

*Coast 2050:
Toward a Sustainable
Coastal Louisiana,
The Appendices*

Appendix E — Region 3 Supplemental Information

This document is one of three that outline a jointly developed, Federal/State/Local, plan to address Louisiana's massive coastal land loss problem and provide for a sustainable coastal ecosystem by the year 2050. These three documents are:

- ! Coast 2050: Toward a Sustainable Coastal Louisiana,
- ! Coast 2050: Toward a Sustainable Coastal Louisiana, An Executive Summary,
- ! Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices.



Suggested citation: Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1999. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices. Appendix E—Region 3 Supplemental Information. Louisiana Department of Natural Resources. Baton Rouge, La.

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Appendix E — Region 3 Supplemental
Information

report of the

Louisiana Coastal Wetlands Conservation
and Restoration Task Force

and the

Wetlands Conservation and Restoration Authority

Louisiana Department of Natural Resources
Baton Rouge, La. 1999

ACKNOWLEDGMENTS In addition to those named in the various attributions throughout this Appendix, a number of people played key roles in bringing this document together in its current form. This included editing, table development, writing explanatory and transitional text, and general formatting. These people were: Honora Buras, Ken Duffy, Bill Good, Cathy Grouchy, Bren Haase, Bryan Piazza, Phil Pittman, Jon Porthouse, Diane Smith, and Cynthia Taylor.

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SECTION 1

INTRODUCTION

Region 3 (Fig. 1-1) spans from Bayou Lafourche on the east to Freshwater Bayou Canal on the west. It is bordered on the south by the Gulf of Mexico and on the north by the coastal wetlands boundary as it is defined in the 1997 Louisiana Coastal Wetlands Conservation Plan. It encompasses the Terrebonne, Atchafalaya, and Teche-Vermilion hydrologic basins. Region 3 covers all or part of Lafourche, Terrebonne, Assumption, Iberville, St. Martin, Iberia, St. Mary, Lafayette, and Vermilion parishes.

This appendix contains information and data, collected by the Region 3 Regional Planning Team (RPT), that was used in the formulation of the Coast 2050 Plan. In order to organize the information during this planning effort, the RPT used “mapping units” which are depicted and summarized here (Figure 1-2).

Within each mapping unit, wetland loss trends and habitat shifts, fish and wildlife resources, infrastructure, and previously proposed strategies were assessed by the RPT, and this information is presented here. Based upon these analyses and in conjunction with regional habitat objectives, strategies were developed for each mapping unit by the RPT, in association with the Planning Management Team (PMT) and others participating in the 2050 process. The PMT took the lead in developing the regional ecosystem strategies but were greatly assisted by the RPT and others. The final regional ecosystem and mapping unit strategies, as well as programmatic recommendations, are also included in this appendix.



Figure 1-1. Regions used in the Coast 2050 plan.

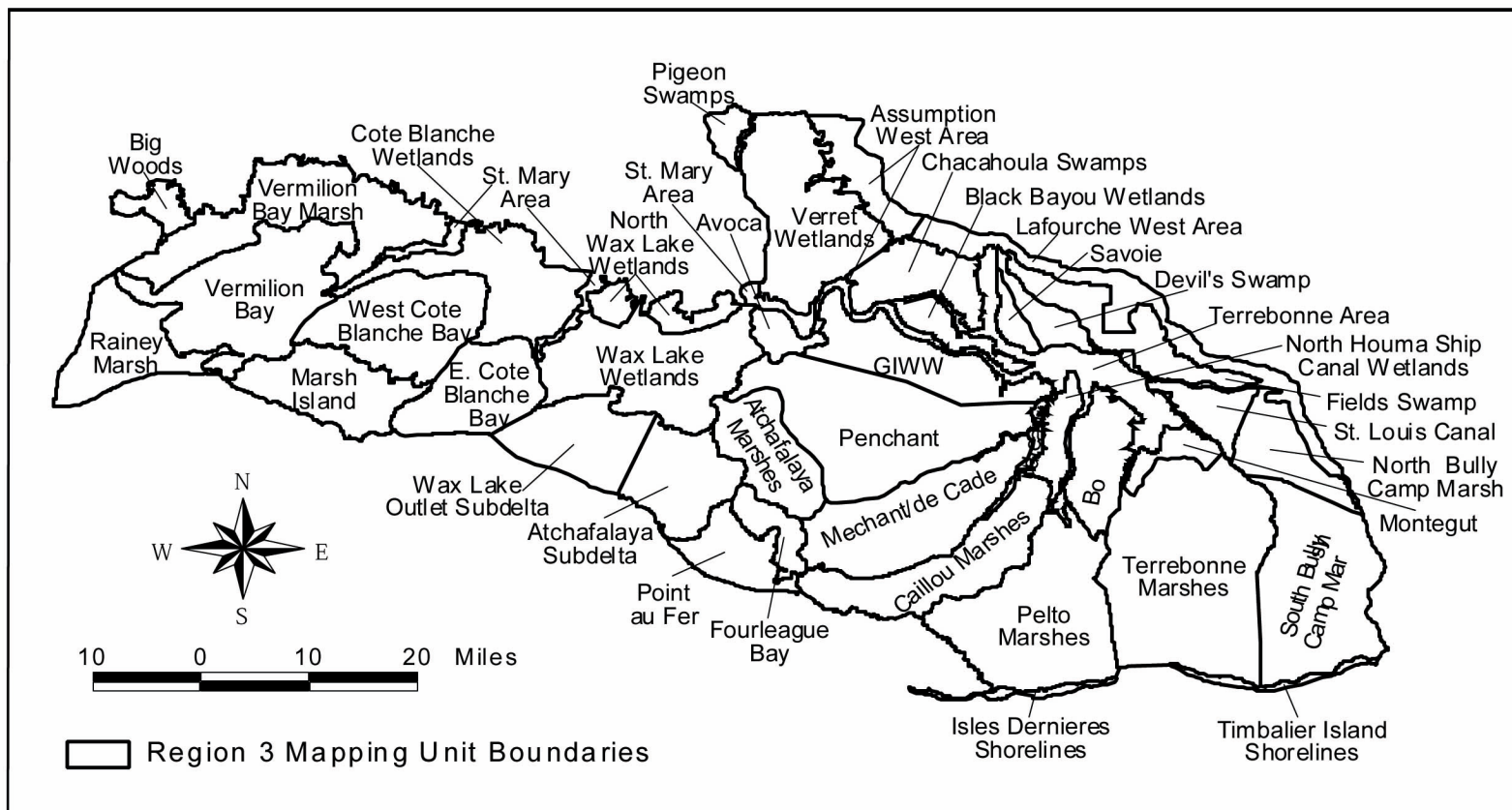


Figure 1-2. Region 3 mapping units.

SECTION 2

REGION 3 COAST 2050 REGIONAL PLANNING TEAM (RPT) MEMBERS (DURING PLAN DEVELOPMENT)

Parish Representatives

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Kermit Coulon - Louisiana Land and
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School Board
Dr. Sherwood Gagliano - Coastal
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J. Edwin Kyle - Port of Morgan City
Mike and Kaye LeBlanc - Landowners
Don Lirette - Terrebonne Fisherman
Organization
O'Neil Malbrough - Coastal Engineering
and Environmental Consultants
Matthew Sevier - Terrebonne Parish
Coastal Zone Management
Advisory Committee
Pat Stinson - Mandalay National
Wildlife Refuge

Kerry St. Pé - Barataria-Terrebonne
National Estuary Program
Doug Svendson - Gulf Intracoastal Canal
Association
Mike Voisin - Motavit Seafood
John Woodard - Fina-LaTerre
Jerome Zeringue - South Terrebonne
Parish Tidewater Conservation
District
Linda Zaunbrecher - Farm Bureau Assn.

SECTION 3

MAPPING UNIT SUMMARIES

Terrebonne Basin

South Bully Camp Marsh

Location - This 133,912-acre unit is located in Lafourche Parish. It is bordered on the east by Bayou Lafourche and Belle Pass, and on the west by Bayou Pointe au Chien and the parish line. The northern boundary is the double pipeline canal that runs south of Catfish Lake. The southern boundary is the northern edge of the Timbalier Islands.

Habitat Description and Landscape Change - In 1949, wetlands within the unit were classified as brackish with a small amount of salt marsh along the bay edges. By 1968, the area was primarily salt marsh with some brackish marsh along the northeast boundary. In 1988, the area was almost entirely salt marsh. Numerous access canals were dredged prior to the mid-1970's. Over the last 15 to 20 years, the interior marshes in the area have become increasingly sparse due to rapid subsidence and lack of sediment input.

Historic Land Loss - Between 1932 and 1990, some 10,675 acres of wetlands were lost in this unit. Most of this loss was associated with direct and indirect impacts of canal dredging in the Leeville Oil and Gas Field prior to the 1950's,

although some shoreline erosion in the area's bays occurred. From the mid-1950's through the mid-1970's, most loss consisted primarily of canal dredging west of Catfish Lake plus loss in an area adjacent to Bayou Tete de Ours. A noticeable area of marsh deterioration around Bay Sevin began prior to the mid-1950's. Loss in this area increased following the mid-1970's, resulting in a small hot-spot area of loss. During the 1980's, this area of deterioration and loss expanded throughout much of the area between Catfish Lake and Bay Sevin. The deterioration and loss of these and other interior marsh areas can be attributed in part to local human impacts. Nevertheless, area marsh loss is primarily due to the long-term effects of eliminating riverine flow to the area in the early 1900's, in combination with continued subsidence. Erosion of bay shore marshes has also contributed to the overall loss of marshes for all time periods. Subsidence in the area is estimated at 2.1-3.5 ft/century.

Future Land Loss Projections -

Assuming that future land loss will occur at the 1974 to 1990 rate, 41.2% of the marsh in this unit will be lost by 2050. Total marsh loss will be approximately 12,990 acres.

Fish and Wildlife Resources - Area marshes provide habitat for migratory

waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish such as Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped mullet, southern flounder, blue crab, white shrimp, brown shrimp, and many others. Salinity in the northern and central portions of the unit is suitable for American oyster production.

Over the last 10-20 years, red drum, black drum, blue crab, and Spanish mackerel have shown increasing population trends. Species with declining populations include spotted seatrout, Gulf menhaden, southern flounder, American oyster, and white and brown shrimp. With the exception of the Spanish mackerel population, which should continue to increase, all other fishery species are expected to decline.

The brown pelican has had an increasing population trend over the last 10-20 years, and is projected to increase by 2050. Populations of seabirds, wading birds, shorebirds, nutria, muskrats and American alligators have declined, and are projected to continue so through 2050.

Infrastructure - Substantial infrastructure exists in Golden Meadow and the communities located along Bayou Lafourche. In the late 1980's, the U.S. Army Corps of Engineers (USACE) completed construction of the Larose and Golden Meadow Hurricane Protection project. Through this project,

a hurricane protection levee was built to protect communities along the west bank of Bayou Lafourche, from Golden Meadow northward. Associated with the levees are sector floodgates in Bayou Lafourche at Larose and Golden Meadow. The community of Leeville and Louisiana Highway One south of Golden Meadow have no storm protection system. Bayou Lafourche, from Leeville to the gulf, is a Federal navigation channel maintained by the USACE. The only other significant infrastructure consists of camps, access canals, pipeline canals, and oil and natural gas drilling and production facilities. There are 8.5 miles of secondary roads and no railroads in this unit. This unit has 1,416 oil and/or natural gas wells and 60.1 miles of pipelines.

Previously Proposed Strategies - The short-term critical strategy proposed in the Louisiana Coastal Wetlands Restoration Plan for reducing marsh loss within the South Bully Camp Unit is hydrologic restoration. The long-term critical strategy is freshwater and sediment introduction. The only CWPPRA project authorized within the unit is the West Belle Pass Headlands project. Protection of the lake and bay shorelines has also been proposed.

Coastal Use/Resource Objectives - Habitat objectives for the South Bully Camp unit are fresh, intermediate, brackish, and some relatively minor amounts of saline marshes and their associated aquatic habitats. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, recreation and tourism, storm buffering capacity, oil and natural gas, roads,

levees, bridges, communities, and utilities.

Regional Ecosystem Strategies -

Strategies for this unit include stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, building land in the Timbalier subbasin by sediment diversion from the Mississippi River via a conveyance channel parallel to Bayou Lafourche, and maintaining the shoreline integrity in Caillou, Terrebonne, and Timbalier bays.

Benefits of Regional Strategies - These strategies are projected to cause a gain in marsh area in this unit by 2050. They will enhance fresh marshes, intermediate marshes, brackish marshes, and salt marshes. For example, sediment delivery material will strongly enhance all of these habitats, and a sediment diversion will enhance fresh, intermediate, and brackish marshes.

Shrimp, blue crab, American oyster, finfish, American alligator, furbearer, waterfowl, nongame fish and wildlife, and endangered species populations should be enhanced by all of these strategies. The same projections are made for recreation and tourism, storm buffering capacity, and infrastructure such as roads, levees, bridges, and communities. Barrier island restoration in the mapping unit to the south will protect oil and gas infrastructure. The oil and natural gas industry is projected to be enhanced only by shoreline integrity measures.

Mapping Unit and Programmatic Strategies - Protecting bay and lake shorelines (e.g., with a reef zone,

breakwaters, oyster reefs, or oyster shells from shucking plants), establishing and protecting ridge function, and beneficial use of dredged material are mapping unit strategies adopted for the area. There are no programmatic strategies recommended for this unit.

North Bully Camp Marsh

Location - This 43,882-acre unit is located in Lafourche Parish. It is bordered on the east by the back levee of the developed areas on the west bank of Bayou Lafourche. It is bordered on the west by Grand Bayou Canal, Grand Bayou, and Cutoff Canal. The northern boundary is Bayou Manuel. The southern boundary is the double pipeline canal that runs south of Catfish Lake. Communities near the unit include Belle Amie, Galliano, and Golden Meadow.

Habitat Description and Landscape Change - In 1949, this unit was primarily intermediate marsh, dominated by floating three-cornered grass, with lesser amounts of fresh and brackish marshes. By 1968, most of the intermediate marsh had become either brackish or fresh marsh.

Historic Land Loss - Total land loss in this unit between 1932 and 1990 has been estimated at 12,840 acres. A significant amount of the land loss in this area since 1949 may be attributed to direct removal and altered hydrology from canal dredging. Between 1956 and 1974, an estimated 5,760 acres of marsh were lost. Altered hydrology remains a current cause of land loss. Subsidence in this unit is high (2.1-3.5 ft/century), and in conjunction with wind and wave erosion, contributes largely to the current

land loss. Between 1974 and 1990, an additional 5,200 acres of marsh were lost due to natural and indirect causes. This was in addition to 380 acres lost to man-made causes.

Future Land Loss Projections - By 2050, it is expected that approximately 54.7% (10,485 acres) of the 1990 marsh area will be lost if nothing is done. Approximately 1,900 acres will be preserved by CWPPRA projects.

Fish and Wildlife Resources - This mapping unit is host to a large variety of fish and invertebrate species. Recent monitoring in the Bully Camp marshes (North and South) has shown increases in populations of red drum, black drum, and blue crabs, but decreases in spotted seatrout, flounder, American oysters, and brown and white shrimp populations. Although American oyster and Spanish mackerel populations are expected to increase, all other fishery species are projected to decline through 2050.

