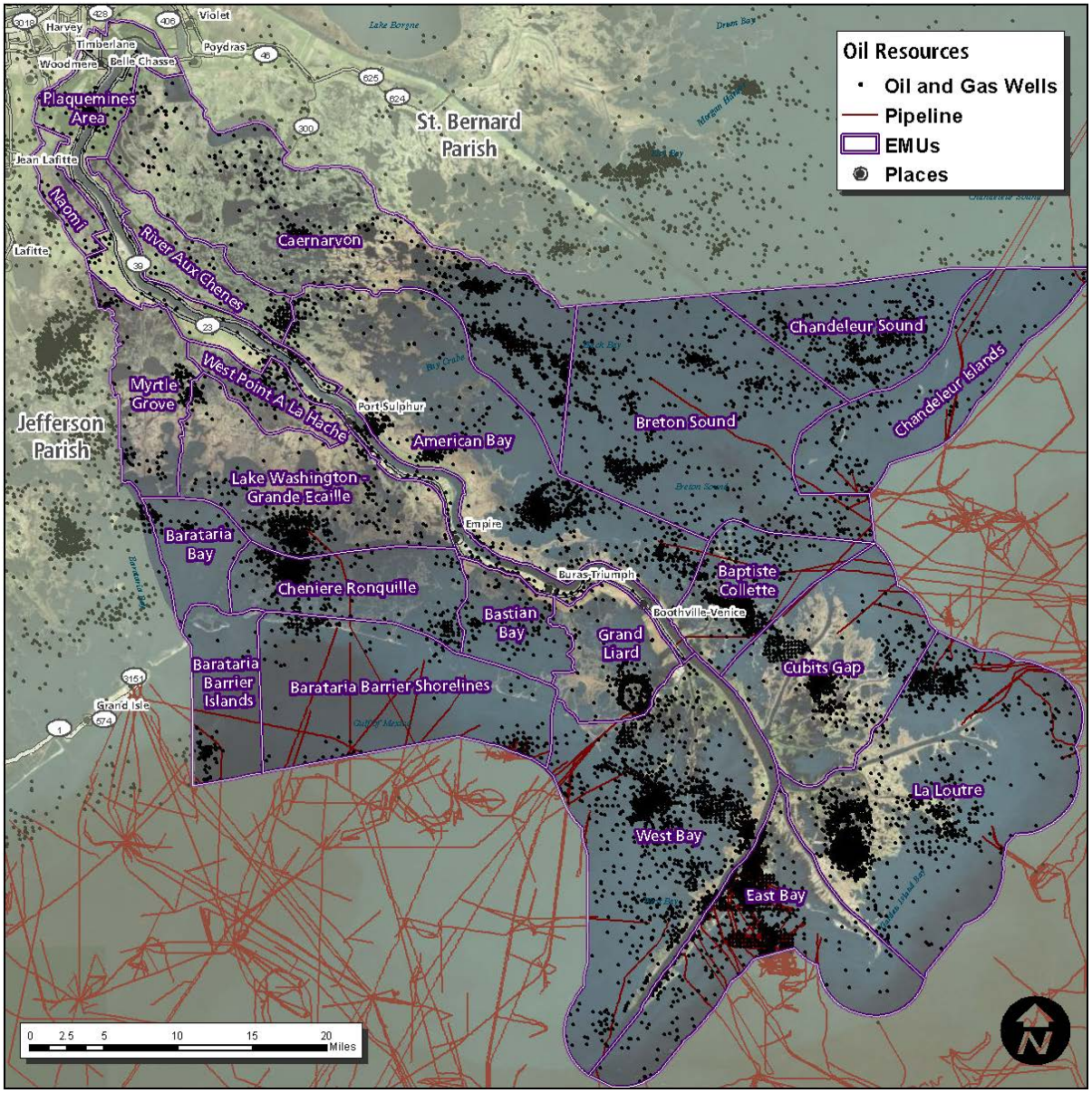

Fig. 2.2 Plaquemines Parish Oil and Gas Wells; Offshore Pipelines
Sources: Louisiana Department of Natural Resources; Bureau of Energy Management, Regulation and Enforcement

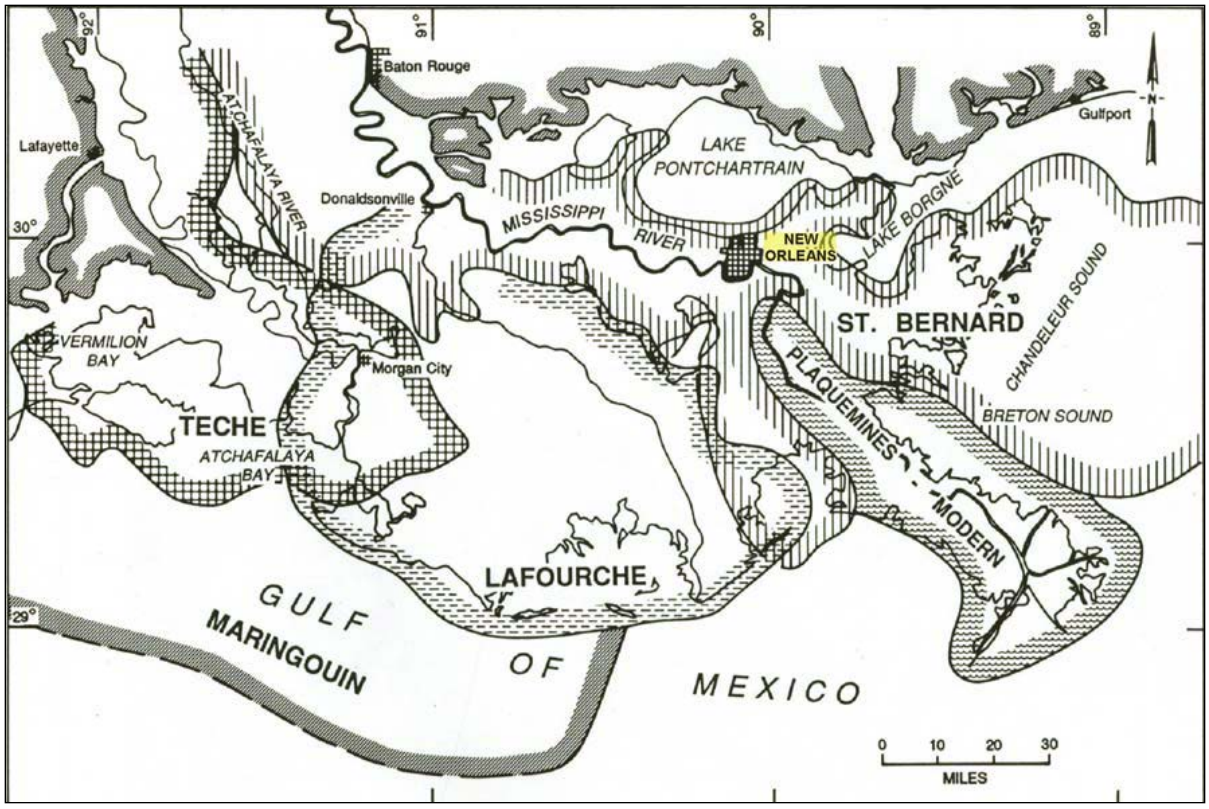

Fig. 2.3 (lower): Major depositional lobes identified in lower Mississippi Delta, taken from Saucier (1994).

The land area of the parish has decreased drastically in the latter half of the twentieth century. Land loss has occurred primarily through marsh and barrier island destruction due to a combination of processes including: subsidence related to sediment compaction, fluid withdrawal, and faulting; sea level rise; saltwater intrusion and subsequent die off of freshwater vegetation; wave erosion; extensive canalization for navigation and oil and gas activities; herbivory (animal consumption of marsh vegetation); and reduction in sediment and nutrient input associated with leveeing of the Mississippi River and damming of tributaries in the Upper Mississippi River Basin (Gagliano 1999). As seen by the variation in subsidence rates in coastal Louisiana by mapping units (corresponding to EMUs) as defined in the state of Louisiana's recent Coast 2050 project (LCWCRTF & WRCA 1999), Plaquemines Parish is experiencing the highest subsidence rates present in coastal Louisiana. These rates range from intermediate (1.1 ft – 2 ft/century) in the north to very high (over 3.5 ft/century) at the mouth of the Mississippi River (Gagliano 1998, LCWCRTF & WCRA 1999).

The delta-building processes that created the parish, such as natural levee buildup and marsh accretion during over bank flooding of the Mississippi River and distributary channels, have been restricted to the lower delta since the construction of the Mississippi River flood protection levee system. The cutoff of sediment to the marshlands that flank the river has permitted subsidence, wave erosion, and saltwater intrusion processes to become more dominant and consequently, contributed to the increased rates of land loss.

Even the active delta area below Venice has experienced high rates of land loss since the 1950s (Gagliano et al. 1981, Van Beek et al. 1986, Wicker et al. 1980). Earlier deltaic studies attributed the high rates of land loss in the lower delta to high subsidence rates combined with the natural deterioration of subdelta lobes within the active delta (Russell 1936).

The smaller subdeltas that comprise much of the active delta experience life cycles of approximately 100 years, and all of them are presently in natural phases of deterioration (Gagliano and van Beek 1970). One small subdelta lobe, Cubit's Gap, has sustained its landmass in recent years because of maintenance dredging of the crevasse channel and continued sediment distribution throughout the delta lobe.

With delta lobe abandonment to the north and southwest of the modern delta, wave reworking of the outermost sediments is the dominant physical coastal process. The Chandeleur, Breton, and Barataria barrier systems reflect this marine process and are characterized by sandy beaches and low dunes that dissipate storm wave energy. The southern Chandeleur Islands, Grand Gosier Island, and Breton Island continue to experience high levels of shoreline erosion (exceeding 60 ft/yr in recent years). Hurricane Camille in 1969 (van Beek and Meyer-Arendt 1982; Wright et al. 1970) diminished the islands considerably. Recent hurricanes have narrowed the width of the islands and segmented them in numerous places. Hurricane Georges, in 1998, virtually destroyed much of the remaining subaerial portions of the Chandeleur Island Chain (Macaluso 1998). The Barataria barrier islands and beaches have experienced lower rates of shoreline retreat (generally less than 20 ft/yr) because of lower nearshore wave energy. However, the barrier system is narrow and sand-deficient, and breaching and overwash processes have caused considerable beach destruction in recent years.

The Barataria barrier shoreline is segmented by numerous tidal passes, especially along the Barataria Bay coast. These passes, which reach depths of 50 to 100 ft, serve as tidal exchange conduits, as well as passageways for migratory, estuarine-dependent fish.

Unique geologic features associated with deltaic sedimentation are the mudlumps (e.g., very small islands) that are located at the mouths of the major active Mississippi River distributary channels. These mudlumps, which are formed by a "squeezing" up of fine clays between coarser sands and silts as the sediments are deposited, often break the water's surface and can reach 12 ft in height and 20 ac in size (Morgan et al. 1968). The mudlumps often provide good nesting and roosting sites for birds.

The geology of the parish influences, to a large extent, the development of a coastal zone management (CZM) Program for addressing environmental problems and resolving resource user conflicts. A major premise of the CZM Program is that development should be directed toward uplands (lands above 5 ft in elevation) and fastlands (lower-lying lands enclosed by artificial levees and under pump). Transitional areas (e.g., subsiding natural levees outside of fastlands) may support limited development, such as campsites, while wetlands function best as source areas for renewable, natural resources and buffer zones for transitional areas, uplands and fastlands. Recall Figure 1.3 from Chapter 1 for depiction of locations of uplands, fastlands and transition areas located along the natural levee of the Mississippi River in Plaquemines Parish.

The remaining landmass is predominantly wetland consisting of fresh-to-saline marsh and small expanses of freshwater swamp near the base of the back protection levees in low salinity areas.

Wetland loss continues to be a concern for The Barataria estuary with a total of 312 square miles of land that is now open water (Barras, 2006). Subsidence, saltwater intrusion, sea-level rise, canal and levee construction, urban expansion, and navigation and flood risk projects are responsible for additional wetland loss. Although the causes vary, all have resulted in the conversion of wetland habitats to areas of open water.

Fault Movements and Subsidence

Current research indicates that the tectonic stability should be considered in conjunction with planning and design of coastal restoration. Results have shown that fault movement effects are underrated. A key discovery was made in recognizing and showing that there exists movement along ancient geological faults, as illustrated on Figure 2.4. The maps show a correlation between areas of faults and land loss. The coastal community is already aware that a large portion of land loss is due to submergence and erosion but not aware of moving faults. Fault-bound blocks beneath the coastal zone, as shown on Figure 2.5 are sinking and tilting. Because south Louisiana sits on top of a linked tectonic system that extends under the Gulf of Mexico, the area continues to sink. There is a trough that fills with sediment brought in by rivers and resulting in submerging the fault further. If the rate of subsidence is larger than the rate of sediment delivery the land loss continues. As a result, sediment loading could increase subsidence. Not surprising there is a divide between geologists and geophysicists and the community of scientists, engineers, and planners involved in coastal restoration. A goal should be to incorporate the fault information for better planning and design of coastal restoration projects.

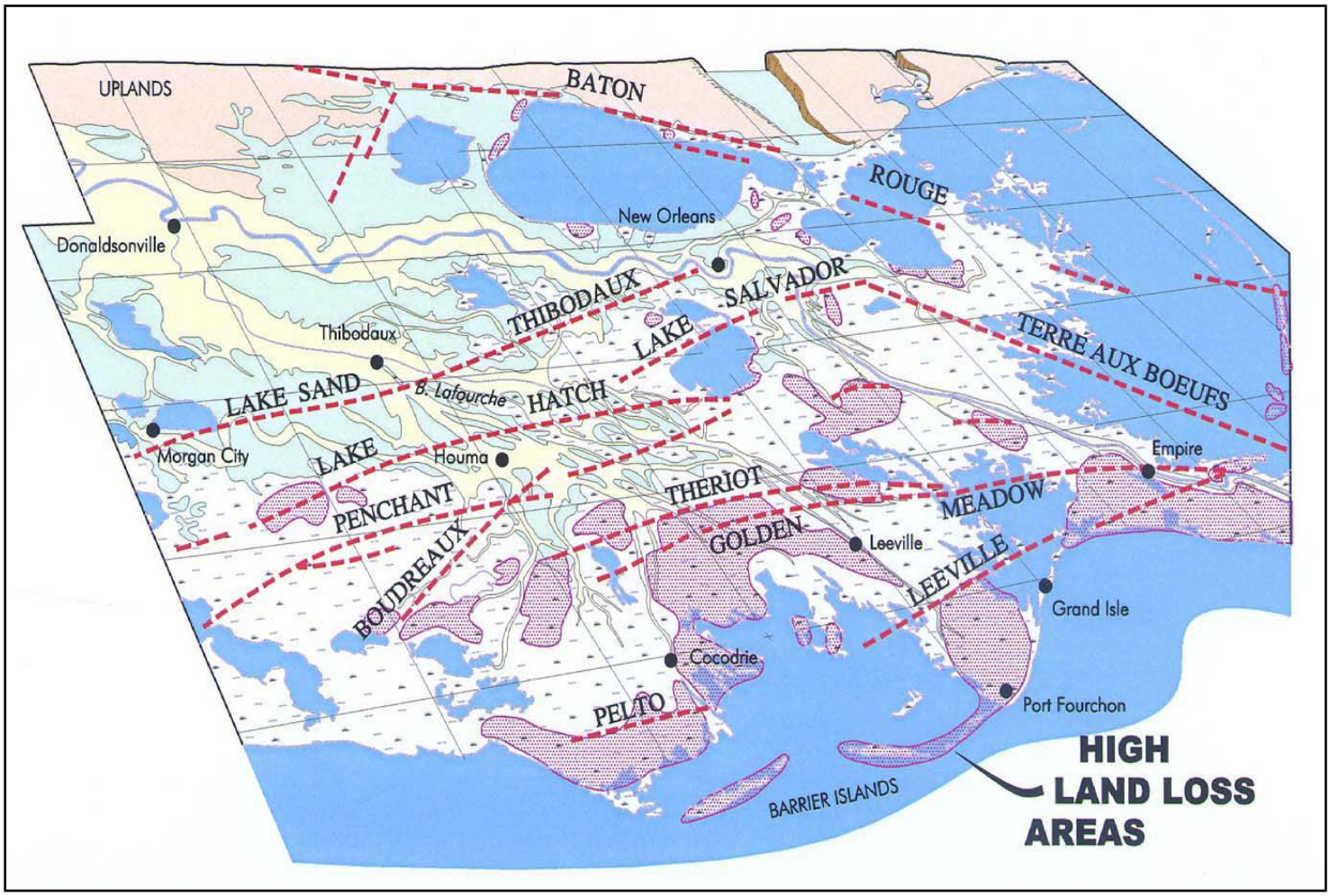

Fig. 2.4 Illustration between fault and high land loss in Southeastern Louisiana. Faults are the cause of land submergence and loss (Gagliano, 2005)

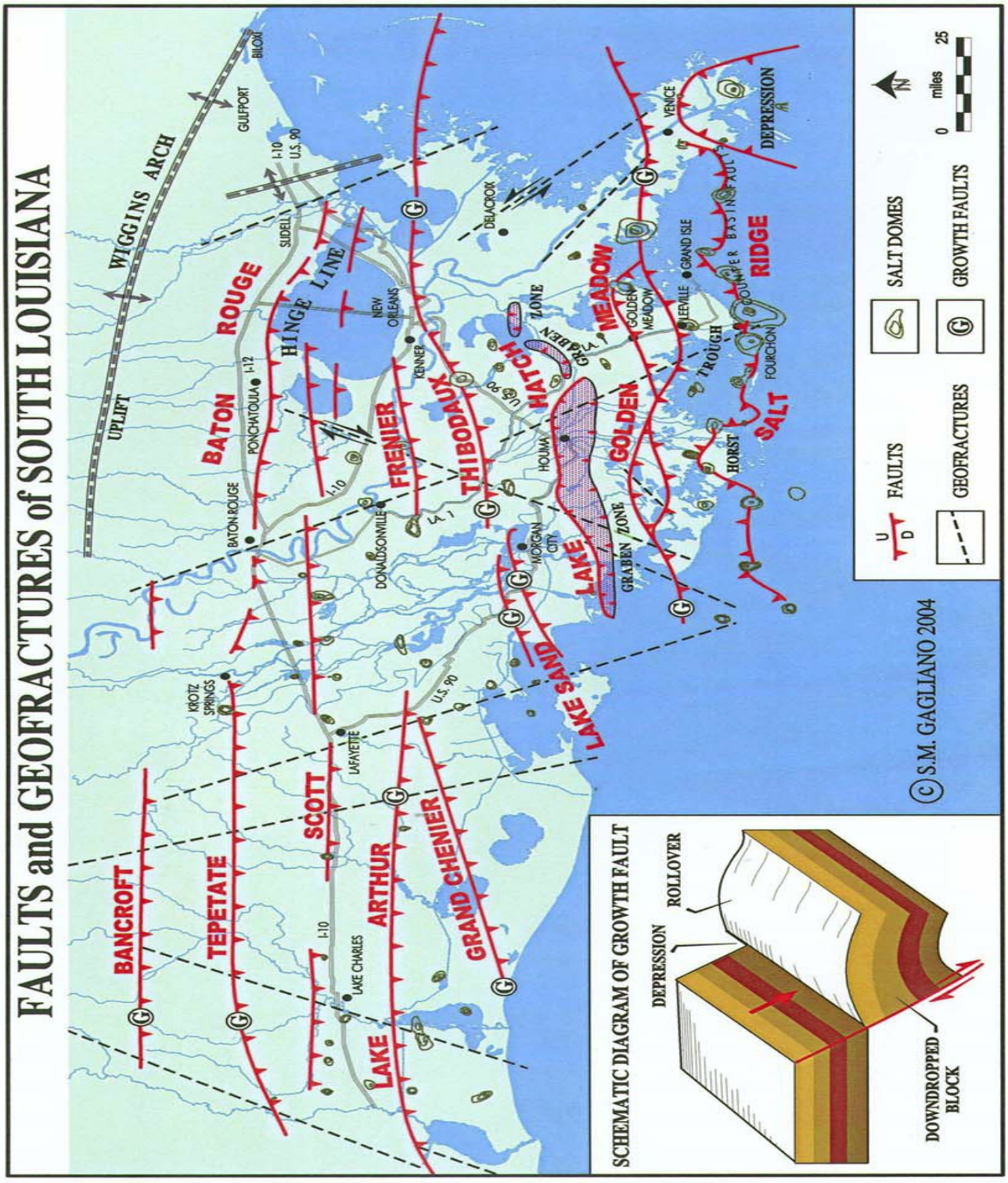

Fig. 2.5 Major Faults and Geofractures of South Louisiana (Gagliano, 2005)

Soils

The soil types in Plaquemines Parish can be grouped into six major categories according to physiographic features or human alterations (i.e., leveeing and draining or spoil deposition) (Table 2.1). Maps of the soil types within Plaquemines are printed in the *Soil Survey of Plaquemines* (U. S. Department of Agriculture, Natural Resource Conservation Service [USDA-NRCS], in press). Soils within the natural levee category constitute approximately eight percent of the land area of Plaquemines Parish and are "…level, poorly drained and somewhat poorly drained, clayey and loam soils of the natural levee of the Mississippi River and its distributaries" (USDA-NRCS in press). The Sharkey-Commerce soils are located inside the flood protection levees and are in urban uses, cropland/pasture, idle land, and hardwood production. The Convent-Commerce-Sharkey soil associations are located between the Mississippi River and the flood protection levees and subject to frequent flooding and scouring. These soils support hardwood production and constitute a source for fill material (USDA-NRCS, in press).

Table 2.1 Soil Associations Grouped by Physiographic Feature or Human Impact (USDA, NRCS in press).

Natural Levee:	(8.0 % of Parish Land)
Sharkey-Commerce	4.0 %
Convent-Commerce-Sharkey	4.0 %
Marshes and Swamps:	(79.5 % of Parish Land)
Balize-Larose	22.0 %
Kenner-Allemands	2.5 %
Clovelly-Lafitte-Gentilly	29.0 %
Bellpass-Timballier	18.5 %
Scatlake	7.5 %
Former Swamps and Marshes:	(6.0 % of Parish Land)
Harahan-Westwego-Rita	6.0 %
Soils in Spoil Areas and On Sandy Ridges:	(6.5 % of Parish Land)
Aquents	5.5 %
Felicity	1.0 %

Marsh and swamp soils cover about 79.5 percent of the parish and are "…level, very poorly drained, loamy and mucky soils in marshes and swamps that are flooded and ponded most of the time" (USDA-NRCS in press). The marsh and swamp soils are located between sea level and 1 ft in elevation and are better suited for recreation, wetland wildlife habitat, oil and gas activities, and support for estuarine dependent organisms. The Balize-Larose and Kenner-Allemands soils, covering 22 percent and two and one-half percent, respectively, of the parish, are found in fresh marshes. The Clovelly-Lafitte-Gentilly soils, covering 29 percent of the parish, are found in

brackish marshes.

The Bellpass-Timbalier soils and the Scatlake soil, covering 18.5 and seven and one-half percent, respectively, of the parish, are located in saline marshes. Former swamps and marshes that have been leveed and drained, usually for agriculture/pasture or development cover approximately six percent of Plaquemines Parish. These soils are level, poorly drained clayey and mucky soils. The Harahan-Westwego-Rita soils in former swamp and marsh areas are from sea level to –3 ft in elevation. Characteristic land uses include cropland, pasture, woodland, home sites, and idle land.

Soils in spoil areas and on sandy ridges constitute approximately six and one-half percent of the parish. These soils are "…level and gently sloping, poorly drained and somewhat poorly drained, variable textured soils on spoil banks and sandy soils on ridges on barrier islands (USDA-NRCS in press)." They are frequently subjected to flooding from high tides and storms. The Aquents, associated with spoil banks, have an elevation ranging from sea level to 5 ft and are used for wetland wildlife habitat, recreation, and limited commercial development. Felicity soils are located on ridges, 1 to 5 ft in elevation, near beaches along the Gulf of Mexico (i.e., Chandeleur Islands and Breton Islands). These areas serve as habitat for wetland wildlife and open land wildlife, such as shorebirds (USDA-NRCS, in press).

Climate

Plaquemines Parish is located in extreme southeastern Louisiana and surrounded on three sides by Barataria Bay, Breton Sound and the Gulf of Mexico. Plaquemines Parish's climate is characterized as hot, humid, and subtropical. The maritime tropical air masses associated with the Gulf of Mexico and the many water surfaces of rivers, canals, lakes, and waterways in the area significantly influence the local climate. The area receives approximately 65 inches of precipitation annually. The summer average daily temperature is 81 degrees F, with the average daily high temperature around 90 degrees F. Winter average daily temperature is 54 degrees F, and the average daily minimum is 44 degrees F. Tropical storms and hurricanes frequent the region, specifically between the August and October peak time frame. Regional climate trends show that over the past decade Louisiana has been subject to increasing temperatures and humidity, increasing precipitation and more intense precipitation events, stronger tropical storms, and a rising sea level (Ning, et al., 2003). Climate modeling efforts to predict future hurricane frequency are currently inconclusive; however, the currently supported climatic trends listed above are generally agreed to result in future increases in flooding, erosion, and subsidence, specifically to coastal areas (Ning, et al., 2003).

The rainiest periods for southern Louisiana are mid-summer, especially July, and winter and spring (Muller et al. 1983). The driest periods appear in early summer and fall, especially June and October (Muller et al. 1983). Table 2.2 illustrates the average rainfall by month over the past 30 years in Plaquemines Parish. Plaquemines Parish is subjected frequently to tropical storms and hurricanes that, generally, enter Louisiana moving from south to north. Between 1886 and 1996, the parish experienced approximately 50 tropical storms and hurricanes (Fournerat 1983, Strone et al. 1997). During this period, 23 hurricane tracks crossed the parish (see Figure 2.6). While the greatest frequency of storm occurrences is between Grand Isle and

Morgan City (averaging one year in two), the rest of southern Louisiana receives storms on the average of one year in three (Muller et al. 1983).

All or part of Plaquemines Parish was severely flooded by hurricanes in the following years: 1886, 1901, 1909, 1915, 1915, 1940, 1947, 1956 (Flossy), 1961 (Carla), 1964 (Hilda), 1965 (Betsy), 1969 (Camille), 1985 (Danny), 1985 (Elena), 1985 (Juan), 1988 (Gilbert), 1992 (Andrew), and 1998 (Georges) (U.S. Army Corps of Engineers [USACE] 1972 rev. 1997, Stone et al. 1997, Thevenot 1998).

Table 2.2 Monthly Precipitations for Plaquemines Parish 1981-2010 (NOAA)

Month	Precipitation Average (inches)
January	5.17
February	5.68
March	4.55
April	4.51
May	4.41
June	6.45
July	5.04
August	4.93
September	4.68
October	4.70
November	4.09
December	5.18
Annual	**59.39**

Hydrology

Hydrologic Processes

Although many causative relationships remain to be defined, hydrology must be recognized as a primary determinant of wetland ecosystems (Gosselink and Turner 1978). Hydrology in Louisiana's estuaries can be thought of as governed by basin physiography and the changes over time in the water supply derived from freshwater and marine sources. The interaction of these water supplies is a basis for estuarine habitat zonation and distribution of major renewable resources.

On a daily basis the interaction of marine and freshwater supplies are a function of the daily tidal envelope (e.g., the range of water levels between high and low tide). The marine supply is provided by means of the saltwater head at the seaward end of the tidal envelope where the tidal range is largest and daily water exchange greatest. The freshwater supply is allowed to accumulate at the landward end. Here the tidal signal has attenuated and daily exchange of water is minimal. The elevation difference between the estuarine water surface and the midpoint of the tidal range represents the freshwater head.

The relevant opposing forces cause a seaward flow of fresh water and an inland flow and progressive dilution of saline water. Mixing of the two waters produces a large volume of estuarine water that is resistant to rapid physical and chemical changes and whose characteristics represent a long-term balance between the two supply forces.

This balance is a function, as well, of the larger meteorological water-level envelope that conforms to the water supply changes of lesser frequency as related to seasonal rainfall and temperature patterns, frontal passage, and flood events. As long as a freshwater head exists in the upper estuary, fresh water continues to move seaward and a salinity gradient is maintained as a result of the dilution of the marine water entering from the gulf.

A typical estuary can be divided into two regions based on the relationship of the freshwater head to the daily tidal envelope. Where the head is larger than the tidal envelope, only outflow occurs during the tidal cycle. Swamps and freshwater marshes are the predominant habitat types. Where the head is totally encompassed by the tidal envelope, there is daily inflow and outflow, and brackish-to-saline marshes predominate. Intermediate marsh develops in the transition zone between the two regions.

The wetland areas of Plaquemines Parish reside in three of Louisiana's designated hydrologic units: Barataria Estuary Unit IV west of the Mississippi River; Breton Estuary Unit II east of the river and Mississippi River Unit III.

There are few areas in the parish where a freshwater head equals or exceeds the daily tidal envelope. Except for certain areas of the active delta, salinities of two (2) parts per thousand (ppt) or less are restricted to the marshes north of the Ollie Canal on the west side and perhaps the marshes west of the Big Mar on the east side of the river. The majority of the parish experiences salinities of 10 to 20 ppt and daily tidal ranges of 0.5 to 1.0 ft.

The active processes of subsidence and land loss tend to cause the tidal envelope to continually increase in a given area until some equilibrium point is reached with the major surrounding landforms. If the freshwater supply remains the same, salinities will continually increase until that equilibrium point is reached. The zones of salinity, depicted on maps by isohalines, shift seasonally in the upper Breton and Barataria Basin portions of Plaquemines Parish in response to freshwater input from the Mississippi River distributary channels. East of the Mississippi River, the 10 and 15 ppt isohaline used to shift inland between 10 and 15 miles during the fall. These shifts have been moderated in the upper Breton Sound Basin since the introduction of fresh water via the Caernarvon Freshwater Diversion structure.

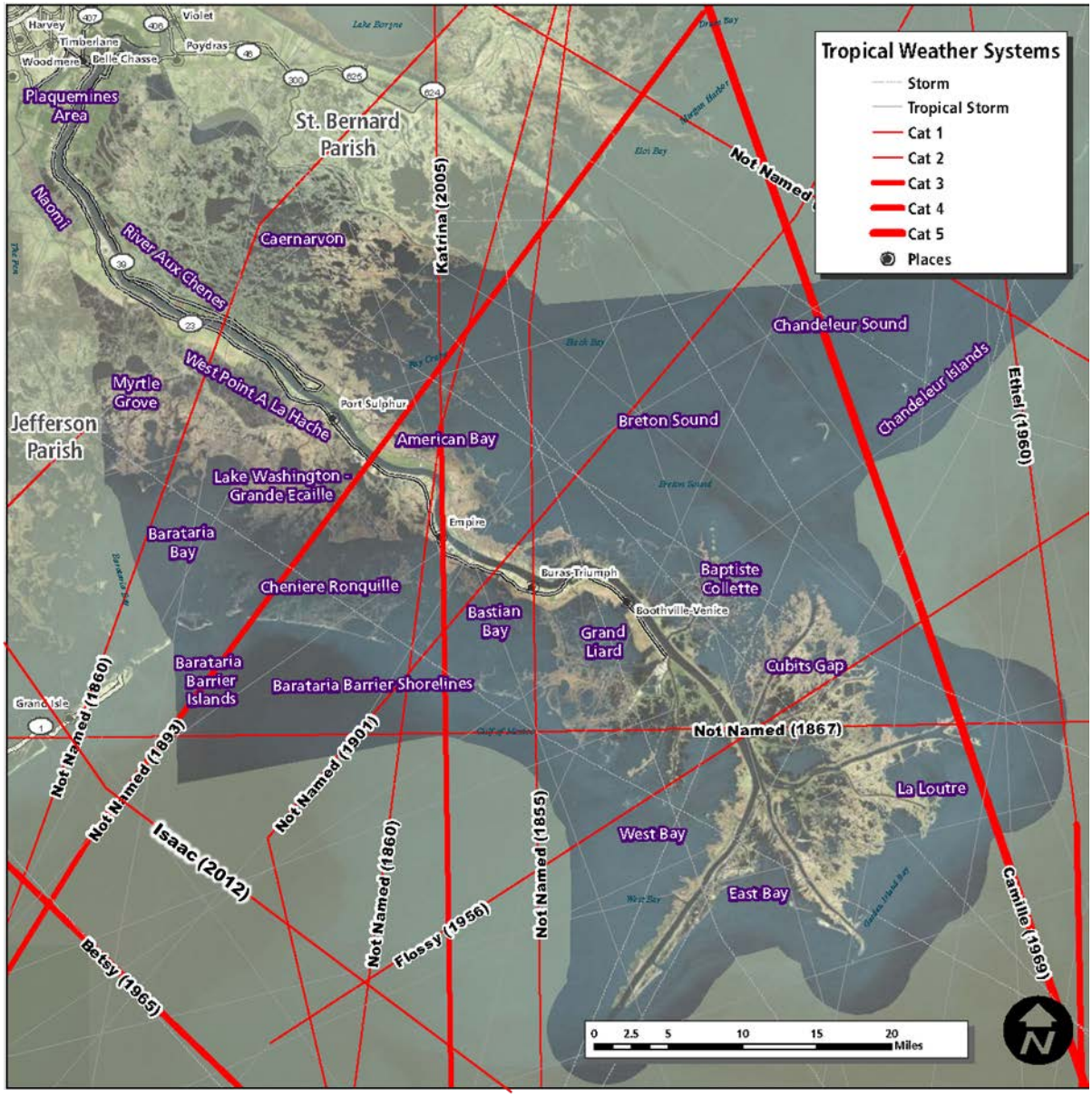

Fig. 2.6 Tropical Storms that passed over Plaquemines Parish
Source: National Oceanic and Atmospheric Administration

Hydrologic Modification

Hydrologic modification is thought to be the culprit behind the problems of an estuary. Building levees and dredging canals alters the natural flow path of water resulting in increased erosion of estuaries. In addition, the salinity concentration in water is altered and accelerates the erosion rate of marsh. Another urgent issue is loss of sediment because for a marsh to thrive sediment is a necessary resource. The river was the source of sediment however, levees restricted sediment to the river only and eluded marshes. Also, the marshes continue to subside. Previously the amount of sediment accumulation exceeded the rate of subsidence. Winds and surges from tropical storms have contributed to the loss of land too.

After a storm passes the marsh is completely underwater and the water chemistry fluctuates with salt water intrusion. At times of storm events extended periods of flooding decreases the ability of growth. If the flooding impact is sufficient, the plants in the marsh die.

The Barataria Estuary

The Barataria estuary can be physiographically divided into upper, middle, and lower sections by LA HWY 90 and the Intracoastal Waterway/LA HWY 45, respectively (Roberts et al. 1982). The lower basin is further subdivided into eastern and western sections by the Barataria Waterway. The lower, eastern section of the Barataria estuary lies in Plaquemines Parish.

The freshwater head in the Barataria estuary, at present, is derived solely from rainfall. Freshwater surpluses generated in the upper basin flow down Bayou des Allemands into the middle basin. Because of the greater ratio of uplands to wetlands and open water, the upper basin acts as a source of freshwater flow that is stored in the large freshwater marsh/open water area of the middle basin. Exchange of water between the middle basin and the lower basin is primarily related to meteorological events with astronomical tides being relatively unimportant. In Lake Salvador, the mean tidal range is 0.2 ft due to a greater than 80 percent attenuation of tidal energy (Byrne et al. 1976). Mean monthly water levels for three stations in the middle basin show two peaks over the annual cycle (Byrne et al. 1976): a spring maximum and a fall maximum, which were attributed to freshets. Winter and summer minima were attributed to lowered Gulf of Mexico levels. A more plausible explanation is that the spring and fall peaks are primarily the result of water set-up due to strong southeast winds.

Within the lower basin, the influence of astronomical tides on water flux increases steadily from Lafitte to Grand Isle. Tidal dynamics in the Barataria Bay region have been discussed by Mariner (1948) and summarized by Byrne et al. (1976). It is important to note that the range of the tide is attenuated by 67 percent between Grand Isle and Lafitte (Byrne et al. 1976). The flushing power of the tide is, therefore, progressively diminished within a short distance.

As mentioned earlier, the lower basin is segmented into western and eastern portions by the Barataria Waterway, an unnaturally deep navigation channel. Banas (1978) explains the effect of the channel on the salinity regime of the lower estuary as follows. Incoming saline waters from the passes should tend to move up the east side of Barataria Bay on a flood tide due to the Coriolis force, resulting in an east-west surface slope and a net flow of water from east to west over the tidal cycle. Data from release of drift bottles substantiates this phenomenon (Broussard 1982).

The Coriolis force also appears to influence the path and distribution of freshwater flowing south from the middle basin. Discharge from Lake Salvador entering Bayou Barataria, Bayou Rigolettes, and Bayou Perot tends to be deflected to the west toward Little Lake, as evidenced by the large acreage of intermediate marsh extending far south on the western margin of the basin. The fresh water then flows through Grand Bayou and Bayou St. Denis and is intercepted by the navigation channel. Banas (1978) observed that the Barataria Waterway acts as a conduit for these southerly ebb flows.

The integration of these processes results in a very steep and seasonally variable salinity gradient between Barataria Bay and Little Lake on the western side of the lower basin with a flatter and less variable gradient on the eastern side. This difference can be seen in the plots of mean monthly salinity for St. Mary Point and Bay Batiste. Salinity at St. Mary Point varies from a low of 10 ppt in May to a high of 18 ppt in November, while Bay Batiste salinity oscillates between 14 and 16 ppt throughout the year. The mean monthly ranges and standard errors are much wider for St. Mary's Point where large freshwater surpluses depress salinity and small freshwater surpluses allow saltwater intrusion.

In fact, van Sickle et al. (1976) reported a gradual increase in salinity through time at St. Mary Point of 0.11 ppt per year, while recently a rate of 0.12 ppt per year increase was found for St. Mary Point and a 0.02 ppt per year increase was found for Bayou Barataria at Lafitte using an entirely different method (van Beek et al. 1986). The latter results are not influenced by changes in the freshwater supply or climate, but relate only to the processes of physical change in the estuary. In other words, subsidence and wetland erosion are causing an increase in the tidal envelope.

Introduction of Mississippi River water into Lake Cataouche (e.g., Davis Pond Freshwater Diversion) was proposed as a solution to the salinity encroachment problems of the Barataria estuary (USACE 1982a). However, because of the tendency for fresher ebb flows to be deflected to the west, this diversion will do little to decrease salinity in Plaquemines Parish (Roberts et al. 1982). Additional measures of the types mentioned above are needed to address this problem in Plaquemines Parish.

In 2010, the Louisiana Department of Wildlife and Fisheries conducted a study of the mortality rates in the Barataria basin by dredging samples producing 1,123 animals with seed oysters accounting for 65.2% of the samples. Specimens were sampled from a matrix of 17 sites. Each site produced an average catch of 66 animals per station and only one sample location in this basin yielded 10 animals or less. The total mortality was approximately 32.5% with mortalities being fairly evenly distributed across public grounds and private leases, and between oyster size categories. Nearly identical estimates of mortality were generated from public ground sample locations (34.7%) as from private lease areas (32.1%) Market-size (sack) oysters suffered approximately 33.8% mortality while seed oysters experience 31.8% mortality. Spat oysters showed approximately 49% mortality. “Up-estuary” locations experienced more mortality than “down-estuary” sites, although one “down-estuary” location (Bay Jaques) which is situated very near the mouth of the Mississippi River showed 100% mortality (94 seed and sack animals were collected). Discrete salinity measurements recorded during sampling averaged 9.9 (± 7.9) ppt.

The Breton Estuary

Geologically, the Breton estuary is much older than the Barataria estuary. One could speculate that around 2000 years ago Breton Island was part of a barrier island chain similar to the Grand Isle/Grand Terre system of today and that Breton Sound was more comparable in size to Barataria Bay. At present, the tidal envelope in the estuary is close to (if not at) an equilibrium point with the major surrounding landforms of the Mississippi River and Bayou Terre aux

Boeufs. The estuary is totally within the region of daily outflow and inflow.

The estuary can be divided into upper, lower east, and lower west sections. The upper basin is the area north of a line between Phoenix and Delacroix, extending generally through Grand Lake and Lake Petit. The lower basin is subdivided into eastern and western sections by River aux Chenes.

Water movements in the upper basin are dominated by the movement of weather systems through the area. Water levels may rise continuously during several days of southerly wind, as water is pushed in from the lower estuary, then fall for several days after passage of a cold front produces northerly winds.

It is evident that the rise and fall of water levels at Delacroix is positively correlated with this particular component of the wind, although not directly proportional. The discrepancy may relate to other directional components of the wind and also influence water levels at Delacroix. Astronomical tides are not responsible for major water movements in the upper basin. The daily tidal range is about 0.5 ft at Delacroix and 0.2 ft at the Big Mar. The lag between high tide at Delacroix and Big Mar is about 8 hours. Tides become more predominant south of Grand Lake, increasing continuously to a range of about 1 ft at Bay Gardene

Mississippi River Delta

Within the Mississippi River Delta hydrologic unit, riverine processes predominate but are modified by tidal influence and salt wedge formation during low discharge times. Surface salinities do not appear to exceed 5 ppt often, as evidenced by the presence of fresh and intermediate marsh vegetation (Chabreck and Linscombe 1988). The average annual discharge of the Mississippi River is approximately 460,000 cubic feet per second (cfs) (van Beek et al. 1984) and it occurs primarily through six distributary channels: Grand Pass (5 percent), Baptiste Collette (5 percent), Cubit's Gap (10 percent), South Pass (17 percent), Southwest Pass (32 percent) and Pass a Loutre (31 percent) (Roberts et al. 1982, van Beek et al. 1982, 1984).

In addition to Mississippi River overflow in the Pointe a la Hache Relief Outlet area east of the river, precipitation, and freshwater runoff from the upper parts of the Barataria and Breton Sound drainage basins, the wetlands above the birdfoot delta intermittently receive freshwater input via sixteen pumps, and three freshwater diversions (White's Ditch, Bayou Lamoque and Caernarvon) located east of the river.

While the White's Ditch (250 cubic feet per second [cfs]) and Bayou Lamoque (12,000 cfs) structures were not operating as of 1999, the Caernarvon Diversion has operated since its completion in 1992. The structure was designed to discharge a maximum of 8,000 cfs during high Mississippi River stages in order to enhance habitat for the benefit of fish and wildlife, and especially oysters. The actual discharge is considerably less than 8,000 cfs and varies according to a detailed operational plan implemented by the Louisiana Department of Natural Resources (LDNR.)

Figure 2.7 depicts the location of the drainage districts along the Mississippi River natural levees. The drainage districts are enclosed by back flood protection levees that range in elevation from 5 ft to 17 ft and define the extent of fastlands in the parish. Hydrologic processes within the drainage districts are controlled by drainage canals that collect precipitation and runoff and pumps that discharge excess water into wetlands located outside the levees. As a result of pumping and consequent dewatering and soil compaction, large expanses of fastlands have a lower elevation (0 ft to below –2 ft) than the marshes outside the levees.

Vegetation and Habitat Change

As of 1988, over three-fourths (78 percent) of Plaquemines Parish out to the three-mile State-Federal demarcation line consisted of open water (LDNR 1999a, National Wetlands Inventory [NWI] 1988). Of the remaining 22 percent in land (approximately 377,000 ac), 18 percent was in wetland habitats such as swamps, marshes, tidal flats and shores, bottomland hardwood forest, and bottomland scrub/shrub. The remaining four percent consisted of uplands and fastlands containing upland forest and scrub/shrub habitat on natural levees and spoil deposits, developed sites, agricultural and pasture lands, and inert/barren upland. Between 1956 and 1988/90, 34 percent (193,244 ac) of the 1956 land area in Plaquemines Parish disappeared at an overall average rate of 6,039 ac per year.

Since the early 1980s, numerous studies chronicled the large amount of land loss in coastal Louisiana. In response to this land loss problem, the Plaquemines Parish Commission Council funded a major study to develop a long-term management and protection program for the parish (van Beek et al. 1986). Beginning in the 1990s, both the state and federal governments identified numerous coastal wetland restoration programs to address the land loss problem (Figure 2.8, Table 2.3 and 2.4). In all, there are approximately fifteen projects either under construction, operational or anticipated for near-term implementation in the parish with 24 others in planning or engineering/design phases (Table 2.3) In the 2012 Louisiana Coastal Master Plan, eleven additional projects are proposed for implementation in the near term (2012-2031) and four more in the long-term (2032-2061) in Plaquemines Parish (Table 2.4).