The brown pelican has shown an increase in abundance over the last 10-20 years, and a further increase is projected by 2050. Populations of shorebirds, wading birds, seabirds, and raptors have shown a steady trend, but are projected to decline. Nutria, muskrat, and other furbearer populations have shown a declining trend, but are expected to remain steady by 2050. American alligator populations have shown a declining trend, and this is expected to continue.

Infrastructure - Bayou Lafourche borders the southern end of this unit. Its hydrology has been severely altered for commercial navigation purposes and a

permanent closure is present at the head of the bayou. Between Golden Meadow and Leeville, a 9-ft deep and 100-ft wide channel is maintained. The bayou is also closed at Pass Fourchon, but a jettied entrance is maintained at Belle Pass. There is oil and natural gas activity in the area, but it is much more substantial in the South Bully Camp mapping unit. In this unit there are no primary roads or railroads, but there are 1.2 miles of secondary and 3.3 miles of tertiary roads. There are 982 oil and/or natural gas wells and 40.9 miles of pipelines (36.6 natural gas and 4.3 crude oil).

Previously Proposed Strategies - Proposed defensive measures in this unit are numerous and include protecting and/or preserving the natural ridges, maintaining and managing the hydrology of navigation channels (Bayou Lafourche) and marshes, implementing freshwater diversions, creating reef zones, and protecting lake shorelines. Offensive measures include sediment diversions and the dedicated use of dredged material.

Coastal Use/Resource Objectives - The objective of this mapping unit is maintenance as a fresh marsh habitat. However, a fresh/intermediate marsh objective may be more achievable (from north to south, respectively), since the southern region of this management unit is currently largely brackish marsh. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish (spotted seatrout, red and black drum, and flounder), waterfowl, recreation, and tourism. The area also serves as a storm buffer and contains roads, levees, bridges, oil, and natural gas.

Regional Ecosystem Strategies - The regional strategy for the North Bully Camp Marsh is to build land in the Timbalier subbasin by sediment diversion from the Mississippi River via a conveyance channel parallel to Bayou Lafourche.

Benefits of Regional Strategies - This strategy is projected to cause a gain in marsh area in this unit by 2050 and will enhance the fresh and intermediate marshes in this unit.

Blue crab, finfish, American alligator, furbearer, waterfowl, and nongame fish and wildlife populations are generally projected to be enhanced by this strategy. It will have a short-term, detrimental effect on shrimp and saltwater finfish. However, in the long term, these resources will be enhanced. Oysters will be displaced in this mapping unit but will be benefitted regionally. This strategy is also projected to enhance recreation and tourism, storm buffering capacity, and infrastructure such as roads, levees, and bridges.

Mapping Unit and Programmatic Strategies - Four mapping unit strategies for this unit are to establish and protect the ridge function, protect bay and lake shorelines, beneficial use of dredged material, and hurricane and flood protection (e.g., maintain an apron of marshes outside the levees where possible). There are no programmatic strategies for this unit.

St. Louis Canal

Location - This 25,563-acre unit, located in Lafourche Parish, is bordered on the north by Louisiana Highway 24;

on the east by Grand Bayou Canal, Grand Bayou, and Cutoff Canal; and on the southwest by Bayou Pointe au Chien. Communities bordering the unit include Grand Bois, Larose, Pointe au Chien, and Klondyke. The Pointe au Chien Wildlife Management Area, owned and operated by the Louisiana Department of Wildlife and Fisheries (LDWF), lies within the southern portion of this unit.

Habitat Description and Landscape Change - This unit includes the upper end of an intertributary basin located between Bayou Pointe au Chien and Bayou Blue. Most of the unit consists of fresh marsh, but the northwestern and western fringes are bordered by cypress swamps, shrub/scrub, and some bottomland hardwoods. In 1949 and 1968, non-forested areas were entirely fresh marsh. By 1978, fresh marsh still dominated the unit, but its southern portion had become brackish. Additionally, cypress trees located along the lower portion of Bayou Pointe au Chien and along the southern portion of St. Louis Canal were either dead or dying. By 1994, brackish marshes in the south and southeastern areas occupied almost half of the unit. The southern portion of the unit experienced high land loss rates during the 1960's, 1970's, and 1980's.

Historic Land Loss - Area marsh loss between 1932 and 1990 is estimated to be about 3,450 acres. Much of this loss can be attributed to subsidence, the long-term effects of eliminating riverine inflow in the early 1900's, and canal-related hydrologic changes. Dredging of Grand Bayou Canal and Cutoff Canal in the early 1900's disrupted area

hydrology. Prior to the mid-1950's, other changes occurred which also affected area hydrology. These changes included canal dredging and marsh loss in the Bully Camp Oil and Gas Field, subsidence of marshes and ridges that provided storm surge protection, and the deterioration of the southern rim of Lake Felicity, which allowed saltwater to flow northward through the Cutoff Canal. These changes increased area salinity and tidal exchange, and made the area more vulnerable to storm surge inundation. Marshes within the southern portion of the unit experienced rapid conversion to open water between the mid-1950's and 1974, likely due to entrapment of saline storm surges in areas enclosed by canal spoil banks. Rapid loss of marshes in the southern and eastern portion of the unit continued through 1990. Despite these losses, the northern interior areas remained intact. However, during the mid-1990's, those areas have begun to experience increased loss rates. Subsidence rates are currently 1.1-2.0 ft/century.

Future Land Loss Projections - By 2050, approximately 32.3% of the 1990 wetlands acres will be lost. Approximately 5,020 acres of marsh and zero acres of swamp will be lost.

Fish and Wildlife Resources - Swamp and fresh marshes in the northern portion of the unit provide high quality habitats for migratory waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, white-tailed deer, and American alligators. In addition, swamp, forest, and bottomland hardwood habitats support populations of songbirds, woodpeckers, raptors, and other bird species. One active bald eagle

nest exists in the northwestern portion of the area near St. Louis Canal. Fresh and low-salinity areas support populations of largemouth bass, bluegill, crappie, blue catfish, and other recreationally and commercially important fishes. These areas may also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish species such as Atlantic croaker, Gulf menhaden, red drum, striped mullet, southern flounder, blue crab, white shrimp, and others.

The brackish marsh portions of the unit provide habitat for migratory waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish such as Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped mullet, southern flounder, blue crabs, white shrimp, brown shrimp, and many others.

This unit has had increasing populations of red and black drum, Gulf menhaden, American oysters, brown shrimp, and blue crabs. Declining populations over the last 10-20 years include spotted seatrout, southern flounder, largemouth bass, and channel catfish. The white shrimp population has remained steady. Although American oyster populations are expected to remain steady and largemouth bass and channel catfish populations are expected to increase, all other fishery populations are expected to decline.

Wading birds, raptors and American alligators have had increasing population trends over the last 10-20 years. Bald eagle, other avifauna, nutria, muskrat, and other furbearer populations have remained steady. Bald eagle, seabird, nutria, muskrat, other furbearer, and American alligator populations are expected to have a steady trend through 2050. Wading bird, raptor, and other avifauna populations are expected to decline.

Infrastructure - Infrastructure in the area consists primarily of Louisiana Highways 24 and 665 and the structures associated with the adjacent communities of Grand Bois and Pointe au Chien, respectively. The Fina LaTerre, Inc./Grand Bois oil and natural gas field, located in the northwestern portion of the area, was developed between 1974 and 1983 and is serviced by board roads. Other infrastructure includes several pipelines and pipeline canals which cross the area, St. Louis Canal, which runs along the southwestern unit boundary, two large water control structures located along Grand Bayou Canal/Grand Bayou, several small boat pullovers located on the Pointe au Chien Wildlife Management Area, and the low-level levee along the west bank of Cutoff Canal, Grand Bayou, and Grand Bayou Canal. There are no primary roads or railroads, but there are 3.9 miles of secondary and 12.1 miles of tertiary roads. This unit has 39 oil and/or natural gas wells and 22.6 miles of natural gas pipelines.

Previously Proposed Strategies - Previously proposed strategies include preservation and protection of the natural

bayou ridges and freshwater diversions into the marshes. The authorized Grand Bayou Diversion/Cutoff Canal Structure CWPPRA project would benefit part of the unit. Proposed expansion of this project, if authorized, would benefit the entire unit.

Coastal Use/Resource Objectives - Habitat objectives for the St. Louis Canal unit are fresh marshes and forested wetlands and their associated aquatic habitats. Resource priorities include freshwater finfish, American alligators, furbearers, crawfish, waterfowl, agriculture/grazing, storm buffering capacity, roads, levees, and bridges.

Regional Ecosystem Strategies - Regional strategies for this unit include stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, and building land in the upper Timbalier subbasin by sediment diversion from the Mississippi River via a conveyance channel parallel to Bayou Lafourche.

Benefits of Regional Strategies - All of the strategies for this unit are projected to enhance fresh marshes and forested wetlands. These strategies are projected to enhance populations of freshwater finfish, American alligators, furbearers, crawfish, and waterfowl in this unit. All of the strategies will enhance the storm buffering capability of the unit and protect infrastructure, such as roads, levees, and bridges. Communities and utilities are projected to be enhanced by the strategies.

Mapping Unit and Programmatic Strategies - Establishing and protecting ridge function and stabilization of banks are mapping unit strategies for the St. Louis Canal unit. Flood protection is a programmatic strategy.

Montegut

Location - This 17,326-acre unit is located southeast of Houma in Terrebonne Parish. It is made up of two independent marsh management subunits and an unmanaged area. The Upper Bayou La Cache subunit lies between Bayou Petit Caillou and Bayou Terrebonne, north of Bush Canal. This area is within the local hurricane protection levee system and water exchange is regulated primarily through a large water control structure on Bayou La Cache at its junction with Bush Canal. The second subunit, the Montegut Marsh Management Area, is part of the LDWF Pointe au Chien Wildlife Management Area. This area lies at the upper end of the intertributary basin between Bayou Terrebonne to the west and Bayou Jean Charles to the east. Two large flap-gated water control structures along its southern levee regulate water exchange between this area and adjacent areas. The unmanaged Viguerie Canal area is made up of the upper portion of the intertributary basin between Bayou Pointe au Chien to the east and Bayou Jean LaCroix to the west. The southern boundary of this area is the Island Road, which allows vehicular access between Isle Jean Charles and Louisiana Highway 665 along Bayou Pointe au Chien. Communities adjacent to this unit include Montegut, Chauvin, Isle

Jean Charles, and Bayou Pointe au Chien.

Habitat Description and Landscape Change - The Upper Bayou La Cache subunit was swamp, fresh, intermediate, and brackish marsh in 1949. By 1978, nearly the entire subunit was brackish marsh, and the cypress swamps were dead.

The Montegut subunit was fresh marsh in 1949, with some living cypress trees present along the northern and western perimeters. The area experienced substantial marsh loss as well as conversion to more brackish conditions during the 1950's, 1960's, and 1970's. By the mid-1980's, the area was primarily brackish open water and most of the cypress trees were dead. A few living cypress trees still remain on higher elevations in the northern portion of the subunit. After being acquired by the LDWF in 1968, the Montegut marsh management area was leveed and managed passively with two fixed-crest weirs. In 1995, both weirs were modified into variable-crest flap-gated structures and the area is now managed actively as an intermediate marsh.

In 1949 and 1968, the Viguerie Canal area was dominated by fresh marsh with brackish marsh occupying the southern quarter of the area. By 1978, brackish marsh covered the majority of the area. In 1988, the entire area consisted of brackish marsh.

Historic Land Loss - Between 1932 and 1990, about 8,330 acres of wetlands were lost in this unit. The elimination of riverine inflow in the early 1900's resulted in interior marshes with high

organic content. These organic soil areas are very susceptible to loss due to hydrologic alterations and saltwater intrusion. All subunits suffered significant marsh loss beginning in the mid-1950's and this loss continued through the 1980's. Dredging of numerous access canals north of Lake Barre prior to the mid 1950's allowed saline Lake Barre water to readily flow northward through Bayou Barre and into sensitive freshwater marshes.

Additionally, the dredging of canals, such as Humble Canal, Madison Canal, and several other unnamed canals through the east bank of Bayou, Terrebonne have increased tidal exchange in Bayou Terrebonne. This facilitated saltwater intrusion into connecting waterways such as Bush Canal and Bayou La Cache. Causes of marsh loss within the Viguerie Canal area are not clear. However, construction of the Island Road and entrapment of saline storm tides may have occurred. Additionally, development of cuts through the Bayou Jean Charles ridge and extending the Island Road borrow canal through the west bank of the Bayou Pointe au Chien ridge may have altered water exchange and contributed to rapid breakup of the area's fragile organic marshes. Subsidence rates are 1.1-2.0 ft/century.

Future Land Loss Projections -

Assuming that future land loss will occur at the 1974 to 1990 rate, over 69.7% (4,000 acres) of the unit's marsh will be lost by 2050.

Fish and Wildlife Resources - Marsh management activities in the Upper Bayou La Cache and the Montegut subunits have increased production of

submerged aquatic vegetation, making these marshes high quality wintering areas for migratory waterfowl. These subunits also provide habitat for wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. Water control structures are operated to provide for ingress and egress of estuarine-dependent fish and shellfish so that they may use the managed areas as nursery habitat. Commercially and recreationally important species using the subunits include Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped mullet, southern flounder, blue crabs, white shrimp, brown shrimp, and many others. Because fresher conditions are maintained in the Montegut subunit compared to the Upper Bayou La Cache subunit, species preferring more saline conditions (e.g., spotted seatrout, black drum, and brown shrimp) may not be as abundant there. Remaining marshes within the Viguerie Canal area provide low-quality wildlife habitat, having only moderate value for estuarine-dependent fish and shellfish.

This unit has had increasing populations of red and black drum, Gulf menhaden, American oysters, blue crabs, and brown shrimp over the last 10-20 years. White shrimp populations have remained steady. Spotted seatrout, southern flounder, largemouth bass, and channel catfish populations have declined. With the exception of the American oyster, largemouth bass, and channel catfish populations, which are projected to increase, all other fishery species are expected to decline.

The brown pelican population has shown an increasing trend over the last 10-20 years. Seabird populations have remained steady, whereas nutria, muskrat, other furbearer, and American alligator populations have shown a declining trend. By 2050, the brown pelican population is expected to increase, while other avifauna populations are expected to remain steady. Furbearer and American alligator populations are expected to decline.

Infrastructure - Infrastructure in the area consists primarily of Louisiana Highways 56, 55, and 665, and the structures associated with the communities of Chauvin, Montegut, and upper Bayou Pointe au Chien, respectively. Hurricane protection features such as the Bayou Petit Caillou Floodgate, the Bayou Terrebonne Floodgate, the Humble Canal Floodgate, and the protection levee along Bush Canal and Bayou Terrebonne provide hurricane protection to the Upper Bayou La Cache subunit. Other infrastructure includes the Bayou La Cache water control structure/pump that is operated to regulate water levels and salinities within the Upper Bayou La Cache subunit. Similarly, the two flap-gated, variable-crest weirs located along the southern levee of the Montegut marsh management area are operated to provide water level and salinity management for that area. Oil and natural gas exploration within the subunits is presently inactive. Portions of Bayou Petit Caillou and Bayou Terrebonne adjacent to the subunits are maintained by the USACE. This unit has three drainage pump stations that drain from the Terrebonne Area. There are no

primary roads or railroads, but there are 6.7 miles of secondary and 21.6 miles of tertiary roads. There are 112 oil and/or natural gas wells and a total of 21.7 miles of pipelines.