Fig. 2.7 Plaquemines Parish Drainage Districts
Source: Plaquemines Parish

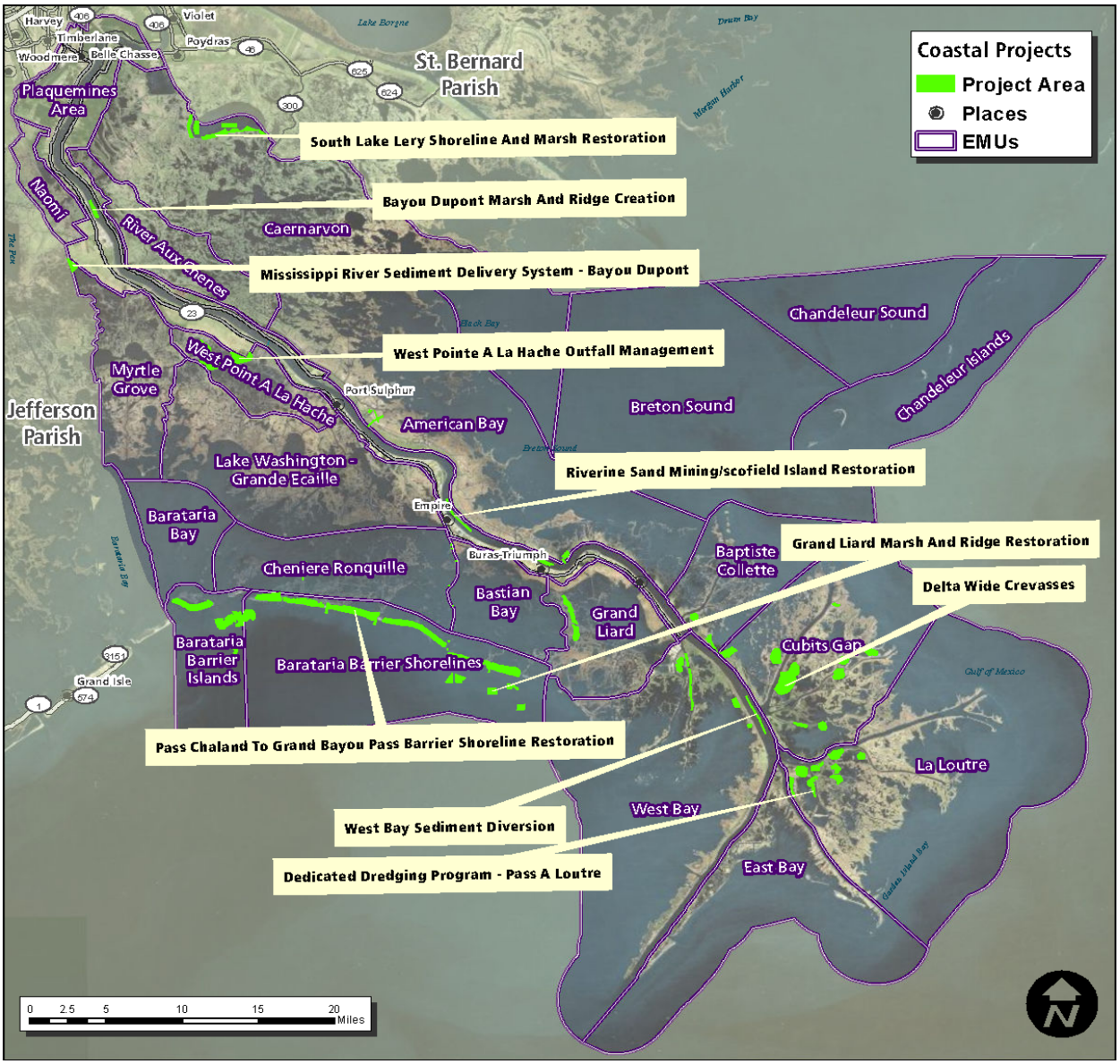

Fig. 2.8 Coastal Restoration Projects in Plaquemines Parish
Source: Louisiana Department of Natural Resources

Table 2.3 Current Coastal Restoration Projects in Plaquemines Parish (OCPR)

Name	OCPR Project No.	Project Type	Project Phase	Program	Federal Sponsor
NF-2, Braithwaite and Scarsdale Breach repair (East Bank)	BA-67-NF-2	Levee	Engineering and Design	STATE	USACE
NOV-NF-W-5, LaReusitte to Myrtle Grove	BA-67-NOV-NF-W-5	Levee	Engineering and Design	STATE	USACE
NOV-13, Empire Floodgate	BA-67-NOV-13	Levee	Engineering and Design	STATE	USACE
New Orleans to Venice	BA-67	Levee	Engineering and Design	STATE	USACE
West Pointe a la Hache Marsh Creation Project	BA-47	Marsh Creation	Engineering and Design	CWPPRA	NRCS
West Pointe a la Hache Outfall Management	BA-04C	Diversion	Construction	CWPPRA	NRCS
Plaquemines Parish - Southeast Louisiana Strategic Restoration	BA-46 SF	Ridge	Engineering and Design	SURPLUS 07	
LCA Mississippi River Delta Management Study	MR-16	Planning	Planning	WRDA	USACE
East Grand Terre	BA-30	Barrier Island Restoration	Complete	CWPPRA	BOEMRE
Channel Armor Gap Crevasse	MR-06	Diversion	Operations, Maintenance and Monitoring	CWPPRA	USACE
Tidewater Road Flood Protection	BA-57	Flood Protection	Operations, Maintenance and Monitoring	CIAP	BOEMRE
Delta Wide Crevasses	MR-09	Diversion	Operations, Maintenance and Monitoring	CWPPRA	NMFS
Mississippi River Sediment Delivery System - Bayou Dupont	BA-39	Marsh Creation	Operations, Maintenance and Monitoring	CWPPRA	EPA
Pelican Island and Pass La Mer to Chaland Pass Restoration	BA-38	Barrier Island Restoration	Construction	CWPPRA	NMFS
Pass Chaland to Grand Bayou Pass (BA-35)	BA-35	Barrier Island Restoration	Operations, Maintenance and Monitoring	CWPPRA	NMFS
Delta Management at Fort St. Philip	BS-11	Diversion	Operations, Maintenance and Monitoring	CWPPRA	USFWS
Caernarvon Freshwater Diversion	BS-08	Diversion	Operations, Maintenance and Monitoring	WRDA	USACE
Caernarvon Diversion Outfall Management	BS-03A	Diversion	Operations, Maintenance and Monitoring	CWPPRA	NRCS
West Bay Sediment Diversion	MR-03	Diversion	Operations, Maintenance and Monitoring	CWPPRA	USACE
Update of the Plaquemines Parish Coastal Management Plan	BA-56	Planning	Engineering and Design	CIAP	BOEMRE

Jump Basin Dredging and Marsh Creation	BA-64	Marsh Creation	Engineering and Design	CIAP	BOEMRE
Fringe Marsh Repair	BA-58	Marsh Creation	Engineering and Design	CIAP	BOEMRE
Cheniere Ronquille Barrier Island Restoration	BA-76	Barrier Island Restoration	Engineering and Design	CWPPRA	NMFS
Grand Liard Marsh and Ridge Restoration	BA-68	Marsh Creation	Engineering and Design	CWPPRA	NMFS
Long Distance MS River Sediment Pipeline	BA-43 (EB)	Marsh Creation	Engineering and Design	CIAP	BOEMRE
Riverine Sand Mining/Scofield Island Restoration	BA-40	Barrier Island Restoration	Engineering and Design	CWPPRA	NMFS
Bertrandville Siphon	BS-18	Diversion	Engineering and Design	CWPPRA	EPA
Bohemia Mississippi River Reintroduction Project	BS-15	Diversion	Engineering and Design	CWPPRA	EPA
Venice Ponds Marsh Creation and Crevasses	MR-15	Diversion	Engineering and Design	CWPPRA	EPA
White Ditch Resurrection and Outfall Management	BS-12	Diversion	Engineering and Design	CWPPRA	NRCS
Coastwide Nutria Control Program	LA-03B	Nutria Control	Operations, Maintenance and Monitoring	CWPPRA	NRCS
LCA Modification of Davis Pond Diversion	BA-72	Diversion	Planning	WRDA	USACE
LCA Modification of Caernarvon Diversion	BS-19	Diversion	Planning	WRDA	USACE
Bayou Lamoque Floodgate Removal	BS-13 (EB)	Diversion	Engineering and Design	CIAP	BOEMRE
LCA Medium Diversion with Dedicated Dredging at Myrtle Grove	BA-71	Diversion	Planning	WRDA	USACE
LCA Beneficial Use Feasibility Study	LA-19	Planning	Planning	WRDA	USACE
Lake Hermitage Marsh Creation	BA-42	Marsh Creation	Construction	CWPPRA	USFWS
South Lake Lery Shoreline and Marsh Restoration	BS-16	Shoreline Protection	Engineering and Design	CWPPRA	USFWS
LCA Barataria Basin Barrier Shoreline - 2007	LA-10	Barrier Island Restoration	Planning	WRDA	USACE

Table 2.4 2012 Louisiana Coastal Master Plan Projects in Plaquemines Parish

Name	Scale (Acreage/Volume)	Project Type	Implementation Period
Barataria Pass to Sandy Point Barrier Island Restoration	Dune, beach and back barrier marsh	Barrier Island/Headland Restoration	2012-2031
Mississippi River Channel Realignment	Planning, engineering and design to explore potential locations for channel realignment of Lower Mississppi	Channel Realignment	2012-2031
Grand Liard Marsh/Ridge Restoration	561 acres of marsh and historic ridge	Combined	2012-2031
Lower Breton Diversion in the vicinity of Black Bay	50,000 cfs	Sediment Diversion	2012-2031
Upper Breton Diversion in the vicinity of Braithwaite	250,000 cfs	Sediment Diversion	2012-2031
Mid-Breton Diversion in the vicinity of White Ditch	5,000 cfs	Sediment Diversion	2012-2031
Mid-Barataria Diversion (50,000 cfs) in the vicinity of Myrtle Grove	50,000 cfs	Sediment Diversion	2012-2031
Lower Barataria Diversion in the vicinity of Empire	50,000 cfs	Sediment Diversion	2012-2031
Bayou Long Restoration	110 acres of historic ridge	Ridge Restoration	2012-2031
Spanish Pass Ridge Restoration along banks of Spanish Pass near Venice	120 acres of historic ridge	Ridge Restoration	2012-2031
Maintain West Bank Levees	Maintenance lifts of 145,000 ft. of earthen levee	Structural Protection	2012-2031
Large-Scale Barataria Marsh Creation	8,070 acres	Marsh Creation	2032-2061
Mid-Barataria Diversion (250,000 cfs) in the vicinity of Myrtle Grove	250,000 cfs	Sediment Diversion	2032-2061
South Lake Lery Marsh Creation	450 acres	Marsh Creation	2032-2061
Barataria Bay Rim Marsh Creation	2,010 acres of fringe marsh	Marsh Creation	2032-2061

There are four types or zones of marsh habitat that correlate to salinity regimes in Plaquemines Parish: fresh (0 – 1 ppt), intermediate (1 -8 ppt), brackish (8 – 18 ppt), and saline (18+ ppt) (recall Figure 1.3 from Chapter 1) (Chabreck and Linscombe 1988, Montz 1976).

Each marsh zone has certain characteristic vegetative species. A comparison of four marsh vegetation maps made in 1949, 1968, 1978, and 1988 (O'Neil 1949, Chabreck et al. 1968, Chabreck and Linscombe, 1978, 1988**)** illustrates the inland shift in marsh zones since the mid-twentieth century. These changes in distribution were in response to saltwater intrusion

associated with channel dredging, subsidence, erosion, and subsequent rapid interior marsh breakup.

Analysis of the 1988 Louisiana coastal marsh vegetation maps (Chabreck and Linscombe 1988) reveals the impact that saltwater intrusion has had on the distribution of marsh zones in the parish. Salt marshes now extend to the base of the back protection levee from Triumph to Port Sulphur in the west central portion of the parish. On the west side of the Mississippi River, brackish marsh abuts the flood protection levees from Port Sulphur northward to Alliance and from Bayou Grand Liard southward to Duvic. On the east side of the Mississippi River, brackish marsh extends northward from Futch Bayou nearly uninterrupted to Caernarvon and from Bay Deneese southward to Olga. There are small areas of intermediate marsh south of Braithwaite and Little Coquille Bay, on the fringes of the extensive fresh marsh zone of the Mississippi Delta, and adjacent to the Mississippi River flood protection levee between Jesuit Bend and La Reussite.

While there are two small areas of fresh marsh in the extreme northern part of the parish, the only extensive fresh marsh zone occurs in the central area of the lower birdfoot delta. This lower delta area is a dynamic environment subject to continuous and seasonally massive inputs of fresh, silt-laden water. Newly emergent, alluvial landforms are rapidly colonized by delta duck potato (*Sagittaria platyphylla*), elephant ear (*Colocasia antiguorum*), wild millet (*Echinochloa crusgalli*) and three-square (*Scirpus Americana*.) The shallow water bodies contain flotons (floating mats of emergent vegetation) dominated by water hyacinths (*Eichhornia crassipes*) and alligatorweed (*Alternanthera philoxeroides*) during the warm weather months (http://www.fws.gov/r4slr/delta.html 1999).

The inner, fresh marsh core of the active delta is rimmed by a permanently flooded (a few inches to 3 ft), intermediate-to-brackish marsh composed monotypically of Roseau cane (*Phragmites australis*). Water bodies in this zone commonly support submerged and floating aquatics such as Eurasian water-milfoil (*Myriophyllum spicatum*), horned bladderwort (*Utricularia cornuta*), small pondweed (*Potamogeton pusillus*), white water-lily (*Nymphaea odorata*), duckweed (*Lemna minor*), and coontail (*Ceratophyllum demersum*) (Gosselink 1984).

The forest habitats existing outside the upland/fastland areas are very limited in area and distribution within the parish. These forests are confined to very narrow fringes outside the protection levees at the base of the Mississippi River natural levee and along subsiding, relict distributary channel levees in the upper basins. Baldcypress and other bottomland hardwood species characterize these fringing forests and live oaks outline the crests of relict distributary levees in the upper reaches of the parish. In the lower, active birdfoot delta, the upper reaches of the narrow, low-lying levees of the active distributary channels, such as Tiger Pass and Grand Pass, support small patches of willows. The levee flanks and interdistributary basins also have small stands of bald cypress.

There are three main segments of barrier islands in eastern Plaquemines Parish: Breton Island (north and south), Grand Gosier Island, and Curlew Islands. These islands are remnants of the Mississippi River's former St. Bernard Delta that was active around 2000 years ago. These islands are low-lying (less than 6 ft above mean sea level) and subject to frequent reshaping by

tropical storms, wind, and tidal action. The dominant vegetation on these islands is black mangrove (*Avicennia germinans*), groundselbush (*Baccharis halimifolia*) and wax myrtle (*Myrica cerifera*) (http://www.fws.gov/r4slr/breton.html 1999). Black mangroves also characterize the leeward side of barrier islands and fringes of saline marsh in Breton Sound and Barataria Bay. The shallow reaches of Breton Sound behind the barrier islands contain manateegrass (*Cymodocea filiforma*), shoalgrass (*Halodule beaudettei*), turtlegrass (*Thalassia testudinum*), and widgeongrass (*Ruppia maritima*) (http://www.fws.gov/r4slr/breton.html 1999).

Wildlife and Fisheries

Plaquemines Parish encompasses a diverse set of habitats that support many different wildlife and fisheries species. Because over 96 percent of the parish consists of wetlands and open water habitat, the majority of the animals present are species that utilize these types of environments (i.e., open water, aquatic beds, fresh, intermediate, brackish and saline marsh, and freshwater swamps). The three percent of the parish that is in hardwood forests, agriculture/upland and barrier beaches also provide important habitat for some species, especially during periods of nesting and migration.

An assessment of current and future wildlife and fisheries resources in Plaquemines Parish was developed as part of a larger study (LCWCRTF & WCRA 1999) to develop a comprehensive management strategy for sustaining coastal Louisiana to the year 2050. Twenty-three species or groups of species having similar habitat requirements were selected for evaluation in relation to current and projected habitat conditions. These species are representative of the avifauna, mammals/reptiles, and fish/invertebrate species using the various types of habitats in coastal Louisiana (LCWCRTF & WCRA 1999:87). These species were selected for analysis based on existing knowledge about the species and their prominence in the area. Matrices were developed by knowledgeable scientists with the Louisiana Department of Wildlife and Fisheries, U. S. Fish and Wildlife Service and U. S. Department of Agriculture, Natural Resources Conservation Service (LCWCRTF & WCRA 1999) to assist in selecting management strategies for sustaining coastal habitats. The matrices identified current (1988/90) habitat type and function of interest (i.e., nesting, stopover, wintering, and multiple functions for wildlife and spawning, nursery, and foraging for fish and invertebrates), species status, population trends since 1985, and projections through the year 2050. The projected population for each species or group of species was based on predictions for future habitat conditions resulting from loss of wetland and forest habitat and was based on existing conditions and processes, including implementation of selected coastal restoration projects.

Many of the species (i.e., ducks, geese, mammals/reptiles and fish/invertebrates) listed constitute major renewable resources utilized by both commercial and sports interests in Plaquemines Parish. They are dependent upon shallow water bodies and marsh habitat for major phases of their life cycle (i.e., spawning, nursery, foraging).

The following sections discuss the habitat use, status, trends, and projections for representative wildlife and fisheries species by mapping unit (e.g., EMU) in Plaquemines Parish and utilize data derived from the Coast 2050 study (LCWCRTF & WCRA 1999).

Avifauna

Bald Eagle and Brown Pelican

Although both species have been delisted from the Endangered Species Act list of threatened anf endangered species, these species remain protected under the Migratory Bird Treaty Act. The bald eagle was not historically present in Plaquemines Parish except in the Myrtle Gove and Naomi EMUs, where it nested in low numbers. Its trend and projected status through the year 2050 are rated steady. The brown pelican winters in Plaquemines Parish and nests on islands in the Barataria Bay and the Chandeleur EMUs. The bird's status ranges from moderate to high in habitats where it was present historically. The trend and projected population for the brown pelican are characterized as increasing. Loss of forest habitat would negatively impact potential availability of nesting sites for the bald eagle in the parish. Loss of barrier islands and beaches and associated mangrove communities also would negatively impact the potential nesting sites for brown pelican in the parish.

Seabirds, Wading Birds, and Shorebirds

The open water, barrier beaches, and fresh-to-saline marshes provide multiple functions (nesting, stopover, and wintering habitat) for numerous species of seabirds, wading birds and shorebirds. Where historically present, their status is considered to be primarily moderate to high. Population trends are generally steady except where they are decreasing in areas experiencing loss of vegetated habitat (e.g., Barataria Barrier Shorelines, Bastian Bay, Chenier Ronquille, and Grand Liard). Almost all EMUs have projected decreases in population through the year 2050, except the Caernarvon, West Bay and Naomi EMUs, where restoration projects are planned.

Visser and Peterson (1997) conducted an extensive ground survey to update the database on nesting seabirds and wading bird colonies along the Louisiana. Of the 50 colonies identified in the database for Plaquemines Parish between 1976 and 1997, 29 colonies were active at the time of the 1997 ground survey. These colonies contained nearly 85,000 birds or approximately 38.5 percent of all the nesting seabirds and wading birds counted in Louisiana. Of the 11 species found nesting during the study, all were represented by colonies in the Plaquemines Parish. These include laughing gull (*Larus atricilla*), sandwich tern (*Sterna sandvicensis*), royal tern (*Sterna maxima*), black skimmer (*Rynchops niger*), Forster's tern (*Sterna forsteri*), brown pelican (*Pelecanus occidentalis*), least tern (*Sterna albifrons*), caspian tern (*Sterna caspia*), gull-billed tern (*Gelochelidon nilotica*), common tern (*Sterna hirundo*), and herring gull (*Larus argentatus*).

The most numerically abundant bird species nesting in Plaquemines Parish was the laughing gull (*Larus atricilla*) with over 52,000 birds. One colony (238A-01) located on the Curlew Islands in the Chandeleur EMU in 1997, contained 37,600 Gulls, almost 28 percent of that species' total population in Louisiana. This was the largest single species congregation located within the parish. The laughing gull was also the most widely distributed species, being found in 16 different colonies in the parish.

Even though these figures on nesting bird colonies located in 1997 are probably accurate, they must be viewed as an index to the species' populations, not an exact enumeration. Colony locations may change from one year to the next, and species abundance almost certainly varies from year to year. Some colonies have disappeared because of the loss of habitat. However, these data reflect relative species' abundance and may serve as reliable biotic indicators of coastal ecosystem stability.

Dabbling Ducks, Diving Ducks, and Geese

Because of its strategic location at the terminus of the Mississippi River, Plaquemines Parish is a major waterfowl wintering area. Thousands of ducks migrating down the Mississippi Flyway each fall and winter find optimum habitat conditions in the vast wetlands of the parish. Even though waterfowl usage of wintering habitats depends on water depth, food availability, distribution of aquatic habitats, soil and water salinity, and climatic conditions (Chabreck et al. 1974, Chabreck 1979), the wetlands of Plaquemines Parish provide more than enough habitat diversity to satisfy the requirements of all waterfowl species. The most preferred waterfowl habitat is freshwater marsh, and during most years this marsh type winters more puddle ducks than all other marsh types combined (Palmisano 1973). Use of coastal marshes seems to be inversely related to salinity, and brackish marsh is important to wintering waterfowl due to its large acreage (Palmisano 1973) and high density of ponds and lakes (Chabreck 1972). Saline marsh is generally poor waterfowl habitat and supports only five percent of waterfowl populations present in coastal marshes. Even within fresh and intermediate marshes, localized plant distributions and areas of high human disturbance may determine use or avoidance of particular areas.

Dabbling ducks and diving ducks utilize the marshes and estuarine open water areas throughout the parish during winter, but concentrations are highest in the fresh-to-brackish marshes in the lower Mississippi River delta (Baptiste Collette, Cubits Gap, La Loutre, and West Bay EMUs). In other EMUs, their status ranges from low to moderate. In the Mississippi River Basin EMUs, their trends have been steady and populations are projected to remain steady or increase in most areas. With the exception of the Myrtle Grove, Naomi, and West Pointe a la Hache EMUs, where trends and projections are steady or increasing, trends and projections in the Barataria Basin EMUs are declining. Breton Sound Basin EMUs show steady or increasing trends and projections, except in American Bay where decreasing populations are projected. Operation of the Caernarvon Freshwater Diversion structure has improved habitat and attracted more wintering waterfowl in the upper Breton Sound Basin east of the river since 1992.

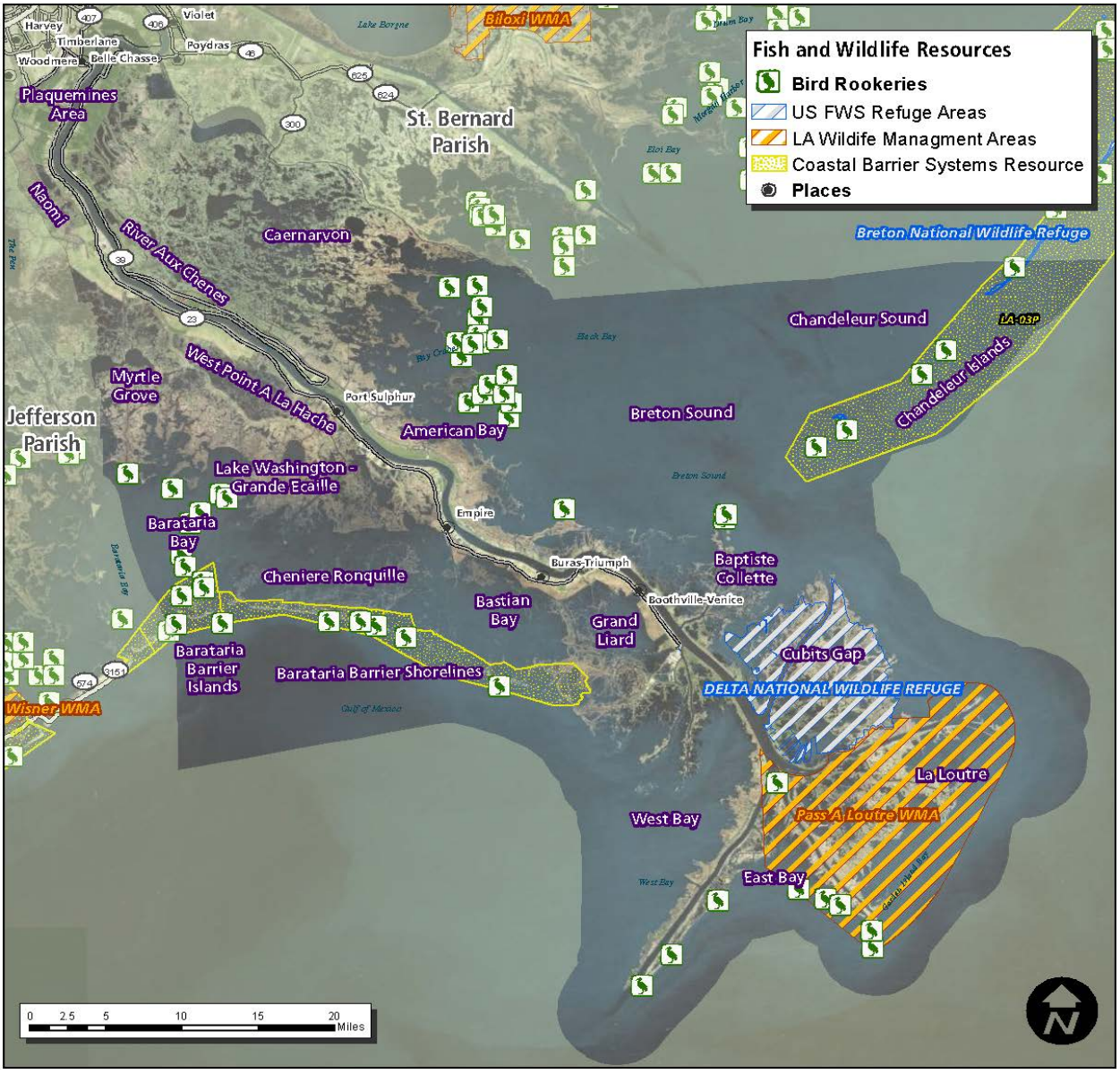

Fig. 2.9. Plaquemines Parish Wildlife Resources
Sources: Louisiana Department of Natural Resources; LAGIS; U.S. Fish and Wildlife Service

Geese, historically, have used only the lower-salinity marshes and open water areas of the lower Mississippi River Basin and Grand Liard areas during winter. Their status is low in Grand Liard and their population trend and projection are expected to decrease through the year 2050. In the Mississippi River Basin EMUs, their status is moderate-to-high and their population trends and projections range from steady to increasing.

Raptors

Raptors utilize the hardwood forest and agriculture habitats as stopover areas during migration

and the fresh-to-brackish marshes for multiple uses, including foraging for food. Their production is expected to remain steady in some areas of marsh habitat (i.e., Naomi and Caernarvon) and agricultural areas but to decline in other EMUs (Grand Liard, Myrtle Grove, and Naomi). Their use of other areas are projected to decline as habitat is lost (i.e., Barataria Barrier Islands, Barataria Barrier Shorelines, American Bay, River aux Chenes, and Lower Mississippi River delta EMUs).

Rails, Coots, and Gallinules

Rails, coots, and gallinules utilize the open water areas for wintering habitat and the marshes for multiple uses. Their population status in the Mississippi River Basin EMUs is projected to remain steady. In the Breton Sound Basin EMUs, their status is low to moderate and their population trend since 1985 has been steady or increasing. Projected populations range from steady to increasing, except in the American Bay EMU where they are decreasing. In the Barataria Basin EMUs their status ranges from low-to-high, but their trends and projections are generally decreasing, except in the Pointe a la Hache, Naomi, and Myrtle Grove EMUs. Here populations are projected to increase.

Other Marsh/Open Water Residents

Other marsh/open water resident species of avifauna utilize the open water habitat for multiple use and the marshes and hardwood forests for nesting. Where historically present, their status ranges from moderate to high. Their trends range from steady to decreasing, depending upon habitat type.

Other Woodland Residents

Other woodland resident species of avifauna have not been present, historically, in most areas of the parish because of the limited extent of forest habitat. Their status ranges from high in hardwood forests of the Naomi EMU to low in the agricultural/upland habitats of the Grand Liard, Myrtle Grove and Naomi EMUs. Their population trends and projections are steady except for projected declines in areas of hardwood forest (i.e., Naomi EMU).

Other Marsh/Open Water Migrants

The various habitat types throughout Plaquemines Parish provide multiple functions for other marsh/open water migrant species of avifauna. Their current status ranges from moderate-to-high where they have been present historically. Population trends are steady except in salt marsh habitat in the Barataria Basin Shoreline, Bastian Bay, Chenier Ronquille, and Grand Liard EMUs where there is a decline. Trends are also declining in the brackish and intermediate marshes in the Grand Liard EMU. About half of the areas that had a steady trend in population since 1985 are projected to show a decline through the year 2050**.**

Other Woodland Migrants

Other woodland migrants have utilized the hardwood forests in the Naomi EMU and the

agricultural/upland habitats in Grand Liard and Myrtle Grove EMU for multiple uses. In general, their population trends have been steady since 1985, but most populations are expected to decline through the year 2050, as habitat is lost.

Game Mammals and Reptiles

Nutria, muskrat, mink, otter, and raccoon utilize virtually all habitats in Plaquemines Parish for multiple uses. Their status generally ranges from low-to-moderate. Their population trends have been steady in most areas, except where declines have been noted (e.g., American Bay, Barataria Barrier Islands, Barataria Barrier Shorelines, Chenier Ronquille, and Grand Liard EMUs.) The trends are projected to remain the same through the year 2050, except for the West Pointe a la Hache and American Bay EMUs, where trends are expected decline. These species are trapped for fur in some of the remaining fresh-to-brackish marshes in the upper reaches of the parish.

While harvest of individual species may be determined by the number of animals present in an area and by harvest regulations, regional market prices paid for pelts can greatly influence the intensity of trapping in an area (Chabreck 1978). Between 1962 and 1982, fur trappers harvested an average of 1.2 million nutria pelts per year in Louisiana. The demand for nutria pelts declined after 1982 and with that the prices and harvest also declined. Prices and demand for nutria pelts have fluctuated since 1982. In the 1995-1996 seasons, prices for nutria pelts averaged $2.15; in the 1996-1997 seasons, they averaged $4.00; in the 1997-1998 season, they averaged $4.90; and in the 1998-1999 seasons, they averaged $2.50 per pelt.

Market development strategies are being developed through the Louisiana Fur and Alligator Public Education and Marketing Fund to promote the use of nutria pelts. Promotion success has been mixed because of the overstocking by worldwide fur dealers, and by additional competition in northern Europe (LA Coop. Ext. Ser. 1998). The harvest of pelts in the state fell to the 100,000 level in 1998-1999 seasons, from a recent high of 375,000 during the 1997-1998 seasons. During 1998, there were 9166 fur pelts harvested at a value of $57,055 in Plaquemines Parish (including mink, otter, raccoon, and muskrat) (LA Coop. Ext. Ser. 1998).

Rabbits, squirrels, and deer represent game species present in Plaquemines Parish. Rabbits utilize the vegetated habitats for multiple uses and their status is generally low. In most areas, their population has been steady since 1985, except for declines in the Chenier Ronquille, Grand Liard, and Lake Washington/Grand Ecaille EMUs. Populations are projected to remain steady through the year 2050. Squirrels have not been present, historically, in most wetland habitats of Plaquemines Parish except in hardwood forests in the Naomi EMU. Population trends are steady and are projected to remain steady through the year 2050.

Deer are present in low numbers in the fresh, intermediate, and brackish marshes, hardwood forest, and agriculture/upland areas of Plaquemines Parish. Population trends are steady and are projected to remain so, except for fresh marsh areas of the East Bay, Grand Liard, Lake Washington/Grand Ecaille EMUs, where both trend and projected populations are declining.

Alligators are a renewable resource that has been harvested in the parish since the ban on their trapping was lifted in the 1980s. The American Alligator makes multiple-use of habitats in all

areas of Plaquemines Parish except the Barataria Bay, Barataria Barrier Islands, and Barataria Barrier Shorelines EMUs, where it is no longer present. Its status ranges from low-to-moderate. Current population trends range from declining in the American Bay, Baptiste Collette, Bastian Bay, Chenier Ronquille, Grand Liard, Lake Washington/Grand Ecaille, West Pointe a la Hache EMUs to steady or increasing in the Caernarvon, River aux Chenes, Cubit's Gap, East Bay, La Loutre, West Bay, and Myrtle Grove EMUs. Populations are projected to be steady or to increase in all areas where it is currently present except for the Bastian Bay, Chenier Ronquille, Grand Liard, and Lake Washington/Grande Ecaille EMUs, where suitable habitat is disappearing.

Between the 1980 and 1983 alligator harvest season, the number of alligators taken per year averaged 684 with a mean hide length of 6.863 ft (Delcambre 1985). In spite of the loss of marsh habitat in Plaquemines Parish, the harvest of alligator hides has increased. In 1998, approximately 10,612 feet of alligator skins were harvested (Center for Business & Economic Research 1999, LA Coop. Extension Service 1998).

Fish and Invertebrates

Fish and invertebrate species utilize the fresh-to-saline environments of Plaquemines Parish at different seasons for spawning, nursery areas, and foraging (LCWCRTF & WRCA 1999:75). These species have great renewable resource value to commercial and sport fisheries interests. The present and future distributions of selected species are related to the type and diversity of habitats that are being affected by both natural processes and human activities. The present population status or trends and projected status of representative species within mapping units designated for Plaquemines Parish are included in the Coast 2050 study (LCWCRTF & WCRA 1998b, 1999:78-79). Trends were based on personal observations and sampling data derived by fisheries biologists with the Louisiana Department of Wildlife and Fisheries over the past one to 20 years. Projected population status was derived from landscape change models developed from habitat change data, primarily percent and pattern of wetland loss, for selected time periods between 1934 and 1988.

The analysis of trends and projected population by mapping unit (e.g., EMU) provides a rationale for decision-making regarding activities, such as permitting of activities and habitat restoration, which would impact these species, either negatively or positively.

In general, for most fisheries species population trends are steady in the Lower Mississippi River Basin (West Bay, East Bay, La Loutre, Cubits Gap, and Baptiste Collette EMUs) and East of the River (American Bay, Caernarvon, and River aux Chenes EMUs). Some species (e.g., Gulf Menhaden, American oyster, white shrimp, blue crab, largemouth bass, and channel catfish) in the American Bay, Caernarvon, and River aux Chenes EMUs have an increasing population trend. These same species also show a steady or increasing trend in the northwest area of the parish in the Naomi, Myrtle Grove and West Pointe a la Hache EMUs. However, all species, except Spanish mackerel show a decreasing trend in production in the Barataria Barrier Islands EMU. A decreasing trend is also characteristic of most species in the West Central part of the parish (e.g., Lake Washington/Grande Ecaille, Bastian Bay, Chenier Ronquille, and Grand Liard EMUs) with a few exceptions. The species maintaining a steady trend in production in selected

EMUs are: 1) black drum, spotted seatrout, Gulf menhaden, and southern flounder in the American Bay EMU, 2) Spanish mackerel in the Grand Liard EMU, 3) gulf menhaden and southern flounder in the Chenier Ronquille EMU, and 4) American oyster in the West Pointe a la Hache and Lake Washington/Grande Ecaille EMUs.

Projected populations of almost all species in the west central part of Plaquemines Parish (West Pointe a la Hache, Lake Washington/Grand Ecaille, Bastian Bay, Chenier Ronquille, Grand Liard, and Barataria Basin Islands EMUs) are projected to continue to decline in production through the year 2050. In addition, most species (red drum, black drum, Gulf menhaden, southern flounder, white shrimp, brown shrimp and blue crab) that currently have steady populations are projected to decline in the future in the lower delta (East Bay, La Loutre, Cubit's gap, and Baptiste Collette EMUs). In the American Bay, Caernarvon, and River aux Chenes EMUs species are projected to maintain a steady or increased population largely in response to maintenance of habitats through the discharge of fresh water, sediments, and nutrients via the river siphons. Comparable steady or increased production is anticipated in the Naomi EMU for all species except spotted seatrout and southern flounder, which are projected to decrease in production. Also, species in the Myrtle Grove EMU are projected to maintain steady or increased populations, except for spotted seatrout, Gulf menhaden, white shrimp, and brown shrimp, which are predicted to decrease.

The marine assemblage of species, represented by Spanish mackerel, prefers brackish and saline deep-water habitats (i.e., deep passes, channels, off shore areas) as juveniles and adults in spring and summer. These species have a steady population trend and projection in all EMUs in the Mississippi River Basin, except the West Bay EMU, where populations are expected to decrease. Their trend and projected population status are rated steady in the Breton Basin EMUs, where they are present.

Within the Barataria Basin, the species have a steady population trend in the Bastian Bay, Chenier Ronquille and Barataria Barrier Islands EMUs. Their status is projected to remain the same through the year 2050. Populations are projected to increase in the Lake Washington/Grande Ecaille EMU.

Estuarine dependent species prefer marsh, shallow water or deep-water habitats depending upon their life stage, for foraging, nursery areas, or spawning. Some species, such as blue crab, tolerate all salinity ranges, while other species prefer specific salinities during different life stages. Knowledge of habitat preferences for selected species aids in establishment of priorities of use for selected EMUs and facilitates decision-making regarding permits and restoration.

Blue crabs and brown shrimp show a steady or increasing trend and projected population status in the Breton Sound EMUs. In the Mississippi River Basin EMUs, the population trend since 1985 has been steady, but is projected to decrease in all units except West Bay by the year 2050. Blue crabs and brown shrimp show a decline in trend and projected status in almost all EMUs in the Barataria Basin. In the Naomi and Myrtle Grove EMUs, their population trend is increasing and is projected to remain steady through the year 2050, except for a decrease in brown shrimp in the Myrtle Grove EMU.

Within the Breton Basin EMUs, red drum, black drum, spotted seatrout, Gulf menhaden, white shrimp, and southern flounder have a population trend and projection that is either steady or increasing. In the Mississippi River Basin EMUs, these species show a steady population trend, but projected populations are expected to decrease in all EMUs, except West Bay, where they remain steady or increase. Population trends and projected status within the Barataria Basin EMUs are mixed according to species, but are generally decreasing, except in the Naomi and Myrtle Grove EMUs. Here trends and projections are either steady or increasing except for spotted seatrout, Gulf menhaden, southern flounder, and white shrimp that are decreasing in some areas.

The American oyster represents the estuarine resident assemblage of invertebrates that live in shallow waters and have a preference for brackish salinities. Within the Breton Basin EMUs, this species has an increasing population trend and projected status, except in American Bay where it is projected to be steady. Where present in the Mississippi River Basin, its population trend and projected status is steady, except for West Bay where its population is projected to decline. In Barataria Basin EMUs, the population trends and projected status are steady in the West Pointe a la Hache, Lake Washington/Grande Ecaille and Grand Liard EMUs, but declining in the Bastian Bay, Chenier Ronquille, and Barataria Barrier Islands EMUs. In the Myrtle Grove EMU its population trend is increasing and is projected to remain steady. The location of leased oyster growing areas and public seed grounds are depicted on Figure 2.10. Leased areas have increased in recent years from 95,217 acres in 1984 (Dugas 1984) to 156,969 acres in 1999 (LDNR 1999d).

In the Breton Basin, the freshwater assemblages represented by largemouth bass and channel catfish are present only in the Caernarvon and River aux Chenes EMUs where both their trend and projected population status are increasing.

Their population trend and projected status in the Mississippi River Basin EMUs are steady, except in the West Bay EMU where the projected population status is projected to increase. Within the Barataria Basin EMUs, freshwater species are present in West Pointe a la Hache, Myrtle Grove and Naomi EMUs and their population trends and projected status are steady or increasing. However, populations of these species are projected to decrease in the West Pointe a la Hache EMU.

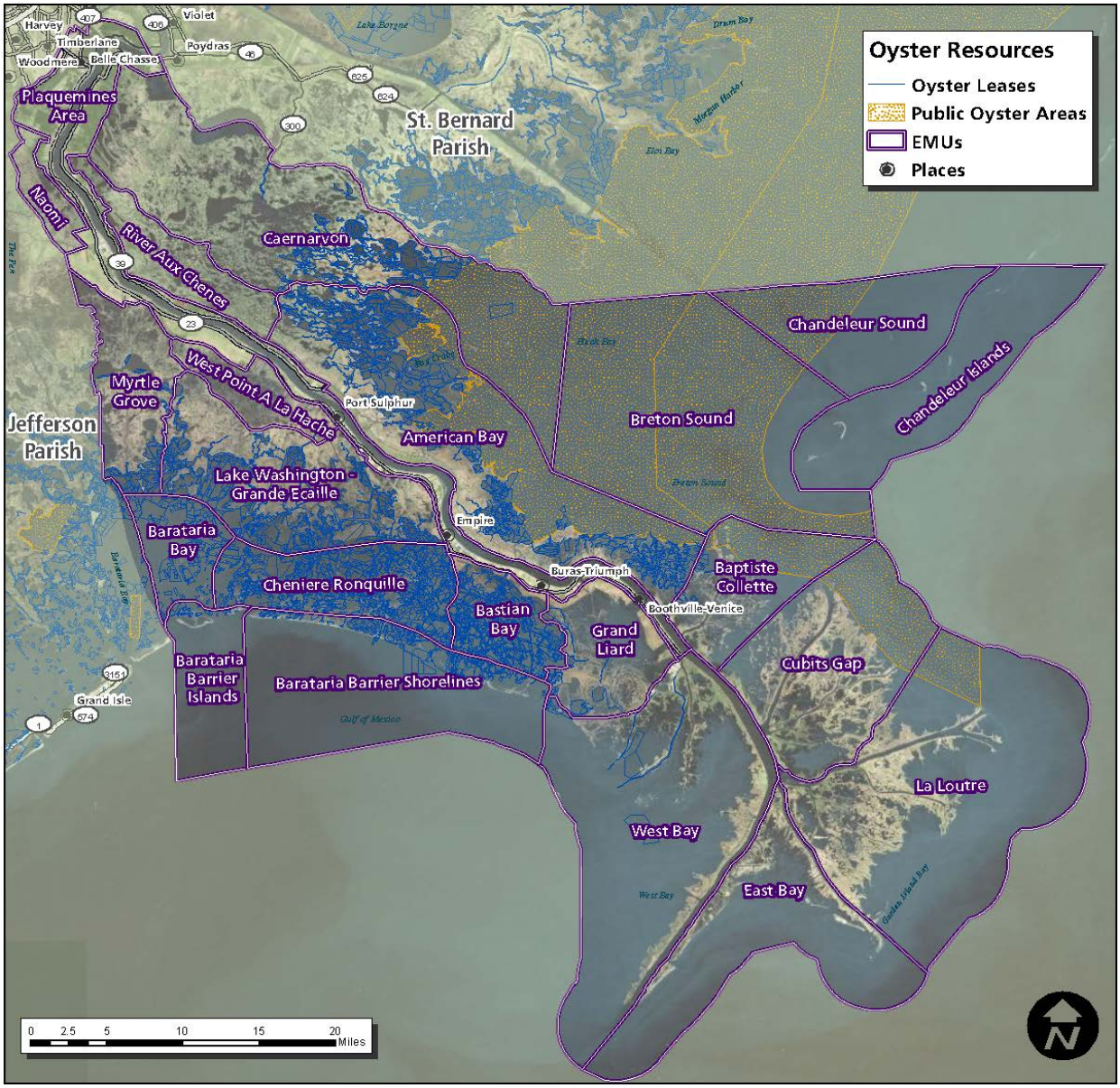

Fig. 2.10 Plaquemines Parish Oyster Resources
Source: Louisiana Department of Natural Resources

Commercially important freshwater fish in Plaquemines Parish include: channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), flathead catfish (*Pylodictis olivaris*), yellow bullhead (*Ictalurus natalis*), carp (*Cyprinus carpio*), largemouth buffalo (*Ictiobus cyprinellus*), smailmouth buffalo (*Ictiobus bubalus*), alligator gar (*Lepisosteus spatula*), spotted gar (*Lepisosteus oculatus*), longnose gar (*Lepisosteus osseus*), bowf in (*Amia calva*), and freshwater drum (*Aplodonatus grunniens*) (USACE 1982b). Red swamp crawfish (*Procambarus spp*.) also are harvested commercially either from freshwater swamp and marsh areas or farm ponds in the upper reaches of the parish. Freshwater species commonly sought by sports fishermen include largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis*

nigromaculatus), bluegill (*Lepomis macrochirus*), channel, blue and flathead catfish, and freshwater drum. The Caernarvon EMU has become an important largemouth bass area attracting major bass tournaments since the Caernarvon Freshwater Diversion structure began operation.

Plaquemines Parish comprises some of the most productive estuarine and marine habitats in the United States for finfish and shellfish resources important to both commercial and sport fishermen. The Mississippi River Basin and upper Breton Basin areas produce freshwater species of finfish, and marine species are harvested in the more saline areas of Barataria Bay, Breton Sound, and the open waters of the Gulf of Mexico. Literally millions of pounds of fish and shellfish worth millions of dollars in revenue are caught commercially every year in parish waters.

According to estimated data on the amount of commercially harvested fisheries resources reported for Plaquemines Parish between 1979 and 1998 (Center for Business and Economic Research [CBER] 1999, LA Coop. Ext. Ser. [LCES] 1998), major species harvested include farmed crawfish, wild catfish, shrimp, menhaden, oysters, crabs, and commercial finfish. Farmed crawfish production occurs in freshwater wetlands inside the flood protection levees and catch has varied from a low of 30,000 pounds in 1981 to a high of 320,000 pounds in 1990. Catfish production in freshwater environments was reported beginning in 1988 and has varied from a low of 95,136 pounds in 1992 to a high of 650,000 pounds in 1990. Shrimp production has been consistently high from 1974 to 1998, ranging from a high of 20,105,000 pounds in 1998 to a low of 4,641,289 pounds in 1992. The average annual harvest of shrimp between 1979 and 1997 was 12,303,875 pounds (CBER 1999, LCES 1998). Menhaden constitute the largest amount of fish harvested but the amount has varied from a low of 20,300,000 in 1990 to a high of 475,000,000 in 1982. Production has been consistently lower in the 1990s than between 1979 and 1982. Oyster production was highest in 1981 (4,260,000 sacks) and lowest in 1983 and 1984 (286,000 sacks). Production of crabs has shown a steady increase from 1979 to 1998.

Production was lowest in 1983 (345,000 pounds) and highest in 1996 (2,973,500 pounds). Other commercial finfish production has increased steadily between 1975 and 1998, but was highest in 1997 (22,579,600 pounds) (CBER 1999, LCES 1998).

Threatened and Endangered Species

There are no listed, proposed or candidate vegetation species having Threatened and Endangered Species Status for Plaquemines Parish (Watson 1999).

The U.S. Fish and Wildlife Service lists several faunal species as either threatened or endangered that may occur within Plaquemines Parish. These include the threatened Piping Plover (*Charadrius melodus*), the endangered pallid sturgeon (*Scaphirhynchus albus*), the endangered Kemp's ridley turtle (*Ledipochelys kempii*), the threatened loggerhead sea turtle (*Caretta caretta*), and the endangered West Indian manatee (*Trichechus manatus*) (Watson 1999).

The Piping Plover winters in coastal areas, roosts in sparsely vegetated areas, and feeds extensively on mudflats and beaches. The main threats to the species include habitat degradation

due to development, predation, and disturbance by humans and pets.

The pallid sturgeon can be found in the Mississippi River and is believed to spawn in Louisiana, but not in Plaquemines Parish. Little is known of its habitat requirements other than its adaptation to large, free flowing, and turbid rivers with habitats that are in a constant state of change. Some of the major causes of decline of the species include stream channelization and dams.

The Kemp's Ridley turtle occurs mainly in the coastal waters of Plaquemines Parish. The juveniles and young adults occupy sandy or muddy, shallow water bottoms and are usually found nearshore from May to October. Adults are abundant near the mouth of the Mississippi River from May to October. During the winter months, adults move into deeper, warmer waters of the Gulf. Kemp's Ridley turtles use nearshore waters, ocean sides of jetties, small boat passageways, and dredged and non-dredged channels. The major threats to the species include over-exploitation, pollution, and drowning in fishing nets.

The threatened loggerhead sea turtle has been recorded nesting on the Chandeleur Islands. The nesting and hatching period in Louisiana extends from May 1 to November 30. The species is threatened by the destruction of its nesting habitat and drowning in fishing nets.

The endangered West Indian manatee has been sighted along the Louisiana Gulf Coast and in canals in adjacent coastal marshes although it is not a native species. The decline in the manatee population in its native habitat has been the result of collisions with boats and barges, entrapment in flood control structure gates, poaching, loss of habitat, and pollution.

Cultural Resources

Plaquemines Parish is rich in both prehistoric and historic resources. From a geological perspective, the parish is a fairly recent creation, with all its land having been deposited by the Mississippi River within approximately the past 3,000 years. Because of a general time lag between active deltaic processes and initial human occupation of an area, coupled with subsidence of the earlier landforms, the earliest sites known from the parish date to only about 2,000 years ago.

As of June 1999, there were 156 recorded archaeological sites in Plaquemines Parish**.** Most sites (n=120; 76.9 percent) are historic or primarily include an historic component, while the remainder of the sites (n=36; 23.1 percent), principally, are prehistoric locales. The majority of the historic sites are located along the natural levees of the Mississippi River and/or the main passes at the river's mouth. These sites can be divided into three primary categories: (1) plantations and/or their associated structures (big house, overseer's house, sugar mill, pumping station, landing, slave quarters, and store) and cemeteries; (2) fortifications and their associated magazines and redoubts; and (3) maritime structures, such as ports, jetties, lighthouses, pilot stations, custom houses, revenue stations, and quarantine stations. Other types of historic sites include fishing villages, railroad tracks and trestles, oil-related construction areas, oyster-processing plants, individual house locations, camps, churches, and small farmsteads. Some of the most interesting historic locales are related to shipwrecks from the Civil War period. These

ships were lost when the Union fleet ran past the guns of Forts Jackson and St. Philip while on its way to capture New Orleans: *C.S.S. Governor Moore* (16 PL 90), *C.S.S. Louisiana* (16 PL 91), *C.S.S. Manassas* (16 PL 92), the *U.S.S. Varuna* (16 PL 93), and the possible remains of the *C.S.S. Warrior, Belle Algerine, Phoenix*, or *Music* (16 PL 97).

Some of the prehistoric sites are located on the natural levees of the Mississippi River, but most are situated on smaller distributary channels in the swamps and marshes, where hunting and fishing probably were more productive. Two main site types can be recognized: (1) earth and/or earth and shell mounds and (2) shell middens. Many of the shell middens have been affected by retreating shorelines, and now are nothing more than piles of eroded, wave-washed shells and artifacts. The earliest site (16PL154) reportedly contains ceramics dating to the Tchula period (ca. 800 to 1 B.C.), although most sites can be tied to Coles Creek (ca. A.D. 700 to 1200) and Mississippi period (ca. A.D. 1200 to 1700) occupations. It is interesting to note that almost all of the earliest sites recorded in the parish, at least through site 16PL41, were prehistoric locations, while the vast majority of all succeeding sites are historic locales.

This clearly reflects an early bias towards recording only aboriginal locations as archaeological sites, and the recent practice associated with cultural resources management of recording just about any site greater than 50 years of age. There are five sites in the parish that are listed in the National Register of Historic Places. These sites represent some of the most significant resources present in the parish. Included are Fort de la Boulaye (16PL27), Fort Jackson (16PL38), Fort St. Philip (16PL39), Harlem Plantation House (included in site 16PL84), and Woodland Plantation (16 PL 157). Two other locales are listed in the National Register but have not been assigned state site numbers. These are the Mary Plantation House and Promised Land Plantation.

Public Infrastructure and Services and Recreation Facilities

Transportation

Plaquemines Parish's transportation network, comprised of roads, railroads, and navigation channels, is controlled to a large extent by the topography and physiography of the lower Mississippi River deltaic system. Roads and railroads were historically constructed near the crest of the natural levees that parallel the river. Two state highways are the principal roadways in Plaquemines Parish. Louisiana Highway 39, the primary arterial road on the east bank, extends from St. Bernard Parish on the north, approximately 39 miles to its terminus in Bohemia. On the west bank, LA HWY 23 conveys traffic from Belle Chasse to the community of Tidewater, south of Venice. The Louisiana Department of Transportation and Development (LDOTD) has upgraded both highways through the years in order to improve public safety and storm evacuation efficiency. Louisiana Highway 39, relocated as a wider two-lane roadway to the east, generally parallels the old route that is closer to the river. Louisiana Highway 23 is a four-lane divided road located west of the old highway. Both upgraded highways bypass the most congested population centers by tracking through sparsely developed or agricultural lands. Numerous crossroads connect the old and new highways.

The Plaquemines Parish Government recently acquired the right-of-way and commissioned the design of the Peters Road and Extension Project – Phase I. Construction is underway for the new major thoroughfare that will connect Peters Road in Jefferson Parish to LA HWY 23 in Plaquemines Parish. Phase I of the project is the segment from LA HWY 23 towards the southern bank of the Gulf Intracoastal Waterway (GIWW) where it will ultimately connect to Peters Road via a bridge across the GIWW. Phase II of the project will entail building from the existing terminus of Peters Road in Jefferson Parish to the northern bank of the GIWW to provide an approach for a future bridge crossing the waterway. Phase III of the project includes construction of a four-lane bridge over the waterway connecting Phase I and II. Furthermore, different rail alignment alternatives are under study for inclusion as part of the bridge project. The Parish is also undertaking the Barriere Road Widening to tie Phase I into northern Belle Chasse. The Parish has slated the Peters Road Bridge and Extension Project for priority funding with an anticipated completion dated projected for 2018.

There are no bridges spanning the Mississippi River in Plaquemines Parish, nor are any planned. Two ferryboat operations provide cross-river transportation services between Belle Chasse and Scarsdale and East Pointe a la Hache and West Pointe a la Hache. Boat ferries operate at no charge to commuters.

Railroad lines at one time carried freight and passengers to Buras on the west bank and to the Braithwaite area on the east bank. The east bank line, currently operated by The Norfolk Southern, remains active to the Amex facility. The southern portion of the west bank track has been removed, but intermittent services continue on the remaining track to St. Rosalie, located north of Myrtle Grove. Operated by the New Orleans & Lower Coast, the west bank rail connects to the Union Pacific Railroad at the Gouldsboro Yard in Gretna (Entergy Corp and LA Economic Development 1999*).*

The principal waterway serving Plaquemines Parish is the Mississippi River that bisects the parish for more than 90 miles. As initial landfall and primary avenue of ocean access to the central United States through the ports of New Orleans and Baton Rouge, commerce on the 19,000-mile Mississippi River system annually exceeds hundreds of millions of tons of cargo and billions of dollars in value. Access from the river to the adjacent wetlands and water bodies is through the Empire Lock/Canal on the west bank and the Ostrica Lock/Canal on the east bank that are operated by the LDOTD. Additional waterways including, but not limited to, Tiger Pass, Main Pass, Grand Pass and Baptiste Collette Bayou, provide cross-river navigation routes in the lower delta. The Gulf Intracoastal Waterway (GIWW) traverses the extreme northwestern border of the parish between the Harvey Canal and the Algiers Locks.

The Plaquemines Parish Port, Harbor, and Terminal District maintain a deep draft (45 ft) port facility near Braithwaite. Major import commodities include steel, crude oil, and iron ore while major exports consist of coal, coke, soybeans, corn, and wheat. Major domestic goods include crude oil, phosphate, and coal. Available services at the port include two river pilot associations and three stevedore companies.

The only major airport in the parish is located in Belle Chasse. The Naval Air Station- Joint Reserve Base (formerly known as Alvin Callendar Field), initially constructed and operated as

New Orleans' naval air base, is presently utilized by the other branches of the military. The multi-branch station is the first of its type in the country. An annual air show, comprised of aerial performances and ground exhibits at the base, has gained a popular following through the years.

The base has grown substantially in recent years – much as a result of the closure of the Naval Support Activity in New Orleans and other bases across the country – and includes almost $90 million in recently completed construction projects. Since 2008, more than 1,130 jobs have shifted to the air station from the Naval Support Activity. As of February 2011, about 6,284 people currently work at the air station, making it one of Louisiana's largest employers. The base has an annual payroll of $402 million. Housing occupancy at the air station is 99.9 percent and there is a waiting list for families seeking housing on the base.

Port Sulphur has the only public airstrip in Plaquemines Parish that is actively used at the present time; however, small, unimproved airstrips, heliports, and seaplane landing areas are scattered throughout the parish. Louis Armstrong International Airport, located in neighboring Jefferson Parish, provides regularly scheduled commercial airline service for the region.

Utilities

Entergy supplies electricity throughout the parish. Natural gas is supplied by Louisiana Gas on the east bank and on the west bank north of Alliance. Delta Gas supplies natural gas from West Pointe a la Hache to Venice on the west bank. Under normal conditions, water is derived from intakes along the river and processed into potable water by several plants along the river. Water is supplied by the Dalcour Waterworks District at Braithwaite (Mile 80.9 above Head of Passes [AHPI]) and Pointe a la Hache Water District (Mile 49.2 AHP) on the east bank. On the west bank, water supplies are handled by the Belle Chasse Waterworks District in Belle Chasse (Mile 75.8 AHP), the Port Sulphur Waterworks District (Mile 49.0 AHP), and the Boothville-Venice Waterworks in Venice (Mile 18.6 AHP). During low water events in the river, normally in late summer and fall, when salt water pushes upstream, the increased sodium in the processed water becomes a health risk and its removal is cost prohibitive. When these conditions occur, the water system between Buras and Venice has the capability of switching to imported water that is delivered by a pipeline.

Fire protection in the parish is provided by an all volunteer fire department divided into seven fire districts: Pointe a la Hache, Belle Chasse, Port Sulphur, Buras, Boothville/Venice, Lake Hermitage, and Woodlawn/Braithwaite. A heavy saturation of fire hydrants, located throughout the parish, facilitates fire protection that has resulted in the parish receiving excellent fire class ratings.

Sewage and Solid Waste Disposal

The Parish Government maintains six sewer systems: Belle Chasse, Buras/Triumph, Port Sulphur, Boothville/Venice, Empire and District 1-Pointe a la Hache. Sewage on the west bank is processed through four treatment plants located in Belle Chasse, Port Sulphur, Buras, and Boothville and one oxidation pond located in Ironton. On the east bank, there is one oxidation

pond located in Davant. Most of the parish utilizes individual, and to a lesser degree, community sewage systems.

There is no community treatment of sewage generated at recreation camps outside of the levee systems; however, new camps require individual sewage systems that must be approved by the parish.

Parishwide solid waste disposal is provided by one commercially operated sanitary landfill in Venice. Transfer (or compactor) stations, located in Belle Chasse, Port Sulphur, and Boothville, serve as compacting and staging sites for facilitated deliveries of compressed solid waste to the Venice landfill. While a curbside recycling program is not in effect, recycling bins located throughout the parish provide recycling opportunities for interested citizens.

Recreational Facilities

Plaquemines Parish is one of the top fishing areas in the world. The abundance, size, and diversity of freshwater and saltwater sportfish species provide a wide array of angling opportunities. For instance, it is possible for one to fish for largemouth bass in the lower delta and blue marlin in the Gulf of Mexico in the same day. Between the freshwater and blue water habitats, anglers find great fishing in estuarine waters, as well as the near and offshore waters surrounding oil and gas platforms. During low stages of the Mississippi River, particularly in the late summer and fall, saltwater intrudes into the river. When "the river runs green" saltwater species, most notably red drum, speckled seatrout, and flounder, invade the river and are caught in appreciable numbers by anglers from the banks of the river.

The parish is also recognized as having superior waterfowl hunting resources. The Mississippi Flyway's southern terminus at the Mississippi River Delta serves millions of ducks, geese, and other waterfowl with a major wintering habitat or migratory rest stop. The 48,834-acre Delta National Wildlife Refuge, operated by the U. S. Fish and Wildlife Service, and the 66,000-acre Pass a Loutre Wildlife Management Area, maintained by the Louisiana Department of Wildlife and Fisheries, provide public access to hunters in the lower delta.

The parish has one public boat launch that is located along the Hero Canal; however, there have been discussions about opening a second public boat launch along the GIWW under the bridge. There are four boat harbors in the parish. The Pointe a la Hache Boat Harbor is located east of the Mississippi River and back flood protection and contains Beshel's boat launch. Three boat harbors are located west of the river at Buras, Empire, and Venice. The Venice Boat Harbor has two boat launches on Tiger Pass: Cypress Cove Marina and the Venice Marina, Inc. The Delta marina is located on Doullot Canal in Empire and the Riverside Marina is located on the Mississippi River at Buras. Other marinas include Joshua's Marina on the Buras Canal, Hi Ridge Marina on Grand Bayou at Port Sulphur and Myrtle Grove Marina on Wilkinson Canal (Henning 1998).

Recreational parks are located in Belle Chasse, Ironton, Port Sulphur, Fort Jackson, and Boothville/Venice on the west bank and Davant on the east bank.

Plaquemines Parish's rich history has been used to compliment its image as a Sportman's Paradise for increasing tourism. Strides have been made in recent years to develop the non-sporting tourism industry. The addition of several motels, particularly in the Venice area, has helped address the prior shortage of overnight accommodations.

Tourists are drawn to Plaquemines Parish on planned as well as impromptu trips. While visiting New Orleans, tourists will often venture into Plaquemines Parish in order to see the Louisiana countryside and/or follow the Mississippi River. Tourist attractions, consisting of historical structures, some of which are noted on the National Register of Historic Places, include Fort Jackson, the LaSalle Monument, the Plaquemines Parish Courthouse, and various plantations located along the Mississippi River.

Land Use (Uplands/Fastlands, Transitional Areas, Wetlands)

Uplands/Fastlands

Virtually all residential, commercial, and industrial development and agricultural/pasture lands in Plaquemines Parish are located within the Upland/Fastland areas bordered by flood protection levees along the Mississippi River and drainage district levees on the backslopes of the natural Mississippi River levees. Major industrial sites are located adjacent to the Mississippi River because of access to shipping, roads, utilities, and railroad lines that were built originally on the highest parts of the natural levee. Residential and commercial development is most concentrated in the northern portion of the parish around Belle Chasse and the Empire-to-Buras area, west of the Mississippi River. The most southern community in Plaquemines Parish is Pilottown, located on the east bank of the Mississippi River south of Cubits Gap, on an isolated upland/fastland site (LDNR 1998c). This community consists primarily of river pilots who reside here temporarily and guide large ships in the Mississippi River from the mouth of the river as far north as Baton Rouge. A petroleum tank facility located on the east bank of the Mississippi River north of Ostrica also is located on an isolated upland/fastland site. The former Pointe a la Hache Relief Outlet located on the east side of the Mississippi River south of Bohemia qualifies as upland, but is not developed because it is subject to Mississippi River flooding.

Transition Areas

Several communities have been established in transition areas as a result of fisheries, recreational, or industrial interests. The community of Venice developed south of the flood protection levees on the low-lying natural levees between Grand/Red Pass and Tiger Pass, west of the Mississippi River. This site supports oil and gas operations in coastal and offshore continental shelf areas and contains numerous petroleum-related infrastructures. The recreational/fisheries community of Lake Judge Perez (Lake Hermitage) is located west of the Mississippi River on the subsiding Bayou Grande Cheniere natural levee near the junction of Lake Judge Perez and Hermitage Bayou.

The transition area stretching south from the flood protection levees to the former settlement of Ostrica, on the east side of the Mississippi River, is subject to Mississippi River flooding and

contains no concentrated settlements or camps. A small stretch of the Mississippi River natural levee east bank between Phoenix and Belaire is classified as a transition area by the LDNR (1998c) because it is below five ft in elevation and is not enclosed by levees. However, it was included in the Upland/Fastland area of the Plaquemines mapping unit (EMU) in the Coast 2050 project (LCWCRTF & WCRA 1999). This narrow area contains LA HWY 39 and is protected from Mississippi River flooding. The remaining transition areas in the upper portion of Plaquemines Parish are covered by bottomland hardwood forests and are used primarily for hunting and other recreational activities.

Wetlands

The wetlands of Plaquemines Parish provide valuable habitat for fish and wildlife, as well as recreational opportunities for residents and visitors. The numerous campsites scattered throughout the wetlands are primarily used on a temporary basis for recreational purposes although some may be occupied seasonally in conjunction with renewable resource harvesting, such as trapping, fishing, or oyster harvesting. A study completed in 1979 revealed that of the more than 10,000 recreational dwellings located in the Chenier and Deltaic Plain regions of Louisiana, an estimated 10 percent (1090) were located in Plaquemines Parish (Gary et al. 1979). The small community of Grand Bayou, located on the narrow, subsided Bayou Grande Cheniere natural levee southwest of Happy Jack was originally founded by residents who harvested fish and oysters for a living.

The Freeport Sulphur Company once operated a sulfur mining operation in the wetlands of the lower delta at Dennis Pass and maintained a large freshwater reservoir that was used both for their mining process and by sport fisherman. However, this mining operation and the one at Grande Ecaille have been closed.

The public utilization of wetlands for recreation is largely confined to navigable waterways and three public recreational areas: Louisiana's Pass-a-Loutre Wildlife Management Area, and the Federal Government's Breton National Wildlife Refuge and Delta National Wildlife Refuge. Some privately owned wetlands are leased for hunting and trapping.

Potential Unique and Particular Areas

The natural environment of Plaquemines Parish provides many examples of ecological features that should be managed in such a way as to preserve them for future generations. A unique ecological feature has been defined as an area or resource with characteristics qualifying 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) vital to the maintenance of a coastal ecological process, 6) a unique physiographic feature, or an area of exceptional recreational value (Burk and Associates 1976).

Particular areas are characterized by their "unique and valuable characteristics requiring special management procedures" (OCZM and CMS 1980:C6-3). As stated in the Excerpts (OCZM and CMS 1980:C6-3), "areas shall be identified, designated, and managed by the local government

following procedures consistent with those for Special Areas." Procedure designation, utilization, and management of special areas are also included in the Excerpts (OCZM and CMS 1980:C4-1) and Section 213.10 of Act 361 (OCZM and LCRP, 1980: b-14).

CHAPTER 3. SOCIO-ECONOMIC SETTING AND PROJECTED GROWTH

Demographics

The population of Plaquemines Parish is small (23,042) (U.S. Census Bureau 2010) when compared to the surrounding urbanized parishes of Orleans, Jefferson, and St. Bernard. The population grew approximately 16 percent in the forty year period from 1960 (22,545) to 2000 (26,758) but declined 14 percent by 2010 due to population loss following Hurricanes Katrina and Rita. Figure 3.1 shows the population change from 2000 – 2010 by voting district. While there was population growth in the Belle Chasse area, there were significant declines in all other districts in the parish. The population of the parish as a whole is expected to remain relatively stable for the foreseeable future with the possibility of further slight decline due to exposure to tropical storms and increased risk of flooding due to land erosion.

Plaquemines Parish has a population density of 9.0 persons/square mile compared to the state average of 96.9 persons/square mile *(U.S Census Bureau; Louisiana Department of Natural Resources)*. Most parish residents live on the west bank of the Mississippi River, primarily in the unincorporated areas of Belle Chasse, Buras-Triumph, Port Sulphur, Boothville-Venice and Empire. District 1 - Pointe a la Hache is the most populated area along the east bank of the river. Residential subdivision development increased before Hurricane Katrina in and around Belle Chasse, which has become a “bedroom community" for New Orleans. Many newcomers are attracted to the parish because of the availability of larger house lots, lower taxes, and lower crime rate, as compared to surrounding parishes.

Plaquemines Parish is governed by the Parish Council form of government. Nine council members are elected from and represent the same number of council districts (Table 3.1). The executive office, the Parish President, is elected parish-wide. None of the communities within the parish is incorporated; therefore, there is no duplication in local governmental services.

Table 3.1 Population and Location of Council Districts in 2000 and 2010 (U.S. Census Bureau).

Council District	2000 Population	2010 Population	Location
1	3,025	1,943	Entire East Bank
2	3,063	4,036	Belle Chasse
3	3,129	3,212	Belle Chasse
4	2,965	4,576	Belle Chasse
5	2,986	3,763	½ Belle Chasse & ½ Port Sulphur
6	2,959	1,776	½ Port Sulphur
7	2,788	1,371	Empire
8	3,064	1,017	Buras
9	2,779	1,348	Boothville/Venice
Parish Total:	**26,758**	**23,042**	

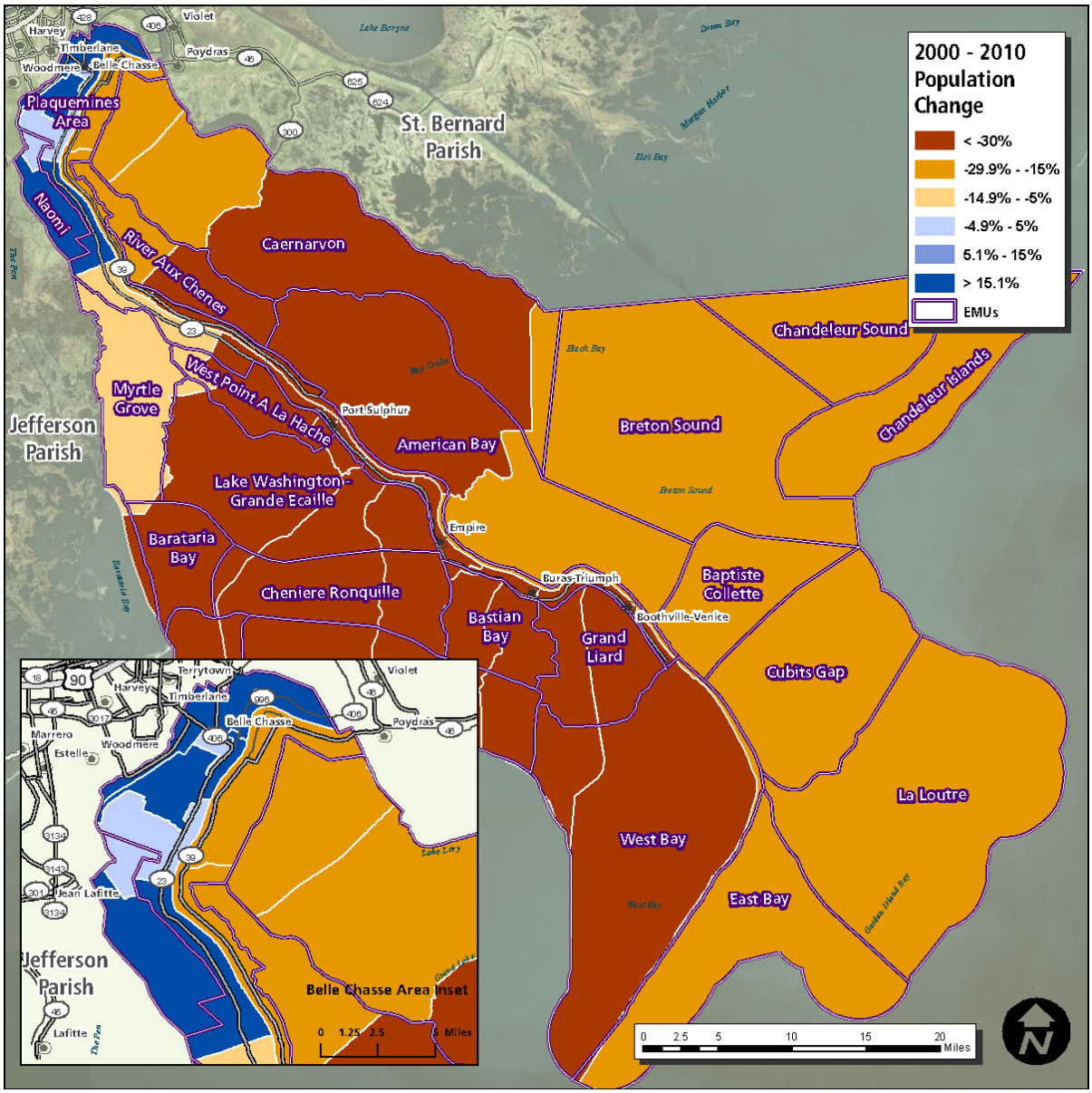

Fig. 3.1 Plaquemines Parish Population Change by Voting Precinct, 2000 – 2010
Source: U.S. Census Bureau

Economic Sectors and Potential Expansion

The economy of Plaquemines Parish is centered on the hydrocarbon and river-based industries as well as the Naval Air Station Joint Reserve Base New Orleans (NAS JRB New Orleans). As of 2010, over 73 percent of the parish work force was employed in five major industry sectors in 2010: services (25.6 percent), transportation (15.8 percent), retail trades (6.8 percent), manufacturing (10.5 percent), and construction (14.8 percent). Hydrocarbon related employment is apportioned within these major sectors and not entirely reflected in the "mining" sector. The parish is expected to continue to provide support for the nationally important oil and gas activities in the nearshore and offshore continental shelf (OCS) areas of the central Gulf of Mexico for the foreseeable future.

The number of businesses and employment by major industry in Plaquemines Parish in 2010 is shown in Table 3.2.

Table 3.2 Plaquemines Parish Business and Employment Distribution by Industry Sector 2010

	Businesses		Employees	
Industry Sector (NAICS Codes)	**Number**	**Percent**	**Number**	**Percent**
Agriculture, Forestry, Fishing & Hunting	7	0.7%	19	0.2%
Mining	11	1.1%	83	0.7%
Utilities	5	0.5%	55	0.5%
Construction	147	14.8%	1,772	14.8%
Manufacturing	55	5.5%	1,253	10.5%
Wholesale Trade	83	8.3%	944	7.9%
Retail Trade	121	12.2%	816	6.8%
Transportation & Warehousing	71	7.1%	1,893	15.8%
Information	13	1.3%	56	0.5%
Finance & Insurance	31	3.1%	117	1.0%
Real Estate, Rental & Leasing	45	4.5%	581	4.8%
Professional, Scientific & Tech Services	66	6.6%	731	6.1%
Management of Companies & Enterprises	0	0.0%	0	0.0%
Admin & Support & Waste Mgmt & Remed. Services	41	4.1%	168	1.4%
Educational Services	15	1.5%	604	5.0%
Health Care & Social Assistance	28	2.8%	330	2.8%
Arts, Entertainment & Recreation	23	2.3%	236	2.0%
Accommodation & Food Services	60	6.0%	968	8.1%
Other Services (except Public Administration)	103	10.3%	530	4.4%
Public Administration	51	5.1%	691	5.8%
Unclassified Establishments	20	2.0%	144	1.2%
Total	**995**	**100%**	**11,990**	**100%**

Source: Business data provided by Infogroup, Omaha NE Copyright 2010, all rights reserved. Esri forecasts for 2010.

A further detailing of industry classification codes (NAICS codes) demonstrates the following about the sectors with the largest amount of employees:

- Construction employment is heavily focused in "water and sewer line and related structures" and "site preparation constractors"; in other words, oil and gas pipelines and construction of offshore facilities.
- Manufacturing employment is dominated by "petroleum and coal products

manufacturing" and "electrical equipment, appliance and component manufacturing" most likely for offshore facilities.

- Wholesale Trade employment consists primarily of "industrial machinery and equipment merchant wholesale," undoubtedly related to offshore construction.
- Transportation and Warehousing employment is predominately "Other Airport Operations" – clearly indicating activity at the NAS JRB New Orleans – and "navigational services" supporting the offshore industry.
- Rental and Leasing employment supports "commercial air, rail and water transportation" and "construction and mining machinery and equipment."
- "Professional, Scientific and Tech Services" employment is focused on "testing labs" and "research and development" undoubtedly related to chemical manufacturing and refinery production.
- "Educational Services" employment is devoted to the local school district.
- "Accommodation and Food Services" are restaurants and caterers that primarily serve the large scale needs of offshore platforms.

Many of the parish's work force commute from outside the parish, mostly from the Orleans and St. Bernard Parish areas.

Existing and Projected Land Use

Existing land use on wetlands, upland/fastlands, and transition areas was discussed in detail in Chapter 2 with regard to the sections on *Upland/fastlands, Transitional Areas, and Wetlands* and *Public Infrastructure and Services and Recreation Facilities*. With regard to projected land use, it is anticipated that major residential and commercial development will continue to be concentrated on the west bank of the Mississippi River, especially in the vicinity of Belle Chasse and the U. S. Naval Air Station – Joint Reserve Base.

Smaller communities such as Empire, Buras, Port Sulphur, and Venice will also continue to develop in response to recreational and petroleum-related activities. Improvement of LA HWY 23 to Venice has opened up large expanses of the west bank to new residential development for people who want to live outside the New Orleans metropolitan area but be close to work or businesses in the area.

Recreational community development (e.g., Wilkinson Canal, Lake Judge Perez, and Deer Range) exists in several areas of the parish near waterways and marinas that provide access to the wetlands and water bodies outside the flood protection levees. This type of development is expected to continue to some extent in response to a healthy economy and people's desire to live and participate in recreational activities in coastal areas.

The federal government has sponsored several projects in Plaquemines Parish. The U. S. Army Corps of Engineers maintains navigation projects on the Mississippi River from the jetties north to New Orleans, Main Pass and Tiger Pass; flood protection levees along the Mississippi River; and the back hurricane flood protection levees. These activities have made development within the protected areas possible, both from a residential and industrial

point of view. Maintenance of navigation channels supports the commercial fishing industry, as well as offshore oil and gas service vessel transportation and port development along the river.

Belle Chasse falls within the USACE Greater New Orleans Hurricane and Storm Damage and Risk Reduction System (HSDRRS) of levees. All other areas of Plaquemines Parish are outside of the HSDRRS, but are protected by levees (all federal levees except for a few on the east bank) proposed to be upgraded by USACE under the New Orleans to Venice (NOV) Hurricane Protection Project. The New Orleans to Venice (NOV) project is upgrading the existing federal levees on the east bank of Plaquemines from Phoenix to Bohemia and on the west bank from St. Jude to Venice. For this project the Corps will apply the new and more stringent design criteria that are being used for the (HSDRRS). Prior to Hurricane Katrina, the New Orleans to Venice (NOV) project was approximately 85 percent finished with an estimated completion date of September 2018. Funding constraints slowed work and extended the project completion date. The New Orleans to Venice project was funded at $769 million in the 3rd, 4th, 6th, and 7th Supplemental Emergency Spending Bills passed by Congress in the aftermath of the 2005 hurricane season. The Corps prepared a Supplemental Environmental Impact Statement (SEIS) which outlined the proposed project alignment and the human and environmental impacts.

The U.S. Fish and Wildlife Service operates Breton National Wildlife Refuge and the Delta National Wildlife Refuge. These areas, accessible only by boat or floatplane, are used for recreation and support businesses in the parish that cater to sportsmen and eco-tourist interests. The U.S. Coast Guard maintains stations at Southwest Pass and Venice that also bring revenue into the parish.

Various state departments have projects in Plaquemines Parish. The LDOTD is responsible for maintaining state highways (e.g., LA HWY 23, LA HWY 39, LA HWY 406, LA HWY 407, LA HWY 3017, and LA HWY 3137) in the parish.

The LA Dept. of Wildlife and Fisheries controls the Pass a Loutre Wildlife Management Area and the freshwater diversion Bayou La Moque which has not been operated since 1994 due to repair issues and lack of an interagency plan. Plaquemines Parish controls four additional freshwater diversion structures at West Pointe à la Hache, Naomi, White Ditch and Bohemia (non-operational). These activities contribute to the economy in areas of recreation and fisheries. The Ostrica and Empire Locks are owned and operated by the LDOTD and facilitate the movement of recreational and commercial interests from one side of the river to the other. Louisiana State University maintains the Citrus Research Station, an experiment station for agricultural activities. Research at this facility contributes directly to the support of the citrus industry in the parish.

Parish projects include the Fort Jackson Recreation area and numerous playgrounds and recreational facilities within the upland/fastlands area. The parish and the Louisiana Department of Culture, Recreation, and Tourism (LDCRT) have discussed the transfer of the Fort Jackson to the LDCRT and its development into a state park. The concept would be enhanced with the inclusion of Fort St. Philip, which is three times the size of Fort Jackson,

but currently privately owned and located on the opposite side of the river. It was envisioned that the new state park complex would include camping, cabins, recreational vehicle camping, boat launching facilities, and a pavilion. It appears these plans have yet to materialize. The fort was badly damaged by Hurricane Katrina's storm surge in 2005. Between Katrina and Hurricane Rita the following month, much of the fort sat under water for up to six weeks. Many of the historic exhibits in the fort were destroyed, and the fort itself suffered structural damage.

Future Social and Economic Conditions

As previously noted the population of the parish is expected to remain stable or slightly decline due to out-migration due to tropical storm exposure. Because Plaquemines Parish has existing forced drainage systems and an abundance of undeveloped, vacant lands within these systems, there is no public or private demand for additional wetlands (wetlands outside of the existing levees) to be reclaimed for development through construction of new landfills, new levees and pumping facilities.

New residential developments are expected to continue to occur in the parish, primarily near Belle Chasse and in the Peters Road area as described below. The east bank will probably continue to have less development pressure than the west bank. There is little demand for the development of recreational campsites as evidenced by two existing communities located outside of the leveed areas, Lake Hermitage (Lake Judge Perez) and Grand Bayou, which have shown no noticeable growth in recent years.

As noted previously, open, undeveloped land remains available for new industries to locate in the parish along the Mississippi River. The availability and abundance of resources (e.g., existing pipelines with a wide variety of available products for feedstocks, proximity to deepwater for ocean-going vessels, source of large volumes of non-potable water for industrial processing, etc.) are important to specific types of industry.

However, the shortage of an expansive electrical service system will need to be addressed before the parish can reach its full potential as an industrial competitor. At this time, Entergy has no plans to enhance and expand the delivery of electrical services.

Roadway and rail projects will help redirect development pressures to available land west of the Belle Chasse Naval Air Base and away from sensitive wetland habitat. Specifically, the Peters Road highway project will promote future development within the 100-year West Bank and Vicinity Protection System constructed by the Corps of Engineers. By making this land behind a hurricane protection system available for development, the Parish will help alleviate pressure to develop areas outside of the levee system that has a greater impact on the environment and increase future risks.

Additionally, once complete, the project will offer the West Bank an additional evacuation corridor spurring off Hwy 23 south of Belle Chasse at the current site of Walker Road and crossing over the Gulf Intracoastal Waterway to connect with the existing Peters Road on the Jefferson Parish side. Once across the waterway, the new evacuation corridor connects to US

Hwy 90 and Interstate 10. The completion of the new roadway will help alleviate traffic concerns along Hwy 23 and in a worst-case scenario, where the Harvey Tunnel and Bridge suffered catastrophic damage, the new roadway could be used to reroute traffic safely out of the Parish in an evacuation scenario.

Expansion of the oil and gas industry is expected to continue. Discoveries of scores of deepwater prospects and the active leasing of additional scores of potential prospects have re-energized and changed the landscape of offshore oil and gas exploration and production. Larger vessels are required to service the new platforms that are located much further offshore than previous wells. Ports with deepwater access are required to stage these activities. The Port of Venice is in a prime location to many of these prospects and if developed to its potential, will compete with the Ports of Mobile and Fourchon for the companies needing staging/port facilities.

There will be a continuing demand for existing wetland habitat to be impacted by dredging for access to oil and gas prospects and the emplacement of production and transmission related equipment (e.g., pipelines for all producing facilities). However, the social and economic needs of the parish are directly related to the preservation, maintenance, and restoration of parish wetlands. Statistics on the commercial fishing industry also indicate the importance of this sector to the parish. Therefore, the general priority of need within the parish's coastal zone is for the preservation and restoration of the wetlands that contribute so significantly to the economic base of the parish.

While other industries dominate the economy of the parish, agriculture has been a mainstay through the years due to the parish's rich fertile soils and long growing season. The premier crop in Plaquemines Parish is citrus fruit, and to a much lesser degree, citrus tree seedlings. The presence of the Louisiana State University Citrus Research Center near Myrtle Grove underlies the importance of the parish's citrus industry. Complimenting citrus, truck farming products include tomatoes, eggplants, peppers, and other vegetables. Plants and tree seedlings for nursery stock are also produced in the parish. Cattle production is not as prevalent as in the past, with most occurring in the lower portion of the parish where cattle roam and graze freely along the banks of the river.

Aquaculture in the parish is limited to a few small, commercial crawfish ponds on the east bank of the river near Braithwaite. Mariculture is also limited to five or six softshell crab operations in the lower part of the parish. These industries are not expected to expand (Thibodeaux 1999).

CHAPTER 4. ENVIRONMENTAL AND SOCIO-ECONOMIC ISSUES AFFECTING COASTAL RESOURCES

Introduction

The environmental and socio-economic settings, presented in Chapters 2 and 3, identified existing and projected environmental and socio-economic conditions, current utilization of coastal resources, environmental problems, actions being taken to resolve some environmental problems, and anticipated socio-economic conditions related to land, water, and other resource uses. An analysis of the data presented indicates that utilization of resources and actions proposed for addressing some environmental problems related to subsidence, land loss and habitat change -- three of the parish's major environmental setting problems -- can result in conflicts among the various resource users. Examples of resources include: 1) wildlife, 2) fish and shellfish, 3) oil/gas/other minerals, 4) land, 5) water, and 6) archaeological and cultural sites. Conflicts arise when one person's use interferes with another person's use of the same resources or when actions taken to resolve environmental problems impact or preclude the use of existing resources, especially on a short-term basis.

Major uses of resources in Plaquemines Parish include: 1) fresh and estuarine water for commercial and recreational fishing (oysters, shrimp, crabs, finfish, etc.), 2) marshes, water bodies, and forested habitats for hunting, 3) wetlands and water bodies for trapping, 4) oil/gas/other mineral extraction, production, and transportation, 5) fresh water for residential/commercial/industrial use, 7) freshwater wetlands and ponds for crawfish farming, 8) land for agriculture/pasture/orchards and residential, campsite, commercial, and industrial development, 9) navigable waterways for commerce and recreation, 10) wetlands and waterways for non-extractive recreational uses such as boating, bird watching, swimming, etc., and 11) archaeological and cultural sites for tourism and cultural identity.

Environmental Problems Leading to Resource Use Conflicts

The more serious environmental problems confronting the parish are subsidence of the upland/fastland areas, transition areas and wetlands; the shift in salinity zones in wetlands outside the flood protection levees; and loss of coastal wetlands and barrier shorelines**.** These problems could ultimately adversely impact the ability of the citizens of Plaquemines Parish to continue living and working in the area and are related to:

- regional subsidence and sea level rise,
- local subsidence related to compaction of fastland soils from forced drainage
- erosion of barrier islands and barrier shores
- construction of canals, slips, and pipelines, and other subtidal excavations (i.e., deepening of navigation channels and excavation of borrow areas),

- loss of fresh-to-intermediate salinity emergent marsh through saltwater intrusion, erosion, and/or submergence,

- widening of tidal passes and drainage routes due to current scour, boat wakes, and wind-induced waves, and increasing tidal envelope with corresponding decrease in retention of fresh water in upper Barataria and Breton hydrologic basins.

The environmental problems have had and will continue to have impacts on both the socio-economic and renewable resource sectors of the parish in terms of: 1) allocation of renewable and harvestable resources, 2) selection and implementation of coastal restoration/management programs, and 3) regulation of development and related activities.

Plaquemines Parish has a long history of using its wetlands and water bodies as a source of both renewable and non-renewable resources (i.e., reclamation for agriculture, trapping, commercial and recreational hunting and fishing, oil and gas extraction and support activities, maritime trade, etc.). The parish also has a history of diverting fresh water from the Mississippi River to support its economy. While the uses for, and objectives of, implementing freshwater diversions have changed over time from agriculture to enhancement of wildlife and fisheries productivity, the parish has been proactive in using the fresh water as a resource.

In the 1920s, a minimum of 50 siphons were used to flood rice fields on the east bank of the Mississippi River between Carlisle and Bohemia (*The Times-Picayune*, April 13, 1991). Fur trapping, a leading industry in south Louisiana, declined in the late 1940s and early 1950s because of increases of salinities in the marshes and the resulting disappearance of three-cornered grass. Between 300 and 400 trappers asked elected officials in Plaquemines and St. Bernard Parishes to do something about the marshes that had become barren in the two parishes. The request resulted in a plan developed by the engineering departments of both parishes that included siphons to be located at Braithwaite in Plaquemines and Poydras in St. Bernard (*New Orleans States*, February 21, 1953).

The oyster industry was significantly impacted in the early 1960s by an increase in salinities, resulting in an influx of saltwater snails (*Thais haemostoma*) that prey on oysters. Oyster fishermen were convinced that the only way to eliminate the snails was to drive them out with fresh water (*New Orleans States-Item*, May 31, 1963). By 1964, two 50-in siphons, originally planned at Little Coquille Bay, but located at White's Ditch, began introducing fresh water into the wetlands (*The Plaquemines Gazette*, June 5, 1964). The results of the project were so successful that a second diversion project was constructed at Little Coquille Bay. Both projects were totally funded by the Plaquemines Parish Commission Council, without federal or state assistance (*The Plaquemines Gazette*, November 20, 1964). Four years later, the siphon project at White's Ditch was identified as being responsible for the highest muskrat population in Plaquemines and St. Bernard Parishes in the last 20 years and increasing the amount of inside shrimp and seed oysters (*The Plaquemines Parish*, June 28, 1968).

Oyster fishermen prevailed again in the early 1970s to implement a freshwater diversion control structure at Bayou Lamogue. The $1.5 million project was funded in half by the U.S. Army Corps of Engineers and in half by the state and Plaquemines Parish (*The Times Picayune/The States Item*, February 22, 1972). A plan proposing a 50:50 cost sharing of a freshwater diversion structure at the Caernarvon Canal was approved by officials from Plaquemines and St. Bernard Parishes but was initially rejected by the U. S. Army Corps of Engineers (*The Times Picayune/The States Item*, June 16, 1977). The project was ultimately funded by the U. S. Army Corps of Engineers (*The Times-Picayune*, June 19, 1987) and constructed in 1992.

The public's awareness and determination to combat the coastal land loss problem was demonstrated in a special election on April 16, 1988. Voters in Plaquemines Parish approved a $29 million bond issue, which included $10 million for freshwater control structures between City Price and Belle Chase and $2.5 million for levee drainage including works to prevent coastal erosion. This recognition to address the problem at the local level came prior to state and federal actions to programmatically fund coastal restoration efforts.

The loss of vegetated wetlands in coastal Louisiana is the result of a number of factors and is well documented. Enactment of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) in 1990 provided a federal funding source for hundreds of millions of dollars to develop coastal restoration and protection projects. Funding for CWPPRA projects initially required 25 percent matching funds from the state. Louisiana frequently could not obtain the annual maximum allotment of available CWPPRA funding because of failure to provide the required match. The LDNR obtained a grant from the U. S. Environmental Protection Agency (EPA) for the development of the *Louisiana Coastal Wetlands Conservation Plan* (LCWCP), as directed in the initial CWPPRA legislation. Adoption of the LCWCP allows for the state to decrease its funding for CWPPRA projects from 25 percent to 15 percent. The LCWCP is a comprehensive approach to the state's management and protection of coastal resources, including the goal of no net loss of wetlands due to human development activities.

The CWPRRA program is facing imminent implementation challenges due the fact that its annual funding is about the same level every year. As new projects come online, more and more of the funding is consumed by operation and maintenance costs thereby limiting the amount available to implement new projects.

More recently, the State of Louisiana has commissioned the newly formed Coastal Protection & Restoration Authority (CPRA) to develop a comprehensive plan for coastal Louisiana with the duel objectives of restoring coastal resources and providing storm protection. The first Coastal Master Plan was completed in 2007 and outlined the goals and long term vision for rebuilding the coast. On May 22, 2012 the legislature approved the 2012 Master Plan for the Coast which specifies short and long term projects that will be prioritized for funding and construction. Chapter 2 identifies the Coastal Master Plan projects slated to take place in Plaquemines Parish. In addition to these, there are numerous projects currently ongoing in the parish. These are in various stages ranging from planning to engineering and design to operation and maintenance (recall Table 2.3 from Chapter 2).

These projects are conducted under five primary programs/ funding sources: 1) Coastal Impact Assistance Program (CIAP) program administered by the U.S. Fish and Wildlife Service (USFWS), 2) the Louisiana Coastal Area (LCA) program authorized by the Water Resources Development Act (WRDA) and administered by U.S. Army Corps of Engineers (USACE), 3) hurricane protection upgrade programs conducted by USACE in coordination with the State, 4) CWWPRA where each project has one of four federal sponsors: the Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), the National Resources Conservation Service (NRCS), or the National Marine and Fisheries Service (NMFS) under the National Oceanic and Atmospheric Administration (NOAA), and 5) post-Katrina/ Rita state surplus funds appropriated to coastal restoration/ protection purposes to satisfy cost shares associated with billions in dollars in federal reconstruction spending.

In all, many coastal restoration programs have been proposed for Plaquemines Parish. These restoration projects include freshwater diversions, sediment diversions, outfall management, crevasses, siphons, channel armoring, beneficial use of dredged materials, marsh creation, ridge and barrier island restoration as well as both structural and nonstructural flood protection measures. However, implementation of these stabilization / enhancement / restoration projects can result in the following resource user conflicts:

- Displacement of salinity zones and relocations of current commercial fishing locations
- Destruction of existing oyster beds by excessive sediment and freshwater flooding
- Destruction of existing oyster beds, oyster lease areas, and fishing areas by deposition of dredged material for wetland creation projects
- Closure of existing oyster bedding areas because of impaired water quality associated with freshwater diversions
- Siltation of canals and waterways used for navigation by commercial and sports fishermen and recreational interests as a result of freshwater and sediment discharge
- Questions of ownership and use of newly created land
- Appropriation of rights-of-way from private landowners for freshwater diversions, siphons, overflow areas that benefit the public
- Destruction of archaeological/historic/cultural sites.

Both coastal restoration projects and development activities have the potential to impact historic and cultural resources of the parish that are so crucial to defining the area's cultural heritage. One mechanism for determining whether or not a site is of a quality that requires it to be protected, prior to any federal or federally financed or licensed project, is the assessment of a site's eligibility status for National Register designation.

As a first step in management, sites not already assessed in terms of their National Register significance should be examined. This is particularly true for those locales in the wetlands that are threatened with destruction from either natural processes or human activities.

Expansion of residential, industrial, and commercial development in upland/wetland areas may result in destruction in area or quality of wetland habitat inside drainage districts, as well as adjacent wetlands as a result of solid waste landfill or improperly treated wastewater discharge or seepage. While the coastal use permit process may limit the impact, projects with greater public good may result in unavoidable loss of wetlands and habitat for renewable resources. Demands for infrastructure improvements, such as levee relocations and upgrades, construction of port and harbor facilities, construction of additional oil and gas transmission pipelines, and construction of new transportation infrastructure to meet the demand of a growing population and industrial/port sector may also negatively impact wetlands.

CHAPTER 5. OVERVIEW OF FEDERAL AND STATE CZM PROGRAMS

Federal

Initially passed as the Coastal Zone Management Act of 1972, the reauthorized and amended Coastal Zone Protection Act of 1996 encourages states to formulate, adopt, and implement policies and programs for the management and protection of coastal resources (Dwyer and Bergsund 1999).

According to Section 1451 of the CZMA (§ 302), Congress determined that:

A. There is a national interest in the effective management, beneficial use, protection, and development of the coastal zone.

B. The coastal zone is rich in a variety of natural, commercial, recreational, ecological, industrial, and esthetic resources of immediate and potential value to the present and future well-being of the Nation.

C. The increasing and competing demands upon the lands and waters of our coastal zone occasioned by population growth and economic development, including requirements for industry, commerce, residential development, recreation, extraction of mineral resources and fossil fuels, transportation and navigation, waste disposal, and harvesting of fish, shellfish, and other living marine resources, have resulted in the loss of living marine resources, wildlife, nutrient-rich areas, permanent and adverse changes to ecological systems, decreasing open space for public use, and shoreline erosion.

D. The habitat areas of the coastal zone, and the fish, shellfish, other living marine resources, and wildlife therein, are ecologically fragile and consequently extremely vulnerable to destruction by man's alterations.

E. Important ecological, cultural, historic, and esthetic values in the coastal zone which are essential to the well-being of all citizens are being irretrievably damaged or lost.

F. New and expanding demands for food, energy, minerals, defense needs, recreation, waste disposal, transportation, and industrial activities in the Great Lakes, territorial sea, exclusive economic zone, and Outer Continental Shelf are placing stress on these areas and are creating the need for resolution of serious conflicts among important and competing uses and values in coastal and ocean waters;

G. Special natural and scenic characteristics are being damaged by ill-planned development that threatens these values.

H. In light of competing demands and the urgent need to protect and to give high priority to natural systems in the coastal zone, present state and local institutional arrangements for planning and regulating land and water uses in such areas are inadequate.

I. The key to more effective protection and use of the land and water resources of the coastal zone is to encourage the states to exercise their full authority over the lands and waters in the coastal zone by assisting the states, in cooperation with Federal and local governments and other vitally affected interests, in developing land and water use programs for the coastal zone, including unified policies, criteria, standards, methods, and processes for dealing with land and water use decisions of more than local significance.

J. The national objective of attaining a greater degree of energy self-sufficiency would be advanced by providing Federal financial assistance to meet state and local needs resulting from new or expanded energy activity in or affecting the coastal zone.

K. Land uses in the coastal zone, and the uses of adjacent lands which drain into the coastal zone, may significantly affect the quality of coastal waters and habitats, and efforts to control coastal water pollution from land use activities must be improved.

L. Because global warming may result in a substantial sea level rise with serious adverse effects in the coastal zone, coastal states must anticipate and plan for such an occurrence.

M. Because of their proximity to and reliance upon the ocean and its resources, the coastal states have substantial and significant interests in the protection, management, and development of the resources of the exclusive economic zone that can only be served by the active participation of coastal states in all Federal programs affecting such resources and, wherever appropriate, by the development of state ocean resource plans as part of their federally approved coastal zone management programs.

Furthermore pursuant to Section 1452 of the CZMA (§ 303), Congress declared national policy as follows:

1. to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations;

2. to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values as well as the needs for compatible economic development, which programs should at least provide for:

   A. the protection of natural resources, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat, within the coastal zone,

   B. the management of coastal development to minimize the loss of life and property caused by improper development in flood-prone, storm surge, geological hazard, and erosion-prone areas and in areas likely to be affected by or vulnerable to sea

level rise, land subsidence, and saltwater intrusion, and by the destruction of natural protective features such as beaches, dunes, wetlands, and barrier islands.

C. the management of coastal development to improve, safeguard, and restore the quality of coastal waters, and to protect natural resources and existing uses of those waters,

D. priority consideration being given to coastal-dependent uses and orderly processes for siting major facilities related to national defense,, energy, fisheries development, recreation, ports and transportation, and the location, to the maximum extent practicable, of new commercial and industrial developments in or adjacent to areas where such development already exists,

E. public access to the coasts for recreation purposes,

F. assistance in the redevelopment of deteriorating urban waterfronts and ports, and sensitive preservation and restoration of historic, cultural, and esthetic coastal features,

G. the coordination and simplification of procedures in order to ensure expedited governmental decision making for the management of coastal resources,

H. continued consultation and coordination with; and the giving of adequate consideration to the views of, affected Federal agencies,

I. the giving of timely and effective notification of, and opportunities for public and local government participation in, coastal management decision making,

J. assistance to support comprehensive planning, conservation, and management for living marine resources, including planning for the siting of pollution control and aquaculture facilities within the coastal zone, and improved coordination between State and Federal coastal zone management agencies and State and wildlife agencies, and

K. the study and development, in any case in which the Secretary considers it to be appropriate, of plans for addressing the adverse effects upon the coastal zone of land subsidence and of sea level rise

3. to encourage the preparation of special area management plans which provide for increased specificity in protecting significant natural resources, reasonable coastal-dependent economic growth, improved protection of life and property in hazardous areas, including those areas likely to be affected by land subsidence, sea level rise, or fluctuating water levels of the Great Lakes, and improved predictability in governmental decision making;

4. to encourage the participation and cooperation of the public, state and local governments, and interstate and other regional agencies, as well as of the Federal

agencies having programs affecting the coastal zone, in carrying out the purposes of this chapter;

5. to encourage coordination and cooperation with and among the appropriate Federal, State, and local agencies, and international organizations where appropriate, in collection, analysis, synthesis, and dissemination of coastal management information, research results, and technical assistance, to support State and Federal regulation of land use practices affecting the coastal and ocean resources of the 'United States; and

6. to respond to changing circumstances affecting the coastal environment and coastal resource management by encouraging States to consider such issues as ocean uses potentially affecting the coastal zone.

The federal CZM program is administered by the Office of Coastal Resource Management, National Oceanic and Atmospheric Administration, Department of Commerce.

State

Pursuant to Section 306 of the CZMA, authorizing the Department of Commerce to award grants to any coastal state for the administration of a state coastal management program, the Louisiana State Legislature passed the Louisiana State and Local Coastal Resources Management Act of 1978 (Act 361). This legislation authorized the Louisiana Coastal Resources Program by initiating actions to develop a coastal management program on both the state and local levels. Public policy embodied in Act 361 and subsequent legislation includes the following:

1. To protect, develop, and, where feasible, restore or enhance the resources of the state's coastal zone.

2. (a) To assure that, to the maximum extent feasible, constitutional and statutory authorities affecting uses of the coastal zone should be included within the Louisiana Coastal Management Program and that guidelines and regulations adopted pursuant thereto shall not be interpreted to allow expansion of governmental authority beyond those laws.

(b) To express certain regulatory and non-regulatory policies for the coastal zone management program. Regulatory policies are to form a basis for administrative decisions to approve or disapprove activities only to the extent that such policies are contained in the statutes of this state or regulations duly adopted and promulgated pursuant thereto. They are to be applicable to each governmental body only to the extent each governmental body has jurisdiction and authority to enforce such policies. Other policies are non-regulatory.

They are included in the Coastal Zone Management Plan to help set out priorities in administrative decisions and to inform the public and decision-makers of a coherent state framework, but such policies are not binding on private parties.