Previously Proposed Strategies -

Previously proposed strategies for this unit include protection and preservation of bayou ridges and beneficial use of dredged material. Hydrologic management of the brackish marshes has also been proposed. The existing Upper Bayou La Cache and Montegut marsh management unit projects are restoration projects funded through the Louisiana Department of Natural Resources (DNR).

Coastal Use/Resource Objectives -

Habitat objectives for the Montegut unit include fresh and intermediate marshes and their associated aquatic habitats. Resource objectives include shrimp, blue crabs, saltwater finfish, freshwater finfish, furbearers, waterfowl, storm buffering capacity, flood water retention, navigation, oil, and natural gas.

Regional Ecosystem Strategies -

Regional strategies for this unit include enhancing Atchafalaya River water influence to central Terrebonne marshes and stabilizing the banks of navigation channels for water conveyance.

Benefits of Regional Strategies - These strategies are projected to enhance fresh and intermediate marshes, forested wetlands, and fastlands.

All of these strategies are generally projected to enhance blue crab, finfish, American alligator, crawfish, furbearer, waterfowl, and nongame fish and

wildlife populations. Storm buffering capacity; agriculture and grazing; recreation and tourism; infrastructure such as roads, levees, and bridges; communities; and utilities are projected to be enhanced by all of the strategies.

Mapping Unit and Programmatic Strategies - Mapping unit strategies recommended for this unit include establishment/protection of ridge function, beneficial use of dredged material, and beneficial use of pump outfall. A programmatic strategy for this unit is to conduct additional studies on the influence of Atchafalaya River water.

Terrebonne Marshes

Location - This 211,992-acre unit is located in Terrebonne Parish. The northern boundary of this unit runs from the community of Point Barre east to Bayou St. Jean, south along Bayou St. Jean to Isle of Jean Charles Road, and northeast along this road to its intersection with Louisiana Highway 665. The southern boundary is formed by Timbalier Island and Wine Island. The western boundary runs from Wine Island Pass north to the Houma Navigation Canal (HNC) and inland to Bayou Petit Caillou, then follows the Bush Canal to Bayou Terrebonne and north to the community of Point Barre. This unit is bordered on the east by the Pointe au Chien ridge and the Terrebonne-Lafourche parish line.

Habitat Description and Landscape Change - In 1949, this mapping unit was about half salt marsh and half brackish and intermediate marsh. By 1968, all of the intermediate marsh was lost or

converted to brackish and salt marsh. In 1990, the unit was 80% saline marsh.

Historic Land Loss - Subsidence has been and continues to be a major problem plaguing this mapping unit. This unit has had some of the highest rates of wetland loss in the state. Between 1932 and 1990, total land loss in this unit was estimated to be 24,270 acres, representing the loss of more than 44.3% of the 1932 land area. In addition to subsidence, a significant amount of the land loss in this area may be attributed to storm-related events (including several hurricanes) and wind and wave erosion of shorelines. Altered hydrology from canal dredging has also impacted this area, which has been largely deprived of sediment and freshwater input. Between 1974 and 1990, 11,530 acres of marsh were lost due to natural and indirect causes and an additional 140 acres lost due to man-made causes. Land in the Terrebonne Marshes unit is subsiding at a high rate (2.1-3.5 ft/century).

Future Land Loss Projections - It is expected that approximately 64.5% of the 1990 marsh area will be lost by 2050 if no actions are taken. This amounts to 19,620 acres.

Fish and Wildlife Resources - This mapping unit is host to a large variety of fish and invertebrate species. Recent monitoring has shown increases in red drum, black drum, blue crab, and Spanish mackerel populations, but decreases in spotted seatrout, Gulf menhaden, flounder, American oysters, and brown and white shrimp populations. Although the American oyster populations are expected to

remain steady and Spanish mackerel populations are expected to increase, all other fishery species are projected to decline by 2050.

The brown pelican population has increased over the last 10-20 years. Other avifauna abundance has remained steady in open water habitats, but decreased in salt marsh habitats. Furbearer and American alligator populations have decreased in the salt marsh habitats. By 2050, the brown pelican population is expected to increase. Other avifauna abundance is expected to remain steady in open water habitats but decrease in salt marshes. Furbearer and American alligator populations are expected to decrease in salt marshes.

Infrastructure - The hydrology of this mapping unit has been significantly affected by the creation and maintenance of commercial navigation channels. The HNC is part of the western boundary of this unit. The HNC is approximately 15 ft deep and 150 ft wide from Houma to the Gulf of Mexico. Little Caillou Bayou is five ft deep and 40 ft wide and extends from Bayou Terrebonne to Robinson Canal. Bayou Terrebonne has a six-ft deep channel and is sufficiently wide from Houma to Bush Canal. There is substantial oil and natural gas activity in the area, especially in Terrebonne and Timbalier bays to the south. There are no primary roads or railroads in this unit, but there are 13.2 miles of secondary and 6.1 miles of tertiary roads. This unit has 2,647 oil and/or natural gas wells and 88.6 miles of pipelines.

Previously Proposed Strategies - Proposed defensive measures in this unit

include protection and preservation of natural ridges, stabilizing the banks of navigation channels, managing hydrology to enhance and restore the brackish and salt marsh vegetation in the area, protecting lake shorelines, and creating reef zones. Offensive measures for the unit include sediment diversions and the dedicated use of dredged material to help offset the high subsidence rates in the area.

Coastal Use/Resource Objectives - The habitat objective for this management unit is a brackish and salt marsh and their associated aquatic habitats. Resource priorities for the area include shrimp, blue crabs, American oysters, saltwater finfish, and waterfowl. The area's storm buffering capacity and oil and natural gas infrastructure, roads, levees and bridges are also resource priorities.

Regional Ecosystem Strategies - Regional strategies for the Terrebonne Marshes unit include enhancing Atchafalaya River water influence to central Terrebonne Marshes, establishing multi-purpose hydrologic control of the HNC, stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, maintaining shoreline integrity in Timbalier Bay, restoring and maintaining Timbalier Island, and building land in upper Timbalier basin by sediment diversion from the Mississippi River via a conveyance channel parallel to Bayou Lafourche.

Benefits of Regional Strategies - These strategies are projected to reduce future loss by more than 50%. All of these strategies are projected to strongly

enhance intermediate, brackish, and salt marshes.

Shrimp, blue crab, American oyster, finfish, American alligator, furbearer, waterfowl, nongame fish and wildlife, and endangered species populations are all projected to be enhanced by these strategies, except for sediment diversions, which are projected to displace oyster production in the upper portion of the unit. All of the strategies are projected to enhance recreation and tourism, scientific study, storm buffering capacity, and infrastructure, such as roads, levees, bridges, communities, and utilities, and the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Mapping unit strategies for Terrebonne Marshes are to establish and protect ridge function, stabilize banks (Bayou Terrebonne), protect bay and lake shorelines, and use dredged material beneficially. Establishing multi-purpose control of the HNC is proposed as a programmatic strategy for this area.

Timbalier Island Shorelines

Location - This 8,615-acre unit is located at the southern extent of Lafourche and eastern Terrebonne parishes. This mapping unit is bordered on the east by the Lafourche erosional headland. The shoreline extends to the west from the Belle Pass jetties and includes the western shoreline of the Lafourche erosional headland, East Timbalier Island, and Timbalier Island.

Habitat Description and Landscape Change - In 1949, this barrier island chain was about half salt marsh and half

beach. In 1968, salt marsh was dominant. These islands have been slowly migrating to the northwest as storms and overwash events erode the beach and deposit sands into the back barrier marshes. As the islands have migrated, they have decreased in width, height, and area.

Historic Land Loss - Land loss estimates are not available for the period between 1932 and 1978. Approximately 631 acres of land were lost in this unit from 1978-1988/90. Much of the land loss and erosion of the islands is attributable to storm events. Tropical storms and hurricanes have resulted in substantial beach erosion and overwash of these islands over the years. Winter storms and cold front passages also erode the islands, particularly the back barrier salt marsh shorelines. The erosional forces acting on Timbalier Island, combined with western longshore transport, cause updrift erosion and downdrift accretion. This results in the southeast to northwest lateral migration of the island. During the past 100 years, the eastern half of Timbalier Island has been eroding at a rate of 61 ft/yr, whereas the western end has accreted at a rate of 57.7 ft/yr. Over the past century, Timbalier Island has decreased 58% in size. During this time, dune height has decreased and the width of the island has diminished considerably. The subsidence rate is currently 2.1-3.5 ft/century.

Future Land Loss Projections - Future land loss estimates are not available for this unit. However, land loss is expected to be high.

Fish and Wildlife Resources - This mapping unit is host to a large variety of fish and invertebrate species. Of all the species reported, only numbers of Spanish mackerel are believed to be increasing. Spotted seatrout, red drum, black drum, southern flounder, Gulf menhaden, blue crabs, American oysters, and brown and white shrimp are all decreasing in abundance. These trends are expected to remain the same in the future.

The brown pelican, seabird, and other avifauna populations have remained steady over the last 10-20 years, while furbearer populations have declined. By 2050, numbers of brown pelican, seabirds, and most other avifauna are expected to remain steady, while furbearer populations are expected to continue to decline.

Infrastructure - There is substantial oil and natural gas activity in the area, especially in Terrebonne and Timbalier bays behind the islands, but also on the islands themselves. Both East Timbalier and Timbalier Islands have been negatively impacted by oil and natural gas access canals that were dredged on the islands. These canals serve as potential weak spots, or focal points, for breaches to form during severe storm and overwash events. There are no roads or railroads in this unit. It does contain 258 oil and/or natural gas wells and 11.6 miles of pipelines.

Previously Proposed Strategies - Previously proposed strategies for this unit include creating and restoring the barrier islands, as well as protecting the bay shoreline and beneficial use of dredged material. There have been six

different proposed plans that address the restoration of these fragile and dynamic barrier islands. The proposed plans utilized a variety of techniques and included the use of sand fencing and/or pumped sand additions to nourish the beach and maintain island elevation. Vegetative plantings have been recommended to help stabilize and bind the sand, and to further capture and accrete wind-blown sand. Dedicated dredging may also be utilized as a means to fill and restore canals. Various hard structures, such as rip-rap shorelines or breakwaters, have also been proposed.

Coastal Use/Resource Objectives - The habitat objective for this unit is barrier island/chenier shoreline. However, the back barrier salt marshes must be included as a critical component of the overall barrier island environment. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, nongame fish and wildlife, endangered species, and recreation and tourism. The area also serves as a storm buffer and contains oil and natural gas infrastructure.

Regional Ecosystem Strategies - A regional strategy proposed for this unit includes restoring and maintaining the Timbalier barrier island chain.

Benefits of Regional Strategies - This strategy is projected to enhance salt marsh and barrier island habitats.

Shrimp, blue crab, American oyster, saltwater finfish, nongame fish and wildlife, and endangered species populations are projected to be enhanced by this strategy. This strategy is also projected to greatly enhance recreation

and tourism and storm buffering capacity, as well as the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Protection of bay, lake, and gulf shorelines, and beneficial use of dredged material are the mapping unit strategies for this area. The programmatic strategies for Timbalier Island Shorelines are to eliminate any new dredging of canals on the islands, directional drilling to prevent new development footprints on the land, and getting oilfield companies to help restore the island.

Boudreaux

Location - This 48,053-acre unit is located south of Houma in Terrebonne Parish. It consists of the intertributary subbasin bordered by Bayou Grand Caillou to the west, Bayou Petit Caillou to the east, and Louisiana Highway 57 to the south. Communities bordering the unit include Chauvin, Cocodrie, Dulac, and Ashland. Lakes Boudreaux and Quitman are located within the area.

Habitat Description and Landscape Change - In 1949, wetlands within the unit were classified as fresh and intermediate marsh. However, by 1968, the southern half of the unit had become brackish. By 1988, most of the area consisted of brackish marsh and open water with only a small area of fresh marsh remaining in the northeast corner of the unit. Fresh marshes north of Lake Boudreaux have experienced substantial conversion to shallow open water. Wax myrtle thickets, once abundant throughout the northern area, have

deteriorated to the point where few healthy thickets remain. Cypress swamps in the vicinity of Bayou Chauvin have also experienced substantial mortality. Some living cypress and bottomland hardwood areas still exist around the extreme northwestern and northern fringes of the unit. Extensive conversion of marsh to open water has occurred in the unit from the 1960's to the present.

Historic Land Loss - Between 1932 and 1990, approximately 10,330 acres of marsh were lost within this unit. The dredging of Boudreaux and Robinson canals in the early 1900's caused a profound basinwide hydrologic change. During the same period, basin hydrology was also affected by the elimination of riverine processes throughout the region. These changes, however, did not result in immediate deterioration and loss of marsh, but greatly reduced long-term marsh viability in a rapidly subsiding environment. Prior to the 1950's, marsh loss consisted primarily of physical erosion along larger water bodies within the southern portion of the unit. Dredging of numerous access canals within the unit, in the marshes north of Lake Barre, and through the natural banks of bayous Petit Caillou and Terrebonne, not only allowed high salinity Lake Barre water to enter the Lake Boudreaux unit through Robinson and Boudreaux canals, but also helped introduce saline water into interior portions of the unit.

Having been deprived of riverine sediment and freshwater for decades, the interior fresh and low-salinity marshes, comprised largely of organic sediments, were very vulnerable to local hydrology

changes and increased salinity. Over time, canal spoil banks deteriorated, allowing the introduction of increasingly saline water throughout sensitive interior areas and causing rapid loss of the interior marshes during the 1960's, 1970's, 1980's, and 1990's. Hurricanes Juan and Andrew also caused extensive loss of marshes in the central and southern portion of the unit through shoreline erosion and lifting/displacement of interior marshes. Such losses are to be expected where stressed organic marshes are exposed to high wave energy or storm surges. Land in the unit is subsiding at a rate of 1.1-2.0 ft/century.

One project designed to reduce marsh loss is the Lashbrook Outfall Management project. This project, completed in the mid-1990's, was designed to route freshwater discharge from the Lashbrook Pump Station through deteriorated marshes rather than directly into Lake Boudreaux. During the mid 1990's, the South Terrebonne Tidewater District also constructed a steel sheet pile structure in Boudreaux Canal to restrict that channel and reduce excessive water exchange and saltwater intrusion into the basin. Since the 1970's, Fina LaTerre, Inc. has helped to reduce shoreline erosion along the northern and northeast portions of Lake Boudreaux by building and maintaining an earthen dike along portions of those shores. In 1985, Terrebonne Parish reconstructed a portion of East Island and later, with the USACE, rebuilt a portion of Wine Island.