3. To support and encourage multiple use of coastal resources consistent with the maintenance and enhancement of renewable resource management and productivity, the need to provide for adequate economic growth and development and the minimization of adverse effects of one resource use upon another, and without imposing any undue restriction on any user.

4. To employ procedures and practices that resolve conflicts among competing uses within the coastal zone in accordance with the purpose of this Subpart and simplify administrative procedures.

5. To develop and implement a coastal resources management program which is based on consideration of our resources, the environment, the needs of the people of the state, the nation, and of state and local government.

6. To enhance opportunities for the use and enjoyment of the recreational values of the coastal zone.

7. To develop and implement a reasonable and equitable coastal resources management program with sufficient expertise, technical proficiency, and legal authority to enable Louisiana to determine the future course of development and conservation of the coastal zone and to ensure that state and local governments have the primary authority for managing coastal resources.

A complete discussion of the development and contents of the Louisiana Coastal Resource Program is included in *The Final Environmental Impact Statement and the Louisiana Coastal Resources Program* (OCZM and LCRP 1980). *A Coastal User's Guide to the Louisiana Coastal Resources Program* (Applied Technology Research Corp. 1997) provides a more concise and updated compilation of program policies and objectives, coastal use guidelines, regulatory requirements, definitions, and related information. The document also contains forms associated with the coastal use permit application process. These and other relevant resources can be found on the Louisiana Department of Natural Resources' web site on the Office of Coastal Management Link: http://dnr.louisiana.gov.

The Louisiana Department of Natural Resources - Coastal Management Division (LDNR-CMD) is charged with the administration of the Louisiana Coastal Resources Program.

CHAPTER 6. GOALS, OBJECTIVES, POLICIES, AND ENVIRONMENTAL MANAGEMENT UNITS (EMUs)

Parish-wide Coastal Management Goals and Objectives

Due to a high rate of land loss, the impacts of Hurricanes Katrina, Rita, Ike, Ivan, Gustav, and most recently Hurricane Isaac in 2012 and the Deepwater Horizon oil spill have added additional stresses to the coast. Plaquemines Parish continues to fight to sustain its coastal land and its long-term involvement in developing and implementing wetland management measures through development of a CZM program.

The intent of the Coastal Use Permit process is to ensure any activity that is occurring in a Coastal Zone, whether it involves dredging or filling is carried out in accordance with the criteria established by the Louisiana Coastal Resources Program (LCRP). These regulations are designed so that development in the Coastal Zone can be accomplished with the greatest benefit and the least amount of damage. The Coastal Use Permit system is a major mechanism for the parish to manage activities impacting the safety and well being of its citizens and the normal functioning and conservation of its natural environment. Through the permit review process, the parish evaluates a proposed activity and its environmental impact and either prohibits or conditions the activity, whenever practicable, to lessen the environmental damage and/or natural resource use conflicts.

The goals, objectives, policies, and priorities of use for Plaquemines Parish are summarized in Tables 6.2, 6.3, 6.4, and 6.5, respectively. These tables are designed in a matrix format to permit rapid identification of the goals, objectives, policies, and priorities of use for each EMU. The matrices also provide an overview for the parish as a whole.

Environmental Management Units (EMUs)

Parish-wide priorities would be the beneficial use of dredge material, strategic protection of the parish from storm events, policing and enforcement of the policies and permits and sustaining remaining resources. In addition to identifying goals and objectives for the entire parish, the CZM Program identifies goals, objectives, and policies for individual EMUs. In accordance with guidelines contained in the Louisiana coastal resources program (OCZM and LCRP 1980) the location of uplands/fastlands, transition areas, and wetlands were mapped (Figure 1.3).

In Plaquemines Parish, upland and fastland areas are grouped into one relatively contiguous EMU (Plaquemine Area) that encompasses the land between the Mississippi River flood control levees and the back levees of the drainage districts. For ease of mapping, this EMU also encompasses the Mississippi River, batture and flood protection levees.

Transition areas are lands that are undergoing a change from upland to wetland habitat, primarily due to subsidence and hydrologic alternations. These lands are better drained than adjacent wetlands. Transition areas are below 5 feet in elevation. They are outside protection levees and generally consist of low-lying portions of the natural levees of the Mississippi River or its

distributary channels, both relict and active. These areas were subdivided into EMUs but are components of wetland EMUs. The location and extent of transition areas are difficult to map at a small scale because of their narrow, linear form. They will change through time in response to natural processes. In areas cut off from Mississippi River overbank flow and accretion, transition areas will diminish in size as a result of natural processes such as subsidence. Some transition areas still receiving overbank flow (i.e., East Bank of the river south of Point a la Hache and active birdfoot delta distributary channels) may sustain their configuration longer or even grow in area as a result of accretion. If these areas become higher than 5 ft in elevation, they would be classified as uplands.

The wetlands and water bodies of Plaquemines Parish that lie outside the flood protection levees were divided into EMUs based on characteristics, such as physiographic similarities, hydrologic regime, controlling geomorphic landforms (i.e., natural levees and waterways), and potential management programs (i.e., CWPPRA, Coastal Restoration). These criteria facilitate management of the EMUs for specific purposes through enhancement or restoration of the area's natural processes. There are twenty-two EMUs in Plaquemines Parish, including the upland/fastland EMU (i.e., Plaquemines Area) (see Table 6.1). The parish will utilize federal, state, and local laws and regulations to achieve its goals and objectives. Implementation of the Plaquemines Parish CZM Program will be consistent with the provisions contained in the *Louisiana Coastal Resources Program* (OCZM and LDNR 1980).

The remainder of this chapter provides a description of the physical and cultural characteristics, as well as developmental constraints, for each EMU in order to facilitate the decision-making process involved in permit reviews and environmental management programs. Based on these physical and cultural conditions and input of the CZM Advisory Committee members, parish representatives, and parish citizens, goals, objectives, policies, and priorities of use have been developed for each EMU.

Table 6.1 Environmental Management Units in Plaquemines Parish

American Bay	Cubits Gap
Baptiste Collette	East Bay
Barataria Barrier Islands	Grand Liard
Barataria Barrier Shorelines	La Loutre
Barataria Bay	Lake Washington/Grande Ecaille
Bastian Bay	Myrtle Grove
Breton Sound	Naomi
Caernarvon	Plaquemines Area
Chandeleur Islands	River aux Chenes
Chandeleur Sound	West Bay
Chenier Ronquille	West Pointe à la Hache

Table 6.2 Goals for Environmental Management Units in Plaquemines Parish.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
1	Reduce land loss, and where feasible, create new wetlands.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#
2	Maintain, protect, and/or restore barrier islands, headlands, and adjacent wetlands as hurricane buffer zones.			#	#					#													
3	Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.	#				#	#		#			#			#		#	#	#		#		#
4	Require mitigation measures where development activities adversely impact wetland and aquatic environments.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
5	Encourage land use compatible with wetland and aquatic habitats.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
6	Maintain, restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.	#				#	#	#	#		#	#			#		#	#					
7	Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
8	Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#

Table 6.2 Continued.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
10	Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
11	Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
12	Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct Corps to assist parish with regard to environmental protection.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
13	Encourage the USA Corps of Engineers and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
14	Restore and/or maintain wetlands at the base of the flood protection levees.	#					#		#			#			#		#	#	#		#		#
15	Utilize existing and newly created wetlands as storm buffer zones.	#	#	#	#	#	#		#			#	#	#	#	#	#	#	#		#	#	#
16	Maintain extensive sea grass beds.								#	#	#												
17	Maintain portions of EMU as estuarine nursery area.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#

Table 6.2 Continued.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
18	Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
19	Encourage wetland management and restoration of eroded wetlands, where practicable.	#	#	#	#	#	#		#	#		#	#	#	#	#	#	#	#		#	#	#
20	Prohibit future man-made cuts in barrier islands.			#	#					#													
21	Maintain wetlands and quality of water bodies for renewable resources.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
22	Modify jetties to facilitate sand transport along beach.				#																		
23	Restore and /or maintain islands supporting bird colonies, where practicable.	#	#	#	#	#	#	#		#	#		#	#		#						#	
24	Block all non-essential navigation passes to retard further erosion in area.						#											#					#
25	Protect the natural environment of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
26	Enhance the productivity of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
27	Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
28	Enhance wetlands and water quality, through surface water management of fresh water to maintain natural gradient of fresh-to-saline wetlands and water bodies.	#					#		#			#			#	#	#	#	#		#		#

Table 6.2 Concluded.

NO.	GOALS	American Bay	Baptiste Collette	Barataria Barrier Island	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
29	Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.						#								#		#	#					
30	Sustain development and compatible land uses on uplands and fastlands.																			#			
31	Protect upland/fastland areas from flooding																			#			
32	Sustain agricultural land uses on uplands and fastlands.																			#			
33	Protect wetlands and water bodies in adjacent EMUs from adverse environmental effects related to land use in upland/fastland EMU.																			#			

Table 6.3 Objectives for Environmental Management Units in Plaquemines Parish.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
1	Remove remnant abandoned artificial levees to facilitate overflow of Mississippi River waters into adjacent wetlands, where beneficial.	#																					
2	Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
3	Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.	#					#		#			#			#		#	#	#		#		#
4	Encourage emplacement of major pipelines in established corridors.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
5	Allow and encourage environmentally sound mineral exploration and production.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
6	Conserve wetland habitat for both harvestable and non-harvestable renewable resources.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
7	Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.	#	#				#		#			#		#		#	#	#	#	#	#	#	#
8	Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
9	Encourage the U.S. Army Corps of Engineers to develop a systematic coastal restoration program to use Mississippi River water and sediment to create or enhance new wetlands and restore barrier islands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
10	Improve and maintain water quality compatible with designated uses.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Table 6.3 Continued.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
11	Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.		#	#	#					#													
12	Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.	#					#		#			#			#		#	#	#		#		#
13	Protect water bottoms and associated habitats from damage or destruction by man-made activities.	#	#			#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
14	Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
15	Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.	#					#	#				#		#	#		#	#	#		#	#	#
16	Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
17	Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
18	Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.	#	#		#	#	#		#		#	#	#	#	#	#	#	#	#		#	#	#
19	Protect the natural state of the environment.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#

Table 6.3 Concluded.

NO.	OBJECTIVES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
20	Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
21	Enhance productivity of the EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
22	Introduce fresh water and nutrients into the EMU.	#				#	#		#			#	#	#	#		#	#	#		#	#	#
23	Support environmentally sound economic use, especially with regard to waterfront areas.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
24	Prohibit development of wetland areas for non-wetland dependent uses.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#		#	#	#
25	Delineate boundary between upland/fastlands and wetlands and support development in uplands/fastlands.																			#			
26	Ensure compliance with land use plans and zoning.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#

Table 6.4 Policies for Environmental Management Units in Plaquemines Parish.

NO.	POLICIES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
1	Major pipelines are to be constructed in established corridors, where practicable.	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
2	Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
3	Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.	#	#	#	#	#	#		#			#			#	#	#	#			#	#	#
4	Support wetland management and wetland restoration programs undertaken by landowners and public agencies.	#	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#		#	#	#
5	Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
6	Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.		#							#			#	#		#						#	
7	Support recreational use of areas through support of appropriate and environmentally compliant support facilities.	#	#				#		#			#	#			#	#	#	#	#	#	#	#
8	Inform the US Army Corps of Engineers and Congressional delegation of the parish policies regarding activities in the coastal zone.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.	#	#	#	#	#	#	#		#		#	#	#	#	#	#	#	#		#	#	#
10	Support establishment of major navigation routes and blockage of all non-essential man-made canals.	#	#	#	#		#			#		#			#		#	#	#		#	#	#

Table 6.4 Continued

NO.	POLICIES	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
11	Support efforts to improve and maintain water quality compatible with designated uses.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
12	Support wetland restoration programs involving freshwater and sediment input into EMUs.	#	#			#	#		#			#	#	#	#	#	#	#	#		#	#	#
13	Support use of dredged material to create wetlands, barrier islands, and beaches, where practicable.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
14	Oppose activities that damage integrity of barrier islands and beaches.			#	#					#													
15	Discourage dredge and fill operations in wetlands and waterbodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetlands on-site or within the parish, preferably in same EMU.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
16	Encourage utilization of Best Management Practices for development in upland/fastland areas in order to minimize detrimental environmental impacts on adjacent wetlands.																			#			
17	Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.	#	#						#				#			#	#	#	#		#	#	#

Table 6.5 Priorities of Use by Environmental Management Units in Plaquemines Parish.

No.	PRIORITIES OF USE	American Bay	Baptiste Collette	Barataria Barrier Islands	Barataria Barrier Shorelines	Barataria Bay	Bastian Bay	Breton Sound	Caernarvon	Chandeleur Islands	Chandeleur Sound	Cheniere Ronquille	Cubits Gap	East Bay	Grand Liard	La Loutre	Lk Washington/Grande Ecaille	Myrtle Grove	Naomi	Plaquemines Area	River aux Chenes	West Bay	West Pointe à la Hache
1	Commercial harvesting of renewable resources.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
2	Exploration and production of oil, gas, and other mineral resources.	#	#	#	#	#	#	#	#		#	#	#	#	#	#	#	#	#	#	#	#	#
3	Fisheries and wildlife habitat.	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#		#	#	#
4	Restoration and enhancement of wetlands for storm buffer zone (Freshwater diversions).	#	#				#		#			#	#	#	#	#	#	#	#		#		#
5	Wetland restoration using MS River sediment (Crevasses/dredged material).	#	#				#						#	#		#		#	#			#	
6	Restoration and maintenance of barrier islands and beaches.			#	#					#													
7	Natural water bottoms and benthic communities.					#	#	#		#	#												
8	Recreational activities (sports fishing, boating, swimming, birdwatching, etc.)	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
9	Environmentally compatible development.														#					#		#	#
10	Aquaculture and farming of hide/furbearing animals.																			#	#		
11	Threatened & endangered species habitat and/or wildlife refuges.		#	#	#	#				#			#	#		#			#			
12	Residential, commercial, industrial, and port development/multiple use.																			#		#	
13	Tourism and Cultural Resources.		#						#	#		#	#	#		#		#		#		#	#
14	Freshwater management and enhancement of water quality.																	#	#	#			#

AMERICAN BAY

Location and Area

The 143,400-ac American Bay EMU encompasses the wetlands in the east central portion of the parish, east of the Mississippi River and extends from Pointe a la Hache to Baptiste Collette Pass. The EMU's western boundary is the outside base of the back flood protection levees in the vicinity of Point a la Hache and the east bank of the Mississippi River south of the protection levee. The northern boundary of the EMU is Breton Sound from the Baptiste Collette subdelta to California bay, the eastern perimeter of Bay Crabe, the western perimeter of Black Bay and the south bank of River aux Chenes to a rig access canal in Section 24, Township 17 South, and Range 14 East.

Geology and Soils

The northern three-quarters of this EMU are in the inactive Plaquemines Delta Lobe and the southern one-quarter is in the active Balize or Modern Delta lobe. From the end of the back flood protection levees south of Point a la Hache to Baptiste Collette, the EMU receives sedimentation from Mississippi River overflow and the natural levees reach five feet in elevation and are better drained than adjacent marshlands. The natural levees are composed of alluvial soils, primarily Convent, and the marshes are classified as brackish or saline marsh type soils, predominantly Clovelly, Scatlake, Bellpass, and Timbalier (USDA, NRCS in press). Subsidence rates in this EMU are high (2.1 ft to 3.5 ft per century) (Gagliano 1998).

Vegetation and Habitat Change

Marsh zone distribution has remained fairly stable in this area since the mid-twentieth century (O'Neil 1949, Chabreck et al. 1968, Chabreck and Linscombe 1978, 1988). Most of the marshland is saline, while a narrow, intermittent band of brackish marsh is located near the Mississippi River levee and expands to cover the northwestern part of the EMU west of Grand Pointe Bay. A small wedge of intermediate marsh was located on delta splays building near crevasses in the natural levee near Fort St. Philip in 1988 (Chabreck and Linscombe 1988). The higher natural levees supported dense stands of willows and other bottomland hardwood species.

Analysis of historic land loss presented in the Coast 2050 report (LCWCRTF & WCRA 1998b) indicates that between "…1932 and 1974, nearly 6,470 acres of marsh were lost, mainly due to dredging, wind erosion, and subsidence. Between 1974 and 1990, another 5,060 acres were lost due to continued subsidence, wind erosion, and altered hydrology, which allowed higher salinity and greater tidal energies into the area."

With regard to future land loss projections, the Coast 2050 report (LCWCRTF & WCRA 1998b) indicates that "…the delta splays will continue to build land, but by 2050, 13,880 acres could be lost due to continued subsidence and wind erosion, if nothing is done. However, the Caernarvon Freshwater Diversion will prevent the loss of about 1,240 acres, mostly in the saline fringe. Even with this project in place, 29.9% of today's acres could be lost."

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Many species of the estuarine dependent assemblage (red and black drum, spotted seatrout, southern flounder, and brown shrimp) have shown a steady population trend over the last 10-20 years. Other populations (Gulf menhaden, white shrimp and blue crab) have shown increasing trends over the same period. Populations of the American oyster have shown an increasing trend, and the Spanish mackerel has had steady populations.
>
> Brown pelicans and wading birds have shown increasing population trends over the last 10-20 years. Furbearer and American alligator populations have been decreasing over the same time period. Other wildlife populations, such as game mammals, seabirds, shorebirds, ducks, and raptors, have been steady. In the future, brown pelican populations are expected to continue to increase, while nearly all other wildlife species are projected to show decreasing populations.

Hydrology and Flooding Potential

The central and northern portions of the EMU are partially influenced by the Bayou Lamoque Diversion Structure that can discharge up to 12,000 cfs of freshwater into the EMU from the Mississippi River (LCWCRTF & WCRA 1998b). Approximately 5 percent of the Mississippi River discharges into Breton Sound through Baptiste Collette, thereby slightly influencing the southern reaches of the EMU (van Beek et al. 1986). Because there are no maintained Mississippi River flood control levees in this EMU, the area is subject to seasonal flooding from the river, while the marshes are flooded regularly by tides. The Pointe a la Hache pump station discharges directly into the EMU. This EMU also receives some freshwater influence from the Caernarvon Freshwater Diversion Structure that can discharge up to 8,000 cfs in the upper end of the Breton Sound Basin. The Bohemia Freshwater Diversion Structure located outside of the flood protection levees south of Bohemia was not operable in 1999.

Land Use and Transportation Infrastructure

Much of this EMU, between Bayou Lamoque and Ostrica, was leased by the Louisiana Department of Wildlife and Fisheries from the Orleans Levee Board and was operated as the Bohemia State Wildlife Management Area and open for hunting. However, the land is being returned to the previous owners or their heirs and is no longer designated as a wildlife management area. There are locks at Ostrica to permit boat passage between the Mississippi River and Quarantine Bay. Two leveed areas north of Ostrica contain tank batteries for storage of oil. There are dock structures on Bayou Lamoque and the Pointe a la Hache Boat Harbor is located on the Back Levee Canal southeast of Pointe a la Hache.

Virtually all of the water bottoms in the interior portions of this EMU are leased for private oyster beds. Water bottoms on the Breton Sound side of the marsh zone are designated as public oyster seed grounds.

There are numerous oil and gas producing fields, pipelines and rig cuts in the EMU. The area contains several large oil and/or gas fields: Pointe a la Hache, Potash, West Black Bay, Cox Bay, Quarantine Bay, and Empire Oil Field.

The southern perimeter of this EMU encompasses the New Orleans-to-Venice Hurricane Protection Levee that extends from Point a la Hache to just south of Bohemia, the natural levee of the Mississippi River in the Pointe a la Hache Relief Outlet area, and another reach of Mississippi River Flood Protection Levee from Bayou Lamoque to Baptiste Collette Bayou. There are no primary or secondary roads in the EMU, but an unimproved dirt road lies along the crest of the natural levee from the end of the flood protection levees at Bohemia to Nestor, northeast of Port Sulphur.

Unique Ecological Features

A. Geologic: None

B. Botanical: Extensive wetlands

C. Zoological: The EMU supports good furbearing animal populations in the brackish marshes near the levee and is an important habitat for commercial and sport fishery species. The area is an important nursery ground for marine organisms and the water bodies are productive oyster-growing areas. Clam beds are located to the east of this EMU in Breton Sound. Between 1976 and 1997, islands within this EMU have supported various types of nesting bird colonies (Foster's Tern, Royal Tern, Sandwich Tern, Laughing Gull, Black Skimmer, and Caspian Tern): 235D-09, 235D-07, 235D-08, 235D-09, 235D-10, 235D-13, 235D-15, 240A-01, 240B-01 and 240B-02.

Resources and Resource Users

The abundant wildlife and fisheries resources are harvested by recreational hunters and fishermen, as well as by commercial fishermen and trappers. Virtually all of the interior water bottoms are privately leased for oyster growing, while the open bays and northwestern portions of Breton Sound are reserved as public oyster harvesting areas. There are numerous oil and gas wells and pipelines in this EMU.

Cultural Resources

A. Historical: None identified.

B. Cultural: None identified

C. Archaeological: Thirty archaeological sites have been recorded for the EMU: 16 PL 39, 47, 50, 51, 61, 64, 65, 66, 67, 68, 69, 71, 73, 74, 75, 76, 77, 78, 80, 81, 82, 90, 91, 92, 93, 95, 96, 97, 100, and 139.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levees.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Restore and/or maintain islands supporting bird colonies, where practicable.

20. Protect the natural environment of the EMU.

21. Enhance the productivity of the EMU.

22. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

23. Enhance wetlands and water quality, through surface water management of fresh water to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Remove remnant abandoned artificial levees to facilitate overflow of Mississippi River waters into adjacent wetlands, where beneficial.

2. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

3. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

4. Encourage emplacement of major pipelines in established corridors.

5. Allow and encourage environmentally sound mineral exploration and production.

6. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

7. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

8. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

9. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

10. Improve and maintain water quality compatible with designated uses.

11. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

12. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

13. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

14. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

15. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

16. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

17. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

18. Protect the natural state of the environment.

19. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

20. Enhance productivity of the EMU.

21. Introduce freshwater and nutrients into the EMU.

22. Support environmentally sound economic use, especially with regard to waterfront areas.

23. Prohibit development of wetland areas for non-wetland dependent uses.

24. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Recreational activities (i.e., sports fishing, boating, swimming, birdwatching, etc.)

BAPTISTE COLLETTE

Location and Area

This 33,700-ac EMU encompasses the Baptiste Collette Subdelta lobe and is located east of the Mississippi River, across the river from Venice. The EMU is approximately nine miles long from the Mississippi River to the end of the Baptiste Collette Bayou and extends approximately three miles on both sides of Baptiste Collette Bayou.

Geology and Soils

This subdelta lobe consists of low-lying, low relief marshes and large expanses of open water and organic/mud flats dissected by numerous active and relict distributary channels. The majority of the EMU contains fresh-to-intermediate marsh type soils, Balise-Larose, with a narrow band of Convent soils on the natural levee (USDA, NRCS in press). The EMU has a very high subsidence rate of greater than 3.5 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

The marsh habitats have remained fairly uniform in distribution since 1949 (O'Neil 1949, Chabreck et al. 1968, Chabreck and Linscombe 1978, 1988, USGS 1988/90). The majority of the EMU in 1988 was a freshwater marsh while the perimeter adjacent to Breton Sound was intermediate marsh. A strip of brackish marsh existed along the northwestern perimeter of the delta lobe (Chabreck and Linscombe 1988, USGS 1988/90). The higher natural levees along the main Mississippi River Channel and along the distributary channels supported dense stands of willows and scattered stands of baldcypress. A few of the highest ridges along the main channel contained live oaks.

Analysis of historic land loss in the EMU reveals that:

> …between 1932 and 1956, 2,810 acres of the original 14,850 acres of marsh were lost. The greatest loss was from 1956-74 when 5,790 acres disappeared due to a combination of subsidence, altered hydrology, and hurricanes. The same forces, with wind erosion added, continued to cause the loss of 1,750 acres from 1974-90 (LCWCRTFW & WCRA 1998b).

The Coast 2050 report concluded that:

> If nothing is done, 2,900 acres (64% of the 1990 marsh) are projected to be lost by 2050. However, if the US Army Corps of Engineers (USACE) uses the material from dredging the bayou to create marsh, by 2050, this effort will save 1,400 acres. Thus, by 2050, only 33% of the present marsh acreage is estimated to be lost (LCWRTFW & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years all assemblages have had steady populations of representative species: Estuarine dependent (red and black drum, spotted seatrout, southern flounder, Gulf menhaden, white and brown shrimp, blue crab); estuarine resident (American oyster); marine (Spanish mackerel); and freshwater (channel catfish and largemouth bass). In the future, populations of all species in the estuarine dependent assemblage are projected to decrease. Those of the American oyster, Spanish mackerel, largemouth bass, and channel catfish are expected to remain steady.
>
> The brown pelican is the only wildlife species that has shown increasing population trends over the last 10-20 years. The American alligator has had decreasing populations over this period. All other wildlife such as seabirds, shorebirds, wading birds, dabbling and diving ducks, geese, rails, gallinules, coots, raptors, furbearers, and game mammals have had steady populations for the last 10-20 years. In the future, the pelican populations are expected to continue to increase. Wading bird, shorebird, seabird, and raptor populations are projected to decrease. Other wildlife species populations are expected to have steady populations.

Hydrology and Flooding Potential

The Baptiste Collette channel and its three major distributary channels, Main Pass, Kimbel Pass, and Emeline Pass, carry approximately 5 percent of the Mississippi River discharge (van Beek et al. 1986). The entire EMU is barely above sea level and subject to seasonal Mississippi River flooding. Almost all of the area is subject to regular tidal flooding.

Land Use and Transportation Infrastructure

This EMU consists primarily of fresh-to-intermediate marshes and small stands of bottomland hardwood and swamp vegetation along the low-lying natural levees that serve as wildlife and

fisheries habitat. Because of the consistent freshwater input, this EMU is prime habitat for freshwater dependent species. The EMU contains numerous oil and gas wells in two fields (Grand Bay Oil Field and Block 47 Oil and Gas Field), rig cuts, and pipelines. A small portion of the Delta National Wildlife Refuge is located on the southeastern side of the EMU.

There are no roads or railroads in this EMU. The Mississippi River has a 45-ft deep channel adjacent to the EMU, and therefore no maintenance dredging is required. For the first six miles from the Mississippi, the Baptiste Collette Bayou has a maintained depth of 14 ft and a width of 150 ft. The remainder of the bayou out to the 16-ft contour has a depth of 16 ft and a width of 250 ft (LCWCRTF & WCRA 1998b).

Unique Ecological Features

A. Geological: The primary unique feature is the active Baptiste Collette Subdelta lobe.

B. Botanical: This is part of the most extensive fresh-to-intermediate marsh habitat in the parish.

C. Zoological: This is considered to be a part of what is possibly the most biologically productive area in Louisiana with tremendous species diversity. This active delta area attracts extensive seasonal waterfowl concentrations and supports numerous furbearing animals and alligator populations. The area is unique in that it supports both fresh and saltwater species at different periods of the year depending on Mississippi River stages. A unique subspecies of white-tail deer (*Odocoileus virginianus mcilhennyi*) inhabits the natural levees in this EMU.

Resources and Resource Users

While the area can only be reached by boat, its diverse, abundant renewable resources provide a variety of recreational opportunities for hunting and fishing, water-based sports, and general nature study, such as bird watching. The non-renewable oil and gas resources are also being extracted.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: One site of historic age, 16 PL 79, has been recorded for this EMU.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

3. Encourage land use compatible with wetland and aquatic environments.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Utilize existing and newly created wetlands as storm buffer zones.

12. Maintain portions of EMU as estuarine nursery area.

13. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Maintain wetlands and quality of water bodies for renewable resources.

16. Restore and/or maintain islands supporting bird colonies, where practicable.

17. Protect the natural environment of the EMU.

18. Enhance the productivity of the EMU.

19. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

6. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

7. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

8. Improve and maintain water quality compatible with designated uses.

9. Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.

10. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

11. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

12. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

13. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

14. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

15. Protect the natural state of the environment.

16. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

17. Enhance productivity of the EMU.

18. Support environmentally sound economic use, especially with regard to waterfront areas.

19. Prohibit development of wetland areas for non-wetland dependent uses.

20 Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

7. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

8. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

9. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

10. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

11. Support efforts to improve and maintain water quality compatible with designated uses.

12. Support wetland restoration programs involving freshwater and sediment input into EMUs.

13. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

14. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

15. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Threatened and endangered species habitat and/or wildlife refuges/management areas.

7. Tourism and cultural resources.

BARATARIA BARRIER ISLANDS

Location and Area

The Barataria Barrier Islands EMU covers approximately 3,700-ac in Plaquemines Parish, between Pass Abel and Point Cheniere Ronquille. The EMU is located in the southwestern part of the parish and is bordered on the north by the Barataria Bay and Cheniere Ronquille EMUs, on the east by the Barataria Barrier Shorelines, on the south by the Gulf of Mexico, and on the west by the Jefferson Parish boundary.

Geology and Soils

This EMU, consisting of barrier islands, beaches, and sea rim marsh, is undergoing erosion along the gulf shore and longshore transport or rollover of shorefront material on interior marsh and bay areas. The natural topography is primarily low-lying, low-relief marsh and water bodies. The only topographic relief is provided by spoil banks and sand dunes behind the gulfward barrier island beaches.

Soils are primarily Felicity on the gulf rim and Bellpass-Timbalier on the interior saline marsh. Subsidence is high (2.1 ft to 3.5 ft) per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

This area has remained primarily in salt marsh since vegetation was first mapped by O'Neil in 1949. A narrow strip of sand/shell beach covers some of the Gulf shoreline and interior spoil banks along pipeline canals contain scrub/shrub vegetation. Land loss between 1932 and 1990 totaled approximately 553 ac, of which about 56 ac was due to dredging of pipeline canals. Natural land loss resulted from erosion along the gulf, bay and inlet edges as a result of normal wind and storm generated wave movement and tidal scouring. Land loss for different time periods include: 1932 to 1958 equaled 87 ac; 1958 to 1974 equaled 211 ac; 1974 to 1983 equaled 103 ac; and 1983 to 1990 equaled 152 ac (Britsch 1999).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU was summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years, the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) and the estuarine resident assemblage (American oyster) have shown decreasing population trends. Only the marine assemblage (Spanish mackerel) has increased. The same trends are projected to occur in the future.

The brown pelican has shown an increasing trend over the last 10-20 years. All other wildlife, such as seabirds, wading birds, shorebirds, dabbling ducks, diving ducks, and furbearers, have shown decreasing trends in this rapidly eroding EMU. Continuing decreases are projected for the future.

Hydrology and Flooding Potential

The wetlands or barrier beaches, approximately 0 to 1 foot in elevation, are subject to regular tidal flooding. Salinities are over 25 ppt. Several large bays (Bay Melville, Bay Dispute, Bay Cheniere Ronquille, and a portion of Cat Bay) are located behind the barrier shoreline. The EMU includes two deep tidal passes, Pass Abel and Quatre Bayou Pass.

Land Use and Transportation Infrastructure

The saline marshes, bays, narrow barrier beaches, tidal channels and canals function as wildlife and fisheries habitat. This estuarine area is a primary spawning ground for a variety of species such as red drum, black drum, speckled trout, and flounder (LCWCRTF & WCRA 1998b). Water bodies in the backbay marshes are leased as oyster grounds. Commercial and recreational fishing, including shrimping, occurs in the interior bays and tidal passes.

There are no roads or railroads in this EMU. There are numerous pipelines crossing the EMU; however, erosion and beach rollover processes have obscured their location or left them in the Gulf of Mexico.

Unique Ecological Features

A. Geological: Deep tidal passes

B. Botanical: The barrier islands are often fringed on the bay side by black mangroves which serve as important nesting and roosting sites for shore and wading birds.

C. Zoological: This EMU is excellent habitat for important sport and commercial species of finfish, for oysters and for nursery habitat for estuarine organisms. One bird colony (242D-1) was identified in 1990 on the land between Bay Dispute and Quatre Bayoux Pass.

Resources and Resource Users

Abundant renewable resources make this a prime recreational area for sport and commercial fishing and other water-based activities.

Cultural Resources

A. Historical: Four unidentified shipwrecks are located along the Gulf margin of this EMU.

B. Cultural: None identified

C. Archaeological: No recorded sites.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Maintain, protect, and/or restore barrier islands, headlands, and adjacent wetlands as hurricane buffer zones.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

7. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

8. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

9. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

10. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

11. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

12. Utilize existing and newly created wetlands as storm buffer zones.

13. Maintain portions of EMU as estuarine nursery area.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Prohibit future man-made cuts in barrier islands.

16. Maintain wetlands and quality of water bodies for renewable resources.

17. Restore and/or maintain islands supporting bird colonies, where practicable.

18. Protect the natural environment of the EMU.

19. Enhance the productivity of the EMU.

20. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Allow and encourage environmentally sound mineral exploration and production.

3. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

4. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

5. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

6. Improve and maintain water quality compatible with designated uses.

7. Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.

8. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

9. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

10. Protect the natural state of the environment.

11. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

12. Enhance productivity of the EMU.

13. Support environmentally sound economic use, especially with regard to waterfront areas.

14. Prohibit development of wetland areas for non-wetland dependent uses.

16. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

9. Support efforts to improve and maintain water quality compatible with designated uses.

10. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

11. Oppose activities that damage integrity of barrier islands and beaches.

12. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and maintenance of barrier islands and beaches.

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Threatened and endangered species habitat and/or wildlife refuges/management areas.

BARATARIA BARRIER SHORELINES

Location and Area

The 8,000-ac Barataria Barrier Shoreline EMU is a narrow EMU bordering the Gulf of Mexico between Point Cheniere Ronquille and the west side of Sandy Point Bay. The EMU is bordered on the north by the Cheniere Ronquille and Bastian Bay EMUs, on the east by the West Bay EMU and on the west by the Barataria Barrier Islands EMU.

Geology and Soils

This EMU consists of barrier islands, beaches, and sea rim marsh that are undergoing erosion along the gulf shore and longshore transport or rollover of shorefront material onto interior marsh and bay areas. The natural topography is primarily low-lying, low relief marsh and water bodies. Spoil banks and sand dunes located behind the gulfward barrier island beaches provide the only topographic relief. Soils are primarily Felicity on the barrier beach ridges and Scatlake on bayside saline marshes (USDA, NRCS in press). Subsidence rates range from high (2.1 ft to 3.5 ft) on the western half of the EMU to very high (over 3.5 ft) on the eastern part of the EMU (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

The wetland area has remained in salt marsh vegetation since first mapped by O'Neil in 1949. Scrub/shrub vegetation grows on spoil banks along rig access and pipeline canals. Most of this EMU exhibits medium-high to high land loss rates (8 to 18 ac/mi^2/yr between 1956 and 1978) (van Beek et al. 1986). The causes of land loss include shoreline erosion, subsidence, and dredging of pipeline canals and access channels, and installation of jetties at the mouth of the Empire to Gulf Waterway that impacted sediment transport.

A recent coastal planning effort (LCWCRTF & WCRA 1998b) described the EMU's historic land loss and made projections for future land loss:

> …breakup (gulfside and landside erosion and inlet widening) and landward rollover has been occurring from Scofield Bayou to Sandy Point. Shoreline retreat has been the dominant process on Cheniere Ronquille and in front of Bay Joe Wise. Shell Island increased in acreage from 313 acres in 1884 to 432 acres in 1932. However, it had lost 270 acres by 1988. Cheniere Ronquille is moving landward at about 16 ft per year; it retreated as much as 4,500 ft landward from 1884-1988.
>
> … Cheniere Ronquille will have lost its western point by 2050, and its shoreline will have moved inland up to 1/3 of a mile. Bay Joe Wise will be open to the gulf, with only remnants of its bar remaining, and Shell Island will be nearly gone. Pelican Island, the headland between Fontenelle Pass and Scofield Bayou, is in dynamic equilibrium and is likely to be in existence in 2050. Sandy Point will no longer exist, and Bay Coquette will be open to the gulf.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years, the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) and the estuarine resident assemblage (American oyster) have shown decreasing population trends. Only the marine assemblage (Spanish mackerel) has increased. The same trends are projected to occur in the future.
>
> The brown pelican has shown an increasing trend over the last 10-20 years. All other wildlife, such as seabirds, wading birds, shorebirds, dabbling ducks, diving ducks, and furbearers, have shown decreasing trends in this rapidly eroding EMU. Continuing decreases are projected for the future.

Hydrology and Flooding Potential

The wetlands or barrier beaches, approximately 0 to 1 foot in elevation, are subject to regular tidal flooding. Salinities are over 25 ppt. Several large bays (Bay Coquette, Shell Island Bay, Bastian Bay, Bay Joe Wise, and Bay Long are located behind the barrier shoreline. North-south trending channels that beach the barrier shoreline are: Dry Cypress Bayou, Bayou Scofield, and Empire to Gulf Waterway/Fontenelle Pass*)*, Grand Bayou/Grand Bayou Pass, Bayou Chaland/Bayou Chaland Pass. Numerous unnamed breaches of barrier shorelines allow tidal flow into the interior bays.

Land Use and Transportation Infrastructure

The entire EMU consists of saline marshes, bays, narrow barrier beaches, tidal channels and canals that serve as wildlife and fisheries habitat. The area is a primary spawning ground for a variety of estuarine dependant organisms. Oyster growers lease virtually all of the open water bodies behind the barrier beach. Both commercial and sport fishermen harvest renewable resources such as finfish, crabs, shrimp and oysters in interior water bodies and tidal passes. A few camps are located along natural bayous and spoil banks throughout the area.

There are no roads or railroads in this EMU, but there are extensive oil and gas wells, pipeline canals and rig access canals. The Lake Washington Oil and Gas Field covers part of the southwest portion of the EMU. The 9-ft deep by 80-ft wide Empire-to-Gulf Waterway enters the gulf through Fontenelle Pass in the eastern half of this EMU and its opening is maintained by the jetties.

Unique Ecological Features:

A. Geological: Narrow barrier islands with sand and shell beaches outline the Gulf shore portion of this EMU.

B. Botanical: The barrier islands are often fringed on the bay side by black mangroves which serve as important nesting and roosting sites for shore and wading birds.

C. Zoological: This EMU is excellent nursery and growout habitat for important sport and commercial species of finfish, crabs, shrimp, and oysters. Five bird colonies were recorded in this EMU between 1976 band 1997: 241C-1, 241C-2, 241C-3, 241C-4, and 257B-1.

Resources and Resource Users

Because of its abundant renewable resources, this EMU is used for both sport and commercial fishing and other water-based activities. There are numerous navigable water bodies and boat docking and launching facilities between Port Sulphur and Triumph to provide access to this EMU. The non-renewable oil and gas resources are being extracted and transported through the EMU via pipelines that run both parallel and perpendicular to the EMU's alignment. Private campsites, elevated on pilings, are located along bayous and canals throughout the EMU.

Cultural Resources

A. Historical: Four unidentified shipwrecks are located along the Gulf margin of this EMU. One is situated off Lanaux Island, one is at the mouth of Scofield Bayou and two are east of Quatre Bayoux Pass.

B. Cultural: None identified

C. Archaeological: There are three recorded shell beach deposit sites in this EMU: 16 PL 24, 30, and 31.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Maintain, protect, and/or restore barrier islands, headlands, and adjacent wetlands as hurricane buffer zones.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

7. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

8. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

9. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

10. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

11. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

12. Utilize existing and newly created wetlands as storm buffer zones.

13. Maintain portions of EMU as estuarine nursery area.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Prohibit future man-made cuts in barrier islands.

16. Maintain wetlands and quality of water bodies for renewable resources.

17. Modify jetties to facilitate sand transport along beach.

18. Restore and/or maintain islands supporting bird colonies, where practicable.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Allow and encourage environmentally sound mineral exploration and production.

3. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

4. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

5. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

6. Improve and maintain water quality compatible with designated uses.

7. Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.

8. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

9. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

10. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

11. Protect the natural state of the environment.

12. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

13. Enhance productivity of the EMU.

14. Support environmentally sound economic use, especially with regard to waterfront areas.

15. Prohibit development of wetland areas for non-wetland dependent uses.

16. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

9. Support efforts to improve and maintain water quality compatible with designated uses.

10. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

11. Oppose activities that damage integrity of barrier islands and beaches.

12. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and maintenance of barrier islands and beaches.

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Threatened and endangered species habitat and/or wildlife refuges/management areas.

BARATARIA BAY

Location and Area

The Barataria Bay EMU in Plaquemines Parish encompasses approximately 20,039 ac and is located in the southwestern portion of the parish west of the Mississippi River. Adjacent EMUs include Myrtle Grove, Lake Washington/Grande Ecaille, Cheniere Ronquille and Barataria Barrier Islands. The EMU's western boundary is the Jefferson Parish-Plaquemines Parish boundary line. The northern boundary extends from the mouth of Bayou St. Denis through St. Mary's Point and Big Island to the western edge of Lake Grande Ecaille. The eastern perimeter lies between Bay Ronquille and Cat Bay and the southern boundary is the northern perimeter of marsh along Bay Melville and Bay Dispute.

Geology and Soils

This EMU is the southeastern area of a large, interdistributary bay located between the Mississippi River and Bayou Lafourche. Soils on the few remaining saline marsh islands scattered along the eastern perimeter of the EMU are primarily Bellpass-Timbalier and Scatlake (USDA-NRCS in press).). Subsidence rates are high, 2.1 ft to 3.5 ft (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

The vegetation in this EMU has been saline marsh since it was first mapped by O'Neil (1949). Between 1932 and 1990 approximately 900 ac of land, primarily saline marsh, disappeared as a result of subsidence and erosion from wind and water generated processes. Only small remnant islands remained along the eastern side of the EMU in 1988 and these can be expected to disappear in the near future.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

Over the last 10-20 years, species populations in the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) and estuarine resident assemblage (American oyster) have shown decreasing trends. Only the marine assemblage (Spanish mackerel) has shown increased populations. The same trends are projected to occur in the future.

This EMU is mainly open water. Over the last 10-20 years brown pelican numbers have increased. Diving ducks have shown decreasing population trends, while seabirds have remained steady. Over the next 50 years the brown pelican is expected to continue to increase, seabirds will remain steady, and diving ducks will decrease as food supplies decrease.

Hydrology and Flooding

The EMU contains the larger Barataria Bay and smaller Cat Bay located in the southeast portion of the EMU. These bays are subject to regular tidal fluctuations and salinities vary from 20 to 25 ppt (van Beek 1986). Implementation of the Davis Pond Freshwater Diversion Structure is expected to lower salinity levels in the upper portion of the EMU.

Land Use and Transportation Infrastructure

The EMU's small remnants of saline marsh and relatively large, shallow estuarine water bodies serve as fisheries habitat. The area functions as a primary nursery area for inshore and some offshore marine species. Virtually all of the water bottoms in this EMU are leased for growing oysters. Most of these leases occur around existing marshland or in areas where the marsh has eroded.

There are no roads, railroads or maintained navigable waterways in the part of the Barataria Bay EMU in Plaquemines Parish. The actively maintained 12-ft deep by 125-ft wide Barataria Bay Waterway extends through the western part of Barataria Bay in Jefferson Parish. The EMU contains numerous oil and gas wells, a part of one major oil and gas field in the northwest portion of the EMU, and numerous oil and gas pipelines.

Unique Ecological Features

A. Geological: None identified

B. Botanical: None identified

C. Zoological: Area very good for commercial and sport fishing, for nursery grounds for marine organisms, and for oyster production. This EMU contains five seabird and wading bird colonies (242C-04, 242C-05, 242C-06, 242D-02, and 242D-03) populated by either Foster's Tern or Black Skimmers between 1976 and 1997 (Visser and Peterson 1997).

Resources and Resource Users

This EMU contains renewable resources such as finfish, shrimp, and crabs that are harvested by commercial and sports fishermen. Commercial oyster fishermen maintain extensive areas of privately leased oyster grounds. The open bay is utilized also for general recreational boating activities, including fishing. There are numerous oil and gas producing wells and pipelines in the area.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: One site (16 PL 19) is a prehistoric shell midden that is partially located in the Myrtle Grove EMU.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Utilize existing and newly created wetlands as storm buffer zones.

14. Maintain portions of EMU as estuarine nursery area.

15. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

16. Encourage wetland management and restoration of eroded wetlands, where practicable.

17. Maintain wetlands and quality of water bodies for renewable resources.

18. Restore and/or maintain islands supporting bird colonies, where practicable.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

6. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

7. Improve and maintain water quality compatible with designated uses.

8. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

9. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

10. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

11. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

12. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

13. Protect the natural state of the environment.

14. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

15. Enhance productivity of the EMU.

16. Introduce freshwater and nutrients into the EMU.

17. Support environmentally sound economic use, especially with regard to waterfront areas.

18. Prohibit development of wetland areas for non-wetland dependent uses.

19. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support efforts to improve and maintain water quality compatible with designated uses.

9. Support wetland restoration programs involving freshwater and sediment input into EMUs.

10. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

11. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Natural water bottoms and benthic communities.

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Threatened and endangered species habitat and/or wildlife refuges/management areas.

BASTIAN BAY

Location and Area

The Bastian Bay EMU contains approximately 40,500 acres and is located in the west central portion of the parish, west of the Mississippi River. The EMU boundaries are the back flood protection levee on the north; the west shoreline of Bastian Bay-Bayou la Chute-Bayou Long (Part of Empire-to-Gulf Waterway) on the west; the backside of the barrier island-barrier shore (Barataria Barrier Shorelines EMU) on the south; and Bayou Grand Liard ridge and east shorelines of Bay Jacques and Bay Coquette on the east. The EMU is surrounded by the following EMUs: Plaquemines Area, Grand Liard, Barataria Barrier Shorelines, and Cheniere Ronquille.

Geology and Soils

This EMU consists of low-lying, low relief saline marsh, relict Mississippi River distributary channels (Dry Cypress Bayou, Bayou Long) and numerous lakes and bays that have expanded to dominate the landscape. Spoil banks along dredged canals are the only topographic relief in this EMU. The saline-to-freshwater marsh soils are predominantly Bellpass, Timbalier, Scatlake and Clovelly. The marsh soils located at the base of the levee and LA HWY 23 in the northern part of the EMU consists of frequently flooded Aquents (USDA, NRCS in press) that developed through runoff from construction of the road and levee network. The EMU has a very high subsidence rate of more than 3.5 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

This EMU remained predominantly saline marsh with a narrow band of brackish marsh at the base of the narrow, natural Mississippi River levee from the late 1940s through 1978 (O'Neil 1949, Chabreck and Linscombe 1978). By 1988, most of the EMU consisted of large expanses of estuarine water with almost all of the remaining marsh fragments classified as saline (Chabreck and Linscombe 1988). A narrow band of intact marsh, mapped variously as saline (Chabreck and Linscombe 1988) and brackish (USFWS, NWI 1988) was located between the back protection levee and the levee borrow canal. The rapid marsh loss is attributed to a combination of factors including a very high subsidence rate, shoreline erosion from wave and tidal action, and canal dredging (oil and gas access, pipeline, navigation, and levee borrow areas).

Land loss between 1932 and 1974 totaled approximately 8,000 ac, but increased to 15,300 ac between 1974 and 1990 (LCWCRTF & WCRA 1998b). Recent studies indicate that 95 percent of the remaining marsh will be gone by the year 2050.

The only marsh expected to remain would be located in the ponding areas at the base of the hurricane protection levee along the EMUs northern perimeter (LCWCRTF & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years, the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) and the estuarine resident assemblage (American oyster) have shown decreasing trends. Only the marine assemblage (Spanish mackerel) has increased. The same trends are projected to occur in the future in this rapidly eroding area.
>
> The brown pelican has shown an increasing population trend over the last 10-20 years. All other wildlife species, such as seabirds, wading birds, shorebirds, dabbling ducks, diving ducks, and furbearers, have shown decreasing trends in this rapidly eroding EMU. Continuing decreases are projected for the future.

Hydrology and Flooding Potential

The EMU contains extensive expanses of water bodies consisting primarily of coalesced bays and canals and scattered remnants of marsh and subsided spoil banks subject to regular tidal flooding. Marsh break-up is so extensive in this EMU that the bays, natural channels, and canals are barely definable as individual features. Salinities range from 15 ppt in the eastern portion of the EMU (near the freshwater outlets of the Mississippi River) to over 25 ppt in the western end. The Sunrise Pump Station, located north of Buras, discharges freshwater directly into the EMU.

Land Use and Transportation Infrastructure

The back flood protection levee and LA HWY 23 define the northern portion of this EMU. The 9-ft deep by 80-ft wide Empire to the Gulf Waterway is located along the northwestern border of the EMU and the Buras Boat Harbor is located on the north central perimeter of the EMU. A state-owned lock on the waterway at Empire allows boats to enter and leave the Mississippi River. The entire EMU consists of extensively broken, brackish and saline marshes and estuaries that serve as wildlife and fisheries habitat. Virtually all of the water bottoms in this EMU are leased for private oyster growing grounds.

There are no roads or railroads in this EMU. The EMU contains numerous oil and gas wells, pipelines, and rig access canals. There are two major oil and gas fields in the EMU: West Bastian Bay and Bastian Bay.

Unique Ecological Features:

A. Geological: None identified

B. Botanical: None identified

C. Zoological: This EMU is excellent for important sport and commercial species of finfish, oysters, shrimp, and crabs. It is also a primary nursery habitat for oysters, shrimp and finfish. Some furbearing animals inhabit the brackish marshes near the Mississippi River.

Resources and Resource Users

The abundant renewable resources make this EMU a prime recreational area for sport fishing, other water based activities and commercial harvesting of finfish, oysters, shrimp and crabs. There are numerous navigable water bodies and boat docking and launching facilities between Port Sulphur and Triumph to provide access to this EMU. The mineral industry mines and pipelines transport oil and gas both from and through this EMU.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: There is one recorded site (16 PL 13), an earth and shell midden in this EMU; however, it may have eroded by 1999.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Restore and/or maintain islands supporting bird colonies, where practicable.

20. Protect the natural environment of the EMU.

21. Enhance the productivity of the EMU.

22. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

23. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

24. Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Natural water bottoms and benthic communities.

7. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

BRETON SOUND

Location and Area

The Breton Sound EMU encompasses approximately 150,000 ac of open water in the northeastern part of Plaquemines Parish. This EMU is bordered on the east by the Chandeleur Islands EMU, on the south by the Baptiste Collette and American Bay EMUs, on the west by the Caernarvon EMU, on the north by the border with St. Bernard Parish and on the northeast by the Chandeleur Sound EMU.

Geology and Soils

The Breton Sound is an expansive, relatively shallow, estuarine area located on the outer perimeter of the Mississippi River interdistributary basin. Water depths range from approximately 3 ft on the west to 22 ft near Breton Sound. It is bordered on the east by the Chandeleur Island complex and on the west by the marshes and inter-basin lakes, bays, and channels of the upper basin.

Vegetation and Habitat Change

There are no emergent vegetated habitats in the Sound. However, there are extensive reefs scattered through the Sound that produce oysters under favorable growing conditions.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Many species of the estuarine dependent assemblage (red and black drum, spotted seatrout, southern flounder, and brown shrimp) have shown a steady population trend over the last 10-20 years. Other populations (Gulf menhaden, white shrimp and blue crab) have shown increasing trends over the same period. Populations of the American oyster have shown an increasing trend, and the Spanish mackerel has had steady populations. In the future, all of the above are projected to have steady populations.
>
> Breton Sound contains large historical oyster reefs which produce during or after heavy wet years. Brown pelicans and a variety of seabirds and diving ducks feed in this area.

Hydrology and Flooding Potential

The EMU is open water and experiences daily water level fluctuations due to tidal exchange through the Mississippi River Gulf Outlet and the open area between Breton Island and the Baptiste Collette and Cubits Gap subdeltas. Until the Mississippi River was totally leveed by the Corps in the 1930s, the area received over-bank floodwaters from the river. Several

freshwater diversion structures along the east bank of the Mississippi River and flooding through breaks in the natural levee below Point a la Hache continued to put some freshwater into the Sound through the last half of the twentieth century. Operation of the Caernarvon Freshwater Diversion Structure since 1992, allows for regular input of up to 8,000 cfs of fresh water to moderate high salinity levels in the Sound.

Land Use and Transportation Infrastructure

Historically, the western half of the EMU contained large expanses of oyster reefs from which oysters were taken for transplanting or marketing. This area remains closed to private leasing and serves as a public oyster bed and seed producing area. The EMU contains both oil and gas wells, the largest concentration being in the Main Pass Block 33 and 35 Oil Field, and pipelines. The Mississippi River Gulf Outlet channel and flanking spoil disposal area extend parallel to the EMU's northeastern border. Commercial and recreational fishing and boating are major uses of the EMU.

Unique Ecological Features

A. Geological: None identified

B. Botanical: None identified

C. Zoological: The oyster reefs in the western portion of Breton Sound, historically, supplied much of the seed oysters replanted on private grounds in the southeastern coastal areas of Louisiana. The reef areas remain as public oyster grounds.

Resources and Resource Users

The Breton Sound contains large oyster reefs that produce oysters during or after a heavy wet year that can be harvested by commercial oyster fishermen. The Sound supports a large variety of fisheries species that are harvested by both commercial and recreational fishermen. Species commonly harvested by commercial fishermen include menhaden and other finfish, shrimp, and crabs. The Sound also contains an extensive network of pipelines and reserves of oil and gas that are being actively produced.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: There are several unidentified shipwrecks in the southeastern portion of this EMU.

EMU Goals

1. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

2. Encourage land use compatible with wetland and aquatic environments.

3. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Maintain wetlands and quality of water bodies for renewable resources.

12. Restore and/or maintain islands supporting bird colonies, where practicable.

13. Protect the natural environment of the EMU.

14. Enhance the productivity of the EMU.

15. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Allow and encourage environmentally sound mineral exploration and production.

3. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

4. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

5. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

6. Improve and maintain water quality compatible with designated uses.

7. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

8. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

9. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

10. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

11. Protect the natural state of the environment.

12. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

13. Enhance productivity of the EMU.

14. Support environmentally sound economic development, especially with regard to waterfront areas.

15. Prohibit development of wetland areas for non-wetland dependent uses.

16. Ensure compliance with land use plans and zoning.

EMU Policies

1. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

2. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

3. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

4. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

5. Support efforts to improve and maintain water quality compatible with designated uses.

6. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

7. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Natural water bottoms and benthic communities.

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

CAERNARVON

Location and Area

The 152,600-ac Caernarvon EMU is located in the northeastern portion of the parish, east of the Mississippi River. The EMU is bounded, on the north by the St. Bernard-Plaquemines Parish boundary along Bayou Terre aux Boeufs, on the east by the Breton Sound, on the south by the Forty Arpent Canal and River aux Chenes, and on the west by the back protection levee.

Geology and Soils

This EMU occupies the interdistributary basin between the abandoned Plaquemines and St. Bernard delta lobes and consists of low-lying, low relief marshes heavily veined by abandoned and subsided Mississippi River distributary channels, which now function as tidal channels. There are numerous bays and lakes in the area that are gradually being enlarged by marsh erosion and scouring processes. The fresh-to-saline marsh and swamp areas contain primarily Scatlake, Bellpass, Timbalier, Clovelly, Lafitte, and Gentilly soils. The higher natural levee ridges in the western part of the EMU are mostly Sharkey clay soils while the subsided ridges contain gentilly soils. The EMU has a high subsidence rate of 2.1 ft to 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

In the first quarter of the twentieth century, the EMU contained more extensive fresh-to-intermediate marsh and stands of black willow trees west of Lake Lery that had developed after the man-made crevasses at Caernarvon in 1923 and 1927 put large amounts of fresh water, sediments and nutrients into the EMU. In 1949, the area was about evenly divided between brackish and saline marsh, with a narrow band of intermediate marsh in the northwest part of the EMU (O'Neil 1949). In 1988, the northwestern tip of this EMU, west of Big Mar, remained in intermediate marsh. The majority of the EMU was brackish marsh with a narrow band of saline marsh in the narrow neck of the EMU between Lake Cuatro Caballo and Breton Sound (Chabreck and Linscombe 1988, USGS 1988/90). The higher distributary ridges on the western side of the EMU contained willows and other mixed bottomland hardwood trees and shrubs.

The area experienced a large amount of land loss (6,560 ac) between 1956 and 1974, primarily attributable to Hurricane Betsy in 1965, subsidence, and construction of canals that allowed saltwater and tidal processes to penetrate into the interior of the basin. Land loss between 1932 and 1956 equaled about 3,320 ac and between 1974 and 1984, the loss was 3,380 ac. Land loss between 1984 and 1990 totaled 980 ac (LCWCRTF & WCRA 1998b). Since the Caernarvon Freshwater Diversion Structure began operation in 1992, the area has continued to receive fresh water, nutrients, and some sediment and the western marshes have shown noticeable improvement in plant coverage. Monitoring of plots near Big Mar and

Lake Lery, indicate that about 400 ac of marsh had been restored by 1997 (LCWCRTF & WCRA 1998b).

The Coast 2050 report (LCWCRTF & WCRA 1998a) states that without restoration projects the area would lose about 13,290 ac of marsh by the year 2050. With operation and outfall management of the Caernarvon Freshwater Diversion Structure, it is estimated that about 9,600 ac of this loss could be prevented.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Populations of many species of the estuarine dependent assemblage (red and black drum, spotted seatrout, southern flounder, and brown shrimp) have shown a steady trend over the last 10-20 years. Other populations (Gulf menhaden, white shrimp and blue crab) have had an increasing trend over the same period. The American oyster, an estuarine resident, has shown a greatly increasing trend due to the freshwater diversion. The freshwater assemblage has shown an increasing population trend (channel catfish and especially largemouth bass). Populations of the Spanish mackerel have been steady. In the future, all of the above populations are projected to show increasing trends except for spotted seatrout, southern flounder, and Spanish mackerel, which are projected to remain steady.
>
> Populations of brown pelicans, wading birds, dabbling and diving ducks, rails, gallinules, coots and American alligators have shown increasing trends over the last 10-20 years. Other wildlife populations such as seabirds, shorebirds, raptors, furbearers, and game mammals have remained steady. In the future, most populations such as seabirds, wading birds, shorebirds, raptors, furbearers and game mammals are projected to remain steady. Dabbling and diving duck populations are projected to increase, as are those of American alligators, rails, gallinules and coots.

Hydrology and Flooding Potential

The entire EMU is wetland, 0 ft to approximately 2 feet in elevation, and subject to regular tidal flooding. The Caernarvon EMU is an estuarine system that, prior to the operation of the Caernarvon Freshwater Diversion, had high fall salinity ranges of 5 ppt in the marshes northwest of Lake Lery and 20 ppt in the Black Bay to Long Bay area. These ranges shifted southeastward about five miles in the spring (van Beek et al. 1986). One objective of the Caernarvon freshwater diversion was to lower the peak salinity levels and put the 15 ppt line further eastward to restore the historic distribution of prime oyster growing areas. The outfall area for the 8,000-cfs capacity freshwater diversion structure located west of Caernarvon, St. Bernard Parish, discharges into a canal along the Plaquemines and St. Bernard Parish boundary. In addition to precipitation, fresh water enters the EMU directly via pump stations at Braithwaite and Scarsdale, and Mississippi River overbank flooding can occur in the vicinity of the Pointe a La Hache Relief Outlet south of Point a la Hache. Tidal

circulation throughout the EMU is enhanced by the numerous abandoned distributary channels, tidal channels, and canals.

Land Use and Transportation Infrastructure

The wetlands and estuarine areas of this EMU provide renewable resources that are harvested recreationally by hunters and sport fishermen and commercially by trappers and commercial fishermen, including oyster farmers. There are no public recreational areas except navigable waterways in the EMU. This area contains numerous oil and gas producing fields and canals. The bottoms of most of the interior lakes, ponds, and channels on the eastern half of this EMU and along the shoreline of Grand Lake and the south shore of Lake Lery are in private oyster leases. The bay bottoms on the eastern part of this EMU are public oyster growing areas. Since the Caernarvon Freshwater Diversion structure, located east of Braithwaite, began discharging fresh water into the EMU, the western half of the EMU has become very popular for recreational bass fishing.

There are no roads or railroads in this EMU. Bayou Terre aux Boeufs, a navigable waterway defining the northeastern border of this EMU, is maintained at 5 ft deep by 50 ft wide over a 10-mile stretch (LCWCRTF & WCRA 1998b). There are numerous oil and gas wells and pipelines throughout the area. Oil and gas fields in the area include: Delacroix, Lake Campo, North Black Bay, Crooked Bayou, Bayou Gentilly, Lake Lery, Tigers Ridge, Caskett Bayou, and Dalcour (LGS 1980).

Unique Ecological Features

A. Geological: The abandoned distributary channel-levee complex, covered by live oaks in the northwestern portion of the EMU, is a unique feature.

B. Botanical: None identified

C. Zoological: The area contains extensive private oyster leases, public oyster grounds off of California Point and in Bay Gardene, and seed grounds south of Belle Isle. The low salinity marshes in the northwestern portion of the EMU support alligators. The relict distributary levees and spoil banks in the northwestern portion of the EMU support upland forest species and provide habitat diversity for the EMU. Abundant sport and commercial fishery species are present on the EMU and the upper portion of the EMU is a good nursery area. Very extensive waterfowl concentrations are found seasonally south and west of Lake Lery. Of the seven seabird and wading bird colonies identified on islands in Black Bay during studies conducted between 1976 and 1997 (235B-5, 235D-3, 235D-12, 235D-6, 235D-14, 235D-16, 235D-11), five colonies containing Foster's Tern, Caspian Tern, Laughing Gull, Black Skimmer were active in 1997 (Visser and Peterson 1997).

Resources and Resource Users

The abundant renewable resources are harvested both commercially and recreationally. Largemouth bass fishing has become very popular in the area since the Caernarvon Freshwater Diversion structure began operation.

The eastern portion of the EMU is a designated public oyster growing area that provides both seed and market size oysters. The non-renewable mineral resources continue to be extracted and transported in pipelines that traverse the EMU.

Cultural Resources

A. Historical: The 1892 USGS topographic map shows several buildings on the east bank of River aux Chenes.

B. Cultural:

C. Archaeological: Fifteen sites have been recorded in this EMU: 16 PL 1(20), 2, 14, 15, 16, 21, 22, 23, 32, 33, 42, 148, 149, and 154. Sites 16 SB 33 and 58 are located on Bayou Terre aux Boeufs along the Plaquemines - St. Bernard Parish boundary.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain extensive sea grass beds

16. Maintain portions of EMU as estuarine nursery area.

17. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

18. Encourage wetland management and restoration of eroded wetlands, where practicable.

19. Maintain wetlands and quality of water bodies for renewable resources.

20. Protect the natural environment of the EMU.

21. Enhance the productivity of the EMU.

22. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

23. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresh-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

14. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

15. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

16. Protect the natural state of the environment.

17. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

18. Enhance productivity of the EMU.

19. Introduce freshwater and nutrients into the EMU.

20. Support environmentally sound economic use, especially with regard to waterfront areas.

21. Prohibit development of wetland areas for non-wetland dependent uses.

22. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support efforts to improve and maintain water quality compatible with designated uses.

9. Support wetland restoration programs involving freshwater and sediment input into EMUs.

10. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

11. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

12. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Tourism and cultural resources.

CHANDELEUR ISLANDS

Location and Area

The 41,300-ac EMU is located along the northeastern perimeter of the parish and consists of Breton Islands, Grand Gosier Islands, Myth and Errol Shoals and Curlew Islands. The island chain is bordered on the west by Breton Sound and on the east by the Gulf of Mexico.

Geology and Soils

The Chandeleur Islands were formed through reworking of the St. Bernard Delta front sediments since the abandonment of this delta-building phase around A.D. 400 (Wiseman et al. 1979). The islands consist of sand beaches backed by low sand dunes with salt marsh and mangroves on the lee side. Soils are classified as predominantly sand beach (Felicity), although small pockets of salt marsh soils characterize the lee sides of the islands. The

subsidence rates for this EMU are classified as low to intermediate, 0 ft to 2 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

The eastern portions of the islands bordering the Gulf of Mexico consist of unvegetated sand beaches. Small expanses of saline marsh and black mangroves border the Breton Sound and Chandeleur Sound side of the islands. Land loss has been exceedingly high between 1956 and 1978. Hurricane Camille removed much of the landmass in 1969. Shoreline retreat rates are on the order of 40 to 60 feet per year. Hurricane Georges in 1998, was among the latest hurricanes to greatly alter the elevation and configuration of the remaining portions of the islands in this EMU.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Many species of the estuarine dependent assemblage (red and black drum, spotted seatrout, southern flounder, and brown shrimp) have shown a steady population trend over the last 10-20 years. Other populations (Gulf menhaden, white shrimp and blue crab) have shown increasing trends over the same period. The Spanish mackerel has had steady populations. In the future, the above are projected to have steady populations. Brown pelicans and a variety of seabirds and diving ducks feed in this area.

Hydrology and Flooding Potential

The wetland portions of the islands are subject to daily tidal flooding. The remaining sand dunes are flooded during exceptionally high tides and storms. The barrier islands contain shallow water ponds, tidal channels, and swales whose hydrology is constantly affected by tidal flooding and storm surges.

Land Use and Transportation Infrastructure

The Breton Island National Wildlife Refuge, established in 1904, is the oldest refuge in the National Wildlife Refuge System. All of these federally owned lands, except for North Breton Island that contained an oil facility owned by Keer-McGee, became part of the National Wilderness System in 1975. The islands are uninhabited and serve as wildlife and fisheries habitat. The public uses the islands, usually during the spring and summer months, for camping, fishing, and bird watching. Sport fishing is a popular use of the surf zone and bayside areas. North and South Breton Islands are included in the Breton National Wildlife Refuge and South Breton Island is also under the National Wilderness Preservation System. North Breton Island contains the Kerr-McGee oil industry's facilities that are in the process of being dismantled. The Breton Island Light House marks the north end of Breton Island. The Mississippi River Gulf Outlet Channel and dredge disposal area cuts across the southern third of this EMU between Breton Island and Grand Gosier Island.

Unique Ecological Features

A. Geological: The barrier islands are considered unique because of their limited distribution and their roles as storm surge barriers and roosting and nesting sites for birds and sea turtles.

B. Botanical: There are extensive submerged marine grass beds behind the barrier islands and mangrove shrubs on the lee side of the islands.

C. Zoological: The waters around the islands are good habitat for sport and commercial species of finfish. Surveys taken between 1976 and 1997 identified colonies containing laughing gulls, brown pelicans, black skimmers, royal terns, sandwich terns, caspian terns, herring gulls, and gull-billed terns on the islands (237D-01, 237D-02, 238A-01, 239A-01, 239A-02). Sea turtles historically nested on the Chandeleur to Breton Island chain and there have been attempts to restore these nesting populations on the Chandeleur chain. The islands are used by two threatened and endangered species: least tern, and Piping Plover.

Resources and Resource Users

Sport fishing from the island beaches and on the Sound side is popular. People reach the islands by boat and seaplane and book overnight accommodations on houseboats and large vessels that cater to the sport fishing industry. The islands provide good opportunities for nature study, such as bird watching and camping. The Breton Islands and Grand Grosier Island are part of the Breton National Wildlife Refuge and open to the public, with some restrictions on use because of its Wilderness designation status.

Cultural Resources

A. Historical: Two unidentified shipwrecks are noted on navigation charts of this EMU. One is along the south shore of South Breton Island, and the other is off the northern tip of Grand Gosier Island in the vicinity of Myth Shoal. The lighthouse on North Breton Island is an historic structure.

B. Cultural: None identified

C. Archaeological: No recorded sites.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Maintain, protect, and/or restore barrier islands, headlands, and adjacent wetlands as hurricane buffer zones.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic development that would avoid adverse environmental impacts on wetlands and water quality.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

9. Maintain extensive sea grass beds.

10. Maintain portions of EMU as estuarine nursery area.

11. Encourage wetland management and restoration of eroded wetlands, where practicable.

12. Prohibit future man-made cuts in barrier islands.

13. Maintain wetlands and quality of water bodies for renewable resources.

14. Restore and/or maintain islands supporting bird colonies, where practicable.

15. Protect the natural environment of the EMU.

16. Protect the natural environment of the EMU.

17. Enhance the productivity of the EMU.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

3. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

4. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

5. Improve and maintain water quality compatible with designated uses.

6. Restore integrity of barrier island system through repair of breaks in islands, revegetation for creation of dunes, and prohibition of new, man-made breaks in order to maintain the barrier island system as a hurricane buffer zone for interior portions of the parish.

7. Protect water bottoms and associated habitats from damage or destruction by man-made actions.

8. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

9. Protect the natural state of the environment.

10. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

11. Enhance productivity of the EMU.

12. Support environmentally sound economic use, especially with regard to waterfront areas.

13. Prohibit development of wetland areas for non-wetland dependent uses.

14. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Support wetland management and wetland restoration programs undertaken by landowners and public agencies

3. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

4. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

5. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

6. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

7. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

8. Support efforts to improve and maintain water quality compatible with designated uses.

9. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

10. Oppose activities that damage integrity of barrier islands and beaches.

11. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Fisheries and wildlife habitat.

2. Restoration and maintenance of barrier islands and beaches.

3. Natural water bottoms and benthic communities.

4. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

5. Threatened and endangered species habitat and/or wildlife refuges/management areas.

6. Tourism and cultural resources.

CHANDELEUR SOUND

Location and Area

The triangularly shaped, 50,200-ac Chandeleur Sound EMU is located in the northeastern portion of Plaquemines Parish.

It is bordered on the north by the Plaquemines – St. Bernard Parish boundary, on the east by the Chandeleur Island EMU and on the south by the Breton Sound EMU.

Geology and Soils

The Chandeleur Sound is an expansive, relatively shallow, estuarine area located on the outer perimeter of the Mississippi River interdistributary basin. Water depths range from approximately 3 ft on the west to 22 ft near the Chandeleur Islands chain.

Vegetation and Habitat Change

There are no emergent vegetated habitats in the Sound.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Many species of the estuarine dependent assemblage (red and black drum, spotted seatrout, southern flounder, and brown shrimp) have shown a steady population trend over the last 10-20 years. Other populations (Gulf menhaden, white shrimp and blue crab) have shown increasing trends over the same period. The Spanish mackerel has had steady populations. In the future, the above are projected to have steady populations. Brown pelicans and a variety of seabirds and diving ducks feed in this area.

Hydrology and Flooding Potential

This EMU is open water and experiences daily water level fluctuations due to tidal exchange through the Mississippi River Gulf Outlet and the open area between Grand Gosier Island and the Curlee Islands. Until the Mississippi River was totally leveed by the Corps in the 1930s, the area received overbank flood waters from the river. Several freshwater diversion structures along the east bank of the Mississippi River, flooding through breaks in the natural levee below Point a la Hache, and opening of the Bonnet Carre Spillway continue to put some freshwater into the Sound.

Land Use and Transportation Infrastructure

The Mississippi River Gulf Outlet channel and flanking spoil disposal area in the Breton Sound EMU extend parallel to the EMU's southwestern border.

Commercial and recreational fishing and boating are major uses of the EMU. There are some oil and gas wells and pipelines in the EMU.

Unique Ecological Features

A. Geological: None identified

B. Botanical: None identified

C. Zoological: None identified

Resources and Resource Users

The Sound supports a large variety of fisheries species that are harvested by both commercial and recreational fishermen. Species commonly harvested by commercial fishermen include menhaden and other finfish, shrimp, and crabs. The Sound also contains pipelines and oil and gas wells.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: None identified

EMU Goals

1. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

2. Encourage land use compatible with wetland and aquatic environments.

3. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Maintain extensive sea grass beds.

12. Maintain wetlands and quality of water bodies for renewable resources.

13. Restore and/or maintain islands supporting bird colonies, where practicable.

14. Protect the natural environment of the EMU.

15. Enhance the productivity of the EMU.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Allow and encourage environmentally sound mineral exploration and production.

3. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

4. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

5. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

6. Improve and maintain water quality compatible with designated uses.

7. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

8. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

9. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

10. Protect the natural state of the environment.

11. Enhance productivity of the EMU.

12. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

4. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

5. Support efforts to improve and maintain water quality compatible with designated uses.

6. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Natural water bottoms and benthic communities.

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

CHENIERE RONQUILLE

Location and Area

The Cheniere Ronquille EMU contains approximately 51,600 ac and is located in the west central portion of the parish, west of the Mississippi River. The EMU is surrounded by four EMUs: Lake Washington/Grande Ecaille, Bastian Bay, Barataria Barrier Shorelines and Barataria Bay. This EMU's northern border extends from the northern end of Lake Grande Ecaille through Lake Washington and Adams Bay to the back flood protection levee at Empire. The eastern border runs along Bayou la Chute - Bayou Long (part of the Empire to Gulf Waterway) and the western shore of Bastian Bay. The southern boundary is the back side of the barrier marsh rim along the Gulf of Mexico. The western border is along the western edge of Bay Ronquille and Lake Grande Ecaille.

Geology and Soils

The natural topography is primarily low-lying, low relief, saline-to-brackish marsh and water bodies. The only topographic relief is provided by spoil deposits along canal banks. Soils in this EMU are dominantly brackish-to-saline marsh soils (Bellpass, Timbalier, and Scatlake [USDA, NRCS in press). The EMU has a high subsidence rate of 2.1 ft to 3.5 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

The vegetation in this EMU has been saline since the late 1940s (O'Neil 1949, Chabreck and Linscombe 1978, 1988). Recent habitat data analysis shows that between 1932 and 1974, 5,290 ac of marsh were lost. An additional 7,730 ac were lost between 1974 and 1990 (LCWCRTF & WCRA 1998b). These losses are attributable to subsidence, wind and storm generated wave erosion, canal dredging, sulfur mining activities, and altered hydrologic regime. The Coast 2050 report states that without restoration programs additional land loss is projected to be 5,980 ac.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years, most species in the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, white and brown shrimp, and blue crab) and the estuarine resident assemblage (American oyster) have shown decreasing trends. Only the marine assemblage species have increased, while the southern flounder has remained steady. The same trends are projected to occur in the future; the southern flounder is also projected to decrease:
>
> The brown pelican has shown an increasing trend over the last 10-20 years. All other wildlife such as seabirds, wading birds, shorebirds, dabbling ducks, diving ducks, furbearers, and American alligators have shown decreasing trends in this rapidly eroding EMU. Continuing decreases are projected for the future.

Hydrology and Flooding Potential

The majority of the EMU consists of shallow, open water bodies and numerous canals. The remaining marshes, approximately 0 feet to 1 foot in elevation, are subject to regular tidal flooding. Three pumping stations with a combined discharge of 1800 cfs intermittently put fresh water into the EMU.

Land Use and Transportation Infrastructure

The entire EMU consists of saline marshes and estuaries that serve as wildlife and fisheries habitat. There is extensive oyster farming activity in the western portion of this EMU and generally good oyster harvesting activity throughout the EMU. Almost all water bottoms in this EMU are leased as private oyster growing areas.

This EMU contains no roads or railroads. The northeast corner of the EMU abuts a back flood protection levee located west of LA HWY 23 in the vicinity of Empire. Part of the levee encloses the upper reach of the Empire-to-Gulf Waterway and Empire floodgate. There are numerous oil and gas pipelines and associated canals traversing the EMU. The Lake Washington Oil and Gas Field covers much of the central portion of the EMU. The west central portion of the EMU contains the abandoned Freeport sulfur mining area that was formerly enclosed by rock riprap, and a part of the Freeport Sulphur Co. Canal that extends to LA HWY 23 north of the community of Homeplace.

Unique Ecological Features

A. Geological: None identified

B. Botanical: None identified

C. Zoological: This EMU contains important sport and commercial species of finfish, crabs, shrimp, and oysters and is a prime estuarine nursery area.

Resources and Resource Users

This EMU is a prime recreational area for sport fishing and other water based activities. There are numerous navigable water bodies and boat docking and launching facilities between Port Sulphur and Triumph to provide access to this EMU. The area includes extensive commercial finfishing and oystering operations. There are numerous campsites located primarily along natural bayous throughout the EMU. The area is used extensively by the oil and gas industry for drilling, production, and transport of oil and gas.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: There are five recorded sites in this EMU: 16 PL 4, 5, 6, and 8. a shell mound is located along the west bank of Robinson Canal near the Gulf.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

22. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

CUBITS GAP

Location and Area

This 68,800-ac EMU, in the lower, active delta east of the Mississippi River, encompasses the Cubits Gap subdelta lobe extending northeast from the Mississippi River. The EMU is bordered by three other EMUs: La Loutre, West Bay, and Baptiste Collette. Its physical borders are the Mississippi River and a short segment of Pass a Loutre on the southwest and

southeast and the Gulf of Mexico on the northeast. It is bordered on the northeast by the subdelta lobe of the Baptiste Collette and on the southeast by the La Loutre subdelta.

Geology and Soils

The Cubits Gap EMU is a subdelta lobe of the Mississippi River active delta that began as a crevasse in the east levee of the Mississippi River in 1862 (Coleman and Gagliano 1964). The major soil types are Balize-Larose in the marsh and Convent-Commerce-Sharkey soils on the natural Mississippi River levee (USDA, NRCS in press). The subsidence rate is very high, over 3.5 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a).

Vegetation and Habitat Change

From 1949 through 1988 this EMU has remained predominantly fresh marsh with a fringe of intermediate marsh on the perimeter near the Gulf of Mexico (O'Neil 1949, Chabreck et al. 1968, Chabreck and Linscombe 1978, 1988). There are extensive, vegetated mud flats in the interior portions of the EMU and seasonal floats of water hyacinths. The higher natural levees along the main Mississippi River Channel and along the distributary subdelta lobes support dense stands of willows and scattered stands of baldcypress. A few of the highest ridges along the main channel contain live oaks. Between 1956 and 1978 the central core of this EMU experienced an average annual land loss rate of 12 - 18 ac/mi^2/yr (van Beek et al. 1986).

Between 1932 and 1956, this EMU lost 13,420 ac. Another 15,320 ac was lost between 1956 and 1974 (LCWCRTF & WCRA 1998b). This loss is attributed primarily to hurricanes, subsidence, and wind-generated wave erosion, and to a lesser extent oil and gas related activities. Since 1974, land loss has continued but at a slower rate (e.g., 1,140 ac between 1974 and 1983 and 1,200 ac between 1983 and 1990. Maintenance of the Cubits Gap channel for navigation has allowed sediments and nutrients to be delivered to the delta lobe, thereby sustaining existing wetland habitat.

Without further wetland restoration actions, it is predicted that 6,370 ac of marsh will disappear by the year 2050. Two Corps enacted wetland protection projects (e.g., Channel Armor Gap Crevasse and periodic mining of the hopper dredge disposal site in the mouth of Pass a Loutre) are expected to reduce this projected land loss by 520 ac and 600 ac, respectively (LCWCRTF & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years all assemblages have had steady populations of representative species: Estuarine dependent (red and black drum, spotted seatrout, southern flounder, Gulf menhaden, white and brown shrimp, and blue crab); estuarine resident (American oyster); marine (Spanish mackerel); freshwater (channel catfish and largemouth bass). In the future, populations of all species in the estuarine

dependent assemblage are projected to decrease. Those of the American oyster, Spanish mackerel, largemouth bass, and channel catfish are expected to remain steady.

The brown pelican is the only wildlife species that has shown increasing population trends over the last 10-20 years. All other wildlife such as seabirds, shorebirds, wading birds, dabbling and diving ducks, geese, rails, gallinules, coots, raptors, furbearers, American alligators, and game mammals have shown steady population trends for the last 10-20 years. In the future, the pelican populations are expected to continue to increase.
Wading bird, shorebird, seabird, and raptor populations are projected to decrease. Other wildlife groups are expected to show steady population trends.

Hydrology and Flooding Potential

The entire EMU is barely above sea level and subject to seasonal Mississippi River flooding. Almost all of the area is subject to regular tidal flooding. Approximately 10 percent of the Mississippi River discharges through Cubits Gap. The main passes that branch northeast from Cubits Gap are Main Pass, Octave Pass, Joe Brown Pass and Raphael Pass.

Land Use and Transportation Infrastructure

This EMU consists primarily of fresh-to-intermediate marsh and small, scattered stands of bottomland hardwood and swamp vegetation along the low-lying natural levees near the river that serve as wildlife and fisheries habitat. Because of the consistent freshwater input, the EMU is prime habitat for freshwater dependent species. The federal Delta National Wildlife Refuge encompasses most of this EMU and the headquarters are located on the east bank of the Mississippi River north of Cubits Gap. The community of Pilottown is located on the east bank of the Mississippi River south of Cubits Gap. There are no roads in the EMU, but the distributary channels, primarily Main Pass, are used for navigation by shallow draft boats. The EMU contains numerous oil and gas wells and pipelines and the Duck Oil Field and the Romere Pass Oil and Gas Field.

Unique Ecological Features

A. Geological: The primary unique feature is the active Cubits Gap Subdelta lobe of the active Mississippi River.

B. Botanical: Part of the most extensive fresh-to-intermediate marsh habitat in the parish.

C. Zoological: This is considered to be one of the most biologically productive areas in Louisiana with tremendous species diversity. The area attracts extensive seasonal waterfowl concentrations and supports numerous furbearing animals and alligator populations. The area is unique in that it supports both fresh and saltwater species at

different periods of the year depending on Mississippi River stages. A unique subspecies of white-tail deer (Odocoileus virginianus mcilhennyi) occurs in the area.

Resources and Resource Users

While the area can only be reached by boat, it provides abundant recreational opportunities for hunting and fishing, water-based sports, and general nature study, especially bird watching.

Cultural Resources

A. Historical: This EMU contains several sites related to navigation and international shipping (e.g., two archaeological sites listed below and one unidentified shipwreck east of Main Pass. and a site on the east bank north of Pass a Loutre that contained several buildings in 1883.)

B. Cultural: None identified

C. Archaeological: Two historic archaeological sites have been recorded for this EMU: 16 PL 98 (Pilottown) and 16 PL 99 (Old Quarantine Station).

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

3. Encourage land use compatible with wetland and aquatic environments.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Utilize existing and newly created wetlands as storm buffer zones.

12. Maintain portions of EMU as estuarine nursery area.

13. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Maintain wetlands and quality of water bodies for renewable resources.

16. Restore and/or maintain islands supporting bird colonies, where practicable.

17. Protect the natural environment of the EMU.

18. Enhance the productivity of the EMU.

19. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

6. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

7. Improve and maintain water quality compatible with designated uses.

8. Protect water bottoms and associated habitats from damage or destruction by man-made activities

9. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

10. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

11. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

12. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

13. Protect the natural state of the environment.

14. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

15. Enhance productivity of the EMU.

16. Introduce freshwater and nutrients into the EMU.

17. Support environmentally sound economic use, especially with regard to waterfront areas.

18. Prohibit development of wetland areas for non-wetland dependent uses.

19. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

4. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

5. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support efforts to improve and maintain water quality compatible with designated uses.

10. Support wetland restoration programs involving freshwater and sediment input into EMUs.

11. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

12. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

13. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)
6. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

7. Threatened and endangered species habitat and/or wildlife refuges/management areas.

8. Tourism and cultural resources.

EAST BAY

Location and Area

This 79,600-acre East Bay EMU is comprised of the interdistributary basin and embayment (East Bay) between two active passes (Southwest Pass and South Pass) of the Mississippi River. The EMU is triangular in shape with its apex at Head of Passes. Its western boundary is the east bank of Southwest Pass and its eastern boundary is the east bank of South Pass. Approximately 11,117 ac of this EMU lie gulfward of the State-Federal demarcation line.

Geology and Soils

The East Bay EMU is an interdistributary embayment located between Southwest Pass and South Pass. The low-lying natural levees of Southwest Pass and South Pass have been modified by extensive spoil deposition from ongoing channel maintenance dredging operations. A small expanse of natural freshwater marsh located in the northwest section of the EMU contains Balize-Larose soils. The soils along the passes are aquents (e.g., dredged, frequently flooded soils dredged from the passes). Subsidence is very high in this EMU, reaching rates exceeding 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

The majority of the EMU is a freshwater marsh. The higher portions of the natural levees in the northern portion of the EMU support scrub/shrub vegetation and small trees. Spoil deposits along Southwest Pass and along the numerous oil and gas access canals support marsh grass or scrub/shrub habitat depending upon elevation.

In 1932, the EMU contained 8,510 ac of marsh. Almost half of this marsh was lost between 1932 and 1990 (e.g., 3,000 ac between 1932 and 1974 and 720 ac between 1974 and 1990). The primary causes of land loss are subsidence, canal dredging, shoreline erosion, and channel training along Southwest Pass to maintain a deep navigation channel and prevent breaching of the levees. It is estimated that an additional 1,870 ac of land will be lost by the year 2050 (LCWCRTF & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years all assemblages have shown steady population trends of representative species: estuarine dependent: (red and black drum, spotted seatrout, southern flounder, Gulf menhaden, white and brown shrimp, blue crab); estuarine resident (American oyster); marine (Spanish mackerel); freshwater (channel catfish and largemouth bass). In the future, populations of all species in the estuarine dependent assemblage are projected to decrease. Those of the American oyster, Spanish mackerel, largemouth bass, and channel catfish are expected to remain steady.
>
> The brown pelican is the only wildlife species that has shown increasing population trends over the last 10-20 years. All other wildlife such as seabirds, shorebirds, wading birds, dabbling ducks, rails, gallinules, coots, raptors, and game mammals have shown decreasing population trends during the last 10-20 years. Other wildlife such as diving ducks, geese, furbearers, and the American alligator have shown steady population trends. In the future, the pelican is projected to increase while all other wildlife groups except furbearers and the American alligator are expected to decrease.

Hydrology and Potential Flooding

The entire EMU is barely above sea level and subject to seasonal Mississippi River flooding. Almost all of the area is subject to regular tidal flooding. South Pass distributes 17 percent of the Mississippi River's 460,000 cfs discharge (van Beek et al. 1986).

Land Use and Transportation Infrastructure

This EMU consists primarily of fresh-to-intermediate marshes and small stands of bottomland hardwood vegetation along the low-lying natural levees that serve as wildlife and fisheries habitat. Because of the consistent freshwater input, it is prime habitat for freshwater dependent species. The eastern side of this EMU is in the Pass a Loutre State Waterfowl Management Area. Lands adjacent to South Pass and Southwest Pass are designated spoil disposal sites for dredged material generated by channel maintenance dredging and jetties extend from the mouth of Southwest Pass. The EMU also contains rig access canals,

pipelines, and numerous oil and gas wells, many located in the South Pass Block 27 Oil Field, the South Pass Block 24 Oil Field, and the East Bay Oil Field. Burrwood is located north of the east jetty on Southwest Pass.

Unique Ecological Features

A. Geological: The primary unique feature is the active and very dynamic Mississippi River delta itself. Within the delta complex are mudlump islands that constantly emerge off the mouths of the distributary channels and are reworked by waves.

B. Botanical: This is part of the most extensive fresh-to-intermediate marsh habitat in the parish.

C. Zoological: This is considered to be one of the most biologically productive areas in Louisiana with tremendous species diversity. The area attracts extensive seasonal waterfowl concentrations and supports numerous furbearing animals and alligator populations. The area is unique in that it supports both fresh and saltwater species at different periods of the year depending on Mississippi River stages. The EMU supports a unique subspecies of white-tail deer (*Odocoileus virginianus mcilhennyi*). Eight bird colonies have been recorded in East Bay between 1976 and 1997: 259C-1, 259C-2, 259C-3, 260A-1, 260A-2, 260A-3, 261A-2, and 261B-1.

Resources and Resource Users

The area can only be reached by boat. This EMU provides abundant recreational opportunities for hunting and fishing, water-based sports, and general nature study, especially bird watching.

Cultural Resources

A. Historical: This EMU contains several sites related to navigation and international shipping. These include, in addition to the sites listed below under archaeology: four unidentified wrecks near the mouth of Southwest Pass (one outside EMU boundary) and a dam constructed in the late 1870s to close off Grand Pass at its junction with South Pass. The 1893 USGS topographic map depicted several buildings in the Head of Passes area.

B. Cultural: None identified

C. Archaeological: Seven sites have been recorded for this EMU: 16 PL 55, 56, 62, 63, 68, 123, and 133. All archaeological sites are of historic age.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

3. Encourage land use compatible with wetland and aquatic environments.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Utilize existing and newly created wetlands as storm buffer zones.

12. Maintain portions of EMU as estuarine nursery area.

13. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Maintain wetlands and quality of water bodies for renewable resources.

16. Restore and/or maintain islands supporting bird colonies, where practicable.

17. Protect the natural environment of the EMU.

18. Enhance the productivity of the EMU.

19. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

6. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

7. Improve and maintain water quality compatible with designated uses.

8. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

9. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

10. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

11. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

12. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

13. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

14. Protect the natural state of the environment.

15. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

16. Enhance productivity of the EMU.

17. Introduce freshwater and nutrients into the EMU.

18. Support environmentally sound economic use, especially with regard to waterfront areas.

19. Prohibit development of wetland areas for non-wetland dependent uses.

20. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

4. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

5. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support efforts to improve and maintain water quality compatible with designated uses.

9. Support wetland restoration programs involving freshwater and sediment input into EMUs.

10. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

11. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

7. Threatened and endangered species habitat and/or wildlife refuges/management areas.

GRAND LIARD

Location and Area

The Grand Liard EMU, containing approximately 35,000 ac, is located in the southern portion of the parish, west of the Mississippi River, between Triumph and Venice. It is bordered on the north by the West Bank Hurricane Protection Levee; on the east by Red Pass; on the south by the Gulf of Mexico; and on the west by the west ridge of Bayou Grand Liard, Bay Jacques and Bay Coquette. This EMU is surrounded by three EMUs: Plaquemines Area, West Bay, and Bastian Bay.

Geology and Soils

This EMU consists primarily of flat, broken marsh, heavily dissected by oil canals and associated spoil banks. The Mississippi River natural levee and several relict distributary channels (Red Pass, Spanish Pass, and Grand Liard) have little natural levee expression. The location of the buried Venice salt dome is defined by encircling rig access canals and spur canals that give these water bodies the appearance and nickname of the wagon wheel.

Soils near the Gulf are Scatlake muck and Bellpass muck. Interior marsh soils are Clovelly muck and Belize – Larose. The subsided Grand Liard ridge contains gentilly muck. A wide band of Aquents, dredged frequently flooded soils, rim the base of the hurricane protection levee from Triumph to Venice. Subsidence is high, exceeding 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

In 1949, O'Neil mapped the area north of Bay Tambour and Spanish Pass as brackish three-cornered grass marsh. The area around Bay Tambour was saline, while the area between Spanish Pass and Red Pass was delineated as fresh marsh. From 1968 through 1988, vegetation maps depict the area around Bay Tambour as saline, but show north-south trending bands of brackish and intermediate extending through this EMU (Chabreck et al. 1968, Chabreck and Linscombe 1978, 1988). Land loss has been very severe in this EMU which has a very high subsidence rate of over 3.5-ft per century (Gagliano 1998, LCWCRTF & WCRA 1999). Between 1932 and 1974, 11,600 ac of the original 29,930 ac of wetlands were lost primarily as a result of subsidence, canal dredging and alteration of hydrology, and possibly hurricanes. An additional 3,100 ac of marsh were lost between 1974 and 1990. By 1988/90 the only intact marsh remaining was located at the base of the back protection levee where dredged material had been deposited during construction of the back flood protection levees. Without marsh restoration measures, another 7,200 ac is predicted to be lost by 2050, thus leaving the back protection levees exposed to open waters of the Gulf of Mexico (LCWCRTF & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years, populations of some species of the estuarine dependent assemblage have remained steady (black drum, spotted seatrout, and Gulf menhaden). Other species have shown decreasing population trends (white and brown shrimp and blue crab). The marine assemblage (Spanish mackerel) and the estuarine resident (American oyster) have remained steady. In the future, all members of the estuarine resident assemblage are projected to decrease, and the estuarine resident and marine assemblages should remain steady.
>
> Brown pelican populations have shown an increasing trend over the last 10-20 years. Populations of all other wildlife (wading birds, shorebirds, seabirds, dabbling and

diving ducks, geese, raptors, furbearers, game mammals, and the American alligator) have decreased over the same period. Projections indicate that these population declines will continue in the future in this rapidly eroding EMU.

Hydrology and Flooding Potential

The entire EMU is near sea level and subject to regular tidal flooding and Mississippi River backwater flooding. The majority of the EMU consists of shallow, open water bodies that are influenced by Mississippi River discharges from the east. There are two pump stations discharging into the EMU: Triumph pump station into Bayou Grand Liard and Duvic Pump Station into canal leading into Hospital Bay.

Land Use and Transportation Infrastructure

This EMU consists of fresh-to-saline marsh and shallow estuaries that serve as wildlife and fisheries habitat. Oyster grounds are leased in the Bay Tambour to Yellow Cotton Bay area and within Bayou Grand Liard. The area contains numerous oil and gas fields, rig cuts and pipelines that have obscured the natural drainage channel network in many places. The Venice Oil Field and associated rig access canals and spoil banks are prominent landscape features. There are no roads or railroads in the area.

Unique Ecological Features:

A. Geological: The subsurface Venice salt dome and associated highly productive petroleum reservoirs are noticeable geologic features.

B. Botanical: There are very small expanses of swamp in the extreme northeastern portion of this EMU near Venice and in the levee ponding area near Triumph.

C. Zoological: The northern fresh-to-brackish marshes support good populations of muskrat and nutria and there are large seasonal waterfowl concentrations in Hospital Bay. Ospreys use the area for feeding and nesting. Much of Yellow Cotton Bay is in private oyster leases.

Resources and Resource Users

The area has commercial and recreational opportunities for water-based activities such as finfishing, shrimping, and crabbing. Oyster farming occurs in portions of the EMU. While there are no public hunting sites in the EMU, the area provides good waterfowl hunting in the fall and winter for those with access to private lands.

Cultural Resources

A. Historical: None identified

B. Cultural: None identified

C. Archaeological: None identified

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

22. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresh-to-saline wetlands and water bodies.

23. Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

9. Support efforts to improve and maintain water quality compatible with designated uses.

10. Support wetland restoration programs involving freshwater and sediment input into EMUs.

11. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

12. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Environmentally compatible development.

LA LOUTRE

Location and Area

The La Loutre EMU is roughly triangular in shape and encompasses approximately 114,000 ac of the active Mississippi River birdfoot delta below Head of Passes. The apex of the triangle is at Head of Passes and the base borders the Gulf of Mexico. The southwest side of the EMU is the east bank of South Pass. The north side of the EMU parallels the north bank of Pass a Loutre for about 4 mi then bends north and extends eastward and runs parallel to Pass a Loutre about 2 mi north of the pass to the Gulf of Mexico. The Pass a Loutre Wildlife Management Area (WMA), operated by the Louisiana Department of Wildlife and Fisheries, occupies most of the property within this EMU. The EMU is bordered on the northwest by the Cubits Gap EMU and on the southwest by the East Bay EMU.

Geology and Soils

The Pass a Loutre subdelta lobe of the active Mississippi River birdfoot delta consists of low-lying, low relief fresh-to-intermediate marshes and large expanses of open water and organic/mud flats dissected by numerous active and relict distributary channels. Low natural levees occur along many of the distributaries. Ribbons of alluvial soils flank the active distributary channels, while stretches of sand beach occur along several of the southeast facing shorelines. Virtually all the soils in the EMU are classified as Balize – Larose. Soils in the dredge disposal areas are classified as Aquents, dredged, frequently flooded. There are large designated spoil deposit sites along the southernmost reach of South Pass for depositing material dredged to maintain the pass for navigation. Mudlump islands occur in the vicinity of the mouths of the major distributary channels. Subsidence is high, exceeding 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

Vegetation distribution has remained fairly consistent in this EMU since O'Neil mapped it in 1949. The central portion of the EMU contains a freshwater marsh while the perimeter supports an intermediate marsh. There are extensive vegetated mud flats in the interior portions of the EMU and seasonal floats of water hyacinths.

The higher natural levees along the main distributary channels support dense stands of willows. Between 1932 and 1974, the area lost approximately 20,010 ac of land largely as a result of subsidence, hurricanes, and construction of oil and gas access and pipeline canals. Land loss rates in recent years have decreased in response to wetland restoration activities involving construction of crevasse splays through levees and canal banks. Between 1974 and 1990, 2,050 ac were destroyed.

If no restoration action is taken, it is estimated that an additional 6,340 ac will be lost by 2050. Implementation of proposed CWPPRA projects to build and maintain crevasse splays are expected to maintain 900 ac of land.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10-20 years all fish assemblages have had steady populations of representative species: Estuarine dependent (red and black drum, spotted seatrout, southern flounder, Gulf menhaden, white and brown shrimp, blue crab); estuarine resident (American oyster); marine (Spanish mackerel); and freshwater (channel catfish and largemouth bass). In the future, populations of all species in the estuarine dependent assemblage are projected to decrease. Those of the American oyster, Spanish mackerel, largemouth bass, and channel catfish are expected to remain steady.
>
> Over the past 10-20 years, brown pelican populations have increased. All other wildlife groups have shown steady populations over this period (seabirds, wading birds, shorebirds, dabbling and diving ducks, geese, raptors, rails, gallinules, coots, furbearers, game mammals and the American alligator). In the future, the pelican is expected to continue to increase while seabirds, wading birds, shorebirds, and raptors are projected to have decreasing populations. All other wildlife species groups are expected to remain steady.

Hydrology and Flooding Potential

The entire EMU is barely above sea level and subject to seasonal Mississippi River flooding. Almost all of the area is subject to regular tidal flooding. The Pass a Loutre distributary channel carries approximately 31 percent of the Mississippi River's total discharge of 460,000 cfs (van Beek et al. 1986).

Land Use and Transportation Infrastructure

This EMU consists primarily of fresh-to-intermediate marshes and small stands of bottomland hardwood forest along the low-lying natural levees that serve as wildlife and fisheries habitat. Because of the consistent freshwater input, it is prime habitat for freshwater dependent species. The Pass a Loutre State Waterfowl Management Area is located in the EMU.