Future Land Loss Projections -

Assuming that future marsh loss occurs at the 1974 to 1990 loss rate, over 57.8%

(10,130 acres) of the unit's marshes will be lost by 2050. Of the 1,910 acres of swamp existing in 1990, none are expected to be lost by 2050.

Fish and Wildlife Resources - Fresh and low-salinity marshes in the northern portion of the unit provide high-quality habitat for migratory waterfowl, bitterns, herons, ibises, egrets, rails, nutria, mink, raccoons, river otters, swamp rabbits, white-tailed deer, American alligators, bullfrogs, and other species of reptiles and amphibians. In addition to these species, swamp forest and bottomland hardwood habitats support numerous songbirds, woodpeckers, raptors, and other bird species. Forested and/or shrubby areas also provide habitat for one or two nesting colonies of wading birds. Additionally, two active bald eagle nests are located within the unit. Fresh and low-salinity areas support largemouth bass, bluegill, crappie, blue catfish, and other recreationally and commercially important fish. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish such as Atlantic croaker, Gulf menhaden, red drum, spot, striped mullet, southern flounder, blue crabs, white shrimp, and others.

Brackish marsh portions of the unit provide habitat for migratory waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish such as Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped

mullet, southern flounder, blue crab, white shrimp, brown shrimp, and many others. Salinity within the unit is generally too low for reliable American oyster production except in the extreme southeastern area, which receives saline water from Robinson Canal.

This unit has had population increases over the last 10-20 years for red and black drum, Gulf menhaden, American oysters, blue crabs, and brown shrimp. The population of white shrimp has remained steady, while populations of spotted seatrout, southern flounder, largemouth bass, and channel catfish have decreased. Although populations of American oyster, largemouth bass, and channel catfish are projected to increase, all other fishery populations are projected to decrease.

Over the past 10-20 years, brown pelican populations have increased, whereas populations of other avifauna have remained steady. Nutria and American alligator populations have been decreasing. By 2050, populations of brown pelican are expected to increase, the bald eagle population will remain steady, and most other avifauna populations will decrease. In open water, American alligator populations are expected to decrease; in the marshes, American alligators will remain steady, while nutria numbers will decline.

Infrastructure - Louisiana Highways 57 and 56 and their associated infrastructure nearly surround the unit. Additionally, many of the communities along the east and west boundaries have constructed, or are planning to construct, forced drainage systems to provide flood protection and adequate drainage for

developed areas. Bayou Grand Caillou and Bayou Petit Caillou, which form the western and eastern unit boundaries, respectively, are channels maintained by the USACE. Excluding the developed areas along the distributary channels, the only significant infrastructure within the unit consists of access canals, pipeline canals, and oil and natural gas drilling and production facilities. The outfalls of three pump stations draining the Terrebonne Area mapping unit are located in the Boudreaux mapping unit. There are no railroads or primary roads, but there are 13.6 miles of secondary and 14.1 miles of tertiary roads. There are 253 oil and/or natural gas wells and 44.3 miles of pipelines, as well as one industrial groundwater uptake.

Previously Proposed Strategies -

Previously proposed strategies for this unit include preservation and protection of the natural levee ridges, hydrologic management of the navigation canals and fresh to brackish marshes, and freshwater diversions. The only CWPPRA project authorized within the unit is the Lake Boudreaux Basin Freshwater Introduction project.

Coastal Use/Resource Objectives -

Habitat objectives for the Boudreaux unit are maintenance of fresh and brackish marshes and their associated aquatic habitats, and fastlands and other developed lands. Resource objectives include shrimp, blue crabs, American oysters, saltwater finfish, freshwater finfish, American alligators, furbearers, waterfowl, agriculture and grazing, storm buffering capacity, flood water retention, navigation, oil and natural gas, roads, levees, and bridges.

Regional Ecosystem Strategies -

Regional strategies for this unit include enhancing Atchafalaya River water influence to the central Terrebonne marshes, stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, and establishing multi-purpose control of the HNC.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss by nearly 50%. All of these strategies are projected to greatly enhance fresh, intermediate, and brackish marshes, forested wetlands, and fastlands.

Shrimp, blue crab, finfish, American alligator, furbearer, crawfish, waterfowl, nongame fish and wildlife, and endangered species populations are generally projected to be enhanced by all of the strategies in this unit. American oysters may be displaced with a trend toward fresher conditions. All of the strategies are projected to enhance agriculture and grazing, forestry, recreation and tourism, water quality, storm buffering capacity, floodwater retention, and infrastructure, such as roads, levees, bridges, utilities, and oil and natural gas.

Mapping Unit and Programmatic

Strategies - Mapping unit strategies for the area are to establish and protect ridge function, beneficial use of dredged material, and protect bay and lake shorelines. Two programmatic strategies proposed for this unit include conducting additional studies on the influence of river water and establishing multi-purpose control of the HNC.

Pelto Marshes

Location - This 143,834-acre unit is located in Terrebonne Parish. This unit is bordered by Bayou Grand Caillou, the upland ridge around Four Point Bayou, Louisiana Highways 57 and 56, Bayou Petit Caillou, the HNC, a line from the HNC in Bay Welsh to Wine Island Pass, the back bay side of Isle Dernieres from Wine Island Pass to Pass Wilson, and the marsh edge from Pass Wilson to Bayou Grand Caillou.

Habitat Description and Landscape Change -

In 1949, the Pelto marshes were about 70% salt marsh, 20% brackish marsh, and 10% intermediate marsh. By 1968, the marshes had become more saline (88%) with some remaining brackish (12%). Today this unit is primarily saline marsh.

Historic Land Loss - Of the 56,315 acres of land present in 1932, some 14,800 acres (26.2%) have been lost. Over half of the loss occurred by 1974. Primary causes of loss in this unit are wind and wave erosion, subsidence, and altered hydrology. The HNC is central to changes in hydrology in this unit. Other causes of loss include storm-related loss and lack of sediment and fresh water. Subsidence rates are estimated to be 2.1-3.5 ft/century.

Future Land Loss Projections -

Although land loss rates have recently decreased in this unit, altered hydrology, subsidence, and wind and wave erosion continue to be problems. Lack of fresh water and sediment are underlying causes of marsh loss in this unit. If no action is taken, an additional 14,600 acres (35.2%) will be lost by 2050.

Fish and Wildlife Resources -

According to the fisheries work group, populations of red and black drum, blue crab, and Spanish mackerel have had increasing trends. Species with decreasing populations include spotted seatrout, Gulf menhaden, southern flounder, American oysters, white and brown shrimp, largemouth bass and channel catfish. Although American oyster populations are projected to remain steady and Spanish mackerel populations are projected to increase, all other fishery populations are expected to decline by 2050.

The brown pelican has increased in population over the last 10-20 years. In open water, populations of other avifauna have remained steady. In the salt marshes, avifauna, furbearer, and American alligator populations have declined over the same period. All wildlife in the salt marshes (avifauna, furbearers, and American alligators) are expected to decline by 2050. In the open water, brown pelican populations are expected to increase, seabirds are expected to remain steady, and migratory waterfowl are expected to decline. In salt marshes, avifauna, furbearer, and American alligator populations are expected to decline.

Infrastructure - The HNC is the major navigation channel in this part of the coast. This 15-ft deep, 150-ft wide channel cuts through 41 miles of marshes from Houma to the Gulf of Mexico. Average annual traffic on this channel exceeds 1.2 million tons. Oil and natural gas exploration and production has been active in this unit since the late 1920's. Subsequently, numerous oil and natural gas canals have

been constructed in the unit. The largest community in this unit is Cocodrie. The unit has no primary roads or railroads, but has 11.3 miles of secondary and 6.5 miles of tertiary roads. There are 1,761 oil and/or natural gas wells in this unit and 1.8 miles of natural gas pipeline. One drainage pump station discharges into this unit from the Terrebonne Area mapping unit.

Previously Proposed Strategies - Five previous documents, including the "Blueprint" and CWPPRA plan, target hydrologic management and bank stabilization of the HNC as major strategies for this unit. Other strategies include establishing a reef zone, protecting bay and lake shorelines, and using dredged material beneficially.

Coastal Use/Resource Objectives - Habitat objectives for the Pelto Marshes are fresh, intermediate, brackish, and saline marshes and associated aquatic habitats. Resource objectives include shrimp, blue crabs, American oysters, saltwater finfish, waterfowl, scientific study and education, storm buffering capacity, oil and natural gas, roads, levees, bridges, and communities.

Regional Ecosystem Strategies - Regional strategies proposed for the Pelto Marshes include enhancing Atchafalaya River water influence to central Terrebonne marshes, establishing multi-purpose hydrologic control of the HNC, stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, maintaining the shoreline integrity of Timbalier Bay, and restoring and maintaining the Timbalier barrier island chain.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss. All of these strategies are projected to greatly enhance fresh, intermediate, brackish and salt marshes, forested wetlands, and fastlands.

Shrimp, blue crab, American oyster, finfish, American alligator, furbearer, waterfowl, crawfish, nongame fish and wildlife, and endangered species populations are projected to be enhanced by these strategies. These strategies are also projected to enhance agriculture and grazing, forestry, recreation and tourism, scientific study, water quality, storm buffering capacity, and infrastructure such as roads, levees, bridges, communities, utilities, and the oil and gas industry.

Mapping Unit and Programmatic Strategies - Stabilizing banks (HNC), protecting bay and lake shorelines, and beneficial use of dredged material are the mapping unit strategies adopted for this area. Programmatic strategies proposed for this unit include establishing multi-purpose control of the HNC and conducting additional studies on the influence of river water.

Fields Swamp

Location - The Fields Swamp mapping unit includes 103,790 acres. This unit is bordered by Thibodaux on the northwest, the Bayou Lafourche ridge on the north and east, and the Bayou Blue ridge on the west and south. This unit is within Lafourche Parish.

Habitat Description and Landscape Change - In 1949, Fields Swamp was approximately 70% fresh marsh and

30% unknown. In 1968, the unit was approximately 75% fresh marsh and 25% unknown. In 1988, this unit was 39% fresh marsh, 1% swamp, and the remainder forest, pasture, water, and developed.

Historic Land Loss - From 1932 to 1990, approximately 3,470 acres of land were lost. The largest amount of acreage (1,610 acres) was lost between 1932 and 1956. Historically the primary cause of land loss in this unit was direct removal. Altered hydrology and storm related losses were also contributors to land loss in this unit. Currently, wake and wave erosion is the primary cause of land loss in the Fields Swamp mapping unit. Land in Fields Swamp is subsiding at a rate of 1.1-2.0 ft/century.

Future Land Loss Projections - The projected amount of natural loss by the year 2050 is 3,210 acres (15.5%). With CWPPRA projects in place, 200 acres of the 3,210 acres will be preserved, lowering the rate of loss to 14.5%. Of the 580 acres of swamp in this unit in 1990, it is projected that none will be lost by 2050.

Fish and Wildlife Resources - Populations of largemouth bass and channel catfish in this mapping unit are currently stable and are projected to increase through 2050.

Wildlife in the unit includes wading birds, shorebirds, raptors, other avifauna, nutria, and American alligators. Muskrats and other furbearers are present in low numbers. Populations of most wildlife have been steady for the last 10-20 years, with increases in American alligator populations in fresh

marshes and open water, and raptor populations in hardwood forests. Through 2050, wildlife populations are expected to remain steady, except for projected declines in raptors and other woodland avifauna in the hardwood forests.

Infrastructure - The GIWW is designed to be a 12-ft deep by 125-ft wide canal used for navigation. There are 9.6 miles of primary, 0.5 miles of secondary, and 56.0 miles of tertiary roads, as well as 0.5 miles of railroad. This unit has 202 oil and/or natural gas wells, and 32.4 miles of pipeline, most of which are natural gas (26.6 miles). There are two industrial surface water intakes in this unit.

Previously Proposed Strategies - Navigation canal bank stabilization and freshwater diversions are the only strategies previously proposed for this unit.

Coastal Use/Resource Objectives - Habitat objectives for Fields Swamp are fresh marshes and forested wetlands and their associated aquatic habitats. Resource priorities for the unit are freshwater finfish, American alligators, furbearers, crawfish, waterfowl, endangered species, agriculture and grazing, storm buffering capacity, flood water retention, roads, levees, bridges, and communities.

Regional Ecosystem Strategies - A regional strategy proposed for this unit is to stabilize the banks of navigation channels for water conveyance.

Benefits of Regional Strategies - This strategy is projected to enhance fresh

marshes, forested wetlands, and fastlands.

Mapping Unit and Programmatic Strategies - Three mapping unit strategies (stabilizing banks, beneficial use of dredged material, and beneficial use of pump outfall) have been adopted for this area. A programmatic strategy proposed for this unit is a wake limit control for larger boats in order to reduce wave erosion.

Devil's Swamp

Location - Devil's Swamp mapping unit contains approximately 22,190 acres of land. It is in the upper portion of Terrebonne Parish. This unit is bordered by Thibodaux on the north, Bayou Terrebonne on the west, Houma and a portion of the GIWW on the south, and Bayou Blue to the east.

Habitat Description and Landscape Change - There are no habitat data available on the Devil's Swamp unit for 1949. In 1968, the area was predominately fresh marsh. In 1988, the area was 7% fresh marsh, 1% swamp, 2% open water, and the remainder was forest, pasture, and developed areas.

Historic Land Loss - From 1932 to 1990, approximately 1,010 acres of land were lost. Almost half (490 acres) of the 1,010 acres have been lost since 1974. The two main historic causes of land loss in this unit are direct removal by fire and altered hydrology. Subsidence is also a problem in this unit. Current subsidence rates are 1.1-2.0 ft/century. The major waterbodies in this unit are St. Louis Bayou and Bayou Little Coteau.

Future Land Loss Projections - By 2050, 865 (63.1%) acres of marsh are predicted to be lost in the Devil's Swamp mapping unit. Future loss will most likely be associated with wake and wave erosion. Of the 200 acres of swamp in the unit in 1990, none is expected to be lost by 2050.

Fish and Wildlife Resources - This mapping unit is host to freshwater fishes, including largemouth bass and channel catfish, as well as wading birds, raptors, other woodland avifauna, furbearers, and American alligators. While American alligator populations are currently increasing, their numbers are expected to remain steady through 2050. Furbearer populations have remained steady over the past 10-20 years, and are projected to remain steady through 2050. Most avifauna populations have been increasing. Their numbers are expected to remain steady, except for woodland residents and migrants, which are expected to decline. Currently steady populations of largemouth bass and channel catfish are projected to increase in the future.

Infrastructure - The GIWW is a 12-ft deep by 125-ft wide canal used for navigation. This unit has 14.0 miles of primary, 0.1 miles of secondary, and 117.5 miles of tertiary roads, as well as 3.4 miles of railroad. There are 118 oil and/or natural gas wells and 18.4 miles of pipelines.

Previously Proposed Strategies - The CWPPRA Restoration Plan proposed navigation canal bank stabilization, freshwater diversion, managed hydrology, and beneficial use of dredged

material as means to enhance swamps in this unit.