Designated spoil disposal sites are located near the southeast ends of South Pass in Garden Island Bay. The EMU also contains numerous oil and gas fields, rig cuts and pipelines. There is a Freeport Sulphur Company frasch well and an abandoned freshwater reservoir used in past mining operations adjacent to Dennis Pass, north of Garden Island Bay.

Unique Ecological Features

A. Geological: The primary unique feature is the active and very dynamic Mississippi River delta itself. A unique feature within the delta complex is the mudlump islands constantly emerging and being reworked by waves off the mouths of the distributary channels.

B. Botanical: This is part of the most extensive fresh-to-intermediate marsh habitat in the parish.

C. Zoological: This is considered to be one of the most biologically productive areas in Louisiana with tremendous species diversity. The area attracts extensive seasonal waterfowl concentrations and supports numerous furbearing animals and alligator populations. The area is unique in that it supports both fresh and saltwater species at different periods of the year depending on Mississippi River stages. A subspecies of white-tail deer (*Odocoileus virginianus mcilhennyi*) inhabits the natural levee habitat.

Resources and Resource Users

While the area can only be reached by boat, it provides abundant recreational opportunities for hunting and fishing, water-based sports, and general nature study, especially bird watching.

Cultural Resources

A. Historical: This EMU contains several sites related to navigation and international shipping. These include, in addition to the sites listed below under archaeology: a pre-1744 shipwreck in Old Balize Bayou, a pre-1817 wreck in Garden Island Bay, a pre-1875 wreck east of Port Eads, and a shipwreck site #1627 north of the mouth of South Pass. Four unidentified shipwrecks are located north of Pass a Loutre. The 1893 USGS topographic map depicts several buildings in the Head of Passes area.

B. Cultural: None identified

C. Archaeological: Seven sites have been recorded for this EMU: 16 PL 28, 46, 49, 57, 58, 59, and 130. All archaeological sites are of historic age.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

3. Encourage land use compatible with wetland and aquatic environments.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Utilize existing and newly created wetlands as storm buffer zones.

12. Maintain portions of EMU as estuarine nursery area.

13. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Maintain wetlands and quality of water bodies for renewable resources.

16. Restore and/or maintain islands supporting bird colonies, where practicable.

17. Protect the natural environment of the EMU.

18. Enhance the productivity of the EMU.

19. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

20. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

6. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

7. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

8. Improve and maintain water quality compatible with designated uses.

9. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

10. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

11. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

12. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

13. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

14. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

15. Protect the natural state of the environment.

16. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

17. Enhance productivity of the EMU.

18. Introduce freshwater and nutrients into the EMU.

19. Support environmentally sound economic use, especially with regard to waterfront areas.

20. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

7. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

8. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

9. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)
7. Threatened and endangered species habitat and/or wildlife refuges/management areas.

8. Tourism and cultural resources.

LAKE WASHINGTON/GRANDE ECAILLE

Location and Area

The 77,400-ac Lake Washington/Grande Ecaille EMU is located in the southwestern portion of the parish west of the Mississippi River. The EMU's western boundary is the portion of the Myrtle Grove EMU extending south from Lake Judge Perez along portions of Wilkinson Bayou to its entrance into Barataria Bay. The EMU's southern boundary is defined by the Barataria Bay and Cheniere Ronquille EMU's, extending south and east from the mouth of Wilkinson Bayou through Barataria Bay, Lake Grand Ecaille, Lake Washington and Adams Bay to the west bank back flood protection levee in the vicinity of Empire. The northern boundary is the West Pointe a la Hache EMU from Lake Judge Perez south and east along Bayou Grande Cheniere to Hayes Canal and Port Sulphur. The eastern boundary of this EMU is the west bank back flood protection levee and Plaquemine Area EMU from Port Sulphur to Empire.

Geology and Soils

Most of the EMU consists of flat, low-lying marshland and large bays (Bay Chene Fleur, Bay Batiste, Bay Sansbois, Bay Lanaux, Bay de la Chenier, Bay Chicot, and the northern part of Adams Bay). A formerly active Mississippi River distributary channel-levee complex (Bayou Grande Chenier) defines the northwestern border of the EMU. The brackish marsh soils in the northwestern part of the EMU are Clovelly and Lafitte. The southern and eastern saline marshes contain Bellpass and Timbalier soils. Soils along the upper portion of the Grande Cheniere ridge are gentilly. The lower portion of this ridge and another distributary ridge to the east contain Vacherie soils.

Vegetation and Habitat Change

This EMU is characterized by brackish and saline marsh zones that have oscillated north and south over the past 50 years. In 1949, O'Neil classified the northwestern quarter of this EMU, above Bay Batiste and Bay Sambois, as brackish marsh and the remainder of the area as saline marsh. There was a gradual movement of the saline marsh into the northwestern portion of this EMU by 1978 (Chabreck and Linscombe 1978). By 1988, the marsh zones appeared to have returned to their mid-twentieth century positions (Chabreck 1988). Remnant live oak forests are scattered along the crest of the Bayou Grande Cheniere levees

and fragments of bald cypress swamps lie along the base of the levee. These trees are stressed and dying because of levee subsidence and saltwater intrusion. Between 1935 and 1974, this EMU lost approximately 6,410 as of land. Another 4,120 ac were lost between 1974 and 1990. Without restoration activities it is estimated that 9,500 ac will be lost by the year 2050.

Implementation of the Davis Pond Freshwater Diversion project is expected to preserve about 740 ac. However, land loss in the EMU is expected to result in the base of the protection levee from Empire to Port Sulphur being exposed to a wide expanse of open water.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Over the last 10 to 20 years, the estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) has shown decreasing population trends. The estuarine resident assemblage (American oyster) has remained steady. These same trends are projected to occur in the future, and the marine assemblage is projected to increase.
>
> The brown pelican has shown an increasing trend over the last 10 to 20 years. Populations of seabirds, wading birds, shorebirds, and raptors have been steady over this period. Populations have decreased for diving and dabbling ducks, rails, gallinules, coots, furbearers, game mammals, and the American alligator. Projections over the next 50 years show that populations of all of the above will decrease except for the brown pelican, which will continue to increase.

Hydrology and Flooding Potential

Virtually the entire area, lying between +0.7 feet and +1.0 feet in elevation, is subject to regular tidal flooding. The back slopes of Bayou Grand Chenier are less than 5 feet in elevation and subject to flooding from storm tides. In Bay Batiste, salinities are near 15 ppt throughout the year. The Gainard Wood's Pump Station intermittently discharges directly into the EMU northeast of Bay De La Cheniere. The main marsh drainage is through Wilkinson Bayou, Bayou Dulac, Freeport Sulphur Canal, and Grand Bayou.

Land Use and Transportation Infrastructure

The EMU consists of brackish and saline marshes and estuarine water bodies that serve as wildlife and fisheries habitat. This EMU is a primary nursery area for inshore and several offshore marine species. It appears that most suitable water bodies are under lease for oyster production. Numerous camps are located on the Bayou Grande Cheniere natural levee near Hermitage Bayou.

The northern perimeter of this EMU is defined by the Bayou Grande Cheniere natural levee on the west and the back flood protection levee on the east. There are numerous oil and gas pipelines throughout the area. Numerous drainage canals, pipeline canals, the Freeport Sulphur Canal and Grand Bayou permit boat travel through much of the EMU to the flood protection levee.

Unique Ecological Features

A. Geological: Remnants of the Bayou Grande Cheniere Natural Levee-Channel Complex

B. Botanical: There are impressive remnant stands of live oaks along the crest and bald cypress along flanks of the Bayou Grande Cheniere ridge. These trees are being destroyed slowly by subsidence and saltwater intrusion.

C. Zoological: The area is very good for commercial and sport fishing, as well as for nursery grounds for marine organisms. There is good fur production, primarily muskrat, in the brackish marshes.

Resources and Resource Users

The area provides good opportunities for sport and commercial fishing, hunting, trapping, and boating. Virtually all of the water bottoms in the southern three-quarters of the EMU are privately leased for oyster growing.

Cultural Resources

A. Historical: The 1892 USGS topographic map contains several buildings at the Hermitage (renamed Lake Judge Perez) on Bayou Grande Cheniere and on both banks of the Hermitage Bayou near the northwest corner of this EMU.

B. Cultural: None identified

C. Archaeological: Two sites recorded in this EMU are 16 PL 10 and 16 PL 26. A possible mound has been identified on a ridge extending south from Bayou Grande Cheniere, northwest of Bay Sansbois.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

22. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

23. Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)
5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

MYRTLE GROVE

Location and Area

The Myrtle Grove EMU in Plaquemines Parish contains approximately 39,900 ac and is located west of the Mississippi River, within the Barataria Basin. Adjacent EMUs include: Plaquemines Area, Lake Washington/Grande Ecaille, and Barataria. This EMU is defined on the west by the Jefferson Parish-Plaquemines Parish boundary and Bayou Du Pont and on the south by Barataria Bay. The east perimeter of the EMU follows portions of Wilkinson Bayou from Barataria Bay to Lake Judge Perez, Bayou Grande Cheniere and the road down the Grande Chenier ridge. The northern perimeter is the back flood protection levee and the Cheniere Traverse Bayou.

Geology and Soils

The EMU consists of low-lying, low relief marshland with numerous lakes and marsh drainage channels. A formerly active Mississippi River distributary complex (Bayou Grande Cheniere) runs along the northeast border of the EMU. This distributary levee complex has subsided to less than 5 ft in elevation and represents a transitional area that is changing from upland to wetland. The soils in the southern third of the EMU are Bellpass and Timbalier, while the northern two thirds of the EMU contain Clovelly muck and Lafitte muck. A narrow band of gentilly muck is located in the northern part of the EMU and extends south along a subsided natural levee in the vicinity of the Wilkinson Canal. The subsidence rate for this EMU is high, 2.1 ft to 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

Historically, this area contained three, approximately equally wide marsh zones. The area from Round Lake-Lake Laurier north was intermediate marsh. A brackish marsh zone encompassed the Lake Five and Roquette areas, and Wilkinson Bay area was saline (O'Neil 1949). By 1978, the saline marsh zone remained in approximately the same area, but the brackish marsh had expanded to displace the intermediate marsh to the north (Chabreck and Linscombe 1978). By 1988, all of the remaining marsh, except a zone in the latitude of Wilkinson Bay, was brackish (Chabreck and Linscombe 1988). The Bayou Grande Cheniere levees contain remnant live oaks on their crests and baldcypress along their base. These trees are stressed and dying because of levee subsidence and saltwater intrusion. Between 1932 and 1990, this EMU lost 6,253 ac of land in Plaquemines Parish (Britsch 1999). The greatest rates of land loss occurred between 1958 and 1974 (2910 ac) and 1974 and 1983 (1447 ac). Subsidence and saltwater intrusion in the marsh areas and erosion along marsh and channel bank lines are the dominant physical processes responsible for this land loss. Dredging of oil

and gas pipeline and rig access canals also contributed both directly and indirectly to land loss in this EMU.

The Coast 2050 report stated that, with no restoration efforts, the entire Myrtle Grove EMU in Region 2 would lose 21 percent of its 1990 land by the year 2050. If the approved CWPPRA projects (Myrtle Grove Siphon and Naomi Outfall Management) were implemented, only 12 percent of the 1990 ac were expected to be lost. Furthermore, the Davis Pond Freshwater Diversion is expected to help reduce salinities in the EMU.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Several species in the estuarine dependent assemblage have shown population increases over the last 10-20 years (red and black drum, Gulf menhaden, southern flounder, blue crab, and brown shrimp). White shrimp populations have declined, and spotted seatrout populations have remained steady over this period. The estuarine resident American oyster has increased. In the freshwater assemblage, the channel catfish population has increased, while largemouth bass populations have remained steady. In the future, populations of the red and black drum, American oyster, flounder, and blue crab are projected to remain steady. Spotted seatrout, Gulf menhaden, and brown and white shrimp populations are projected to decrease. The freshwater assemblage is projected to show an increase in populations.
>
> The brown pelican and American alligator have shown increasing population trends over the last 10-20 years. Populations of seabirds, wading birds, shorebirds, dabbling and diving ducks, raptors, rails, gallinules, coots, furbearers, and game mammals have remained steady over this period. Future projections show that over the next 50 years, populations of pelicans, dabbling and diving ducks, rails, gallinules, coots, and American alligators are expected to increase due to the CWPPRA siphons. Seabird, wading bird, shorebird, and raptor populations are projected to decline, and furbearer and game mammal populations should hold steady over the next 50 years.

Hydrology and Flooding Potential

Virtually the entire area lying between +0.7 and +1.0 ft in elevation is subject to regular tidal flooding (van Beek et al. 1986). The back slopes of Bayou Grande Cheniere are less than 5 feet in elevation and subject to flooding from storm tides. Salinities rarely exceed 10 ppt north of Roquette Bay. There are no pump stations discharging directly into this EMU. The main marsh drainage is through Wilkinson Canal and Wilkinson Bayou.

Land Use and Transportation Infrastructure

The EMU consists primarily of brackish and saline marshes and estuarine water bodies that serve as wildlife and fisheries habitat. It appears that most suitable water bottoms are under lease for oyster production.

Numerous camps are concentrated in the community of Lake Judge Perez (formerly known as Lake Hermitage) on the Bayou Grande Cheniere natural levee at the juncture of Hermitage Bayou and Lake Judge Perez. This community lies partly in three EMU, Myrtle Grove, West Pointe a la Hache and Lake Washington/Grande Ecaille, and is connected to LA HWY 23 by a road running along the crest of the east levee. The EMU contains numerous oil and gas wells and pipelines. Wilkinson Canal provides a direct navigation route through this EMU between the Plaquemines Area EMU to the north and Barataria Bay to the south.

Unique Ecological Features

A. Geological: None identified

B. Botanical: There are impressive remnant stands of live oaks along the crest and bald cypress along the flanks of the Bayou Grande Cheniere ridge. Subsidence and saltwater intrusion are slowly destroying these trees.

C. Zoological: The area is very good for stocks of commercial and sport fishing species. It serves as nursery grounds for marine organisms and is important for oyster production. There is good fur production, primarily muskrat, in the brackish marshes. One bird colony (424D-1) was recorded near St. Mary's Point in 1976.

Resources and Resource Users

The area provides for good sport fishing and recreational boating opportunities. Most of the water bottoms in the southern end of the EMU are leased for oyster growing. The open water areas are used for commercial finfishing, crabbing, and shrimping. The marshes in the northern portion of the EMU are trapped for furbearing animals and alligators. There are campsites scattered throughout the EMU along major waterways, with the largest camp concentration along Hermitage Bayou on the Bayou Grande Cheniere levee. Some cattle grazing also occur along this ridge.

Cultural Resources

A. Historical: The 1892 USGS topographic map for the EMU contains several buildings at Lake Judge Perez (The Hermitage) on Bayou Grande Cheniere and on both banks of the Hermitage Bayou at its juncture with Lake Judge Perez (formerly Lake Hermitage).

B. Cultural: None identified

C. Archaeological: Sites recorded in this EMU include: 16 PL 2, 9, 17, 18, 19, and 16 JE 47. Site 16 PL 18 is partially in the West Pointe a la Hache EMU. Site 16 JE 47 is partially in Jefferson Parish. Site 16 PL 19 is on the boundary with the Barataria Bay EMU.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Maintain restore, and protect oyster grounds and estuarine nursery areas while balancing the effects on other CZM Program goals and objectives.

6. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

7. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

8. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

9. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

10. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

11. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

12. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

13. Restore and/or maintain wetlands at the base of the flood protection levee.

14. Utilize existing and newly created wetlands as storm buffer zones.

15. Maintain portions of EMU as estuarine nursery area.

16. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

17. Encourage wetland management and restoration of eroded wetlands, where practicable.

18. Maintain wetlands and quality of water bodies for renewable resources.

19. Block all non-essential navigation passes to retard further erosion in area.

20. Protect the natural environment of the EMU.

21. Enhance the productivity of the EMU.

22. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

23. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

24. Identify and reserve rights-of-way through levees for future emplacement of freshwater diversion infrastructures.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

7. Freshwater management and enhancement of water quality.

NAOMI

Location and Area

The Naomi EMU, located in the northwestern part of Plaquemines Parish west of the Mississippi River, encompasses approximately 11,200 ac. The EMU is defined on the north, east, and south by the back flood protection levees along the Plaquemines Area EMU. The western perimeter of the EMU is the Jefferson Parish - Plaquemines Parish boundary line and a short reach of Bayou Barataria.

Geology and Soils

This EMU is primarily low-lying, low relief, fresh-to-intermediate marsh located along the backslope of the natural Mississippi River levee. The majority of the soils in this EMU are Kenner muck and Allemands muck, characteristic of low-lying (0 to 1 ft above sea level), flooded freshwater marshes. Patches of Lafitte muck, associated with brackish marshes

occur along the western edge of the EMU. The EMU has an intermediate to high subsidence rate of 1.1 ft to 3.5 ft per century (Gagliano 1998).

Vegetation and Habitat Change

A very narrow band of bottomland hardwood-baldcypress forest remains on the northern and eastern perimeter of this EMU adjacent to the back protection levees.

Early vegetation mapping efforts identified the marshes in this EMU as either intermediate (O'Neil 1949) or fresh (Chabreck, et al 1969). By 1978, the northern third of the EMU consisted of fresh marsh vegetation, while the southern two thirds of the EMU were in intermediate marsh (Chabreck and Linscombe 1978) which remained until 1988 (Chabreck and Linscombe 1988). Between 1937 and 1990, this EMU lost 1834 ac of land in Plaquemines Parish (Britsch 1999), the highest rate occurring between 1956 and 1983. The most extensive area of land loss was at the base of the back flood protection levee, north of the Ollie Canal. Causes of land loss include subsidence, alteration of hydrology through construction of levees and canal dredging, saltwater intrusion, and animal herbivory. Freshwater input from the Naomi siphon and the future Davis Pond Freshwater Diversion located west of the EMU should maintain the fresh-to-intermediate marsh zones for the foreseeable future.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Most of the species in the estuarine dependent assemblage (red drum, Gulf menhaden, southern flounder, white shrimp, brown shrimp, and blue crab) have increased. Black drum and spotted seatrout have remained steady. Freshwater species (channel catfish and largemouth bass) have increased as well, probably due to the influence of the Naomi freshwater siphon off the Mississippi River. In the future, white shrimp and Gulf menhaden populations will increase while spotted seatrout and southern flounder populations decrease. Populations of red and black drum, brown shrimp, and blue crab will remain steady. Freshwater species such as the largemouth bass and channel catfish will show increased populations, due to the continued effects of the Naomi siphon.
>
> Populations of bald eagles, seabirds, shorebirds, raptors, open water, woodland, and marsh avifauna have remained stable over the last 10-20 years and are projected to remain so through 2050. Furbearers (nutria, mink, otter, and raccoon) and game mammals (rabbit, deer, squirrel) have also remained steady during this time and are projected to through 2050. Increasing wildlife populations include brown pelicans, dabbling and diving ducks, rails, coots, gallinules, and American alligators. These species are projected to have increased populations through 2050.

Hydrology and Flooding Potential

The entire area is wetland, between 0 and 2 ft in elevation, and subject to flooding from daily tidal action and storm generated water levels. Surface water salinities range from 2 to 5 ppt. In addition to precipitation, this EMU receives fresh water from the Mississippi River through the LaReussite siphon that is operated by Plaquemines Parish and is capable of discharging up to 2,144 cfs. The 680-cfs Ollie pump station discharges water from the leveed area into the Ollie Canal.

The surface waters in this EMU are also affected by pumped discharge from the three pump stations in the Belle Chasse and Algiers areas (Jefferson Parish operated Planter's Canal Pump Station, Belle Chasse No. 1 and No. 2 Pump Stations). The main water exchange between this EMU and adjacent marshes to the west is through Bayou de Fleur and associated pipeline and oil access canals.

Land Use and Transportation Infrastructure

This area is presently used for fishing, hunting, and trapping. It serves as habitat for fish and wildlife, including endangered species, such as the bald eagle, and as an estuarine nursery area. It is the only large fresh-to-intermediate wetland habitat in the northern portion of the parish outside flood protection levees.

This EMU contains no roads, but numerous pipelines and oil and natural gas wells. The Bayou Barataria Waterway (controlling depth of 10 ft) borders the northwestern portion of the EMU and is used mainly for commercial and recreational navigation.

Unique Ecological Features

A. Geological: None identified

B. Botanical: The only large area of bottomland hardwood and fresh-to-intermediate marsh in the northern portion of the parish outside the flood protection levees.

C. Zoological: The fresh-to-intermediate wetland habitat supports numerous fish, waterfowl, and wildlife resources. The area has limited fur and alligator production. An American Bald Eagle nests in the unit.

Resources and Resource Users

The area provides ample recreational opportunities for hunting, fishing, crabbing, and general outdoor boating activities along the public waterways. Commercial trapping and fishing activities are also prevalent in this EMU. There are no public recreational areas or boat launching facilities in the area.

Cultural Resources

A. Historical: On the 1891 USGS topographic map, several buildings are mapped along the east bank of the Bayou Barataria at Hole in the Wall Cutoff.

B. Cultural: None identified

C. Archaeological: There are no recorded archaeological sites in this EMU.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

7. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

8. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

9. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

10. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

11. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

12. Restore and/or maintain wetlands at the base of the flood protection levee.

13. Utilize existing and newly created wetlands as storm buffer zones.

14. Maintain portions of EMU as estuarine nursery area.

15. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

16. Encourage wetland management and restoration of eroded wetlands, where practicable.

17. Maintain wetlands and quality of water bodies for renewable resources.

18. Protect the natural environment of the EMU.

19. Enhance the productivity of the EMU.

20. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

21. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

4. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

5. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

6. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

7. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

8. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

9. Support efforts to improve and maintain water quality compatible with designated uses.

10. Support wetland restoration programs involving freshwater and sediment input into EMUs.

11. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

12. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

13. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

6. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

7. Threatened and endangered species habitat and/or wildlife refuges/management areas.

8. Freshwater management and enhancement of water quality.

PLAQUEMINES AREA

Location and Area

The 85,800-ac Plaquemines Area EMU comprises the uplands/fastlands portion of the parish, as well as the Mississippi River from the Orleans-St. Bernard Parish border at Twelvemile Point and Caernarvon to The Jump at Venice. This EMU is bordered on the north by Orleans Parish. The eastern EMU border is defined by the back flood protection levee where it exists, the base of the natural Mississippi River Levee between White's Ditch and Poverty Point, and the crest of a relict levee located between the end of the east bank flood protection levee and Baptiste Collette Bayou. The western border is defined by back flood protection levees where they exist. In the absence of flood protection levees, the western border of the unit is the west side of LA HWY 23 as in the vicinity of Deer Range and south of West Point a la Hache.

Geology and Soils

The Plaquemines Area EMU is comprised of the Mississippi River natural levees, relict distributary levees, crevasse splay deposits, and drained backswamp and marsh. The natural

levees are comprised of Sharkey-Commerce soil associations inside the flood protection levees and Convent-Commerce-Sharkey soil associations between the protection levees and the Mississippi River. The former swamps and marshes inside the drainage districts are comprised of Harahan-Westwego-Rita soil associations.

Vegetation and Habitat Change

Areas of bottomland hardwood forest and swamp vegetation are extensive in the northern part of the parish but scattered primarily on small patches of abandoned farmland in the remainder of this EMU. The most extensive area of fresh marsh is located inside the Forty Arpent Canal between Bertrandville and Braithwaite. The remaining undeveloped areas within this EMU are in cropland, orchards, and pasture. There have been no major changes in habitat distribution within this EMU in recent years. Habitat change has been primarily the result of the development of residential subdivisions on agricultural/pasture lands or cleared areas in the northwestern part of the parish.

Fish and Wildlife Resources

The ponds, drainage canals, and cutoff relict distributary channels provide limited habitat for freshwater fish and crawfish. These water bodies and freshwater marshes in the northeastern portion of this EMU support nutria; muskrat; the mink, otter, raccoon assemblage; the rails, gallinules, and coots assemblage; and the American alligator. Forested habitat also supports rabbit, squirrel, white-trailed deer and avifauna assemblages represented by other woodland migrants and other woodland residents. The extensive agriculture areas provide foraging areas for raptors.

Hydrology and Flooding Potential

An extensive drainage canal network and a series of pump stations that drain runoff derived from precipitation is designed to control the hydrology within this EMU. The area is enclosed by levees designed to prevent flooding from the Mississippi River and storm surges from the Gulf of Mexico and the Breton Sound. However, extensive areas of this EMU are within the hundred-year flood zone because of its susceptibility to flooding from hurricane storm surge and intense or prolonged periods of precipitation.

Land Use and Transportation Infrastructure

Major land use within this EMU includes: residential, commercial, and industrial development; agriculture/pasture/maintained areas; flood protection levees. Almost all communities in the parish are located within the Plaquemines Area EMU. The densest development is in the northwestern part of the parish in the vicinity of Belle Chasse and the U. S. Naval Air Station. Transportation infrastructure parallels the Mississippi River and flood protection levees and includes LA HWY 39 on the east bank and LA HWY 23 on the west bank. Two ferry services are located in this EMU: Belle Chasse to Scarsdale and West Pointe a la Hache to Pointe a la Hache. The Norfolk Southern Railroad extends to the vicinity of Braithwaite on the east bank and the New Orleans – Lower Coast Railroad is

located on the west bank. The Port of Plaquemines Parish is the eighth largest Port in the United States and exports coal, petro-chemical, and grain to world markets. There are at least 82 port installations with 109 berths in this EMU, most of which are on the Mississippi River or the Algiers Canal (LCWCRTF & WCRA 1999b).

Unique Ecological Features

A. Geological: Mississippi River and natural levees

B. Botanical: None identified.

C. Zoological: Tulane University Research Laboratory (Endangered Species Research).

Resources and Resource Users

The renewable resources within this EMU include agricultural production (i.e., produce, citrus, cattle), natural and pond raised crawfish, and limited forbearing animals and alligators. The Mississippi River and other navigable waterways that touch this unit are major resources utilized by numerous businesses and industries, including port and marina operators, commercial and sports fishermen, recreational boaters, etc.

Cultural Resources

A. Historical: Plantations include: Scarsdale, Harlem, Union, Bellevue, Sophie, Ironton, Monsecour, St. Rosalie, Alliance, La Reussite, Naomi, Belair, Point Celeste, Fanny, Idelwild, Greenwood, Monplasir, St. Clair, Fort St. Leon, Upper Magnolia, Orange Grove, Exile, Alliance, Woodland

   Forts include: de la Bouleaye, Bourbon, St. Leon, St. Mary, Jackson, St. Philip
   Railroads include: Louisiana Southern Railway, Sea Train Terminal
   Sugarmills include: Deer Range, Star Plantation, Braithwaite

B. Cultural: Diverse ethnic communities. Communities built around oystering and fishing, oil and gas industries, sulfur mining, citrus and produce industries.

C. Archaeological: Sixty-two sites are recorded: 16 PL 12, 20, 27, 29, 31, 32, 35, 37, 38, 40, 41, 44, 83, 84, 85, 86, 87, 88, 89, 92, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 115, 114, 116, 117, 118, 119, 120, 121, 122, 124, 125, 127, 128, 129, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 146, 151, 155, 157.

EMU Goals

1. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

2. Encourage land use compatible with wetland and aquatic environments.

3. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

4. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

5. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

6. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

7. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

8. Maintain wetlands and quality of water bodies for renewable resources.

9. Protect the natural environment of the EMU.
10. Enhance the productivity of the EMU.

11. Sustain development and compatible land uses on uplands and fastlands.

12. Protect upland/fastland areas from flooding.

13. Sustain agricultural land uses on uplands and fastlands.

14. Protect wetlands and water bodies in adjacent EMUs from adverse environmental effects related to land use in upland/fastland EMU.

EMU Objectives

1. Encourage emplacement of major pipelines in established corridors.

2. Allow and encourage environmentally sound mineral exploration and production.

3. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

4. Improve and maintain water quality compatible with designated uses.

5. Support environmentally sound economic use, especially with regard to waterfront areas.

6. Delineate boundary between upland/fastlands and wetlands and support development in uplands/fastlands.

7. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

4. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

5. Support efforts to improve and maintain water quality compatible with designated uses.

6. Encourage utilization of Best Management Practices for development in upland/fastland areas in order to minimize detrimental environmental impacts on adjacent wetlands.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

4. Environmentally compatible development.

5. Aquaculture and farming of hide/forbearing animals.

6. Residential, commercial, industrial, and port development/multiple-use.

7. Tourism and cultural resources.

8. Freshwater management and enhancement of water quality.

RIVER AUX CHENES

Location and Area

The 29,000-ac River aux Chenes EMU is located in the northeastern portion of the parish, east of the Mississippi River between the communities of Bertrandville and Pointe a la Hache. This EMU is bordered on the north by River aux Chenes, on the east by Bayou Grand (running from Back Levee Canal to River aux Chenes), and on the south and west by the Back Levee Canal and back flood protection levee.

Geology and Soils

Topographically, this EMU grades southeastward from the low natural levee of the Mississippi River into the low-lying, low relief brackish marshes. Several distributary ridges, the distal ends of which have subsided below the marsh surface, cross the EMU in a northwest to southeast direction. The northwestern portions of these ridges that remain tree covered are considered transitional areas. The majority of the brackish marsh soils in this EMU are Clovelly muck and Lafitte muck, with a narrow fringe of Balize soils on the southeastern edge of the EMU.

The low-lying natural levee ridges contain gentilly and Sharkey clay soils. The subsidence rate for this EMU is high (2.1 ft to 3.5 ft per century.) Evidence of past farming attempts along the Mississippi River natural levee and backslopes are present in the form of numerous drainage ditches and flooded, abandoned reclamation sites.

Vegetation and Habitat Change

In the late nineteenth century, the western and southern perimeter of the EMU near the base of the Mississippi River levee was drained and used for agriculture. However, subsidence and flooding from severe storms resulted in the gradual abandonment of these areas for agriculture. By 1949, most of the marshland was brackish, with only a small expanse of intermediate marsh located between the ridges in the upper part of the basin. Since the mid-twentieth century, the marshes have remained brackish (Chabreck et al. 1968, Chabreck and Linscombe 1988). However, the northern reaches of the relict distributary ridges support mixed hardwoods, while narrow fringes of swamp, primarily baldcypress, flank the base of the ridges. Narrow stands of live oaks cover the River aux Chenes levees as far east as Orange Bayou, but subsidence and saltwater intrusion is slowly killing these trees.

Between 1932 and 1990, this EMU lost 5,120 ac of land: 1,260 ac between 1932 and 1956; 2,190 ac between 1956 and 1974, 1,100 ac between 1974 and 1983, and 570 ac between 1983 and 1990. Hurricanes, especially Betsy in 1965, caused extensive land loss because of saltwater flooding and wind driven wave erosion. Prevention of Mississippi River overbank flooding, subsidence, and dredging of oil and gas pipeline and rig access canals are other

causes of land loss. Without wetland restoration, this EMU is expected to lose an additional 4,870 ac of land by the year 2050. Implementation of the Caernarvon Freshwater Diversion Project is expected to reduce this loss by approximately 550 ac.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Many species of the estuarine dependent assemblage (red and black drum, spotted sea trout, southern flounder, and brown shrimp) have shown steady population trends over the last 10-20 years. Other populations (Gulf menhaden, blue crab, and white shrimp) have shown increasing population trends over the same period. The resident American oyster has shown increasing populations, while Spanish mackerel populations have remained steady. The freshwater assemblage, represented by largemouth bass and channel catfish, has shown increasing populations. In the future, populations of all of the above are projected to remain steady except those of the American oyster and the freshwater assemblage, which are expected to increase.
>
> The brown pelican and the American alligator have shown increasing population trends over the last 10-20 years. Other wildlife (seabirds, shorebirds, wading birds, dabbling and diving ducks, rails, gallinules, coots, raptors, furbearers, and game mammals) have shown steady populations during that time period. In the future, the brown pelican and American alligator are projected to continue to increase, while all other wildlife species will remain steady.

Hydrology and Flooding Potential

The entire area is less than 5 ft in elevation, with most of the marshland being less than 1 ft above mean sea level. The marshes are subject to daily tidal flooding and the rest of the EMU is subject to flooding by storm-generated tides. Salinities range from 2 to 5 ppt in the northern portion to 10 ppt in the southern portion of this EMU. The major drainage system consists of the old 40 Arpent Canal and River aux Chenes. Two pump stations (Belair and Bellevue) discharge directly into the EMU. The White's Ditch siphon is capable of introducing Mississippi River water into the EMU at an average rate of 250 cfs. The EMU's salinity is also influenced by fresh water from the Caernarvon Freshwater Diversion structure that began operation in 1992.

Land Use and Transportation Infrastructure

The low natural Mississippi River levee east of the back flood protection levee is primarily in abandoned farmland with scattered remnants of regenerated forests on the higher ridges. The bottomland hardwoods at the base of the levee and on the low-lying relict distributary levees and the marshlands serve as habitat for renewable resources such as furbearing animals and fish. The habitat provides good recreational opportunities, including hunting, for the private landowners of the EMU. Commercial and recreational finfishing, crabbing and shrimping

occurs on navigable waterways. Private lands are also leased for trapping of furbearing animals and alligators. The area contains numerous oil and gas wells and pipelines. There are no roads or railroads in the EMU.

Unique Ecological Features

A. Geological: The few relict distributary ridges in the northwestern portion of the EMU are unique because of their limited distribution in the parish.

B. Botanical: The bottomland hardwoods and swamps in the upper portion of the EMU and the oak forests along River aux Chenes are unique because of their limited distribution in the parish.

C. Zoological: The fresher portion of this EMU supports furbearing animals, alligators and seasonal concentrations of waterfowl.

Resources and Resource Users

The area provides recreational opportunities for fishing, and other water-related activities, on navigable waterways. Landowners lease much of the private marshland for hunting and trapping of alligators and furbearing animals.

There are no public recreational areas in the EMU and boat-launching sites are very limited and private. The only leased oyster grounds occur on the extreme eastern perimeter of the EMU.

Cultural Resources

A. Historical: The 1892 USGS topographic map of the area shows several structures on the west bank of River aux Chenes. Another structure, probably a pumping station, is shown at the eastern end of the Belair Canal.

B. Cultural: None identified

C. Archaeological: This EMU contains two confirmed sites 16 PL 16 and 27. Two sites, 16 P, 106 and 108 are near the west side of the EMU in the Plaquemines Area Fastland EMU. Sites 16 PL 15 and 25 are on the east bank of River aux Chenes in the Caernarvon EMU.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

7. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

8. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

9. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

10. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

11. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

12. Restore and/or maintain wetlands at the base of the flood protection levee.

13. Utilize existing and newly created wetlands as storm buffer zones.

14. Maintain portions of EMU as estuarine nursery area.

15. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

16. Encourage wetland management and restoration of eroded wetlands, where practicable.

17. Maintain wetlands and quality of water bodies for renewable resources.

18. Protect the natural environment of the EMU.

19. Enhance the productivity of the EMU.

20. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

21. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Aquaculture and farming of hide/forbearing animals.

7. Threatened and endangered species habitat and/or wildlife refuges/management areas.

8. Tourism and cultural resources.

9. Freshwater management and enhancement of water quality.

WEST BAY

Location and Area

This 107,900-ac EMU is located in the active Mississippi River birdfoot delta, west of the Mississippi River. The northeast boundary stretches along the east bank of the Mississippi River from the vicinity of Venice to Head of Passes. The southeastern boundary is the east bank of Southwest Pass. The northwestern boundary is the north bank of Red Pass from Venice to the Gulf of Mexico and northwest along the shoreline to Bay Coquette. The seaward boundary is a concave line from a point southwest of Sandy Point Island southeast to the East Jetty on Southwest Pass.

Geology and Soils

The West Bay EMU contains the West Bay Subdelta lobe of the lower Mississippi River birdfoot delta that was initiated around 1838 with a crevasse at The Jump in the river's west bank. Virtually all of the interior marshland in this EMU disappeared by 1988, with the only remnants remaining in the vicinity of the natural levees of the Mississippi River, the west side of Southwest Pass and along the distributary channels in the northern and western portions of the EMU. Soils along the west side of Southwest Pass are Aquents, dredged and frequently flooded. Fresh marsh soils in the northern part of the EMU are primarily Balize and Larose soils. The fresh-to-saline marsh soils on the southwestern part of the EMU include Clovelly muck, Scatlake muck, and Bellpass muck. Mudlump islands occur in the vicinity of the mouth of Southwest Pass. This EMU has a very high subsidence rate of over 3.5-ft per century (Gagliano 1998).

Vegetation and Habitat Change

This EMU was classified primarily as a fresh marsh with extensive floating mats of water hyacinths and alligatorweed. The natural levee ridges supported stands of baldcypress and black willow (O'Neil 1949). By 1978, large areas of the southern half of the EMU had disappeared. The northern and eastern portion of the EMU remained fresh marsh and narrow bands of intermediate to saline marsh were on the western perimeter of the EMU (Wicker et

al. 1980). By 1988, fresh marsh and scrub/shrub habitat remained in the northern portion of the EMU adjacent to the Mississippi River while the western perimeter near Sandy Point supported brackish-to-saline marsh (NWI 1988, Chabreck and Linscombe 1988). The higher natural levees along the main Mississippi River channel and along the distributary channels (Grand Pass and Tiger Pass) support willows and scattered stands of baldcypress. A few of the highest ridges along the main channel contain live oaks.

Between 1932 and 1974, the EMU lost 38,400 ac of the original 59,640 ac of marsh as a result of subsidence, hurricanes, canal dredging and altered hydrology. Between 1974 and 1990, another 13,260 ac of land were lost (LCWCRTF & WCRA 1998b). The EMU has a very high subsidence rate of over 3.5 ft per century (Gagliano 1998, LCWCRTF & WCRA 1998a). It is estimated that without restoration efforts over 91 percent of the remaining land would be lost by the year 2050. Implementation of the CWPPRA West Bay Sediment Diversion project and selected crevassing is estimated to provide a net gain of 7,100 ac by the year 2050 (LCWCRTF & WCRA 1998b).

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> For the last 10-20 years, fishery populations of the marine assemblage (Spanish mackerel), estuarine resident assemblage (American oyster), freshwater assemblage (largemouth bass and channel catfish) and estuarine dependent assemblage (red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crab) have shown steady trends.
>
> In the future, with construction of the CWPPRA West Bay diversion, the freshwater assemblage is projected to increase as well as some of the estuarine dependent assemblage (red and black drum, menhaden, and white shrimp). The remainder of the assemblages is expected to remain steady.
>
> The brown pelican has shown an increasing trend over the last 10-20 years. All other wildlife, such as wading birds, seabirds, shorebirds, ducks, geese, raptors, furbearers, game mammals, and the American alligator, has shown a steady trend over the same period. With the construction of the West Bay diversion, marsh will significantly increase in the EMU, and all of the above are projected to increase over the next 50 years. As the amount of open water decreases, seabird populations are projected to decrease in this EMU.

Hydrology and Flooding Potential

The remaining marshland, natural levees and spoil banks within this EMU are barely above sea level and subject to seasonal Mississippi River flooding. The marshland is subject to regular tidal flooding. Southwest Pass discharges 32 percent of Mississippi flow, while Grand Pass carries 5 percent.

Land Use and Transportation Infrastructure

This EMU consists primarily of open water with fresh-to-intermediate marshes and small stands of bottomland hardwood and swamp vegetation along the low-lying natural levees that serve as wildlife and fisheries habitat. Because of the consistent freshwater input, it is prime habitat for freshwater dependent species. Land and water bottoms adjacent to Southwest Pass serve as spoil disposal sites for the continuous dredging required to maintain the pass, which is the main entrance to the Mississippi River and the ports along the Mississippi River, for navigation. Southwest Pass is maintained at a depth of 45 ft and extended jetties mark the entrance channel. Tiger Pass is also maintained for navigation and its –16 ft entrance channel is marked by two jetties.

The EMU also contains numerous oil and gas fields (West Bay Oil and Gas Field, West Delta Block 52 Oil Field, West Delta Block 54 Oil Field and two unnamed oil fields), rig cuts and pipelines. The community of Venice, located in the northern apex of the EMU is a major port supporting the offshore oil and gas industry. It is also a landing and support facility for the commercial fisheries industry and for recreational fishing interests. The Venice Boat Harbor is located at the juncture of Red Pass and Tiger Pass south of the community of Venice. Tertiary roads connect various facilities in the Venice area and extend south and southwest to the Venice Boat Harbor and oil facilities along Red Pass to Venice Dome.

Unique Ecological Features

A. Geological: The primary unique feature is the active and very dynamic Mississippi River delta itself. The mudlump islands, constantly emerging and being reworked by waves off the mouths of the distributary channels are a unique feature within the delta complex.

B. Botanical: Scattered expanses of swamp habitat in the northern part of the EMU.

C. Zoological: This is considered to be one of the most biologically productive areas in Louisiana with tremendous species diversity. The area attracts extensive seasonal waterfowl concentrations and supports numerous furbearing animals and alligator populations. The area is unique in that it supports both fresh and saltwater species at different periods of the year depending on Mississippi River stages. Between 1976 and 1995, five wading and shorebird rookeries have been identified in the EMU: 258D-1, 258D-2, 258D-3, 258D-4, and 261A-1. The EMU also supports a unique subspecies of white-tail deer (*Odocoileus virginianus mcilhennyi*).

Resources and Resource Users

The majority of the area can only be reached by boat. It provides abundant recreational opportunities for hunting on private leases, sports and commercial fishing, water based sports, and general nature study, especially bird watching. There are a few private oyster leases on the northwestern side of the EMU near Pass Tante Phine. A small portion of the

eastern part of this EMU near Head of Passes is within the Pass a Loutre State Waterfowl Management Area.

Cultural Resources

A. Historical: One unidentified shipwreck west of Southwest Pass and one shipwreck location #1805

B. Cultural: None identified

C. Archaeological: Five sites have been recorded for this EMU: 16 PL 48, 52, 53, 54, and 60. Two unidentified wrecks and one recorded shipwreck are located in the vicinity of the jetties at Southwest Pass.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Require mitigation measures where development activities adversely impact wetland and aquatic environments.

3. Encourage land use compatible with wetland and aquatic environments.

4. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

5. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

6. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

7. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

8. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

9. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

10. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

11. Utilize existing and newly created wetlands as storm buffer zones.

12. Maintain portions of EMU as estuarine nursery area.

13. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

14. Encourage wetland management and restoration of eroded wetlands, where practicable.

15. Maintain wetlands and quality of water bodies for renewable resources.

16. Restore and/or maintain islands supporting bird colonies, where practicable.

17. Protect the natural environment of the EMU.

18. Enhance the productivity of the EMU.

19. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Encourage emplacement of major pipelines in established corridors.

3. Allow and encourage environmentally sound mineral exploration and production.

4. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

5. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

6. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

7. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

8. Improve and maintain water quality compatible with designated uses.

9. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

10. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

11. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

12. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

13. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.
14. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

15. Protect the natural state of the environment.

16. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

17. Enhance productivity of the EMU.

18. Introduce freshwater and nutrients into the EMU.

19. Support environmentally sound economic use, especially with regard to waterfront areas.

20. Prohibit development of wetland areas for non-wetland dependent uses.

21. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support wetland management programs of state/federal wildlife management areas that comply with parish land use objectives.

7. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

8. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

9. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

10. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

11. Support efforts to improve and maintain water quality compatible with designated uses.

12. Support wetland restoration programs involving freshwater and sediment input into EMUs.

13. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

14. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

15. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Wetland restoration using Mississippi River sediment (i.e., crevasses and dredged material.)

5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Environmentally compatible development.

7. Residential, commercial, industrial, and port development/multiple-use.

8. Tourism and cultural resources.

WEST POINT A LA HACHE

Location and Area

The West Pointe A La Hache EMU, encompassing approximately 19,000 ac, is located west of the Mississippi River near the south central part of the parish between Deer Range and Port Sulphur. It is bordered on the north by the back flood protection levee; on the east by Hayes Canal; on the south by Bayou Grande Cheniere and on the west by the Grande Cheniere ridge road. Surrounding EMUs include Myrtle Grove, Lake Washington/Grande Ecaille and Plaquemines Area.

Geology and Soils

Most of the EMU consists of very broken, low-lying, low relief, brackish marshes interspersed with shallow open water areas. The major topographic highs are the natural levees of Grand Bayou and Bayou Grande Cheniere, two relict Mississippi River distributary complexes that have subsided to less than 5 ft in elevation. The primary soils in this EMU are Lafitte muck and Clovelly muck soils. The subsided natural levee ridges along Bayou Grande Cheniere and Grand Bayou contain Gentilly muck soils. This EMU has a high subsidence rate of 2.1 ft to 3.5 ft per century.

Vegetation and Habitat Change

In 1949, O'Neil mapped this area as predominantly brackish three-cornered grass marsh. The southeastern half of this EMU was mapped as saline in 1978, but appeared to have returned to more brackish conditions in 1988 (Chabreck and Linscombe 1988). The Bayou

Grande Cheniere levees contain remnant live oaks forests on their crest and baldcypress along their base. This vegetation is stressed and dying because of saltwater intrusion and levee subsidence. Between 1932 and 1990, this EMU lost 5,040 ac of land. Another 2,110 ac was lost between 1932 and 1974 and 2,930 ac between 1974 and 1990. Causes of land loss include subsidence, lack of sediment and freshwater input from overbank flooding, dredging of oil and gas rig access canals and pipeline canals, saltwater intrusion, and more recently, herbivory.

The Coast 2050 report stated that an additional 4,500 ac of land would be lost if no restoration activities are implemented in this EMU. However, implementation of the West Pointe a la Hache Siphon and Outfall Management project is expected to maintain 2,140 ac that would otherwise be lost by the year 2050. The Grande Cheniere ridge is expected to remain as emergent wetland providing some measure of protection to the leveed fastland EMU from storm surges from the Gulf of Mexico.

Fish and Wildlife Resources

The status of fish and wildlife resources within this EMU were summarized in the Coast 2050 study (LCWCRTF & WCRA 1998b) as follows:

> Most species in the estuarine dependent assemblage have shown increasing population trends over the last 10-20 years (red and black drum, Gulf menhaden, southern flounder, brown and white shrimp and blue crab). Spotted seatrout populations have remained steady over the same period, as have those of the American oyster and Spanish mackerel. Freshwater assemblage populations (channel catfish and largemouth bass) have increased during this period. In the future, populations of all of the above are projected to decline except for spotted seatrout and the oyster; these populations will remain steady.
>
> Populations of brown pelicans, dabbling and diving ducks, rails, gallinules, and coots have shown increasing trends over the last 10-20 years. Seabirds, wading birds, shorebirds, raptors, and game mammals have had steady populations over the same period. Furbearer and American alligator populations have decreased. All the species and groups that were increasing in the past are projected to continue to do so in the future. Seabird, wading bird, shorebird, and raptor populations are projected to decrease. Populations of furbearers, game mammals and American alligators should remain steady in the future.

Hydrology and Flooding Potential

Almost all the vegetated habitat is wetland, 0 to 1 ft in elevation and subject to regular tidal flooding. Only the levees of Grand Bayou and Bayou Grande Cheniere are better drained, but are still less than 5 ft in elevation. Salinities in this EMU annually range from 10 to 15 ppt. Three pump stations (West Pointe a la Hache, Diamond, and Haynes) discharge directly into the EMU. Fresh water is also introduced into the EMU via the West Point a la Hache diversion structure. The main water exchange is through Hermitage Bayou and Grand Bayou.

Land Use and Transportation Infrastructure

Almost all of the area consists of brackish marsh and estuaries that serve as wildlife and fisheries habitat. A few oyster leases occur in Grand Bayou and Lake Judge Perez (formerly Lake Hermitage). There are numerous camps along the Bayou Grande Cheniere ridge near Lake Judge Perez, and the wetland community of Grand Bayou is situated on the subsided Grand Bayou levee southwest of the community of Happy Jack. A parish maintained road runs along the east levee of Bayou Grande Cheniere connecting the community of Lake Judge Perez to LA HWY 23. The EMU contains numerous oil and gas wells and pipelines.

Unique Ecological Features

A. Geological: The Bayou Grande Cheniere Ridge, forming the southern boundary of the EMU, is a prominent geological feature in the EMU.

B. Botanical: Live oaks along the Bayou Grande Cheniere ridge are unique because they are prominent upland vegetation in this EMU.

C. Zoological: The northwestern portion of this EMU contains sufficient furbearing animals, especially muskrat, for harvesting.

Resources and Resource Users

This brackish water environment provides recreational opportunities in the form of hunting on private leases, finfishing, crabbing, shrimping, boating, and other water-based activities. Water bottoms in Grand Bayou and Lake Judge Perez are leased for oyster growing. The waterways are accessible via boat launching sites at Happy Jack, West Pointe-a-la-Hache, Foster's Canal, and Lake Judge Perez. The ridge lands are also used for cattle grazing. Private marshland is leased for trapping of alligators and furbearing animals.