Coastal Use/Resource Objectives - Habitat objectives for the unit are freshwater marshes and swamps and their associated aquatic habitats. Resource priorities include freshwater finfish, American alligators, furbearers, crawfish, waterfowl, storm buffering capacity, flood water retention, roads, levees, bridges, and communities.

Regional Ecosystem Strategies - A regional strategy proposed for this unit is to stabilize the banks of navigation channels for water conveyance.

Benefits of Regional Strategies - This strategy would protect floodwater retention and infrastructure such as communities, roads, bridges, and levees.

Mapping Unit and Programmatic Strategies - Stabilization of banks is a mapping unit strategy that was adopted for Devil's Swamp. Maintenance of levees and water quality improvement are the programmatic recommendations.

Savoie

Location - The Savoie mapping unit contains approximately 16,240 acres of land and is located in Terrebonne Parish. It is bordered by Little Bayou Black on the west and south, Houma on the southwest, and Bayou Terrebonne on the northeast.

Habitat Description and Landscape Change - There are no habitat type data available on the Savoie mapping unit for 1949 or 1968. The unit is currently classified as 25% fresh marsh and 77%

forested wetlands. Major water bodies include Ouisk Bayou and Bayou Cane.

Historic Land Loss - From 1932 to 1990, approximately 330 acres of land were lost. Most (310 acres) of the 330 acres were lost since 1974. Flooding and altered hydrology, both related to hydrologic changes in the Atchafalaya River floodway, are the two major causes of historic land loss. Lack of sediment and fresh water and, currently, direct removal are also contributors to land loss in this unit. Land is subsiding at an estimated rate of 1.1-2.0 ft/century.

Future Land Loss Projections - The projected land loss by 2050 is 860 acres (33.1%), primarily due to flooding and altered hydrology. Of the 340 acres of swamp occurring in 1990, none is expected to be lost by 2050.

Fish and Wildlife Resources - This mapping unit is host to freshwater fishes, including largemouth bass and channel catfish, as well as wading birds, shore birds, raptors, other woodland avifauna, furbearers, and American alligators. While American alligator and wading bird populations are currently increasing, their numbers are expected to stabilize through 2050. Furbearer populations have been steady over the past 10-20 years and are projected to remain steady through 2050. Most avifauna populations have been increasing, but their numbers are generally expected to remain steady, except for raptors and woodland residents and migrants, which are expected to decline. Currently steady populations of largemouth bass and channel catfish are expected to increase in the future.

Infrastructure - There is no USACE maintained infrastructure in this mapping unit. This unit has 12.0 miles of primary and 32.1 miles of tertiary roads, and 0.8 miles of railroad. There are 31 oil and/or natural gas wells and a total of 5.1 miles of natural gas pipeline in this unit.

Previously Proposed Strategies - Strategies previously proposed for this unit include hydrologic management of swamps and fresh marshes and freshwater diversions into the unit.

Coastal Use/Resource Objectives - Habitat objectives are freshwater marshes and forested wetlands and their associated aquatic habitats. Resource priorities include freshwater finfish, American alligators, furbearers, crawfish, waterfowl, agriculture and grazing, storm buffering capacity, flood water retention, roads, levees, bridges, and communities.

Regional Ecosystem Strategies - There were no regional strategies developed for this unit due to its small size and isolated nature.

Benefits of Regional Strategies - Not applicable.

Mapping Unit and Programmatic Strategies - There are no suggested strategies for Savoie under these headings.

North Houma Ship Canal Wetlands

Location - This 21,134-acre unit is located immediately south of Houma in Terrebonne Parish. It is bordered by the Bayou du Large uplands on the west;

Falgout Canal, the HNC, and Bayou Grand Caillou on the south; by the Bayou Grand Caillou uplands on the east; and Houma on the north. Communities bordering the unit include Houma, Theriot, Dulac, and Ashland.

Habitat Description and Landscape Change

- In 1988, this unit was 4% fresh marsh, 11% intermediate marsh, 0.5% brackish marsh, 28% cypress swamp, and 16% open water. The remainder was forest, agriculture, and developed land. Cypress swamps and fringing bottomland hardwoods presently dominate the northern half of the unit. The southern half of the unit consists of marshes and a few higher elevation ridges supporting cypress trees. In the southern portion of the mapping unit, many of the cypress trees died from saltwater intrusion following completion of the HNC in 1962. Marsh areas which previously consisted primarily of fresh marshes were, by 1978, primarily intermediate marshes, and by 1988, brackish marsh vegetation was abundant in portions of the extreme southern areas. Along with the rapid habitat change, substantial marsh loss occurred. To preserve deteriorating marshes and swamps north of the Falgout Canal and west of the HNC, the Falgout Canal marsh management project was completed by the DNR and Terrebonne Parish in 1992. That project was designed to maintain appropriate water levels, introduce fresh water when available, and to preclude entry of high-salinity water. The DNR had several sections of the west HNC bank rock armored in 1995 to prevent spoil bank breaches and maintain project effectiveness. In 1996, a CWPPRA project to plant vegetation along the

north bank of Falgout Canal was completed. Since construction of the HNC, private land owners have plugged several canals and/or openings to the HNC that allowed saltwater intrusion into adjacent cypress swamps.

Historic Land Loss - Between 1932 and 1990, approximately 1,760 (34.1%) acres of marsh were lost within this unit. Historically, altered hydrology and direct removal were the main causes of loss. Altered hydrology and wind/wave erosion are currently the biggest land loss causes.

Following the construction of the HNC in 1962, fresh marshes north of Falgout Canal and west of the HNC experienced catastrophic loss. Loss in this area continued through the mid 1980's. During this period, most cypress in the southern portion of the unit died. Cypress in areas further to the north also experienced loss, resulting in areas of dead standing trees, with living cypress often nearby on higher elevation sites. The dead trees appeared to have been located in lower areas where saline storm tides were trapped. Some of these areas presently support an intermediate marsh understory. Regrowth of marshes within the northern portion of the Falgout Canal marsh management area has occurred since that project became operational. Currently, land is subsiding at a rate of 1.1-2.0 ft/century.

Future Land Loss Projections

- Assuming that future land loss occurs at the 1974 to 1990 rate, over 58.5% (1,990 acres) of the unit's marsh would be lost by 2050. None of the 1990 swamp acreage (6,030 acres) would be lost by 2050. Since a portion of the unit's

marshes have been placed under water level and salinity management, future marsh loss rates might not be as high as those in the past. Additionally, the HNC and the GIWW are carrying increasingly greater quantities of riverine water to area marshes and may help to reduce adverse impacts of canal-induced saltwater intrusion during periods of low Atchafalaya River flow.

Fish and Wildlife Resources - Swamps and fresh marshes in the northern portion of the unit provide high quality habitats for migratory waterfowl, bitterns, herons, ibises, egrets, rails, nutria, mink, raccoons, river otters, swamp rabbits, white-tailed deer, American alligators, bullfrogs, and other species of reptiles and amphibians. In addition, swamp forest and bottomland hardwood habitats support numerous songbirds, woodpeckers, raptors, and other bird species. Fresh and low-salinity areas support largemouth bass, bluegill, crappie, blue catfish, and other recreationally and commercially important fish. These areas may also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish that are tolerant of fresh water or low salinity such as Atlantic croaker, Gulf menhaden, red drum, striped mullet, southern flounder, blue crab, white shrimp, and others.

Brackish marsh portions of the unit provide habitat for migratory waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and

shellfish such as Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped mullet, southern flounder, blue crab, white shrimp, brown shrimp, and many others.

This unit has had increasing populations of red and black drum, spotted seatrout, Gulf menhaden, southern flounder, white and brown shrimp, and blue crabs, with decreasing population trends for largemouth bass and channel catfish. These trends are all expected to reverse themselves in the future.

Wading birds and raptors have had increasing population trends over the past 10-20 years, whereas populations of seabirds, shorebirds, marsh residents and migrants, and woodland residents and migrants have remained steady. Furbearer populations have declined, and American alligator populations have remained steady. By 2050, avifauna populations are projected to remain steady in all habitats, with the exception of hardwood forests, in which avifauna populations are projected to decline. Furbearer and American alligator populations are expected to remain steady.

Infrastructure - Infrastructure in the area consists primarily of Louisiana Highways 315 and 57 and the communities of Theriot and Ashland/Dulac. Other transportation routes include a portion of the Falgout Canal Road east of the HNC and the Falgout Canal Road pontoon bridge, the HNC, and Bayou Pelton. Additional infrastructure includes four water control structures along the north bank of Falgout Canal and one structure in Forty

Arpent Bayou near the HNC. These structures are part of the Falgout Canal marsh management project. The HNC, Bayou Pelton, and a portion of Bayou Grand Caillou are maintained by the USACE. Oil and natural gas access canals and production facilities also exist within the unit. There are 28 oil and/or natural gas wells and 12.2 miles of pipelines (10.0 miles of natural gas). There are no primary or secondary roads, but there are 18.5 miles of tertiary roads and 1.2 miles of railroad. This unit has one drainage pump station that discharges from the Terrebonne Area mapping unit. There is one industrial surface water intake.

Previously Proposed Strategies -

Hydrologic management and bank stabilization of the navigation canals in this unit are the primary previously proposed strategies. A CWPPRA project involving vegetative plantings along the north side of Falgout Canal was completed in this unit in 1996. Hydrologic management of the swamps and fresh to brackish marshes has also been proposed, as well as beneficial use of dredged material.

Coastal Use/Resource Objectives -

Habitat objectives include freshwater marshes, forested wetlands, and their associated aquatic habitats. Resource priorities are freshwater finfish, American alligators, furbearers, crawfish, waterfowl, nongame fish and wildlife, endangered species, agriculture and grazing, forestry, recreation and tourism, scientific study, storm buffering capacity, navigation, roads, levees, and bridges.

Regional Ecosystem Strategies -

Regional strategies for this unit include establishing multi-purpose hydrologic control of the HNC, stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, and enhancing Atchafalaya River water influence to the central Terrebonne marshes.

Benefits of Regional Strategies -

These strategies are projected to reduce future wetland loss by more than 50%. All of these strategies are projected to greatly enhance fresh marshes, forested wetlands, and fastlands, except for beneficial use of dredged material, which is projected to be compatible with the other resource objectives.

Blue crab, finfish, American alligator, furbearer, crawfish, waterfowl, nongame fish and wildlife, and endangered species populations are projected to be enhanced by all of these strategies. Agriculture and grazing, forestry, recreation and tourism, scientific study, storm buffering capacity, and community infrastructure are projected to be enhanced by all of these strategies. The oil and natural gas industry, navigation, roads, levees, bridges, and utilities are projected to be enhanced by bank stabilization and dredged material use.

Mapping Unit and Programmatic

Strategies - Mapping unit strategies for the North Houma Ship Canal Wetlands include stabilizing banks and beneficial use of dredged material. Programmatic strategies include amending the Falgout Canal project water management plan, flood protection for both sides of the channel, and boat and wake control.

Caillou Marshes

Location - This 87,079-acre unit is located south of Houma in Terrebonne Parish. It is bordered on the east by the HNC and Bayou Grand Caillou, on the west by Bayou du Large, on the north by Falgout Canal, and on the south by the Gulf of Mexico.

Habitat Description and Landscape Change

- According to 1949 habitat maps, the northern 40% of the area was dominated by solid fresh and intermediate marshes at that time. Residents claim the area immediately south of Falgout Canal was a fresh, floating, maidencane marsh. Within this freshwater area, there were wax myrtle thickets and a stand of cypress trees. These freshwater northern areas were separated from the saline marshes along the gulf shore and around Caillou Lake by a band of brackish marsh. After completion of the HNC in 1962, saltwater intrusion caused dramatic losses in the sensitive fresher habitats. By the mid-1970's, fresh marshes and cypress swamps in the northern portion of the area had been converted to open water. By 1988, 34% of the area was saline marsh, 13% brackish marsh, and the remainder open water. The marshes north of Caillou Lake, Monclouse Bay, and adjacent to Bayou Sauveur are presently dominated by black needlerush.

Fohs Canal and many connecting access canals in the northern area were dredged prior to the mid-1950's. Prior to the mid-1960's, marshes between Fohs Canal and the upper end of Bayou Sauveur were partitioned by a grid-like series of east-west and north-south

trenasses. Between the mid-1950's and the mid-1970's, a series of access canals were dredged north of Monclouse Bay.

Historic Land Loss - Between 1932 and 1990, about 13,385 acres (25.8%) of wetlands were lost in this unit.

Historically, altered hydrology, wind and wave erosion, and direct removal were the main causes of erosion. With the exception of continued erosion along the Gulf of Mexico shoreline, most historic and current loss has occurred within the northern and central portions of the unit, areas that were formerly fresh or low salinity areas. Following the construction of the HNC in 1962, fresh marshes south of Falgout Canal experienced catastrophic loss. Loss in this area continued through the mid-1980's. During this same time period, the grid of trenasses in the marshes between the upper end of Bayou Sauveur and Fohs Canal allowed the effects of the HNC to impact that area, resulting in some breakup and loss of marsh. The needlerush marshes further to the south have experienced minimal losses with the exception of shoreline erosion along the bay shores and the Gulf of Mexico. Currently the land is subsiding at 2.1-3.5 ft/century.

The long-term effects of eliminating riverine inflow in the early 1900's, in combination with continued subsidence, have made area marshes more vulnerable to the effects of local and regional hydrologic alterations. With growth of the Atchafalaya River Delta, the HNC and the GIWW are carrying increasingly greater quantities of riverine water to area marshes and may be serving to reduce marsh loss rates.

Future Land Loss Projections - If future marsh loss occurs at the 1974 to 1990 loss rate, over 24.6% (9,960 acres) of the unit's remaining marshes will be lost by 2050. However, increasing flow of Atchafalaya River fresh water down the HNC and the lower end of Bayou Grand Caillou may tend to curtail marsh deterioration and loss within the unit. Future losses will likely occur primarily within the trenasse grid area located in the north central portion of the unit.

Fish and Wildlife Resources - Area marshes provide habitat for migratory waterfowl, wading birds, rails, nutria, mink, raccoons, river otters, swamp rabbits, and American alligators. These areas also provide nursery habitat for commercially and recreationally important estuarine-dependent fish and shellfish such as Atlantic croaker, Gulf menhaden, spotted seatrout, red drum, black drum, sand seatrout, spot, striped mullet, southern flounder, blue crabs, white shrimp, brown shrimp, and many others. The Caillou Lake area is a State oyster seed ground. Because of its seasonal supply of riverine input, it is often very productive. Consistent American oyster production is hampered because areas to the north tend to be too fresh and areas to the south tend to be too saline.

This unit has had increasing population trends for red and black drum, brown shrimp, blue crabs, and Spanish mackerel. White shrimp have remained stable over the last 10-20 years. Largemouth bass, spotted seatrout, Gulf menhaden, southern flounder, and American oyster populations have declined in this same period. Although Spanish mackerel populations are

projected to increase, all other fishery populations are expected to decline.

Brown pelican and wading bird populations have had increasing trends over the last 10-20 years. Other avifauna such as seabirds, shorebirds, raptors, and marsh residents and migrants have remained stable, whereas furbearer and American alligator populations have declined. By 2050, most avifauna are projected to decline in abundance, except for brown pelicans, which are expected to increase. American alligator abundance is expected to decrease, but furbearer numbers are expected to remain stable.