Cultural Resources

A. Historical: None identified.

B. Cultural: Community of Grand Bayou on east and west banks of Grand Bayou southwest of Happy Jack, between Socola Canal and Martins Canal. There is an extensive camp settlement along the north bank of Martins Canal southwest of Happy Jack. There are numerous campsites (Lake Judge Perez) along both banks of Hermitage Bayou where it cuts through the Bayou Grand Cheniere Ridge into Lake Judge Perez (formerly named Lake Hermitage.

C. Archaeological: Two sites were recorded: 16 PL 18 and 34. Site 16 PL 18, located on the Bayou Grande Cheniere natural levee, is near this EMU's juncture with the Myrtle Grove and Lake Washington/Grand Ecaille EMUs.

EMU Goals

1. Reduce land loss, and where feasible, create new wetlands.

2. Retard saltwater intrusion and selectively manage hydrologic regimes to maintain desired salinity gradients.

3. Require mitigation measures where development activities adversely impact wetland and aquatic environments.
4. Encourage land use compatible with wetland and aquatic environments.

5. Coordinate with state and federal agencies operating in the parish to achieve desired land use and wetland conservation, restoration, and enhancement objectives.

6. Encourage and promote economic use that would avoid adverse environmental impacts on wetlands and water quality.

7. Support and encourage environmentally sound mineral exploration and production, but mitigate environmental impacts through creation of wetlands and/or support of wetland management programs.

8. Support, promote, and encourage recreational interests that comply with other goals and objectives of the CZM program.

9. Support, promote, and encourage renewable natural resource harvesting initiatives and construction of support facilities that would avoid adverse environmental impacts.

10. Encourage U. S. Army Corps of Engineers (Corps) to implement viable wetland restoration and enhancement program using Mississippi River water and sediment. If necessary, lobby congressional delegation to support this position and direct the Corps to assist parish with regard to environmental protection.

11. Encourage the Corps and others to utilize dredged material to restore and maintain barrier islands and shorelines, plug canals and breaches, and/or create wetlands.

12. Restore and/or maintain wetlands at the base of the flood protection levee.

13. Utilize existing and newly created wetlands as storm buffer zones.

14. Maintain portions of EMU as estuarine nursery area.

15. Maintain or enhance riverine overflow to preserve salinity gradient and diversity of wetland habitats.

16. Encourage wetland management and restoration of eroded wetlands, where practicable.

17. Maintain wetlands and quality of water bodies for renewable resources.

18. Block all non-essential navigation passes to retard further erosion in area.

19. Protect the natural environment of the EMU.

20. Enhance the productivity of the EMU.

21. Develop and implement an overall wetland management plan and encourage private landowners to manage their wetlands to prevent further destruction.

22. Enhance wetlands and water quality, through surface water management of freshwater to maintain natural gradient of fresher-to-saline wetlands and water bodies.

EMU Objectives

1. Implement wetland management plan to utilize Mississippi River water and sediment to enhance and/or create wetlands, protect and sustain oyster seed grounds, and in general, enhance wetland diversity.

2. Establish wetland area as storm buffer zone and discourage development that is detrimental to integrity of the wetland area.

3. Encourage emplacement of major pipelines in established corridors.

4. Allow and encourage environmentally sound mineral exploration and production.

5. Conserve wetland habitat for both harvestable and non-harvestable renewable resources.

6. Acquire surface servitude, as needed, to provide for Mississippi River overflow or input into wetlands under a wetland management plan.

7. Encourage wetland management and wetland maintenance and/or restoration programs by landowners and public agencies.

8. Encourage the Corps to develop a systematic coastal restoration program to use Mississippi River water and sediment to create new or enhance existing wetlands and restore barrier islands.

9. Improve and maintain water quality compatible with designated uses.

10. Utilize Mississippi River sediment to create wetlands along the base of the back flood protection levees.

11. Protect water bottoms and associated habitats from damage or destruction by man-made activities.

12. Encourage the mineral industry to avoid or minimize environmental damage to wetlands and water bottoms and to ensure that their activities contribute to the greatest extent practicable to the parish's efforts to enhance and restore wetlands and barrier islands.

13. Delineate major navigation routes and areas of no-wake zones, on an as-needed basis.

14. Restore and maintain fresh-to-saline gradients through management of surface hydrology that benefit multiple uses of parish wetlands.

15. Reduce saltwater intrusion by controlling avenues of saltwater intrusion, such as canals, with water control structures or dams and surface water management in the EMUs.

16. Establish designated navigation channels through EMU and block all non-essential channels to retard erosion and saltwater intrusion.

17. Protect the natural state of the environment.

18. Prohibit future wetland loss due to dredge and fill operations unless mitigation involves creation or replacement of wetlands.

19. Enhance productivity of the EMU.

20. Introduce freshwater and nutrients into the EMU.

21. Support environmentally sound economic use, especially with regard to waterfront areas.

22. Prohibit development of wetland areas for non-wetland dependent uses.

23. Ensure compliance with land use plans and zoning.

EMU Policies

1. Major pipelines are to be constructed in established corridors, where practicable.

2. Mineral exploration and production are to be undertaken in an environmentally sound manner and in compliance with the parish CZM program.

3. Support reestablishment of productive oyster seed grounds and leased grounds impacted by government sponsored wetland restoration programs.

4. Support wetland management and wetland restoration programs undertaken by landowners and public agencies.

5. Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated.

6. Support recreational use of areas through support of appropriate and environmentally compliant support facilities.

7. Inform the Corps and Congressional delegation of the parish policies regarding activities in the coastal zone.

8. Support actions to restore and/or maintain barrier islands, headlands, and fringing wetlands, including closing barrier breaches.

9. Support establishment of major navigation routes and blockage of all non-essential man-made canals.

10. Support efforts to improve and maintain water quality compatible with designated uses.

11. Support wetland restoration programs involving freshwater and sediment input into EMUs.

12. Support use of dredged material to create wetlands, barrier islands, and breaches, where practicable.

13. Discourage dredge and fill operations in wetlands and water bodies unless activities are incorporated into wetland management plans or the detrimental impacts are offset through creation of wetland on-site or within the parish, preferable in the same EMU.

14. Oppose activities on natural levee ridges outside fastland/upland areas that would negatively impact adjacent wetlands or diminish their storm buffering functions.

EMU Priorities of Use

1. Commercial harvesting of renewable resources.

2. Exploration and production of oil, gas, and other mineral resources.

3. Fisheries and wildlife habitat.

4. Restoration and enhancement of wetlands for storm buffer zone (i.e., freshwater diversions.)
5. Recreational activities (i.e., sports fishing, boating, swimming, bird watching, etc.)

6. Environmentally compatible development.

7. Freshwater management and enhancement of water quality.

CHAPTER 7. PROGRAM ADMINISTRATION

Coastal Use Permits

The State's approved CZM Program identifies two types of uses of the coastal zone that are subject to the Coastal Use Permitting Program: 1) uses of state concern and 2) uses of local concern (R.S. 49:214.25). Uses of state concern are defined as 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 include, but are not limited to:

- Any dredge or fill activity that intersects with more than one body of water
- Projects involving use of state owned land of 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
- Uses of local concern that may significantly affect interests, or regional, state, or national concern.

Uses of local concern are defined as those uses which directly and significantly affect coastal waters and which are in need of coastal management, but are not uses of state concern and which should be regulated primarily at the local level, if the local government has an approved CZM program. Uses of local concern include, but are not limited to:

- Privately funded projects that are not uses of state concern
- Publicly funded projects that 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.

Activities that do not require CUPs, except when the proposed activity would have direct and significant impact on coastal waters, include [as cited from L.A.C. 43:1,723(B)]:

1. General

a. 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:
   i. agricultural, forestry, and aquaculture activities on lands consistently used in the past for such activities;
   ii. hunting, fishing, trapping, and the preservation of scenic historic, and scientific areas and wildlife preserves;
   iii. normal maintenance or repair of existing structures including emergency repairs of damage caused by accident, fire, or the elements;
   iv. construction of a residence or camp;
   v. construction and modification of navigational aids such as channel markers and anchor buoys;
   vi. activities which do not have a direct and significant impact on coastal waters.

b. Uses and activities within the special area established by R.S. 49:214.29(c) which have been permitted by the Offshore Terminal Authority in keeping with its environmental protection plan shall not require a coastal use permit.

2. Activities on Lands 5 Feet or More above Sea Level or within Fastlands

a. 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.

b. 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.

c. 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.

d. 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.

e. 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.

3. Emergency Uses

a. Coastal use permits are not required in advance for conducting uses necessary to correct emergency situations.

   i. Emergency 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.
   ii. 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.

b. 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.

c. 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.

4. Normal Maintenance and Repair

a. Normal repairs and the rehabilitation, replacement, or maintenance of existing structures shall not require a coastal use permit provided that:
   i. the structure or work was lawfully in existence, currently serviceable, and in active use during the year preceding the repair, replacement or maintenance; and
   ii. the repair or maintenance does not result in an encroachment into a wetland area greater than that of the previous structure or work; and
   iii. the repair or maintenance does not involve dredge or fill activities; and
   iv. the repair or maintenance does not result in a structure or facility that is significantly different in magnitude or function from the original.

b. 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.

c. 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.

5. Construction of a Residence or Camp

a. The construction of a residence or a camp shall not require a coastal use permit provided that:
   i. 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;
   ii. 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.

b. 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.

6. Navigational Aids

a. The construction and modification of navigational aids shall not require a coastal use permit.

b. 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 State Coast Guard standards and requirements.

7. Agricultural, Forestry and Aquacultural Activities

a. Agricultural, forestry and aquacultural activities on lands consistently used in the past for such activities shall not require a coastal use permit provided that:

   i. 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);
   ii. the activity does not require a permit from the U.S. Army Corps of Engineers and meets federal requirements for such exempted activities; and
   iii. 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.

b. The exemption includes but is not limited to normal agricultural, forestry, and aquacultural activities such as:
   i. plowing;
   ii. seeding;
   iii. grazing;
   iv. cultivating;
   v. insect control;
   vi. fence building and repair;
   vii. thinning;
   viii. harvesting for the production of food, fiber and forest products;
   ix. maintenance and drainage of existing farm, stock, or fish ponds;
   x. digging of small drainage ditches; or
   xi. maintenance of existing drainage ditches and farm or forest roads carried out in accordance with good management practices.

8. Blanket Exemption. No use or activity shall require a coastal use permit if:

a. the use or activity was lawfully commenced or established prior to the implementation of the coastal use permit process;
b. the secretary determines that it does not have a direct or significant impact on coastal waters; or
c. the secretary determines one is not required pursuant to §723.G of these rules.

Local CUP Procedure

Preliminary Review of CUP Application

The processing of a coastal use permit application for activities of local concern is outlined in Figure 7.1. After the Louisiana Department of Natural Resources has notified the CZM Administrator that the CUP application is of local concern, the CZM Administrator will review the application for completeness. The CUP application must be complete and the permit application fee must be paid before the processing of the application can continue. The application fee for a commercial project is $500 plus 0.1 percent of the estimated project cost over $100,000. For a non-commercial project, the application fee is $50. If the application form and/or drawings contain significant deficiencies, the CZM Administrator may contact the applicant and schedule a meeting to discuss the necessary changes and/or return the application package to the applicant with a listing of deficiencies that need to be corrected before the application can be resubmitted as complete.

Application processing will begin when an application that is apparently complete is accepted by the local administrator or the state administrator. When received by the local administrator, the local administrator shall assign it a number, acknowledge its receipt, and make an initial determination of whether the proposed activity is a state or local concern in accordance with LA R.S. 49:214.25(A). Copies of all applications submitted to Plaquemines Parish's local administrator along with the local administrator's initial determination shall be submitted to the Secretary within two (2) working days of receipt. This determination is subject to the review of the Secretary. The local administrator shall notify the project applicant of the initial determination and that the application has been forwarded to the Secretary.

Upon the determination that a permit application is a local concern, and has been confirmed by the Secretary, the local administrator shall make public notice of the pending local use application in the parish official journal made in accordance with LAC 43:1,723(C)(5) and review the application for consistency with the state and local coastal zone management program guidelines.

The CZM Administrator will review the CUP application in order to determine if a CUP is required. Should the CZM Administrator determine that the proposed project would have no direct and significant impact (NDSI) on coastal waters, a NDSI letter will be submitted to the applicant in lieu of a CUP. The CUP exemptions and NDSI determinations do not exempt an applicant from the need to obtain other federal, state, and local permits and authorizations that may be required for a project. If a CUP is required, the CZM Administrator will coordinate the processing of the CUP application with other state and federal agencies and other branches of Plaquemines Parish Government, as needed.

Public Notice and Comment Period

A public notice will be placed by the CZM Administrator for publication in the official parish journal within 10 days after the CUP application has been determined to be of local

concern and deemed complete. The notice will include the name of the applicant, legal description of project location, layman's geographical description of the approximate project location, description of the proposed project, wetland acreage impacted by the project, the location and time of where and when the application package can be reviewed, and an address for sending written comments. The public notice will advise of considerations to be reviewed prior to issuance of the CUP. The notice will provide the public with a 25-day public comment period with printed starting and ending dates. Only comments received on or before the ending date of the public notice will be considered by the Committee in the determination if a public hearing is warranted. Comments received after the ending date will be accepted and added to the project file and may be used in the permit decision process, but not used in the determination if a public hearing is to be conducted.

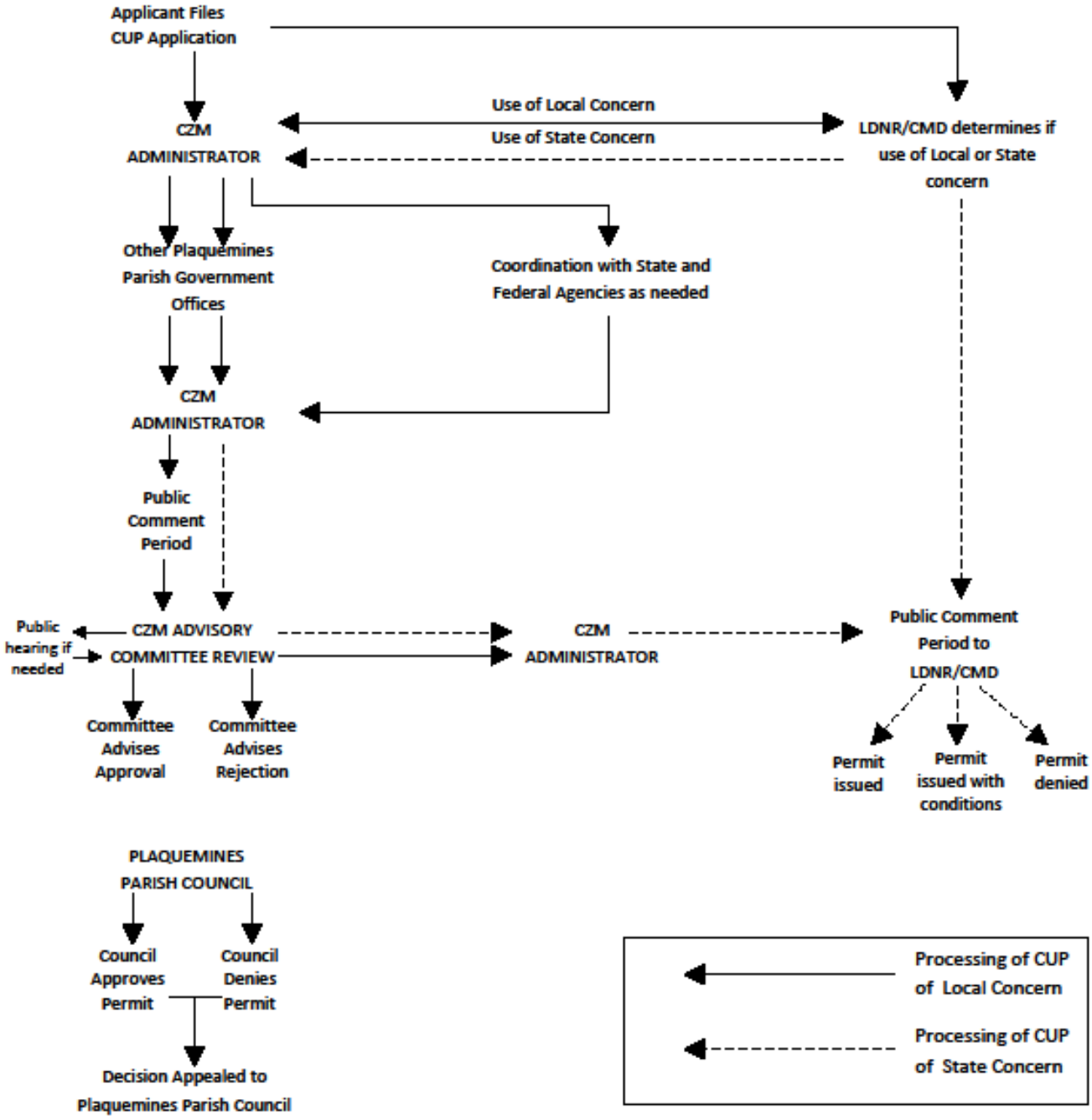

Figure 7.1. Sample procedure for processing a coastal use permit for activities of local concern.

Public Hearings

The primary reason for conducting a public hearing is for the solicitation and procurement of additional information that can be used in the CUP decision process. Should the determination be made that a hearing is required, the CZM Administrator will be responsible for scheduling a time and location to hold the hearing. The location of the hearing should be in the same general geographical location in the parish as the proposed project (north, central, south) unless other factors justify having the hearing in another location. A public notice will be placed for publication in the official parish journal with a minimum of 30 days notice of the hearing. The public notice will contain the location, time, and nature of the public hearing and the location(s) and time(s) that project plans can be reviewed by the public prior to the hearing.

The public notice period shall remain open from the initial start day of the 25-day public comment period, through the public hearing notification period, until 10 days after the public hearing has been conducted.

All public hearings will be facilitated by the CZM Administrator, chairman of the Committee, or Parish President. The CZM Administrator will solicit input from the CZM Advisory Committee and parish administration prior to determining who will facilitate the public hearing. The hearing may be facilitated by more than one person. An attendance sheet(s) should be available to document public attendance and made part of the CUP application record.

The hearing will be opened by the facilitator with an introduction and brief overview of the reasons for holding the public hearing and a procedural explanation of how the hearing will be conducted. The applicant will have the opportunity to make a presentation on the proposed project. If the applicant does not want to give a presentation or is absent at the hearing, the facilitator will describe the project in an objective manner. Depending on the number of expected participants, people interested in speaking may be required to sign speaker cards to speak. People wishing to speak may be advised as to a specific time limit and the number of times they can speak. Specified time limits and protocol should be followed; however, if enforcement of these guidelines is not maintained during the hearing, all speakers should be given equal opportunities.

While written transcripts of public hearings are not routinely required, all hearings shall be recorded on an audiotape that becomes part of the CUP application file. The development of a verbatim transcript may become a necessity at a later time due to the issuance or denial of a CUP and an appeal and/or other associated action. The CZM office and/or parish will be responsible for bearing the costs of transcribing public hearing tapes. Tapes of public hearings should be maintained by the CZM Administrator for a minimum of one (1) year.

Compensatory Mitigation

During the CUP review process, the CZM Administrator will advise the applicant if the Committee has determined that compensatory mitigation will be required as a prerequisite to the issuance of the CUP.

The applicant will be informed as early as possible about mitigation, particularly when it is apparent that a CUP will be issued. The CZM Administrator will inform the applicant of types of acceptable mitigation and associated regulatory requirements.

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 LDNR.

CUP Decisions

The CUP decision process involves consideration of the proposed activity, impacts of the project on human and natural resources, private and public benefits to be derived from the project, and possibly other factors.

Additional information may be required in order for the CZM Administrator to complete the CUP decision process. Should relevant questions and/or concerns about the project be raised during the public comment period and/or public hearing, the CZM Administrator may ask the applicant to provide a written response to said questions and/or concerns. The CZM Administrator may send copies of all of the public correspondence or selected questions and concerns from the correspondence to the applicant. If a public hearing is held, the CZM Administrator will be responsible for the identification and compilation of questions and concerns raised during the hearing that the applicant would need to address.

The time period required for issuance of a CUP will depend on the nature and complexity of the proposed activity, the timeliness and content of additional information submitted by the applicant, if requested; the submittal and acceptance of an appropriate mitigation plan, if required; the need for a public hearing; and possibly other factors.

All CUP's will be issued with standard conditions. Special conditions can be added to an individual CUP, as required. Copies of the vicinity map and plan and cross-sectional views from the application will be attached to, and made part of the CUP. The CUP will become effective after approval of the Committee and upon signature by the CZM Administrator or Parish President after the appeal time has expired.

The CUP will be valid for a period of two (2) years. One 2-year time extension may be granted for a CUP, but the applicant must request the time extension at least 20 days before the expiration date of the CUP. If the request is received within the 20-day period before the original CUP expires, the time extension request will be denied without prejudice and the applicant will need to file a new CUP application for reauthorization of the project.

CUP Appeals Process

Reconsiderations, judicial review

The Plaquemines Parish Council will serve as the appeals board for reviewing decisions of the Committee.

A decision or determination shall be subject to reconsideration if a petition for reconsideration is filed in writing with the CZM Administrator within ten days following public notice of a final coastal use permit or receipt of written notice of a determination.

A written brief pertaining to the appeal issues must be filed within 30 days after the notice of appeal is filed and must contain the following items:

- the CUP number,
- name of the applicant,
- brief description and location of the permitted activity,
- description of how the CUP is contrary to law and any issues providing grounds for appeal,
- statement of facts regarding the permit decision and any information that may be used to determine whether or not the decision to issue the CUP was supported by fact,
- statement regarding how the appellant would remedy the CUP (e.g., revocation, modification),
- statement from appellant that the contents contained in the written notice are believed to be true, followed by the party's signature and that of the party's legal representative, if applicable,
- The name, address, and telephone number of the appellant and, if applicable, the party's legal representative, and copy of the CUP being appealed.

Upon receipt of a complete appeal brief, the CZM Administrator shall notify the appellant by registered mail of said receipt. Any opposition or response to the appeal may be filed by any

person. The opposition or response must be filed within 30 days after the appeal brief is filed.

The CZM Administrator shall provide copies of the appeal notice, appeal brief and oppositions to the applicant as well as to the Parish President, the Parish Administrator, members of the Plaquemines Parish Council, and other affected parties, if applicable. The CZM Administrator shall be responsible for scheduling an appeal hearing date that will constitute a special meeting of the council. The date, time, and location of the appeal hearing will be published in the official journal of the parish at least 25 days prior to the date of the hearing.

A quorum of Plaquemines Parish Council members must be present before the appeal hearing can begin, with the Council Chairman serving as meeting facilitator.

In the absence of the Council Chairman, the Vice Chairman will serve as meeting facilitator. The same protocol used for public hearings may be used for appeals hearings. The hearing will be audio taped in the event a transcript of the hearing is needed at a later date.

The Council may discuss the merits of the case after all parties have testified, convene in Executive Session, and/or adjourn and take the hearing under advisement.

The decision to uphold, modify, or overturn the Committee's decisions to grant or deny the permit shall be made within 30 days of the date of the appeal hearing by a majority vote of the Council**.**

Any person authorized by R.S. 49 §214.35 to appeal a coastal use permit decision or any local government aggrieved by a final decision on approval of a local program may seek judicial review of that decision whether or not a petition for reconsideration has been filed under this Section. A preliminary, procedural, or intermediate action by the secretary or a determination of local or state concern under R.S. 49:214.30(C)(1) or of direct and significant impact under R.S. 49:214.34 is immediately reviewable if review of the secretary's final permit decision or action would not provide an adequate remedy or would inflict irreparable injury.

Proceedings for review may be instituted by filing a petition in the district court of the parish in which the proposed use is to be situated within thirty days after mailing of notice of the final decision by the secretary or, if reconsideration is requested, within thirty days after the decision thereon.

Judicial review shall otherwise be pursuant to the Louisiana Administrative Procedure Act, provided that all such cases shall be tried with preference and priority. Trial de novo shall be held upon request of any party.

Local Enforcement and Monitoring

The CZM Administrator will utilize available resources to inspect projects of Local Concern. Plaquemines Parish personnel, in the normal performance of their duties, may be asked to monitor permitted activities to ensure that such activities conform to their permit specifications and conditions in regards to environmental impacts. Enforcement and monitoring needs to be funded and prioritized and Plaquemines Parish currently has no legitimate enforcement capabilities, in the field or thru the court system.

Project Completion Notice

Upon completion of a project of Local Concern, the permittee has 30 days in which to file with the CZM Administrator a sworn declaration of completion. The declaration must contain the application and permit number and certify that the project has been completed in accordance with the plans and specifications in the approved permit.

Violations

Any individual, department, agency, or corporation may report violations to the CZM Administrator. The first step taken by the CZM Administrator, after notification, is to contact the permittee and attempt to alleviate the problem. A minor violation may be handled through the submittal of an as-built drawing depicting the revised project layout with an explanation as to the specific problem(s) encountered and remedial action(s) taken. Should the permittee be uncooperative and/or the violation is of a serious nature, the CZM Administrator must take the matter to the Plaquemines Parish Council. If the violation is not resolved at this stage, the violator can be prosecuted. At the court's discretion, conviction of a violation is punishable by a fine up to one hundred dollars ($100), imprisonment up to thirty (30) days, and/or the project site restored to pre-project condition. For the purpose of assessing penalties, each day of the violation shall be deemed a separate offense.

Special Area Management

Procedures for Consideration of Uses of Greater than Local Benefit or Impact

Special Areas are defined as those areas that "…must have unique and valuable characteristics, require special management procedures, and be managed for a purpose of regional, state, or national importance." Any person, local government, or state agency can nominate an area in the Coastal Zone for designation as a Special Area. If the area is accepted by the Plaquemines Parish CZM Advisory Committee as a Special Area, the LDNR-CMD shall assist the Governor in the appointment of a task force and provide assistance to the task force with the development of policy and guidelines for managing the Special Area.

Plaquemines Parish does not recognize a Special Area in the parish at this time. However, the parish reserves the right to nominate a Special Area in the future.

CHAPTER 8. GOVERNMENT AND PUBLIC PARTICIPATION IN PROGRAM DEVELOPMENT

A preliminary draft of the CZM Program was developed through a series of meetings held by the CZM Advisory Committee between May 1999 and January 2000 (May 8, 1999; June 16, 19999; August 18, 1999; September 15, 1999; October 20, 1999; and January 19, 2000) in Belle Chasse. At the May 8th meeting, representatives of the LDNR, Coastal Management Division presented an overview of the state's CZM Program and components that needed to be included in the local CZM Program. Representatives of Coastal Environments, Inc. (CEI) presented information on the proposed scope of the CZM document and project schedule.

On June 16th, 1999 CEI presented background information on the environmental setting, potential environmental management unit (EMU) boundaries and corresponding data that could be derived from the state's Coast 2050 project, and overall land loss and habitat change that had occurred in the parish since the mid-twentieth century. At that meeting, the CZM Advisory Committee decided to adopt the Coast 2050 environmental mapping unit boundaries as the EMU boundaries for the CZM Program.

On August 18th, 1999 CEI presented the CZM Advisory Committee with a draft portion of the CZM Program document pertaining to the EMUs and possible goals, objectives, policies, and priorities of use for these EMUs. The contents of the draft were reviewed and the CZM Advisory Committee was asked to submit comments and revisions prior to the next meeting.

On September 15th, 1999 the revisions and comments on the draft portion of the CZM Program document submitted on August 18th were reviewed and changes were noted. Another section of the document pertaining to the CZM Program Administration was handed out for review and comment prior to the next meeting.

On October 20th, 1999 the CZM Advisory Committee continued to review the EMUs, goals, objectives, policies, priorities of use, and the administration of the permit program, including processing of a coastal use permit.

On January 19th, 2000 a preliminary draft of the CZM program document, excluding the chapters on summary of the program and participation in program development, was delivered to the CZM Advisory Committee for review and comment. A discussion of the chapter on program administration resulted in several changes to the text and the permit process diagram. The CZM Advisory Committee was asked to review the document and submit final comments in order to prepare a draft document for public review prior to the Public Meeting.

On March 10th and 17th, 2000, the following Public Notice was printed in The Gazette, "Plaquemines Legals", stating that the preliminary draft of the Plaquemines Parish Coastal Zone Management Program was available for review and that a Public Hearing was scheduled for 7:00 PM, April 12, 2000 at Port Sulphur Civic Center, 278 Civic Drive, Port Sulphur. The same Public Notice was printed in the Plaquemines Watchman on March 14, 2000.

PUBLIC NOTICE

Public Notice

Plaquemines Parish Government

The Coastal Zone Management (CZM) Advisory Committee of the Plaquemines Pa Government is developing a local CZM program that will provide for the recognition of importance of, and the need for conservation and management of coastal resources. The prog will be administered at the local level in cojunction with the Louisiana Department of nat Resources. The CZM Advisory Committee is requesting input from the public in developing program by reviewing and providing comments on the draft CZM Program document. A pu hearing to discuss the program and document will be held on Wednesday, April 12, 2000 at 7 pr the Port Sulphur Civic Center, 278 Civic Drive in Port Sulphur.

Copies of the draft CZM document are available for review at all Plaquemines Pa Government offices, Parish council offices, and public libraries during regular working hours. document will be available for review from Friday, March 10, 2000, at 12 pm, until the end of working day on April 24, 2000.

Prior to the public hearing, comments and/or questions regarding the document can submitted in writing to:

Victoria Caridas
CZM Administrator
106 Avenue "G"
Belle Chasse, LA 70037
Fax (504) 394-9541
E-mail Vicky_caridas@webmail.bellsouth.net

At the public hearing comments and/or questions may be submitted in writing and/or orall Written comments will be received until April 24, 2000. Your participation in this proces appreciated.

The local Public Hearing on the Plaquemines Parish CZM Program was held at the Port Sulphur Civic Center, Port Sulphur on Wednesday, April 21, 2000. Victoria Caridas, CZM Administrator, opened the meeting and made a brief presentation on the development of the draft program before opening the meeting to questions and comments. The hearing was recorded. There were no public comments or questions made at the Public Hearing and the hearing was adjourned. Furthermore, no public comments or questions were mailed or e-mailed during the public comment period following the Public Hearing.

After review of the Program by the Louisiana Department of Natural Resources, on July 13th, 2000 Plaquemines Parish adopted a resolution to implement the Plaquemines Parish Coastal Zone Management Program.

On September 22, 2011 the Parish adopted an ordinance approving Evans-Graves Engineers, Inc. as the engineers of record selected for the required Update of the Plaquemines Parish Coastal Management Plan. In coordination with the Plaquemines Parish Coastal Zone Management Committee, Evans-Graves Engineers and GCR Inc. updated the Plaquemines Parish Coastal Zone Management Program to produce a draft Update for public review.

On January 7th, 2013, a Public Notice was distributed to the public through the Plaquemines Parish Government email listserve, stating that the Plaquemines Parish Coastal Zone Management Department would be holding a public hearing to present the Update to the Coastal Zone Management (CZM) Program and provide the public with the opportunity to present their views and opinions on the proposed CZM Program Update. On January 8th, 2013, the same Public Notice, shown below, was printed in the Gazette.

PUBLIC NOTICE OF PUBLIC HEARING

PLAQUEMINES PARISH

COASTAL ZONE MANAGEMENT PROGRAM UPDATE

The Plaquemines Parish Coastal Zone Management Department will be holding a public hearing to present the Update to the Coastal Zone Management (CZM) Program and to acquire information which will be considered in evaluating the Update to the CZM Program. The hearing will also provide the public with the opportunity to present their views and opinions on the proposed CZM Program. The public hearing will be held at the time and location listed below.

Date:	**Thursday, February 7th, 2013**
Time:	**6:30PM – 8:30PM**
Location:	**Belle Chasse Branch Library** **8442 Louisiana 23** **Belle Chasse, LA 70037**

Public Comment and Inspection of the Update to the CZM Program
At the public hearing, the public will have the opportunity to provide written and oral comments on the Update to the Plaquemines Parish Coastal Zone Management Program which will be included in the public record. The Updated CZM Program Draft Document is currently available for public inspection at the locations listed below.

- Plaquemines Parish Government Building, 8056 Louisiana 23 #200, Belle Chasse, LA 70037
- Belle Chasse Branch Library, 8442 Louisiana 23, Belle Chasse, LA 70037
- Buras Library, 35572 Hwy 11, Buras, LA 70041

The public can also view and comment on the Updated CZM Program Draft document at the program update website: **http://www.ppgczmprogramupdate.com/**

Public Inspection of the Public Record
The public hearing will be recorded by a court reporter. The public record of the hearing will be provided at the above listed locations for at least ten (10) days following the hearing.

For more information about the Public Hearing or the Update to the CZM Program please visit the website listed above or contact the project manager Stephen Lundgren at slundgren@evans-graves.com or (504) 836-8190.

A public comment was received stating that many East Bank residents were still recovering from the effects of Hurricane Isaac and had insufficient mode of travel to attend the public hearing scheduled on the West Bank in Belle Chasse. The comment recommended a second meeting on the East Bank of Plaquemines Parish to accommodate these residents. On January 29th, 2013, the following announcement was provided to the Plaquemines Parish District 1 Councilman for distribution to the residents of District 1.

PUBLIC NOTICE OF PUBLIC HEARING

PLAQUEMINES PARISH

COASTAL ZONE MANAGEMENT PROGRAM UPDATE

The Plaquemines Parish Coastal Zone Management Department will be holding a public meeting to present the Update to the Coastal Zone Management (CZM) Program and to acquire information which will be considered in evaluating the Update to the CZM Program. The meeting will also provide the public with the opportunity to present their views and opinions on the proposed CZM Program. The public meeting will be held at the time and location listed below.

Date:	**Tuesday, February 5th, 2013**
Time:	**1:30PM – 3:30PM**
Location:	**Rev. Percy M. Griffin Community Center** **15511 Hwy 15** **Davant, LA 70040**

Public Comment and Inspection of the Update to the CZM Program
At the public meeting, the public will have the opportunity to provide written and oral comments on the Update to the Plaquemines Parish Coastal Zone Management Program which will be included in the meeting record. The Updated CZM Program Draft Document will be available at the meeting and is currently available for public inspection at the locations listed below.

- Plaquemines Parish Government Building, 8056 Louisiana 23 #200, Belle Chasse, LA 70037
- Belle Chasse Branch Library, 8442 Louisiana 23, Belle Chasse, LA 70037
- Buras Library, 35572 Hwy 11, Buras, LA 70041

The public can also view and comment on the Updated CZM Program Draft document at the program update website: http://www.ppgczmprogramupdate.com/

For more information about the public meeting or the Update to the CZM Program please visit the website listed above or contact the project manager Stephen Lundgren at slundgren@evans-graves.com or (504) 836-8190.

At both the February 5th and February 7th 2013 meetings, Stephen Lundgren of Evans-Graves Engineers presented an overview of the Update, explaining the purpose and some of the major features of the document before opening the floor to comments and questions. A transcript of the February 7th public hearing is provided in the following pages. A summary of the comments received during the February 5th and February 7th meetings as well as responses to these comments are provided following the public meeting transcript.

In fulfillment of the provisions of L.A.C. 43:I.725(D), the Department of Natural Resources, Office of Coastal Management (OCM) provided a public comment period on the Coastal Zone Management Program Update. During this public comment period, the OCM held a public hearing at 1:00 p.m. on Wednesday, November 6, 2013 at 617 North Third Street, Baton Rouge, LA. OCM and Evans-Graves Engineers staff were in attendance, and Evans-Graves Engineers presented an overview of the Update. No members of the public were present. As of the date of the public hearing, no public comments had been received and none were received at the public hearing.

PLAQUEMINES PARISH

COASTAL ZONE MANAGEMENT PROGRAM UPDATE

PUBLIC HEARING

PLAQUEMINES PARISH COASTAL ZONE MANAGEMENT PROGRAM UPDATE, PUBLIC HEARING, TAKEN ON THURSDAY, FEBRUARY THE 7TH, 2013, AT THE BELLE CHASSE BRANCH LIBRARY, 8442 LOUISIANA 23, BELLE CHASSE, LOUISIANA

REPORTED BY:

KRISTINA D. REA

Certified Court Reporter

MR. LUNDGREN:

We will go ahead and get started. First of all, I'm going to just go down the slide presentation. We are just going to read this off so

we all understand and know why we are here.

The Plaquemines Parish Coastal Zone Management Department, otherwise known as the CZM, is holding this public hearing to present the update to the CZM program and to acquire information which will be considered in evaluating the update to the CZM program.

The acquiring information part is why we are here, for you. We want to hear what you have to say. We want to gather your knowledge and input and put it into our document so we have a document that the whole Parish has contributed to.

This hearing will also provide the public with the opportunity to present their views and opinions on the proposed CZM program. At the public hearing, the public will have the opportunity to provide written and oral comments on the update, which will be included in the public record, and we do have a reporter here taking minutes as part of the requirements. This will be a public record document. So that is why we are here today.

My name is Stephen Lundgren. I'm with Evans-Graves Engineers. We are the prime consultants working for the Parish on the Coastal Zone Management Program Update. We are working in association with GCR. Two of their representatives are here, Billy and Joel. Karla Cormier is here representing the Parish. She is Grant's consultant. So thank you all for being here.

Next slide. This slide is just the title of the document. I just want to go over a few

things on this. This is the cover page of the document. You'll see that this is the update to the Plaquemines Parish Coastal Zone Management Program. The original Coastal Zone Management document was put out in the year 2000. And under law, you're required to update this document as changes in the Parish occur. Typically, every ten years is the requirement. So here we are updating that document right now.

And you can see the agencies that are involved. The former MMS, which is now the BOEMRE, Bureau of Ocean Energy Management Regulation and Enforcement. They are the federal grant behind this project as well as the U.S. Fish and Wildlife Service, the federal money coming into the Parish to

pay for this update to the program.

November 2012 is the date that that program went through the Plaquemines Parish Coastal Zone Management Committee. It was approved by the committee, sent forth to us to gather public opinion. After the public opinion, it will go to the Department of Natural Resources for the State's buyoff on the program. And this is also being paid, I should say, with a grant from the Coastal Impact Assistance program, the CF program.

All right. Coastal Zone Management Program Information. As I mentioned, a little background, this is the required ten-year update to address changes in the Parish that have occurred in the year 2000. Of course, there has not only been

changes -- a major change in 2005, but other changes in coastal zone management strategies and standards themselves in addition to the physical and geological and the demographic and socioeconomic makeup of the Parish itself. So we want to capture all of that in this update.

What the document is, this is a guidance document for addressing coastal management goals and objectives on a macro scale. So, in other words, from a global standpoint, how do we manage all these

issues affecting the Plaquemines Parish coast.

What the document is not: This is not a master plan for addressing or proposing specific projects on a microscale. Of course, that -- the State put out its master plan, and that went through a separate public hearing. This is not that. This is a management program, not a master plan. So I just want to make sure we understand that this document does not recommend a specific project. It talks about the coast from a management standpoint.

Who is involved, I went through that briefly. Evans-Graves is in association with GCR. We are the A/E team working for the Parish. Plaquemines Parish CZM is the local; the State is the Department of Natural Resources; and the feds are the BOEMRE working for the CI program.

Okay, next. So why develop a local Coastal Management Program, why is this important. Well, the CZM is the centralized information hub that helps coordinate local implementation of the many state and federal agencies who may not always

put local concerns first. So you got state and federal agencies who might not know anything about Plaquemines Parish. The CZM is their coordination arm and the information hub of that. We've got all

the information here, we've got the knowledge, and so we want to be their go-to people.

The regular meetings, which the CZM does have regular meetings, provide a forum for locals who know the area best to speak out on what should be priority issues and economic considerations. That is one of the reasons why we are here tonight.

Bullet point three says, "To reassert an increased level of local control and permitting authority over activities and uses that would typically be regarded as uses of local concern." I like that language, reassert an increased level of local concern. We know, you know, we all know what is best for Plaquemines Parish. We work here, we live here. Someone working in Baton Rouge or someone working in Washington, D.C. might not fully understand that. So we want local control.

That little asterisks is a definition of a use of local concern. "Those uses which directly and significantly affect coastal waters and are in need of coastal management but are not uses of state concern." I'll talk about that a little bit later on. I just wanted you to understand the definition.

The goal is that we have a more direct and timely review and processing of permit applications.

We all know permits can take a long time. If we've got a management document, that gives us guidelines for permit reviews that will streamline that process.

Number four says, "To take an active role in participating in the decision making that shapes coastal management policy locally and state wide." That is kind of self-explanatory, and obviously we want our local coastal management program to be active in that decision making, and to help facilitate communications regarding access to funds for resource management.

So that is why we have the Coastal Zone Management Program. Why do we have this document? This document will define the decision-making processes regarding the uses and activities affecting coastal resources. Specific projects, as I mentioned before, are handled through a master plan, not through the Coastal Zone Management Program. So this is a decision-making guideline document.

And I want to emphasize here, but we will talk about it a little later on, but goals, objectives, policies and priorities of use. Those are four general headings for our guidelines. When

we talk about the CZM gets a permit across their desk, we want to look at what are the goals, the objectives, the policies and the priorities of use, and identify that specific to a ceratin geographic area. We will talk about that a little later on, too, but those are the guidelines.

Okay. This slide you've seen too many times. I don't think I need to go through it. Plaquemines Parish has lost an enormous amount of land, and we all know that. But this is why we need coastal management. We want to help that land loss, hopefully build back some of that land loss, but right now we want to be able to manage what we have and keep what we have and sustain what we have with an eye towards restoring in the future.

Plaquemines Parish land use and habitat areas. This slide kind of defines what we are going to go into next, and that is the environmental management units or the individual geographic areas. It's a very diverse parish, as you all know. It's a long, skinny parish. There is an east bank and a west bank. How do you manage all these different geographic and socioeconomic and demographics? How do you manage all that into one document and be able to manage the coast effectively?

So land use is certainly one criteria we look at. Basically everything within the levee system -- that is the Mississippi River levee and the back levee -- everything within that levee system is the first two land uses, uplands or fastlands. Those two land uses do not require a coastal use permit.

So the first step when a permit comes across the desk is, is this in a leveed area? Is it an uplands or a fastlands? If so, no coastal use permit is required. Of course, the bottom two,

wetlands and coastal waters, that is where the coastal use permit kicks in and that is a big concern and that is why we want to have this document. So this just shows you the different habitats of the Parish and sort of sets up a guideline for how we get up our geographic subdivisions, which is the next slide.

The environmental management units. The Coastal Zone Management Program document recognizes 22 separate environmental management units in the Parish. Of those 22, 21 are outside of the leveed areas. So everything inside the levee is one environmental unit, don't need a coastal use permit for it. We will just call it one EMU, and say it's

kind of exempt from most of the coastal use permit requirements. The other 21 EMUs are divided based on geography, land use, hydrologic characteristics, waterways, and that division will facilitate the management of what goes on in that certain area.

Okay, next slide. The Coastal Zone Management Program document contains these matrices. There is many more pages of this than what we show you here. We just printed out the first one, just to give you an overview of what it might look like. Goals, there are 34 goals that were identified. We are just showing you nine right now. The document contains all 34. These goals here are organized -- the vertical columns represent the environmental management units, the EMUs. So we identify goals for the Parish and we say does that goal fit in with each certain environment management unit. If it

does, it gets a pound sign. If it does not, it's left blank. So as you can see, some of them are parish wide. It's a common parish goal.

For instance, number four and five, "Require mitigation measures where development activities adversely impact wetland and aquatic environments." Of course, any time you impact the wetland negatively, you need to provide mitigation.

"Encourage land use compatible with wetland and aquatic habitats." Of course, we want compatible projects with the habitat.

So some of those things are common across the Parish. A few of them are specialized. Number two, "Maintain, protect, and/or restore barrier islands, headlands and adjacent wetlands as hurricane buffer zones." That is not parish wide. There is only certain hurricane buffer zone areas.

So that is, you know, once a permit comes across the Parish's desk, they are going to figure out what EMU this is in and go to this chart and make sure the goals, objectives, priorities and processes are met.

I might just say that there is probably four overall parish objectives or priorities. Beneficial use of dredge material, that is something that is going to be throughout the Parish. Any time you dredge, we cannot let that material float away. We need to be able to capture that material and beneficially reuse it to help restore our coast.

Protection from storms, of course, like we

just said about the barrier islands. We need storm surge protection. Land mass does that -- Mother Nature does that great for us. Give us protection

from the storms by increasing the land mass and not having it erode away.

Enforce the policies and the permits that we've got. We need enforcement. It's one thing to be able to review this and manage it, sign off on a permit and give it to someone. We need to be able to enforce and police those activities. And then, of course, provide some sort of measure when the activities are not being complied with.

And then sustain the remaining resources we have. I mean, we are losing land. We want to be able to stop that land loss. In the future, we want to be able to build back that land. But we want to be able to sustain what we have now. We have got people here. We've got tremendous resources: fisheries, oil, oysters. We want to be able to sustain all that and manage it properly.

Okay, next slide. This the objectives. There is 26 of these we identified through the Parish. Again, some of them are Parish wide, consistent. "Improve and maintain water quality." I mean, obviously that is throughout the Parish. Any time you do a project, is it going to impact the water quality? If so, we need mitigation or we need you to alter your project so it doesn't.

And then some of them are very specialized. The first one up there, "Remove

remnant abandoned artificial levees to facilitate overflow of Mississippi River waters into adjacent wetlands." That is a specialized objective to the American Bay EMU. It doesn't apply everywhere.

So again, what we have here is a just a matrix of what are our objectives, what are our goals, and what geographic area do they fit into.

Next. Policies, there are 17 of these identified in the document. This is just the first grouping. Some are common throughout the Parish, and some are a little more specialized. I'll go through one real quick that is very common in the Parish. "Oppose activities that damage wetlands and water bottoms unless such activities are sufficiently mitigated." The only one that does not apply to is the EMU that does not have wetlands, the fastland EMU. Everywhere else, of course, we want to oppose any activity that is going to damage wetlands unless it provides mitigation.

Next. Priorities of use, there are 14 of these. These are all of them. Same concept: Vertical, you've got the EMUs, you got each priority, does it apply; if so, it gets a mark.

You'll see one that is parish wide, recreational activities. That is a priority. This Parish is very wealthy, you know, in sport fishing, boating. We want to maintain those recreational activities and not discourage that.

Okay, next. This slide here shows you just some of the things -- the next few slides show

you some of the constraints and conditions in the Parish that we need to be mindful of and sort of work around and work with when we are talking about permits. Oil, gas wells and pipelines, of course, they are all over the place. We need to be mindful of those. We need to work with those agencies. We need to know where they are so that when a permittee comes in and wants to do a project, we need to be able to coordinate with all the infrastructure.

Wildlife, of course, we need to know where the bird rookeries are, we need to know where the wildlife management areas are, the refuge areas. Projects might not be allowed without -- that don't provide mitigation. And there is like -- projects probably aren't allowed at all in the refuge and wildlife management area. But if so, they have to provide mitigation and the same with the rookeries. We need to know where those are to be able to

dictate and say what the special conditions are for a permit.

Oyster resources, of course, they are all over, also. Oyster leases, we need to know where those are. We need to make sure that a project does not adversely affect an oyster lease and just keep our oyster resources strong.

So now we get to a slide that shows the current coastal restoration projects in Plaquemines Parish. This is just a highlight. The next two slides are actually going to tabulate what is going on around the Parish. This is just sort of an outline. And you can see the diversity from all the

way up in the north to all the way down south. They have projects going all throughout the Parish right now, coastal restoration projects. And just about, you know, a lot of the EMU, too. So it's widely spread. I think the Parish has done a nice job of diversifying the projects and making sure that everyone -- every area at least has some projects that are going to benefit it.

Next slide. The next two slides show the coastal restoration projects that are ongoing. If you look at the project type column, you can see there is many different types of what is defined as

a coastal project. Could be a levee, a marsh creation, it could be a diversion, could be a ridge, plantings, barrier island restoration, flood protection. All these things are classified as coastal restoration projects, and the diversity of those types of projects kind of show you why we need a management guideline document. There is so many different types of projects here, how do we manage them all, how do we set goals and priorities for all the various types of projects we have.

If you look at the last two columns, that shows you another reason why we need this guidance document. The variety of agencies and entities that are sponsoring these projects. You got the Corps, you've got National Resource Conversation Society, you've got BOEMRE, National Marine and Fisheries, EPA, U.S. Fish and Wildlife, just to name a few. You got the State, of course. You've got WRDA,

CWPPRA, all these different programs. So we want one document that is able to manage and give guidance to all these varieties of project types and sponsors.

And the next slide is just a continuation of the previous slide showing again the current coastal restoration projects in the Parish.

Now we get to the State master plan that came out in 2012. I know you-all are probably familiar with that document. It's just a slide to show you some of the things that were in the State master plan. By including this slide, we offer no endorsement or narrative of any of that. This is not the forum for that. We are just showing you what the State has identified as their master plan projects. They already went through a public comment process on that, so we are not going to really -- we are welcome to hear your comments on that, but we are not going to include specific comments on this in our document. The document is just a management document.

And then the next -- this is the short term, this is the long term. So through the year 2061, this is what the State has on their master plan for Plaquemines Parish.