Infrastructure - Infrastructure within this unit consists primarily of Louisiana Highway 314 and the adjacent community located along the east bank of Bayou du Large south of Falgout Canal. This community is surrounded by a hurricane protection levee and includes a swing-barge floodgate in the southern end of Bayou du Large. Drainage for this developed area is provided by pumps. Other infrastructure includes the Falgout Canal Road along the southern bank of Falgout Canal. This road, and the associated HNC pontoon bridge, allows travel from the Bayou du Large community to those located along Bayou Grand Caillou. The only other significant infrastructure consists of access canals, pipeline canals, oil and natural gas drilling and production facilities, and private camps. One drainage pump discharges into this unit from the Terrebonne Area mapping unit. No railroads or primary or secondary roads are in this unit, but there are 5.9 miles of tertiary roads. This unit

also has 235 oil and/or natural gas wells and 16.4 miles of pipeline.

Previously Proposed Strategies - The strategies proposed for reducing marsh loss within the Caillou Marshes unit include preserving/protecting ridge functions, managing hydrology in brackish and saline marshes, developing a reef zone, and beneficially using dredged material.

Coastal Use/Resource Objectives - Habitat objectives for the unit are to have bands of fresh, intermediate, brackish, and saline marshes from north to south. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, freshwater finfish, furbearers, waterfowl, storm buffering capacity, roads, levees, and bridges.

Regional Ecosystem Strategies - Regional strategies affecting this unit include establishing multi-purpose hydrologic control of the HNC, increasing the transfer of Atchafalaya River water to lower Penchant tidal marshes, stabilizing the banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, and maintaining shoreline integrity in Caillou Bay.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss by more than 50% and to enhance fresh, intermediate, brackish, and salt marshes; forested wetlands; and fastlands.

Populations of shrimp, blue crabs, American oysters, finfish, American alligators, furbearers, crawfish,

waterfowl, nongame fish and wildlife, and endangered species are projected to be greatly enhanced by these strategies. The same pattern holds for agriculture and grazing, forestry, recreation and tourism, water quality improvement, storm buffering capacity, and communities. Generally, the strategies are projected to enhance scientific study, navigation, the oil and natural gas industry, roads, levees, bridges, and utilities.

Mapping Unit and Programmatic Strategies - Mapping unit strategies for Caillou Marshes are to establish and protect ridge function and beneficial use of dredged material. There are no programmatic strategies for this area.

Isles Dernieres Shorelines

Location - This 7,307-acre unit is located at the southern extreme of Terrebonne Parish. This unit consists of the Isles Dernieres from Wine Island Pass to Raccoon Point.

Habitat Description and Landscape Change - The Isles Dernieres barrier island chain is the result of transgressive barrier island arc formation after abandonment of the Lafourche delta. The main distributaries of the Lafourche delta were bayous Grand Caillou and Terrebonne, which may have been abandoned 1,200 years ago, or as recently as 600-800 years ago. The Isles Dernieres barrier island chain currently consists of four islands. From east to west these islands are East Island, Trinity Island (the largest island), Whiskey Island, and Raccoon Island. These islands contain beach, dune, swale, and marsh habitats (including

black mangroves), and numerous washover surfaces.

In 1949, this barrier island chain was classified by O'Neil as being composed of nearly equal amounts of salt marsh and beach habitat. The 1968 classification reported salt marsh habitat as the dominant marsh type. A transect across a typical Louisiana barrier island (from gulf to bay) begins with the beach habitat followed by a relatively low elevation primary dune. Behind the dune is the swale habitat, which grades down to a high marsh region where black mangrove is typically found. Finally, the high marsh grades into the tidally influenced back-barrier marsh. Historically, these islands have been slowly migrating to the northwest as storms and overwash events erode the beach and deposit dune sands back across the swale and into the back barrier marshes. As the islands migrate, or rollover, they decrease in width, height, and area.

Historic Land Loss - Much of the land loss and erosion of the islands is attributable to storm events. Tropical storms and hurricanes have resulted in substantial beach erosion and overwash of these islands over the years. Winter storms and cold front passages also erode the islands, particularly the back barrier salt marsh shorelines. Historic rates of shoreline erosion on the Isles Dernieres have averaged 32.8-49.2 ft/yr. Subsidence is occurring at an estimated rate of 2.1 3.5-ft/century. Following the passage of Hurricane Andrew just to the west of the Isles Dernieres in 1992, Raccoon Island lost 30-40% of its area and shoreline erosion along stretches of Trinity Island exceeded 131.2 feet.

Approximately 495 acres of land were lost in this unit from 1978-1990.

Future Land Loss Projections - It is expected that none of the Isles Dernieres will remain in 2050 if no action is taken. In fact, it is believed that, with no action, the Isles Dernieres chain may become sub-aqueous by 2007.

Fish and Wildlife Resources - This mapping unit is host to a large variety of fish and invertebrate species. Of all the species reported, only Spanish mackerel is believed to be increasing in abundance in this unit. Spotted seatrout, red drum, black drum, flounder, Gulf menhaden, blue crabs, American oysters, and brown and white shrimp are all displaying a trend of decreasing abundance. These population trends are projected to continue through 2050.

The brown pelican population has had an increasing trend over the last 10-20 years. Other avifauna populations have remained stable over this time, and furbearer abundance has declined. By 2050, the pelican population is expected to increase, the seabird population in open water habitats is projected to remain stable, and the avifauna populations elsewhere are expected to decline, as are the furbearer populations.

Infrastructure - There is substantial oil and natural gas activity in the area, especially in Terrebonne Bay behind the islands, but also on the islands themselves. Trinity Island in particular has been negatively impacted by oil and natural gas access canals that were dredged on the island. These canals serve as potential weak spots, or focal points, for breaches to form during

severe storm and overwash events. This unit has 11 oil and/or natural gas wells and no roads or pipelines.

Previously Proposed Strategies - There have been six different proposed plans that addressed the restoration of these fragile and dynamic barrier islands. The proposed plans utilized a variety of techniques and included the use of sand fencing and/or pumped sand additions to nourish the beach and maintain island elevation. Vegetative plantings have been recommended to help stabilize and bind the sand, and to further trap and accrete wind-blown sand. Dedicated dredging may also be utilized as a means to fill and restore canals. Various hard structures, such as rip-rap shorelines or breakwaters, have also been proposed.

Coastal Use/Resource Objectives - The habitat objective for this mapping unit is barrier island/chenier shoreline. However, the back barrier salt marshes must be included as a critical component of the overall barrier island environment. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, nongame fish and wildlife, endangered species, and recreation and tourism. The area also serves as a storm buffer and contains oil and natural gas infrastructure.

Regional Ecosystem Strategies - A regional strategy affecting the Isles Dernieres Shoreline unit includes restoring and maintaining the Isles Dernieres barrier island chain.

Benefits of Regional Strategies - This strategy is projected to enhance salt marshes and barrier islands.

Shrimp, blue crab, and American oyster, saltwater finfish, nongame fish and wildlife, and endangered species populations are projected to be enhanced by this strategy. This strategy is also projected to greatly enhance recreation and tourism and storm buffering capacity. The oil and natural gas industry is projected to be enhanced by barrier island restoration and sediment delivery, but institutional measures and dredged material use are projected to have slightly detrimental impacts on the industry.

Mapping Unit and Programmatic Strategies - Protection of bay, lake, and gulf shorelines and beneficial use of dredged material (fill abandoned canals) are two mapping unit strategies. Programmatic strategies include directional drilling to prevent new development footprints on the land, elimination of any new dredging of canals on the islands, and enlisting oilfield companies' help in restoring islands.

Pigeon Swamps

Location - This 11,510-acre unit is located in Assumption, St. Martin, and Iberia parishes. It is bordered on the west by the East Atchafalaya Basin Protection Levee, to the east by Louisiana Highway 70, and Bayou Natchez to the north.

Habitat Description and Landscape Change - In 1988, this unit was 51% cypress swamp, 38% bottomland forest, 6% water, and 4% pasture/development. Major water bodies in the area are Bayou Grosbec, Bayou Natchez, and Big Godde Bayou.

Historic Land Loss - Altered hydrology is the major cause of historic land loss, while flooding is a continued threat in this unit. Currently land in the unit is subsiding at 1.1-2.0 ft/century. There are no other land loss data available for this unit.

Future Land Loss Projections - In 1990 this unit had approximately 5,500 acres of swamp and 10 acres of marsh. By 2050 the unit will lose 40% of this total (2,200 acres). All of the 1990 marsh area will be gone.

Fish and Wildlife Resources - This mapping unit is host to wading birds, raptors, some marsh avifauna, woodland avifauna, furbearers, and American alligators. While wading bird and raptor populations are currently increasing, their numbers are expected to stabilize through 2050. Furbearers have remained steady over the past 10-20 years, and are projected to remain so through 2050. The American alligator population has been increasing, and is expected to continue to increase through 2050. Most avifauna populations are expected to remain steady, except for raptors, woodland residents, and migrants, which are expected to decline in hardwood forests. Fishery population trends are unknown and projections are therefore unavailable.

Infrastructure - There is no USACE-maintained infrastructure in this mapping unit. This unit has no primary or secondary roads or railroads, but has 4.7 miles of tertiary roads. There are 23 oil and/or natural gas wells and 14.1 miles of pipelines, 11.2 miles of which are natural gas.

Previously Proposed Strategies - The only previously proposed strategy is to manage hydrology in the swamps.

Coastal Use/Resource Objectives - The habitat objectives for the Pigeon Swamps unit are forested wetlands and associated aquatic habitats. Resource priorities include freshwater finfish, furbearers, crawfish, nongame fish and wildlife, endangered species, and forestry.

Regional Ecosystem Strategies - The regional strategy for the Pigeon Swamps unit is to improve hydrology and drainage in the Verret Subbasin.

The problems associated with chronic and excessive flooding in this and surrounding areas are largely due to the Atchafalaya River influence and would be alleviated by implementing a USACE flood protection feature named the "Barrier Plan." This feature would block water exchange at U.S. Highway 90 between Morgan City and Houma. A network of pumps would be installed to remove excess water from the Verret Subbasin. Additional measures such as introducing supplemental water from the Atchafalaya River or the Mississippi River during drought conditions to address water quality needs would be considered.

Benefits of Regional Strategies - Implementation of the hydrologic management strategy would benefit about 200,000 acres of forested wetlands in the Verret Subbasin and would protect the affected communities, industries, and agricultural lands from flooding. Hydrologic management is projected to enhance freshwater finfish, crawfish,

nongame fish and wildlife, endangered species populations, and forestry.

Mapping Unit and Programmatic Strategies - There are no suggested mapping unit or programmatic strategies for the Pigeon Swamps mapping unit.

Verret Wetlands

Location - This 116,943-acre unit encompasses portions of Assumption, St. Martin, and St. Mary parishes. It is bordered by Louisiana Highway 70 on the north and west; Morgan City, U.S. Highway 90, Bayou L'Ourse, and Louisiana Highway 398 on the south; and Bayou Lafourche on the east.

Habitat Description and Landscape Change - In 1988, the unit was composed of 49% cypress swamps, 22% bottomland forests, 26% water, and 3% pasture\development.

Historic Land Loss - There are no land loss data for this unit. Flooding and subsidence are the two major causes of land loss. Herbivory and lack of sediment and fresh water are also threats to wetland stability in this unit. Land in the unit is subsiding at an estimated rate of 1.1-2.0 ft/century. Major water bodies in the area include Lake Verret, Lake Palourde, and Grassy Lake.

Future Land Loss Projections - In 1990, the unit had approximately 57,700 acres of swamps and 250 acres of marsh. By 2050, it is estimated that over 40% (23,080 acres) of the swamp and all of the marsh will be gone.

Fish and Wildlife Resources - This mapping unit is host to blue crabs,

wading birds, marsh and woodland avifauna, furbearers, and American alligators. Blue crab, bald eagle, wading bird, and American alligator populations have been increasing over the past 10-20 years. Furbearers and marsh and woodland avifauna populations have remained stable. By 2050, bald eagle, raptor, and American alligator populations are expected to increase, while furbearers and other avifauna populations are expected to remain stable. Blue crab, largemouth bass, and channel catfish populations are projected to increase.

Infrastructure - The Bayou Boeuf to Bayou Long Drainage Canal is a nine-ft deep by 100-ft wide channel that is used for flood control and navigation. There are 16.0 miles of secondary and 62.5 miles of tertiary roads, but no railroads in the unit. There are 499 oil and/or natural gas wells and 70.8 miles of pipelines present. There are also two surface water intakes, one industrial and one for St. Mary Water District 3.

Previously Proposed Strategies - Previously proposed strategies included hydrologic management to enhance the productivity of swamps and fresh marshes, including freshwater diversions. Protection of lake shorelines and beneficial use of dredged material have also been proposed.

Coastal Use/Resource Objectives - Habitat objectives for the Verret Wetlands unit are forested wetlands and their associated aquatic habitats. Resource priorities include freshwater finfish, furbearers, crawfish, waterfowl, endangered species, forestry, recreation and tourism, aquifer recharge, water

quality enhancement, and flood water retention.

Regional Ecosystem Strategies - The only regional strategy for Verret Wetlands is to improve hydrology and drainage in the Verret Subbasin.

The problems associated with chronic and excessive flooding in this and surrounding areas are largely due to the Atchafalaya River influence and would be alleviated by implementing a USACE flood protection feature named the “Barrier Plan.” This feature would block water exchange at U.S. Highway 90 between Morgan City and Houma. A network of pumps would be installed to remove excess water from the Verret Subbasin. The hydrology and drainage will be improved by incorporating the following needs in this unit: flood protection, water quality enhancement, beneficial use of pump outfall, and hydrologic management in swamps and fresh marshes by reduction of excessive flooding.

Benefits of Regional Strategies - Hydrologic management of the swamps in this unit is projected to enhance forested wetlands and fastlands, freshwater finfish, American alligators, furbearers, crawfish, waterfowl, nongame fish and wildlife, and endangered species populations. Floodwater retention, water quality, agriculture and grazing, recreation and tourism, forestry, and infrastructure, such as utilities, roads, bridges, levees, and communities, are projected to be greatly enhanced.

Mapping Unit and Programmatic Strategies - There is one mapping unit

strategy proposed for this unit– the beneficial use of pump outfall to minimize impacts to floatant marshes. There are no programmatic strategies recommended for this unit.

Chacahoula Swamps

Location - This 48,865-acre unit is located in parts of Assumption, Lafourche, and Terrebonne parishes. It is made up of the naturally forested and seasonally wet area which lies east of Louisiana Highway 398, south of forced drainage areas along Bayou Lafourche, west of the Little Bayou Black ridge, and north of Bayou Chacahoula and Louisiana Highway 20.

Habitat Description and Landscape Change - O’Neil listed the habitat as “unknown” in 1949. No data exists on the 1968 habitat types. In 1988 this area was 76% cypress forest and 21% bottomland forest. The majority of this unit is situated on a Barbary-Fausse soil which is low lying and frequently flooded. The natural vegetation for this area consists of water-tolerant trees and understory plants. Baldcypress, black willow, and water tupelo are the main trees.

Historic Land Loss - The major cause of land loss in this area is due to flooding and altered hydrology. There are no land loss data for this unit. Subsidence rates are estimated to be 1.1-2.0 ft/century.

Future Land Loss Projections - Since this area consists of soils with a very high clay content (90-95%), they are not highly subject to erosion unless their natural state is disturbed. The major

threat to this area is in the form of draining these woodlands for development and decreasing the quality of wildlife habitat by long duration flooding events.

In 1990, the unit had 37,300 acres of swamp and 270 acres of marsh. By 2050, the area will lose 14,920 acres of swamp (40%) and all of the marsh.

Fish and Wildlife Resources - This unit supports a steady population of largemouth bass and channel catfish, and an increasing population of Gulf menhaden. These populations are expected to increase in the future. Other wetland wildlife habitat is provided for migratory ducks, wood ducks, squirrels, American alligators, wading birds, and other nongame species. White-tailed deer, turkeys, and swamp rabbits utilize these areas when they are dry or not flooded too deeply.

Wading bird, raptor, and American alligator populations have been increasing over the last 10-20 years. Bald eagle, marsh and woodland avifauna, and furbearer populations have remained stable. By 2050, avifauna populations in the hardwood forests are expected to decline, but remain stable in the freshwater swamp. The American alligator population is expected to increase, whereas furbearer abundance is expected to remain stable.

Infrastructure - This unit has many petroleum exploration canals and board roads. Baldcypress logging operations were extensive during the early 1900's. There are 7.5 miles of primary road (Louisiana Highway 309), 49.8 miles of tertiary roads, and 7.7 miles of railroad.

This unit has 435 oil and/or natural gas wells and 17.6 miles of natural gas pipeline. There are two industrial groundwater intakes and one industrial surface water intake.

Coastal Use/Resource Objectives - Habitat objectives for this mapping unit are forested wetlands and associated aquatic habitats. Resource objectives include freshwater finfish, American alligators, furbearers, agriculture and grazing, recreation and tourism, storm buffering capacity, roads, levees, bridges, and communities.

Previously Proposed Strategies - Freshwater diversions into the area to enhance swamp productivity is the only previously proposed strategy for this unit.

Regional Ecosystem Strategies - A strategy for the Chacahoula Swamps unit is to improve hydrology and drainage in the Verret Subbasin.

Benefits of Regional Strategies - This strategy is projected to enhance forested wetlands in this unit. It is also generally projected to enhance populations of American alligators, furbearers, crawfish, waterfowl, and nongame fish and wildlife. This strategy is also projected to enhance recreation and tourism, forestry, the oil and natural gas industry, and utilities, and greatly enhance agriculture and grazing, floodwater retention, and infrastructure such as roads, levees, bridges, and communities.

Mapping Unit and Programmatic Strategies - There is one mapping unit strategy for this area—bank stabilization

of drainage canals. There are no programmatic strategies recommended.

Black Bayou Wetlands

Location - This 20,695-acre unit is located in Terrebonne Parish. The unit's border follows the northern bank of Bayou Black from Louisiana Highway 20 near Gibson to Southdown. From Southdown, the boundary runs along the western side of Louisiana Highways 311 and 309 north to Louisiana Highway 20 near Chacahoula and follows Louisiana Highway 20 south to Gibson.

Habitat Description and Landscape Change - Historical habitat data are not available for this unit. The area is 78% cypress forest, 17% bottomland hardwood and forest, and 1% fresh marsh.

Historic Land Loss - There are no land loss data for this unit. Nevertheless, historic causes of loss have included altered hydrology and flooding. Current problems are related to subsidence and flooding. Current subsidence rates are 1.1-2.0 ft/century.

Future Land Loss Projections - In 1990, this unit had approximately 16,270 acres of swamp and 160 acres of marsh. By 2050, over 39% (6,510 acres) of the swamp and all of the marsh will be gone.

Fish and Wildlife Resources - This unit supports fish and invertebrate populations of Gulf menhaden, southern flounder, blue crab, largemouth bass, and channel catfish, as well as wildlife populations of wading birds, raptors, woodland avifauna, furbearers, and American alligators. Gulf menhaden,

southern flounder and blue crab populations are increasing. A species with a decreasing trend is largemouth bass. All of these populations are expected to increase in the future, however. Trends for channel catfish are unknown.

Wading birds, raptors, and American alligators have had increasing population trends over the last 10-20 years. Furbearers and other avifauna have remained stable. By 2050, American alligator populations are expected to increase. The other fauna are expected to remain stable, with the exception of populations of avifauna in hardwood forests, which will decline.

Infrastructure - Oil and natural gas operations have been present in this unit since the late 1930's. During this time, canals were constructed to support oil and natural gas activities in the Black Bayou Wetlands. There are 1.8 miles of primary road, 14.7 miles of tertiary roads, and 0.4 miles of railroad. This unit has 100 oil and/or natural gas wells, and 15.7 total miles of pipeline. There are two industrial groundwater intakes.

Previously Proposed Strategies - There are no previously proposed strategies for this unit.

Coastal Use/Resource Objectives - Habitat objectives for the Black Bayou Wetlands are freshwater marshes and forested wetlands and their associated aquatic habitats. Resource priorities include freshwater finfish, American alligators, furbearers, waterfowl, endangered species, recreation and tourism, storm buffering capacity, flood

water holding capacity, and oil and natural gas.

Regional Ecosystem Strategies - A strategy for the unit is to improve hydrology and drainage in the Verret Subbasin.

Benefits of Regional Strategies - This strategy is projected to enhance wetlands. American alligators, furbearers, waterfowl, and endangered species are projected to be greatly enhanced by flood protection measures. Recreation and tourism, and the oil and natural gas industry are projected to benefit from this strategy. It is also projected to greatly enhance floodwater retention.

Mapping Unit and Programmatic Strategies - There are no proposed programmatic strategies under these headings for this area. The only mapping unit strategy proposed for this unit is bank stabilization of drainage canals.

Avoca

Location - This 15,195-acre unit is located in St. Mary Parish. It is bordered by bayous Shaffer, Chene, and the GIWW.

Habitat Description and Landscape Change - The 1949 habitat map showed that this area was 65% fresh marsh with the remaining 35% of the area unclassified. In 1968, the habitat was 70% fresh marsh with the remaining 30% of the area unclassified. By 1988, the area was 17% fresh marsh, 14% bottomland forest, 8% cypress forest, and 58% water.

Historic Land Loss - Between 1932 and 1990, about 5,000 acres (65.6%) of wetlands were lost. Wake-generated wave action has caused much edge erosion in this unit. Historic interior erosion was primarily a result of failed agricultural impoundments. Subsidence (1.1-2.0 ft/century) has also played a role in causing erosion of the interior marsh.

Future Land Loss Projections - In 1990, this unit had approximately 2,630 acres of marsh and 1,180 acres of swamp. It is estimated that by 2050 over 1,850 acres of marsh will be lost. No swamp acreage will be lost.

Fish and Wildlife Resources - Dominant fish and invertebrate populations in the unit are Gulf menhaden, southern flounder, and blue crab. The populations of these species are increasing. Although southern flounder populations are projected to remain steady, Gulf menhaden and blue crab populations are projected to decline.

Bald eagle, wading bird, and American alligator populations have had increasing trends over the last 10-20 years. Seabird, shorebird, woodland and marsh avifauna, and furbearer populations have remained stable. By 2050, bald eagle populations are projected to increase. Other avifauna, furbearer, and American alligator populations are projected to remain stable, with the exception of avifauna populations in hardwood forest habitat, which are projected to decline.

Infrastructure - The following USACE projects are present in the unit: Atchafalaya River and bayous Chene, Boeuf and Black, a 20-ft deep by 400-ft wide channel; East Atchafalaya Basin

Protection Levee, a levee along the east bank of the Atchafalaya Floodway; and the GIWW, a 12-ft deep by 125-ft wide channel. There are 6.5 miles of pipeline and 19 oil and/or natural gas wells. There are also 14 miles of tertiary roads, but no primary or secondary roads, or railroads.

Previously Proposed Strategies - Prior restoration plans proposed stabilizing the banks of navigation channels, freshwater diversions, increasing Atchafalaya flow to the area, and using dredged material to create marsh.

Coastal Use/Resource Objectives - Habitat objectives for Avoca are freshwater marshes and their associated aquatic habitats, fastlands, and other developed lands. Resource objectives include blue crabs, freshwater finfish, American alligators, furbearers, water fowl, endangered species, recreation and tourism, storm buffering capacity, navigation, oil and natural gas, roads, levees, and bridges.

Regional Ecosystem Strategies - Regional strategies for this unit include stabilizing banks of navigation channels and dedicated delivery of sediment for marsh building.

Benefits of Regional Strategies - These strategies are projected to benefit wetlands.

Mapping Unit and Programmatic Strategies - Mapping unit strategies for Avoca are to establish and protect ridge function, stabilize banks, and use dredged material beneficially. There are no programmatic strategies for this area.

GIWW

Location - This 71,857-acre unit is located in Terrebonne and Assumption parishes. This unit includes the wetlands affected by the GIWW from Avoca Island in the west to the Bayou du Large ridge in the east. The northern boundary is formed by the Bayou Black ridge. The southern boundary parallels the GIWW to its south.

Habitat Description and Landscape Change - This unit consists of fresh marsh and swamps. Large areas of fresh marsh habitat in this unit have changed from maidencane flotant to thin spikerush flotant in the last 20 years. In 1988, this area was 32% fresh marsh, 31% cypress forest, 20% water, 9% bottomland forest, and the remainder nonwetland. Major natural water bodies in this unit are Lake Cocodrie and Lake Hackberry.

Historic Land Loss - A total of 18,140 acres of wetlands (44.3%) were lost in this unit from 1932 to 1990. Land loss in this region has been due to direct removal, especially the construction of the GIWW which, in combination with oil and natural gas access canals, altered the hydrology of this unit. Currently, increased flooding due to the increased stage of the Atchafalaya River and wake erosion along the GIWW have been identified as the most important factors in continued land loss. Wind erosion along the shorelines of the major water bodies and herbivory are also contributing to the land loss in this unit. Subsidence in the GIWW unit is occurring at a rate of 1.1-2.0 ft/century.

Future Land Loss Projections - By 2050, 43.6% of the 1990 marsh acreage (9,940 acres) will be lost if current land loss rates continue and no action is taken. Land loss in the 22,620 acres of swamp is unknown.

Fish and Wildlife Resources - Some fisheries populations have had increasing trends in this unit, such as those of Gulf menhaden, southern flounder, and blue crabs. Largemouth bass and channel catfish, which support a large recreational fishery in this unit, have been steady. Although Gulf menhaden, southern flounder, and blue crab populations are projected to decline, largemouth bass and channel catfish populations are projected to increase.

This unit also supports waterfowl, American alligators and a large population of nutria. The swamp is used for nesting by bald eagles. Bald eagles, wading birds, raptors, and American alligators have had increasing population trends over the last 10-20 years. Other avifauna and furbearer populations have been stable. By 2050, bald eagle populations are projected to increase. Furbearer, American alligator, and wading bird populations are expected to remain stable. In freshwater marshes, populations of seabirds, shorebirds, raptors, and other marsh resident and migrant avifauna are projected to decline in abundance. In hardwood forests, populations of raptors and woodland resident and migrant avifauna are projected to decline. In the freshwater swamps, avifauna populations are projected to remain stable.

Infrastructure - This unit contains part of the GIWW navigation channel. The

USACE is deepening the channel to the 20-ft contour from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW and Bayou Chene. The northern border of this unit is formed by 25 miles of levee protecting the settlement along Bayou Black. This unit has 3.2 miles of primary and 6.2 miles of tertiary roads, as well as 3.8 miles of railroad. There are 506 oil and/or natural gas wells and 56.4 miles of pipeline in this unit.

Previously Proposed Strategies - Stabilizing the banks of all navigation channels, managing hydrology of swamps and marshes to reduce water levels and flows into the unit, increasing freshwater and sediment inflow from the GIWW, and using dredged material to create marsh in open water areas have been previously proposed as strategies for restoration of this unit.

Coastal Use/Resource Objectives - Habitat objectives for the GIWW unit are freshwater marshes, forested wetlands and their associated aquatic habitats, and fastlands and other developed lands. Resource priorities include freshwater finfish, American alligators, furbearers, waterfowl, agriculture and grazing, storm buffering capacity, flood water retention, navigation, oil and natural gas, roads, levees, and bridges.

Regional Ecosystem Strategies - Stabilization of the banks of the GIWW for water conveyance and lowering of the water levels in the Upper Penchant Marshes are the regional strategies proposed for this unit.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss. They are also projected to enhance fresh marshes and forested wetlands.

These strategies are projected to enhance populations of American alligators, furbearers, crawfish, waterfowl, blue crabs and freshwater finfish. Agriculture and grazing, forestry, recreation and tourism, storm buffering capacity, roads, bridges, and levees are also projected to be enhanced by these strategies. Communities and utilities are also projected to be enhanced by these strategies.

Mapping Unit and Programmatic Strategies - Two mapping unit strategies, stabilization of banks and beneficial use of dredge material (create marsh in open water areas), have been adopted for this unit. No programmatic strategies were recommended for this unit.

Penchant

Location - This 157,126-acre unit is located in Terrebonne Parish. The unit's northern border parallels the GIWW to its south from Bayou Chene to the Bayou du Large ridge. The eastern border is the Bayou du Large Ridge. The southern border is the Bayou Marmande and the Mauvois Bois Ridge where it crosses south of Carencro Lake. The eastern boundary excludes the marshes that drain into Four League and Atchafalaya bays and follows the Atchafalaya River north to bayous Shaffer and Chene.

Habitat Description and Landscape Change - The most common habitat in this unit is fresh floatant marsh, with a small band of intermediate and brackish marshes in the southern part of the unit. The 1949 habitat maps show that large areas in the southeastern part of the unit were dominated by floating three-corner grass marsh. In 1968, many of these areas were fresh marsh. It has been shown that although the habitat type remained fresh marsh, the vegetation type in large portions of this unit has changed from robust maidencane floatant to thin spikerush floatant. In 1988, this area was 64% fresh marsh, 3% intermediate marsh, 1% brackish marsh, 3% bottomland forest, and 20% water. The remainder was nonwetland. Major water bodies in this unit include Bayou Penchant, Bayou Copesaw, Lake Theriot, Lake Penchant, and Carencro Lake.

Historic Land Loss - Approximately 39,600 acres (27.1%) were lost in this unit from 1932 to 1990. Increased flooding due to the reduced hydrologic efficiency of the Atchafalaya River has been identified as an important factor in current land loss. Altered hydrology and subsidence have been and continue to play a role in land loss. Herbivory and direct removal for oil and natural gas canals have also contributed to land loss in this unit. Land is subsiding at an estimated rate of 1.1-2.0 ft/century

Future Land Loss Projections - By 2050, 18.2% (19,360 acres) of the remaining marsh will be lost if current land loss rates continue. However, 1,310 acres are projected to be preserved by CWPPRA projects. Of the 1,250 acres of

swamp occurring in 1990, none will be lost by 2050.