The next slide is the tabulation of those master plans again. Varied project types, you've got barrier islands, sediment diversion, marsh creation. You've got structural protection, which could be a levee or a flood wall, lots of different types of projects that fall into this coastal

umbrella.

Next slide. This is a sample procedure for the Parish's guidance, what happens when someone applies for a coastal use permit, which is abbreviated CUP. It's not shown on here. The first step would actually be, do we need a coastal use permit? What is the land use? Is it a wetland or is it a fastland? If it's a fastland, you bypass this whole matrix and no CUP is required. You get a letter back from DNR that says you're exempt and so they can go to work.

If it's found to be in a wetlands, then there is a flow chart here that is provided. First thing, is it a use of state concern or is it a use of local concern. State concern is basically does it cross more than one body of water, does it cross more than one parish, what is the sheer size of it? If it's an enormous project, the state is concerned. Is there federal money involved? These types of things would say, yes, the state wants to be able to have a say-so in this CUP.

Otherwise, if it's a smaller project, maybe strictly on parish property, strictly restricted to one body of water in one parish, no pipelines or wells or oyster leases or anything like that are involved, then the state might kick it back

and say this is a local project, you take it. In which case the CZM administrator would become the main reviewer there.

So basically the coastal use permit, it's a mechanism for the Parish to manage the activities. And what is the end result of this? The Parish is going to come out and they are either going to approve, deny or allow with conditions the permit. They will either say your permit is approved, go to work; they'll say your permit is denied, resubmit something that meets our criteria, or they can say it's approved with condition. You can go to work but you have to do mitigation. And that will all be spelled out in the permit itself.

So again, this document will help the Parish, you know, speed up and put on a fast track the permit review so they can say let's look at where this is, let's look at our charts, it seems to meet all our criteria, seems to not require mitigation, or they can offer conditions based on our document also.

CUPs are typically valid for two years. You can apply for an extension at the end of that two years. And, of course, the Parish would be responsible -- once the permit goes through and the

work starts, the Parish would be responsible for the monitoring, enforcement and handling of any violations.

So that is the end of our presentation. We put this slide up here to remind you that there are comment cards available. We courage you to take those. Our address, Evans-Graves' address, is on the back so it will come to my office. We will take all comments and incorporate them into our document

with a response. So please do that, make use of that.

Next slide. We also want to remind you about the website. It's a long name but it's written there so you don't have to write it down. Through this website you can do several things. You can offer comments, click on this comment link. The website also offers important links to local, state and federal websites, any public hearing announcements -- which this will be the last public hearing. And you can also download the document itself. An electronic version, a PDF version, you can download that and print it out and review it.

And the last side is just, as I mentioned before, the website has a link to important -- called "Important Links," and these are some of

those links: The DNR, Office of Coastal Management, there is their web address; DNR Local Coastal Programs; Plaquemines Parish Coastal Zone Management, and Louisiana Coastal Master Plan 2012. You can click on all of those through from our website, and it will take you right to those websites.

So that is all we had for you. We will now offer anyone to make any public comment, written or oral, and thank you for your showing up and for your attention.

Billy or Joel, what is the timeframe for taking written comments from today?

MR. GILLIAM:

It's at least another 30 days --

MR. LUNDGREN:

Okay. That is what I thought.

MR. GILLIAM:

-- from the conclusion of this.

MR. WALLACE:

Or is it ten days?

MR. LUNDGREN:

I think 30 days is to receive the comments and then address them.

MR. GILLIAM:

Ten days we will actually put -- once we have a complete copy of this public record of this meeting, we will make that available at those locations on the announcement for ten days, but you will have 30 days to submit comments via the website or comment cards or e-mail, however you wish.

MR. LUNDGREN:

So after those 30 days, we will revise the document based on your input. We will finalize it and send it to DNR for their review. So we are looking at probably the end of April or so before the document is totally wrapped up.

MR. GILLIAM:

It should be noted that the State has their own public hearing process. They review the document and hold their own public hearings as well after it's been adopted by the Parish.

MR. ROUSSELLE:

I have just a couple of comments on the local CUP procedure. It looks like from --

comparing 2000 to 2012, some of the process, for instance, changes the appeal process from 15 days to 30 days from the time the CUP is either approved or rejected to submit the written brief, and then any opposition to the CUP appeal must file within 30

days instead of the current 60 days. Is there a reason why we are reducing the time for anybody to file?

MR. LUNDGREN:

Let's see. You're reading from?

MR. ROUSSELLE:

Local CUP procedure 1-34.

MR. LUNDGREN:

Okay. Those changes that were made from the 2000 document I believe mirror the changes that the State -- I don't think that was changed on a local level. I'll check into that, though.

MR. ROUSSELLE:

The next thing, and I'll move on, right below there where you see a quorum of Plaquemines Parish council members must present before the appeal hearing can begin -- I mean, must be present before the appeal hearing can begin with the counsel chairman serving as the meeting facilitator. In the absence of the council chairman it says here that the parish president will serve as the meeting facilitator. My personal opinion is that the vice chairman should serve in that capacity if the chairman is not there since they are both on the legislative same team and the executive may or may

not be at the meeting. The chain of command would fall to the legislative body which is actually the reviewing the permit.

MR. LUNDGREN:

Okay.

MR. ROUSSELLE:

Another brief comment is that in EMUs, the West Bank has two EMUs on page 1-21 number 15 for backfilling of borrow pits, whereas on the East Bank there are no EMUs designated for that. And I don't know if that is a good thing or bad thing, but if we are going to use a source over there we should maybe look at an EMU over there.

MR. LUNDGREN:

That looks like it's for filling of borrow pits, not digging, right?

MR. ROUSSELLE:

I'd like maybe a clarification on what that number 15 really means because it's confusing to me. But if I'm reading it or interpreting it my way, I would think they would need something on the East Bank.

MR. LUNDGREN:

Okay.

MR. ROUSSELLE:

One little minor note is that there is a listing in there about the ferry being free. They are not free. We have to pay a toll. You might want to correct that.

MR. LUNDGREN:

Okay.

MR. ROUSSELLE:

Other than that, in general reading of the document, I will made a broad statement that it's my interpretation from some of the comments that it is better to have large scale projects as compared to small diversions scattered out throughout the Parish, and you even have a statement in here that they do less harm to the oyster industry than the smaller diversions scattered out. So it might be my interpretation, but it seems to me that is a direction that the guidance shows is best to follow, and that would be larger projects.

MR. LUNDGREN:

Okay. I'm trying to remember where that might be in the document.

MR. ROUSSELLE:

I can give you a reading of that on page 1-12, and it may be reflected in the State's attitude more so than...

MR. LUNDGREN:

Yes, that might have -- I'm sorry.

MR. ROUSSELLE:

But that concludes my comments. Thank you.

MR. LUNDGREN:

Okay. Thank you. Let me take a look at that, 1-12.

MR. ROUSSELLE:

One more comment, I'm sorry. On the

historical maps for the storms that cross the Parish, is any way to be able to update that to show Isaac?

MR. LUNDGREN:

I noticed that, right. I noticed it was not updated. We will do that.

MR. ROUSSELLE:

And the other section where you have all of the elevations, the materials seem to be about ten years old if you could update that as well.

MR. LUNDGREN:

The elevations?

MR. ROUSSELLE:

Yes.

MR. LUNDGREN:

Okay.

MR. BALLAY:

I'm looking at the -- I'm getting the book for the first time, and maybe it's in there and maybe it's not. I would just suggest and like to see any of the projects and proposals, anything done, that there would be a cost set out of construction versus other costs, planning, preparation, environmental studies, et cetera, so we can see actually what money is going into the project construction wise versus all the other dollars.

MR. LUNDGREN:

Okay. I see. Planning and management dollars?

MR. BALLAY:

Planning, management, the prep and all that other stuff compared to the actual diesel and labor that goes into getting something done. That has always been a big concern down here for most folks, a lot of planning, a lot of planning --

MR. LUNDGREN:

Lots of studies.

MR. BALLAY:

Lots of studies and not much work.

MR. LUNDGREN:

Okay.

MR. BLINK:

When the Parish's management program is in conflict with the State master plan, how would that be -- are we going to have to go into litigation, or is there some sort of way to work it out?

MR. LUNDGREN:

That is not -- I can't speak to that, but that is why we are doing this document. We are not -- you know, we want to be able to tell the State we don't agree that this is the best project for us. Beyond that, once we've laid out the guidance and laid out what the Parish's priorities are and where it doesn't meet the State priorities and that the State wants to say, no, this is what we recommend, I don't know.

MR. GILLIAM:

Is there a particular issue that you had in mind?

MR. BLINK:

Like we may want to use fewer -- I mean, more smaller diversions where as opposed to they want to put 250 --

MR. LUNDGREN:

We know we are opposed that large diversion.

MR. GILLIAM:

The State is well aware of the Parish's position on that.

MR. LUNDGREN:

Yes. That is in the document also that we oppose the large diversions. But beyond that, we are not going to recommend litigation per se in this document, but I have heard it mentioned.

MR. ROUSSELLE:

I'm sorry, I have one more. There is some language that was removed in the process again with the CUP. In the event a majority vote cannot be obtained, the CUP will stand as issued. And that was taken out. So in a controversial situation where the CUP goes one way or the other, then what happens if, you know, issue is not held up?

MR. LUNDGREN:

I will have to look into that. I know we took out some of that language to bring it more in line with what the State's decision-making process on the coastal use program. I will have to look into that. We will address that in the revised document.

If there are no further questions, again

grab yourself a copy of the slide presentation on the back, grab some index cards, please. Hold on to them, think about them, write us. We want a strong case that -- we've always told the State this parish is very interested in what goes on here. We know you-all are and so we want to be able to show them you submitted comments and you-all were interested in this. I appreciate all the comments you-all have made so far. They are all on public record and they will be incorporated into our document. Thank you for that.

Again, my name is Stephen Lundgren. I'm on the document so feel free to call or e-mail at any time.

(Whereupon the meeting was concluded.)

REPORTER'S CERTIFICATE

I, KRISTINA D. REA, Certified Court Reporter in and for the State of Louisiana, as the officer before whom this testimony was taken, do hereby certify that said testimony was reported by me in the Stenotype reporting method, was prepared and transcribed by me or under my direction and supervision, and is a true and correct transcript to

the best of my ability and understanding.

I further certify that the transcript has been prepared in compliance with transcript format guidelines required by statute or by rules of the CSR Board, that I have acted in compliance with the prohibition on contractual relationships, as defined by Louisiana Code of Civil Procedure Article 1434, and in rules and advisory opinions of the CSR Board.

I further certify that I am not an attorney or counsel for any of the parties, that I am neither related to nor employed by any attorney or counsel connected with this action, and that I have no financial interest in the outcome of this matter.

This certificate is valid only for this transcript accompanied by my original signature and original required seal on this page.

Metairie, Louisiana, this 22nd day of February, 2013.

KRISTINA DIGIOVANNI REA
CCR NO. 20023

Responses to Public Comments Received
During February 5, 2013 Public Meeting
in Davant, Louisiana

Comment #1: The problem is that we can't stop the state from putting in projects that we don't want.

Response #1: This is a guidance document for addressing coastal management goals and objectives on a macro-scale, which will be used to evaluate Coastal Use Permits which fall under the purview of Plaquemines Parish rather than the Department of Natural Resources Office of Coastal Management. State and federally funded projects would likely be considered of "state concern" and therefore would be issued a Coastal Use Permit from the Department of Natural Resources rather than the parish. However, the parish will have the opportunity to provide formal comments to the Office of Coastal Management on any Coastal Use Permit application that is for a project located in Plaquemines Parish.

Comment #2: Why are large diversions shown in this document?

Response #2: These diversions are part of other plans such as the Coast 2050 Plan. Figures in Chapter 6 which detailed the Coast 2050 Plan have been removed to avoid confusion over the intent of this document.

Comment #3: In Caernarvon, the diversion is not building land. It is just killing fisheries.

Response #3: The Plaquemines Parish Coastal Zone Management Program provides goals, objectives, policies and priorities of use for decision-making and comment development on proposed projects, not existing projects.

Comment #4: They [Caernarvon operators] build two acres of fresh marsh and screw up thousands of acres of our marsh.

Response #4: See Response #3.

Comment #5: The 2012 Master Plan shows three big diversions on the East Bank, but the West Bank has way more restoration projects. The East Bank wants restoration projects, not diversion. We want marsh creation.

Response #5: See Response #1.

Comment #6: We don't want any more diversions, of any size, until we understand how and if Caernarvon works.

Response #6: See Response #1.

Comment #7: We want control of our own destiny.

Response #7: See Response #1.

Comment #8: The document should look at the land water ratios since 1990 to show that Caernarvon is not working.

Response #8: Land loss since 1990 has numerous causes, such as Hurricane Katrina, and cannot be exclusively attributed to the operation of the Caernarvon Diversion. Nonetheless, the parish's opposition to large scale diversions is clearly stated within the document.

Responses to Public Comments Received
During February 7, 2013 Public Meeting
in Belle Chasse, Louisiana

Comment #1: Comparing 2000 to 2012, some of the process, for instance, changes the appeal process from 15 days to 30 days from the time the CUP is either approved or rejected to submit the written brief, and then any opposition to the CUP appeal must file within 30 days instead of the current 60 days. Is there a reason why we are reducing the time for anybody to file?

Response #1: The inconsistencies between the timeframes for the appeals process listed in Chapters 1 and 7 have been resolved, and have been made consistent with those provided in the existing Program (2000 document).

Comment #2: The vice chairman should serve in the capacity of the appeal hearing meeting facilitator if the chairman is not there since they are both on the legislative same team and the executive may or may not be at the meeting.

Response #2: This change has been made in the discussion of the appeals process.

Comment #3: The West Bank has two EMUs on page 1-21 number 15 for backfilling of borrow pits, whereas on the East Bank there are no EMUs designated for that. If we are going to use a source over there we should maybe look at an EMU over there. I'd like maybe a clarification on what that number 15 really means because it's confusing to me.

Response #3: The requirement to backfill borrow pits has become a controversial issue within the Parish and remains unresolved. As such, Goal #15 has been removed from the list of goals so the issue can be resolved through parish ordinance or other such means.

Comment #4: Ferries are not free. We have to pay a toll.

Response #4: The sentence "Boat ferries operate at no charge to commuters" has been removed from the document.

Comment #5: My interpretation of the document is that it is better to have large scale projects as compared to small diversions scattered throughout the parish.

Response #5: Page 1-12 states the parish position that smaller diversions would have less of an impact on fishing. Additional background information on diversions included in the Draft has been largely removed so that the parish's position is clear and concise.

Comment #6: The figure showing storms that have crossed the parish should be updated to include Hurricane Isaac.

Response #6: This figure has been updated to include Hurricane Isaac.

Comment #7: The section regarding elevations seem to be about 10 years old and should be updated.

Response #7: The U.S. Geological Service is currently in the process of acquiring and processing updated LIDAR (Light Detection and Ranging) data for Plaquemines Parish; however this data will not be available for several months. Therefore, updated comprehensive elevation data for the entire parish is not currently available.

Comment #8: There should be a cost set out of construction versus other costs, planning, preparation, environmental studies, et cetera, so we can see actually what money is going into the project construction wise versus all the other dollars.

Response #8: This document does not discuss individual projects and therefore does not include a discussion of costs for individual projects.

Comment #9: When the Parish's management program is in conflict with the State master plan, are we going to have to go into litigation, or is there some sort of way to work it out?

Response #9: This is a guidance document for addressing coastal management goals and objectives on a macro-scale, which will be used to evaluate Coastal Use Permits which fall under the purview of Plaquemines Parish rather than the Department of Natural Resources Office of Coastal Management. State and federally funded projects would likely be concerned of "state concern" and therefore would be issued a Coastal Use Permit from the Department of Natural Resources rather than the parish. However, the parish will have the opportunity to provide formal comments to the Office of Coastal Management on any Coastal Use Permit application that is for a project located in Plaquemines Parish. The state's Coastal Zone Management Program statute provides for judicial review of any Coastal Use Permit issued by the state, and provides specific procedures and timelines for filing a petition in the district court if necessary.

Comment #10: Why was the language removed in this Update stating that a coastal use permit will stand in the event a majority vote cannot be obtained for an appeal?

Response #10: The statement remains in the document on page 7-8: "In the event a majority vote cannot be obtained, the CUP will stand as issued."

References

Applied Technology Research Corporation

1997. A Coastal User's Guide to the Louisiana Coastal Resources Program, Louisiana Department of Natural Resources, Baton Rouge, LA.

Barras, J. A.,

2009. Land area change and overview of major hurricane impacts in Coastal Louisiana, 2004-2008 : U. S. Geological Survey Scientific Investigations Map 3080

Banas, P.J.

1978. An Investigation of the Circulation Dynamics of a Louisiana Bar-Built Estuary. M.S. Thesis. Louisiana State University, Baton Rouge, LA. 82pp.

Broussard, W.A., Jr.

1982. Additions to the Drift Bottle Study of the Barataria System. Louisiana Department Wildlife and Fisheries Contributions of the Marine Research Laboratory, 1979. Technical Bulletin 35. Pp. 83-85.

Brown, C.A.

1945. Louisiana Trees and Shrubs. Bulletin I. Louisiana Forestry Commission. Baton Rouge, LA. 262 pp.

Burk and Associates, Inc.

1976. Unique Ecological Features of the Louisiana Coast. Prepared for Louisiana State Planning Office, Coastal Resources Program, Baton Rouge, LA. 39 pp. and map.

1978. Plaquemines Parish Coastal Resources Atlas. Prepared for Louisiana Department of Transportation and Development, Baton Rouge, LA.

Britsch, D.

1999. Area and land loss data for portions of Coast 2050 environmental mapping units in Plaquemines Parish EMUs. U.S. Army Corps of Engineers, New Orleans District. New Orleans, LA.

Byrne, P., M. Borengasser, G. Drew, R. A. Muller, B. L. Sith Jr., and C. Wax

1976. Barataria Basin: Hydrologic and Climatologic Processes. Louisiana State University, Center for Wetland Resources, Baton Rouge, LA. 175 pp.

Center for Business & Economics Research

1999. Plaquemines, Louisiana, Fisheries and Wildlife Production. http://leap.nlu.edu/FISHWILD/PLAWUEMI.TXT. Northeast Louisiana University, Monroe, LA

Chabreck, R.H.

1972. Vegetation, Water, and Soil Characteristics of the Louisiana Coastal Region. Louisiana State University, Agricultural Experiment Station Bulletin 664. Baton Rouge, LA. 72 pp.

1979. Winter Habitat of Dabbling Ducks-Physical, Chemical and Biological Aspects. Pp. 133-152, T. A. Buckhout (ed.), Waterfowl and Wetlands – An Integrated Review. Proceedings of a Symposium, North Central Section, The Wildlife Society, Madison, WS. 147 pp.

Chabreck, R. H. and G. Linscombe

1988. Vegetative Type Map of the Louisiana Coastal Marshes. 1:100,000 scale, Mississippi River Delta, Black Bay, New Orleans. Louisiana Department of Wildlife and Fisheries, New Orleans, LA. 3 maps.

1978. Vegetative Type Map of the Louisiana Coastal Marshes. Louisiana Department of Wildlife and Fisheries, New Orleans, LA. Map.

Chabreck, R. H., T. Joanen, and A. W. Palmisano

1968. Vegetative Type Map of the Louisiana Coastal Marshes. Louisiana Wildlife and Fisheries Commission, New Orleans, LA. Map.

Chabreck, R. H., R. K. Yancey, and L. McNease

1974. Duck Usage of Management Units in the Louisiana Coastal Marsh. Proceedings of the Southeastern Association of Game and Fish Commissioners, 28:507-516.

Coleman, J. M. and S. M. Gagliano

1964. Cyclic Sedimentation in the Mississippi River Deltaic Plan. Gulf Coast Association, Geological Society, Transactions, V.14:67-80.

Cowardin, L. M., F. C. Golet, E. T. LaRoe

1979. Classification of Wetlands and Deep-Water Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC. 100 pp.

Division of Archaeology

1999. Recorded archaeological sites in Plaquemines Parish. Louisiana Department of Culture, Recreation and Tourism. Baton Rouge, LA.

Dugas, E.

1984. Personal Communication. Louisiana Department of Wildlife and Fisheries, Survey Division, New Orleans, LA.

Dugas, K.

1999. Tabulation of Drainage Facilities Data. Office of Plaquemines Parish Engineer, Belle Chasse, LA. Unpublished table.

Dwyer, J. P. and M. F. Bergsund

1999. Dwyer and Bergsund Federal Environmental Laws Annotated. West Group, Berkley, CA. Pp. 425-453.

Engineer Agency for Resources Inventories (EAR1)

1973. Inventory of basic Environmental Data – South Louisiana. U.S. Army Engineer Topographic Laboratories, Washington DC.

Entergy Corp. and Louisiana Economic Development
1999. Plaquemines Parish Profile. Belle Chasse, LA. 4 pp.

Faiers, Greg
1984. Personal Communication. Office of State Climatologist, Louisiana State University, Baton Rouge, LA.

Fisk, H. N., E. McFarlan, Jr., C. R. Kolb, and L. J. Wilbert
1984. Sedimentary Framework of the Modern Mississippi River. Journal of Sedimentary Petrology, 24:76-99

Fournerat, W. M.
1983. Louisiana Climate and Weather 1951-1980. Louisiana Map Series No. 3. Geoscience Publications, Louisiana State University, Baton Rouge, LA. Map.

Frazier, D. E.
1967. Recent Deltaic Deposits of the Mississippi River: Their Development and Chronology. Transactions, Gulf Coast Association of Geological Societies, 17:287-315

Gagliano, S. M., Guempel, B. R. Kappel, W. H., Wicker, K. M., Suhayda, J. N.
2008. Plaquemines Parish Strategic Implementation Plan.

Gagliano, S. M.,
2005. Effects of Earthquakes, Fault Movements, and Subsidence on the Louisiana Landscape.

Gagliano, S. M.
2005. Effects of Geological Faults on Levee Failures in South Louisiana.

Gagliano, S. M., Kemp, E. B., Wicker, K. M., Wiltenmuth, K. S.
2003. Acitve Geological Faults and Land change in Southeastern Louisiana.

Gagliano, S. M., Kemp, E. B., Wicker, K. M., Wiltenmuth, K. S., Sabato, R. W.
2003. Neo-Tectonic Framework of Southeast Louisiana and applications to coastal restoration

Gagliano, S. M.
1999. Faulting, Subsidence, and Land Loss in Coastal Louisiana in Louisiana Coastal, In Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority (compilers), Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices. Appendix B – Technical Methods. LA Dept. of Natural Resource, Baton Rouge, LA. Pp. 21-72.

1998. Faulting, Subsidence and Land Loss in Coastal Louisiana. Coastal Environments, Inc., Baton Rouge, LA. Unpublished report.

Gagliano, S. M., and J. L. van Beek
1970. Geologic and Geomorphic Aspects of Deltaic Processes, Mississippi Delta System, Hydrologic and Geologic Studies of Coastal Louisiana 1, Coastal Studies Institute. Louisiana State University, Baton Rouge, LA. 140 pp.

Gagliano, S. M., K. J. Meyer-Arendt, and K. M. Wicker
1981. Land Loss in the Mississippi River Deltaic Plan, Transactions, Gulf Coast Association of Geological Societies 31:295-300.

Gary, E. L. and D. W. Davis
1979. Recreational Dwellings in the Louisiana Coastal Marsh. LSU Center for Wetland Resources, LSU-T-79-002. Baton Rouge, LA. 80 pp.

Gosselink, J. G.
1984. The Ecology of Delta Marshes of Coastal Louisiana: A Community Profile, U.S. Fish and Wildlife Service, FWS/OBS-84/09. 134 pp.

Gosselink, J. G. and R. E. Turner
1978. The Role of Hydrology in Freshwater Wetland Ecosystems. Pp. 63-78, R. E. Good, D. F. Whigham, R. L. Simpson, and C. G. Jackson (eds.). Freshwater Wetlands, Ecological Processes and Management Potential. Academic Press, NY.

Hahn, P. J.,
2012. (February 4) Consider needs of Coastal Communities. The Times-Picayune.

Henning, B. R.
1998. 1998 Louisiana Marina Directory, 4th ed. Louisiana Sea Grant College Program. Baton Rouge, LA. 54 pp.

Herschfield, D. M.
1961. Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40. Washington, DC.

http://www.fws.gov/r4sl4/delta.html
1999. Web site on Delta National Wildlife Refuge, LA.

http://www.fws.gov/r4slr/breton.html
1999. Web site on Breton National Wildlife Refuge, LA.

Kolb, C. R. and J. R. van Lopik
1958. Geology of the Mississippi River Deltaic Plain, Southeastern Louisiana. Technical Report 3-483. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. 2 volumes.

Louisiana Coastal Wetlands Conservation and Restoration Task Force and Wetlands Conservation and Restoration Authority (LCWCRTF & WCRA)

1999a. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices, Appendix B-Technical Methods. LA Dept. of Natural Resources, Baton Rouge, LA. 138 pp.

1999b. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices, Appendix D-Region 2 Supplemental Information. Louisiana Department of Natural Resources, Baton Rouge, LA. 170 pp.

1998a. Coast 2050: Toward a Sustainable Coastal Louisiana. Louisiana Department of Natural Resources, Baton Rouge, LA. 161 pp.

1998b. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices, Appendix D-Region 2 Supplemental Information, Draft document. Louisiana Department of Natural Resources, Baton Rouge, LA. 138 pp.

Louisiana Cooperative Extension Service

1998. Louisiana Summary, Agriculture and Natural Resources 1998, Plaquemines, Louisiana, Fisheries & Wildlife Production Agricultural Center. Louisiana State University, Baton Rouge, LA. P. 191.

Louisiana Department of Economic Development

1998. Plaquemines Parish Profile 1998. Selected data, Baton Rouge, LA

Louisiana Department of Natural Resources

1999a. 1988 Habitat Types in Plaquemines Parish. Baton Rouge, LA. Digital file.

1999b. 1978 Habitat Types in Plaquemines Parish. Baton Rouge, LA. Digital file.

1999c. 1956 Habitat Types in Plaquemines Parish. Baton Rouge, LA. Digital file.

1999d. Oyster Ground Leases and Seed Ground Areas in Plaquemines Parish. Baton Rouge, LA. Digital file.

1999e. Wildlife Refuges and Management Areas. Baton Rouge, LA. Digital file.

1999f. Land Loss/Land Gain 1956-1990. Baton Rouge, LA. Digital file.

1998a. Environmental Mapping Unit Boundaries Mapped in Coast 2050 Report. Baton Rouge, LA. Digital file.

1998b. CWPPRA and Coastal Restoration Projects in Plaquemines Parish. Baton Rouge, LA. Digital file.

1998c. Fastland Boundary. Baton Rouge, LA. Digital file.

1998d. Marsh Salinity Zones 1998. Baton Rouge, LA. Digital file.

Louisiana Department of Wildlife and Fisheries

n.d. Salinity data from 1968-1979. Baton Rouge, LA. Unpublished.

Louisiana Geological Survey
1980. Parish Atlas of Louisiana Oil and Gas Fields. Department of Natural Resources, Baton Rouge, LA

Louisiana Oil Spill Coordinator's Office
1999. Oil Fields, Faults, Oil and Gas Wells, Hurricanes Data. Louisiana Oil Spill Contingency Plan Map CD 1999. Louisiana State University, Department of Geography and Anthropology, Baton Rouge, LA. Draft version.

Louisiana Sea Grant College Program
1996. Plaquemines Parish, Challenges and Opportunities: An Economic Development. Louisiana State University, Baton Rouge, LA. 82 pp.

Mabus, Ray
2010. America's Gulf Coast (A Long Term Recovery Plan after The Deepwater Horizon Oilspill.)

Macaluso, Joe
1998. LWF Official Says Hurricanes Have Damaged Barrier Islands. The Advocate, Oct. 2, 1998, Section D, Pg. 12.

Mariner, H. A.
1948. The Currents in Barataria Bay. Texas A & M Foundation, Project A, College Station, TX. 30 pp.

McLaughlin, J.
1982. Freeze Occurrences in the Southeast Louisiana. In Muller, R. A. (ed.) Final Project for Coastal Climate. Climatic Division. Louisiana State University, Baton Rouge, LA. Unpublished Report. 52 pp.

Montz, G.
1976. Reports on the File Botanical Elements. U.S. Army Corps of Engineers, New Orleans District, New Orleans, LA. Unpublished data.

Morgan, J. P., J. M. Coleman, and S. M. Gagliano
1968. Field Trip to West Delta Block 27 Gas Field. In R. H. Kesel and R. A. Sauder, (eds.) A Field Guidebook for Louisiana. Association of American Geographers, Washington, DC. Pp. 64-70.

Muller, R.A., W.M. Fournerat, and P.P. Larimore
1983. Guide to Map, Louisiana Climate and Weather 1951-1980. Louisiana Map Series No. 3, Geoscience Publications. Louisiana State University, Baton Rouge, LA. 6 pp.

National Oceanic and Atmospheric Administration
1982. Local Climatological Data. New Orleans, Louisiana. National Climatic Data Center, Asheville, NC. 3 pp.

National Wetlands Inventory

1988. Habitat Maps for Plaquemines Parish. 1:24,000 scale. U.S. Fish and Wildlife Service, St. Petersburg, FL.

Office of Economic Development
1999. Population of Council Districts, Plaquemines Parish. Belle Chasse, LA. Unpublished data.

Office of Coastal Zone Management, National Oceanic and Atmospheric Administration and Coastal Management Section, Louisiana Department of National Resources
1980. Excerpts from Louisiana Coastal Resources Program Final Environmental Impact Statement. Louisiana Department of Natural Resources, Baton Rouge, LA. Pp.:C6-3; C4-1-C4-3

Office of Coastal Zone Management, U.S. Department of Commerce and Louisiana Coastal Resources Program, Louisiana Department of National Resources
1980. Final Environmental Impact Statement and the Louisiana Coastal Resources Program. Department of Natural Resources, Baton Rouge, LA.

O'Neil, T.
1949. Map of the Southern Part of Louisiana Showing Vegetation Types of the Louisiana Marshes. In The Muskrat in the Louisiana Marshes. Louisiana Wildlife and Fisheries Commission, New Orleans, LA. Map.

Palmisano, A. W.
1973. Habitat Preference of Waterfowl and Fur Animals in the Northern Gulf Coast Marshes. Pp. 162-190, R. H. Chabreck (ed.). Proceedings of the Coastal Marsh and Estuary Management Symposium. Louisiana State University, Division of Continuing Education, Baton Rouge, LA

Penfound, W. T. and E. S. Hathaway
1938. Plant Communities in the Marshlands of Southeastern Louisiana. Ecological Monographs 8(1):1-56.

Perret, W. S., B. B. Barrett, W. R. Latapie, J. F. Pollard, W. R. Mock, G. B. Adkins, W. J. Gaidry, C. J. White
1971. Cooperative Gulf of Mexico Estuarine Inventory and Study, Louisiana Phase I and IV. Louisiana Wildlife and Fisheries Commission. New Orleans, LA. 175 pp; 2 maps.

Plaquemines parish Government
1999. Plaquemines Parish Profile. Excerpt provided by Plaquemines Parish Government, Belle Chasse, LA. Pp. 8-16.

Roberts, D. W., D. J. Davis, K. J. Meyer-Arendt, and K. M. Wicker
1982. Recommendations for Freshwater Diversion to Barataria Basin, Louisiana. Coastal Environments, Inc. Prepared for: Coastal Management Section, LA Department of Natural Resources, Baton Rouge, LA. 80 pp.

Russell, R. J.
1936. Physiography of the Lower Mississippi River Delta, Reports on the Geology of Plaquemines and St. Bernard Parishes, Louisiana. Department of Conservation, Geological Bulletin 8:3-199, Baton Rouge, LA.

Schleifstein, M.,
2012. (January 12). Half-Century plan aims to heal State's Coast. The Times-Picayune.

State of Louisiana
2012. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Retrieved from Coastal.louisiana.gov

Stone, G. W., J. M. Grymes, III, J. R. Dingler, and D. A. Pepper
1997. Overview and Significance of Hurricanes on the Louisiana Coast, U.S.A. Journal of Coastal Research:13:3:656-669.

Twichell, D. C., Brock, J. C.,
2011. Seafloor Erosional Processes Offshore of the Chandeleur Islands, Louisiana : U. S. Geological Survey Fact Sheet 2011-3026, 2p

Thevenot, Brian
1998. BP, Coast Guard Working to Keep Oil Away from Land. The Times-Picayune, Oct. 3, 1998. Section A, Pp. 1-6.

Thibodaux, P.
1999. Personal communication. Louisiana Cooperative Extension Service, Plaquemines Parish, LA.

U.S. Army Corps of Engineers
1972. Hurricane Study. History of Hurricane Occurrences along Coastal Louisiana. U.S. Army Engineer District, New Orleans, LA. 43 pp. 20 maps. Updated to 1997.

1982a. Freshwater Diversion to Barataria and Breton Sound Basins. Draft feasibility study. Volume 2 and Technical Appendices A, B, C, D. U.S. Army Engineer District, New Orleans, LA.

1982b. Louisiana Coastal Area, Louisiana – Freshwater Diversion to Barataria and Breton Sound Basins. New Orleans District Corps of Engineers. New Orleans, LA. 3 vol.

U.S. Department of Agriculture, Natural Resource Conservation Service (USDA, NRCS)
In Press. Soil Survey of Plaquemines Parish, Louisiana. (Draft excerpts and digital map). U.S. Government Printing Office, Washington, DC.

U.S. Geological Survey, National Wetlands Research Center (USGS, NWRC)
1994. 1956-90 Land Loss in Coastal Louisiana, Lafayette, LA

U.S. Geological Survey, National Wetlands Research Center (USGS, NWRC)

1988/90. Habitat data for Plaquemines Parish derived from merged, rasterized habitat data/classified Landsat TM digital data (water), Lafayette, LA.

van Beek, J. L., and K. J. Meyer-Arendt
1982. Louisiana's Eroding Coastline: Recommendations for Protection. Coastal Management Section, Louisiana Department of Natural Resources, Baton Rouge, LA.

van Beek, J. L., D. Roberts, D. Davis, D. Sabins, S. M. Gagliano
1982. Recommendations for Freshwater Diversion to Louisiana Estuaries East of the Mississippi River. Coastal Environments, Inc., Baton Rouge, LA. 49 pp.

van Beek, J. L., D. W. Roberts, and T. J. Duenckel
1984. A Management Plan for Freshwater Diversion at Caernarvon, Louisiana. Prepared for Plaquemines Parish Commission Council. Coastal Environments, Inc., Baton Rouge, LA.

van Beek, J. L., T. J. Duenckel, P. C. Howard, K. J. Meyer-Arendt, D. W. Roberts, S. M. Gagliano
1986A Long-term Management Plan for Plaquemines Parish. Coastal Environments, Inc., Baton Rouge, LA. Unpublished manuscript.

van Sickle, V. R., B. B. Barrett, L. J. Golick, T. B. Ford
1976. Barataria Basin Salinity Changes and Oyster Distribution. Wildlife and Fisheries Technical Bulletin 20. Sea Grant Publication LSU-T-76-002, Louisiana State University, Baton Rouge, LA. 22 pp.

Visser, J. M. and G. W. Peterson
1997. Survey of Louisiana Seabird Colonies to Enhance Oil Spill Response. Louisiana Applied Oil Spill Research and Development Program, OSRADP Technical Report Series 98. Unpublished doc.

Wallace, W. E.
1966. Fault and Salt Map of South Louisiana. Transactions, Gulf Coast Association of Geological Societies 16:373.

Watson, R. C.
1999. Personal communication. Letter of July 6, 1999 RE: Threatened and Endangered Species in Plaquemines Parish. Acting Field Supervisor, U.S. Fish and Wildlife Service, Lafayette, LA.

Wicker, K. M.
1980. Mississippi Deltaic Plain Region Ecological Characterization: A Habitat Mapping Study. A User's Guide to the Habitat Maps. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-79-07, Slidell, LA.

Wicker, K. M. et al.
1980. The Mississippi Deltaic Plain Region Habitat Mapping Study. U.S. Fish and Wildlife Service, Office of Biological Services, FWS/OBS-79/07. Slidell, LA. 464 maps and planimetered habitat data.

Wiseman, D., R. Weinstein, K. McCloskey

1979. Cultural Resources Survey of the Mississippi River – Gulf Outlet, Orleans and St. Bernard Parishes, Louisiana. Prepared for U. S. Army Corps of Engineers, New Orleans District. Contract No. DACW 29-77-D-0272.

Wright, R. L., J. J. Sperry and D. L. Huss

1961. Vegetation Type Mapping Studies of the Marshes of Southeastern Louisiana by the Texas A & M Research Foundation – Project 191; for Bureau of Sports Fisheries and Wildlife, U.S. Department of the Interior. 42 pp. and maps. Unpublished manuscript.

Wright, L., F. J. Swaye, and J. M. Coleman

1970. Effect of Hurricane Camille on the Landscape of the Breton-Chandeleur Island Chain and the Eastern Portion of the Lower Mississippi Delta, Coastal Studies Institute Bulletin 4, Louisiana State University, Baton Rouge, LA. Pp. 13-34.

APPENDIX A

COASTAL ZONE MANAGEMENT IMPLEMENTATION ORDINANCE

ORDINANCE NO. 14-135

The following Ordinance was offered by Council Member Edgecombe who moved its adoption:

An Ordinance establishing rules, regulations, definitions and procedures relative to the Plaquemines Parish Coastal Zone Management Program.

WHEREAS, the Parish of Plaquemines, State of Louisiana (the "Parish") adopted a resolution on July 13, 2000 to implement a Plaquemines Parish Coastal Zone Management (CZM) Program and to adopt an Ordinance to establish rules, regulations, definitions and procedures relative to the Coastal Zone Management Program upon approval of the CZM Program Documents by the Louisiana Department of Natural Resources and the National Oceanic and Atmospheric Administration; and

WHEREAS, the Parish adopted Ordinance 12-86 on April 28, 2011, accepting $300,000 in funding from Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) through the Coastal Improvement Assistance Program (CIAP) for the Update of the Plaquemines Parish Coastal Management Plan; and

WHEREAS, the Parish adopted Ordinance 11-274 on September 22, 2011, approving Evans-Graves Engineers, Inc. as the engineers of record selected for the Update of the Plaquemines Parish Coastal Management Plan (CZMP Update); and

WHEREAS, the Plaquemines Parish Government has submitted an Update of the Plaquemines Parish Coastal Zone Management to the state and federal governments for approval and implementation; and

WHEREAS, the approval of the Coastal Zone Management Program by the state and federal governments will afford Plaquemines Parish Government more input on the activities which take place in the coastal zone and wetlands;

NOW, THEREFORE:

BE IT ORDAINED BY THE PLAQUEMINES PARISH COUNCIL THAT:

SECTION 1

It hereby adopts and implements the rules, regulations, definitions, guidelines and procedures of the Update of the Plaquemines Parish Coastal Zone Management Program attached as Exhibit "A" as amended herein.

1. Purposes & construction of this ordinance

1.1. Through the use of permits, implementation of the Coastal Zone Management Program and cooperation with DNR, the Coastal Zone Management Program shall:

1.1.1. Protect, preserve, restore and enhance the coastal zone and wetlands as a natural storm barrier, flood control system, and water filtration system;

1.1.2. Protect, preserve, restore and enhance the coastal zone and wetlands as a habitat for wildlife, an aquatic resource, an aesthetic resource, a parish, state and national resource, and a historic cultural resource; and

1.1.3. Protect, preserve, restore and enhance the coastal zone and wetlands as a legacy to future generations.

1.2. Through the use of permits, implementation of the Coastal Zone Management Program and cooperation with DNR, the Coastal Zone Management Program shall:

1.2.1. Promote coordinated development within the coastal zone;

1.2.2. Promote conflict resolution arising from multiple, competing uses; and

1.2.3. Promote recreational uses (respect private property) and monitor public access within the coastal zone and wetlands.

1.3. Balance competing factors to allow current and future residents the opportunity to enjoy the multiple benefits and cultural values associated with wetlands and a healthy coastal zone.

1.4. Foster the public safety, health and welfare of Plaquemines Parish residents.

1.5. In the event that sections of this ordinance may be subject to multiple interpretations, they must be read to further the purposes stated above and be consistent with the Louisiana Coastal Resources Program as well as provide fair and impartial judgment to all parties. The policies of the local program are consistent with the policies and objectives of the State and Local Coastal Resources Management Act (SLCRMA), as amended, and the state guidelines; the local program shall be interpreted and administered consistently with such policies, objectives, and guidelines.

1.6. All exceptions shall be construed narrowly.

1.7. This ordinance applies to all local uses, defined in the Act.

1.8. Should any provision herein be deemed contrary to law, it shall be severed from the remainder and shall not affect other provisions that may remain applicable, irrespective of the invalid provision.

1.9. This ordinance shall be read and construed as a whole and in accord with the Coastal Zone Management Program, incorporated by reference herein.

SECTION 2

2. Definitions:

2.1. 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.

2.2. "Act" means the Louisiana Coastal Zone Management Act, LSA-R.S. 49:214.21 et seq., also known as the State and Local Coastal Resources Management Act of 1978 (SLCRMA).

2.3. "Coastal Use Permit" or "permit(s)" or "CUP" means those permits required by the Act.

2.4. "Coastal Waters" means bays, lakes, inlets, estuaries, rivers, bayous and other bodies of water within the boundaries of the coastal zone.

2.5. "Coastal Zone" means that area described in the Act.

2.6. "Coastal Zone Management Program" or "CZMP" means laws, regulations, policies, procedures and guidelines developed by the Plaquemines Parish Government through the Parish Council to implement the Act.

2.7. "Department" or "DNR" means Department of Natural Resources.

2.8. "Local Administrator" means the Plaquemines Parish professional charged with implementing and administering this ordinance and the Local Coastal Zone Management Program.

2.9. "Local Coastal Program Advisory Committee" or "Committee" means that committee established by the Parish Council to implement and administer the Coastal Zone Management Program as adopted and amended by the Parish Council.

2.10. "Person" means any individual, partnership, association, trust, corporation, or government body.

2.11. "Parish Council" means the Plaquemines Parish Council, the authority of general jurisdiction and operation at the parish level.

2.12. "Secretary" means the Secretary of the Department of Natural Resources or their designee.

2.13. "Wetland(s)" means land that

2.13.1. Has a predominance of hydric soil;

2.13.2. 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

2.13.3. Under normal circumstances does support a prevalence of that vegetation.

SECTION 3

3. Adoption, Amendment and Modification of the CZMP

3.1. The Parish Council hereby adopts the CZMP Update as amended herein. The CZMP shall not be amended or modified unless all such amendments and modifications are approved by a majority of the Parish Council and are subject to the approval of the Secretary.

3.2. The Parish Council may at any time amend or modify the CZMP by a majority vote of the Parish Council.

3.3. The Committee shall have the power to review, research, and recommend approval or denial of a permit application in accordance with the CZMP. However, no permit shall become effective and binding unless and until the permit(s) is approved by a majority of the Parish Council in accordance with Section 4 of this ordinance.

3.4. Should any provision of the CZMP conflict with any provision of this ordinance, the provision contained in this ordinance shall prevail.

SECTION 4

4. Local Coastal Program Advisory Committee

4.1. The Committee shall be composed of eleven members and shall be appointed by the Parish President with the advice and consent of the majority of the Parish Council. The members shall represent the following occupations in accordance with Plaquemines Parish Government Resolution No. 99-96:

(1) One Member representing the commercial fishermen;
(2) One Member representing the oyster industry;
(3) One Member representing the shrimp industry;
(4) One Member representing the recreational and sport fishermen;
(5) One Member representing the private land owners;
(6) One Member representing the oil industry

(7) One Member representing the Plaquemines Parish Environmental Department;
(8) One Member representing the Parish County Agent (Fisheries);
(9) One Member representing the Parish Council;
(10) One Member representing the Office of the Parish President;
(11) One Member representing the Legal Department of Plaquemines Parish.

4.2. Members of the Committee shall be appointed for a two year term. Members may be re-appointed by the Parish President with the advice and consent of the Parish Council.

4.3. Any member of the Committee may be removed with or without cause at any time by a majority of the Parish Council.

4.4. The Committee shall elect a Chairman and Vice Chairman to conduct meetings. The Chairman shall have the authority to appoint sub-committees and chairman of said sub-committees. The Chairman and/or Vice Chairman shall control the agenda and conduct of each meeting.

4.5. The Committee shall follow Mason's Rules of Order for the conduct of any meeting.

4.6. In addition to the powers, duties and obligations provided by this ordinance, the Committee shall have the powers, duties and obligations as described in the CZMP.

4.7. Each permit application must be approved or disapproved by a majority vote of the Committee. The Committee may be proxy.

4.8. Once a decision is issued by the Committee, the Local Administrator shall bring all permit applications before the Parish Council at the next Council meeting. The Parish Council may accept or reject the recommendation of the Committee when making its decision on the permit application. If the permit is approved by the Parish Council, the permit shall become effective and binding. If the permit is rejected, the permit shall not become effective and binding and the applicant must seek other remedies as provided by the CZMP.

4.9. Any permit application rejected by the Parish Council shall be subject to the administrative appeal process as provided by the CZMP.

4.10. Any permit issued under the CZMP is the property of the Plaquemines Parish Government and may be revoked, amended, modified or canceled by the Parish Council at any time with reasonable cause. A permit does not convey any property rights, mineral rights, or exclusive privileges; it does not warrant or guarantee title nor does it authorize injury to property. All rules, regulations, duties, obligations and responsibilities contained in the CZMP and on the permit shall be accepted and followed by applicant without reservation or condition.

4.11. Without the consent of the Parish Council, the Committee may adopt and implement any procedural rules and regulations, not substantive in nature that aids it in the implementation of the CZMP. The Committee may also recommend to the Parish Council any modification, amendment or supplementation of the CZMP or any ordinance.

4.12. The Committee is also charged with the duties, obligations and powers to enforce the rules and regulations of the CZMP in accordance with the program.

4.13. The Committee shall also create a monetary fund known as the Plaquemines Parish Wetlands Conservation and Restoration Fun ("Fund"). The Fund shall be managed by the Committee and administered by the Local Administrator. The Committee may approve any expenditure or deposit that is in the best interest of Plaquemines Parish. The Committee shall provide an accounting to the Parish Council and Parish President every

sixty (60) days. All permit fees, grants and other fees received under the CZMP shall be deposited in said Fund. The Parish Council and Parish President shall have the right to inspect the books and record of the Committee and the Fund at any time. All fees, grants and other monies received by the Committee under the CZMP shall be the property of Plaquemines Parish Government. The Committee shall act in a Trustee capacity and shall act reasonably in the administration of said Fund. Any monies or assets of the Fund may be transferred to the General Fund by a majority vote of the Parish Council.

SECTION 5

5. Permit Fees and Other Charges

5.1. Non-commercial project fees shall be $50.00.

5.2. Commercial project fee shall be $500.00 plus 0.1 percent of the project cost over $100,000.

SECTION 6

6. Local Administrator

6.1. The Director of Coastal Zone Management shall be appointed by the Parish President and shall have the powers and duties established by the CZMP. The Parish President shall have the power to remove the Director with or without cause and to appoint another Director at any time. The Director shall report directly to the Parish President and to the Committee. The Director shall administer the Fund. No expenditure may be made from the Fund without the majority vote of the Committee. No check or draft may be issued from the Fund unless signed by the Director and the Chairman of the Committee.

6.2. The Local Coastal Program Manager shall review the permit application for completeness and make comment/recommendation to the Committee on a timely basis. Once a decision is reached by the Committee, the Manager shall transfer said permits to the Parish Council for action by the Parish Council. The Manager shall be responsible for all notices and procedures pertaining to the issuance of permits.

6.3. In addition to the powers, duties, obligations and responsibilities provided by this ordinance, the Director shall have the powers, duties and obligations provided in the CZMP and other duties, obligations and responsibilities issued by the Committee. The CZMP shall be generally managed by the Manager under the control of the Committee.

SECTION 7

That if any provision or item of this Ordinance or the application thereof is invalid, such invalidity shall not affect other provisions, items, or applications of this Ordinance which can be given effect without the invalid provisions, items, or applications; and to this end, the provisions of this Ordinance are hereby declared to be severable.

WHEREUPON, in open session the above Ordinance was read and considered section by section and as a whole.

Council Member Marinovich seconded the motion to adopt the Ordinance.

The foregoing Ordinance having been submitted to a vote, the vote resulted as follows:

YEAS: Council Members Percy "PV" Griffin, Keith Hinkley, Kirk M. Lepine, Stuart J. Guey, Anthony L. Buras, Burghart Turner, Jeff Edgecombe and Byron T. Marinovich

NAYS: None

ABSENT: Council Member Marla Cooper

PRESENT BUT NOT VOTING: None

And the Ordinance was adopted on this the 24th day of July, 2014.

I hereby certify the above and foregoing to be a true and correct copy of an Ordinance adopted by the Plaquemines Parish Council at a meeting held in the Temporary Magnolia Center Building, 17563 Highway 15, Pointe-a-la-Hache, Louisiana, on Thursday, July 24, 2014.

Kim M. Soupy

Secretary