Fish and Wildlife Resources - Red drum, black drum, and blue crab populations are increasing. Largemouth bass, which support a large recreational fishery in this unit, brown and white shrimp, American oyster, southern flounder, Gulf menhaden, and spotted seatrout are all declining in this unit. American oyster and largemouth bass populations are projected to increase, while spotted seatrout and southern flounder populations are expected to decline. All other fishery species are projected to remain stable through 2050.

This unit also supports populations of waterfowl, American alligators, and a large population of nutria. Bald eagle, wading bird, and American alligator populations have had increasing trends over the last 10-20 years. Other populations have remained stable, including those of other waterfowl and furbearers. By 2050, increases are projected for populations of bald eagle and American alligator. Other waterfowl and raptor populations are generally projected to decline. Furbearer abundance is projected to remain stable.

Infrastructure - The USACE is deepening the shipping channel to the 20-ft contour from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, Avoca Island Cutoff, and the Lower Atchafalaya River for navigation and harbor purposes. Borrow pits have been constructed below Morgan City for drainage interception. No primary or secondary roads or railroads are located within the unit, but there are 6.9 miles of

tertiary roads. This unit has 620 oil and/or natural gas wells and 42.6 miles of pipeline, as well as one surface water intake for mining.

Previously Proposed Strategies - Preserving and protecting the ridge function of the ridges that form the southeastern boundary of the unit, stabilizing the banks and managing hydrology of all navigation channels, managing hydrology seasonally to reduce water levels and flows in the unit, increasing freshwater and sediment inflow from the GIWW and Atchafalaya River, protecting shorelines of the major lakes, and using dredge material to create marsh in open water areas have been previously proposed as strategies for restoration of this unit. The CWPPRA Penchant restoration effort will protect 244 acres in the western side of this unit. Demonstration projects that will test two new strategies (fencing and enhancement of flotant marshes) will be started soon.

Coastal Use/Resource Objectives - Habitat objectives for the Penchant unit are freshwater marshes and their associated aquatic habitats. Resource priorities include saltwater finfish, freshwater finfish, American alligators, furbearers, waterfowl, nongame fish and wildlife, endangered species, scientific study, water quality enhancement, storm buffering capacity, and oil and natural gas.

Regional Ecosystem Strategies - Regional strategies affecting the Penchant unit include lowering water levels in the upper Penchant marshes, stabilizing banks of navigation channels

for water conveyance, and dedicated delivery of sediment for marsh building along navigation canals.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss by more than 50%. They are also projected to enhance fresh marshes and forested wetlands.

Mapping Unit and Programmatic Strategies - Four mapping unit strategies, (protection of the Marmande and Mauvois Bois ridge function, stabilization of banks, protection of lake shorelines, and beneficial use of dredge material) have been adopted for this unit. There were no programmatic strategies proposed for the Penchant unit.

Mechant/de Cade

Location - This 108,167-acre unit is located west of Dulac in Terrebonne Parish. The unit's northern boundary is the Bayou Marmande and the Mauvois Bois Ridge and crosses south of Carencro Lake to Four League Bay. Its eastern and southern boundary is the Bayou du Large ridge and generally follows Bayou du Large southwest to Four League Bay. The western boundary is the Four League Bay shoreline.

Habitat Description and Landscape Change - In 1949, O'Neil listed the predominant habitat as being brackish, three-cornered grass marsh with lesser amounts of intermediate and freshwater marsh. By 1968, brackish marsh still dominated the habitat but fresh marsh became the second largest habitat type, followed by intermediate marsh. Additionally a small amount of saline

marsh area was recorded southeast of Lake Mechant. In 1988 this unit was 64% fresh marsh, 3% intermediate, 1% brackish, 1% cypress forest, 3% bottomland forest, and 20% water. Major water bodies included in the unit are Lost Lake, Lake Mechant, Lake de Cade, and Blue Hammock Bayou.

Historic Land Loss - Approximately 14,170 acres (20.6%) within the unit were lost between 1932 and 1990. The primary cause for land loss in the Mechant/de Cade unit is high subsidence rates, which are estimated at 2.1-3.5 ft/century in the interior marsh. As the marsh subsides, water exchange due to tidal action increases, leaving the interior wetlands more susceptible to soil erosion. The natural hydrology within the unit has been altered by several manmade waterways including Falgout Canal, Minors Canal, Peoples Canal, Grand Pass, and numerous pipeline and oilfield exploration canals. The result has been severe marsh erosion, especially within the area adjacent to Lake de Cade and Lake Mechant. Although not actually in the unit, the HNC has allowed saltwater intrusion into the Falgout Canal area. Tidal influences and historic water circulation patterns have also been modified by the HNC. This has resulted in a lack of sediment and fresh water replenishing the unit. Hurricanes and herbivory have also contributed adversely to the interior erosion of the unit's marshes.

Future Land Loss Projections - The Mechant/de Cade unit is projected to have future losses of 11,150 acres of marsh by 2050. This is an estimated 20.4% loss of the unit's 1990 acreage. Funded CWPPRA projects will help

preserve 240 acres within the unit through 2050, thereby reducing the land loss rate to 19.9%.

Fish and Wildlife Resources -

Populations of red drum, black drum, Gulf menhaden, American oysters, brown shrimp, blue crabs, and Spanish mackerel have been increasing in this unit. Spotted seatrout, southern flounder, largemouth bass, and channel catfish populations have been declining, while white shrimp populations have been steady. Although American oyster and Spanish mackerel populations are projected to keep increasing and largemouth bass and channel catfish populations are expected to remain steady, all other fishery populations are projected to decline through 2050.

Additionally, this management unit lies within the Mississippi Flyway, a critical wintering site for a large number of waterfowl species. The unit's fresh and intermediate marshes provide habitat for many resident and migratory nongame birds, white-tailed deer, swamp rabbits, American alligators, raccoons, nutria, mink, otters, muskrats, and numerous other furbearers. The unit's saline marsh provides habitat for wading birds, shorebirds, and seabirds. The Mechant/de Cade unit is host to one threatened species, the bald eagle. The brown pelican, an endangered species, also occurs within the unit's boundary.

Brown pelican, wading bird, and American alligator populations have shown an increase over the last 10-20 years. Other waterfowl and bald eagle populations have remained steady. Muskrat, nutria, and other furbearer populations have declined over this time.

They are projected to decline further by 2050, as are American alligator populations. In open water, waterfowl populations are projected to remain stable. In intermediate marsh and brackish marsh, marsh avifauna and raptor populations are expected to decline. In freshwater swamps, bald eagle populations are expected to remain stable.

Infrastructure - Louisiana Highway 315 runs parallel to the unit's eastern border. The only other significant infrastructure within the unit are the numerous oilfield-related waterways and pipelines. The USACE maintains no structures within the unit's boundaries. The outfall of one pump station draining the Terrebonne Area mapping unit is located in this unit. Future considerations may take into account the use of current pumps as a means of establishing a freshwater source to combat saltwater intrusion. This unit has no primary or secondary roads or railroads, but has 11.0 miles of tertiary roads. There are 223 oil and/or natural gas wells, but no pipelines.

Previously Proposed Strategies -

Sediment diversions, establishment of a reef zone, freshwater diversion, preserving ridge function, use of dredged material, managing hydrology, and protecting bay/lake shorelines have been proposed for the unit.

Coastal Use/Resource Objectives - The habitat objectives for Mechant/de Cade are freshwater and brackish marshes and associated aquatic habitats. Resource objectives include shrimp, blue crabs, American oysters, saltwater finfish, freshwater finfish, American alligators,

furbearers, waterfowl, recreation and tourism, storm buffering capacity, flood water retention, oil and natural gas, and communities.

Regional Ecosystem Strategies - The only regional strategy proposed for this unit is to increase transfer of Atchafalaya River water to lower Penchant marshes.

Benefits of Regional Strategies - This strategy is projected to reduce future wetland loss. It would also greatly enhance fresh, intermediate, brackish, and salt marshes; forested wetlands; and fastlands.

Shrimp, blue crab, American oyster, finfish, American alligator, furbearer, waterfowl, nongame fish and wildlife, and endangered species populations are projected to be greatly enhanced by this strategy. This strategy is also projected to enhance grazing, recreation and tourism, water quality, storm buffering capacity, roads, bridges, levees, communities, and utilities.

Mapping Unit and Programmatic Strategies - Four mapping unit strategies are to establish and protect ridge function, stabilization of banks, protecting bay and lake shorelines, and the beneficial use of dredged material. There is one programmatic strategy proposed for this unit—increase water quality and wastewater management.

Atchafalaya Marshes

Location - This 58,844-acre unit is located in Terrebonne Parish and includes those marshes indirectly affected by the Atchafalaya River. The unit's northern border starts where the

Avoca Cutoff enters the Atchafalaya River and includes the Big Horn and Little Horn Bayou areas. The eastern extent is determined by the watershed that enters the Atchafalaya River and Four League Bay. The southern boundary includes the watershed of Big Carencro Bayou, but excludes Carencro Lake. The western boundary follows the Four League Bay shoreline.

Habitat Description and Landscape Change - The most common habitat in this unit is fresh marsh, with a small band of intermediate marsh in the southern part of the unit. Habitat maps show that most of this unit was brackish marsh in 1949. In 1968, habitat maps showed that many of these areas had changed to fresh marsh. It has been shown that the area has continued to freshen especially during years of high floods on the Atchafalaya River. In 1988, 52% was fresh marsh, 19% was intermediate marsh, 2% was brackish marsh, 15% was bottomland forest/shrub scrub, and 12% was water. Major water bodies in this unit include Big Horn Bayou, Deer Island Bayou, Palmetto Bayou, Plumb Bayou, Creole Bayou, Big Carencro Bayou, and Plumb Lake.

Historic Land Loss - Approximately 5,560 acres (11.6%) were lost in this unit from 1932 to 1990. Altered hydrology contributed to historic land loss. Wind-driven wave erosion has been a contributing factor in wetland loss and continues to play a role. Much of the recent loss was due to Hurricane Andrew, which significantly impacted the southern part of the unit. Herbivory is also contributing to current land loss in this unit. The land in the Atchafalaya

Marshes unit is subsiding at an estimated rate of 1.1-2.0 ft/century.

Future Land Loss Projections - If current land loss rates continue and no action is taken, 8.6% (3,680 acres) of the remaining marsh would be lost by 2050.

Fish and Wildlife Resources - All fishery species are stable in this unit (red drum, black drum, spotted seatrout, Gulf menhaden, southern flounder, white shrimp, blue crab, Spanish mackerel, largemouth bass, and channel catfish). These populations are projected to remain steady except for populations of Spanish mackerel, which is expected to decline, and largemouth bass and channel catfish which are expected to increase.

This unit also supports waterfowl, American alligators and a large population of nutria. Over the past 10-20 years, brown pelican, bald eagle, and American alligator populations have had increasing trends, and this is projected to continue through 2050. Other waterfowl and raptor populations, as well as nutria, muskrat, and other furbearer populations have been stable and are projected to remain so.

Infrastructure - The USACE is deepening the Avoca Cutoff channel to the 20-ft contour. No roads or railroads are located within the unit. There are 13.4 miles of natural gas pipelines, and 251 oil and/or natural gas wells.

Previously Proposed Strategies - Strategies that have been proposed for restoration of this unit include stabilizing the banks of all navigation channels, managing hydrology for fresh and

intermediate marshes, protecting the shorelines of the major lakes, and increasing freshwater inflow from the Atchafalaya River.

Coastal Use/Resource Objectives - Habitat objectives for the Atchafalaya Marshes unit are fresh and intermediate marshes and their associated aquatic habitats. Resource priorities include shrimp, blue crabs, saltwater finfish, freshwater finfish, furbearers, recreation and tourism, storm buffering capacity, navigation, and oil and natural gas.

Regional Ecosystem Strategies - The major strategy to maximize land building in Atchafalaya Bay will indirectly lead to reduced shoreline erosion on the Atchafalaya Bay shore of this unit. Other regional strategies include bank stabilization of navigation channels for water conveyance, and dedicated delivery of sediment for marsh building.

Benefits of Regional Strategies - These strategies are projected to greatly reduce future wetland loss. They are also projected to greatly enhance fresh and intermediate marshes.

Mapping Unit and Programmatic Strategies - Three mapping unit strategies (stabilization of banks, beneficial use of dredge material, and protecting bay/lake shorelines) have been adopted for this unit. No programmatic strategies were proposed for this unit.

Four League Bay

Location - This 22,685-acre unit is located in Terrebonne Parish. It includes the entire Four League Bay.

Habitat Description and Landscape Change - This bay consists of fresh to brackish open water. Salinity is strongly influenced by the discharge of the Atchafalaya River.

Historic Land Loss - There has never been land in this unit.

Future Land Loss Projections - There is no land in this unit.

Fish and Wildlife Resources - Several fishery populations are currently increasing in this bay (red drum, black drum, Gulf menhaden, brown shrimp, and blue crabs) and they are expected to remain stable. White shrimp is the only currently steady fishery species, and this population is expected to remain stable. Spotted seatrout, southern flounder, and largemouth bass are decreasing, and except for a projected increase in largemouth bass populations, are projected to keep declining. Trends for Spanish mackerel and channel catfish are undetermined. Although American oyster populations are currently increasing, they are expected to decline through 2050.

The brown pelican population has shown an increasing trend over the last 10-20 years and is projected to continue this trend through 2050. Seabirds and waterfowl populations have been stable and are projected to remain so.

Infrastructure - The bay has 63 oil and/or natural gas wells, and 0.1 miles of natural gas pipeline. It has no roads or railroads.

Previously Proposed Strategies - Previous strategies include creating wetlands in this bay through sediment and freshwater diversions through a channel from the Atchafalaya River.

Coastal Use/Resource Objectives - Habitat objectives for Four League Bay are intermediate and brackish aquatic habitats. Resource priorities include shrimp, blue crabs, saltwater finfish, and freshwater finfish.

Regional Ecosystem Strategies - The major strategy to maximize land building in Atchafalaya Bay might lead to minimal land building in the upper portion of this unit.

Benefits of Regional Strategies - This strategy is projected to enhance fresh, intermediate, and brackish marshes around this unit.

Mapping Unit and Programmatic Strategies - No mapping unit or programmatic strategies have been adopted for this unit.

Point au Fer

Location - This 52,000-acre unit is located in the southwest portion of Terrebonne Parish. The unit includes all of Point au Fer Island, which is bordered by Four League Bay on the north and east, Atchafalaya Bay on the north and west, the Gulf of Mexico on the south, and Oyster Bayou on the east.

Habitat Description and Landscape Change - In 1949, the majority (65%) of the wetlands in this unit were brackish and the remainder were saline. By 1968, more marsh (75%) was brackish. Saline marsh has decreased in this unit from shoreline retreat and conversion to brackish and intermediate marsh due to the influx of fresh water from the Atchafalaya River. In 1988, this unit was 11% intermediate marsh, 55% brackish marsh, 10% saline marsh, and 22% water. Intermediate marshes have been rapidly expanding from none in 1978 to 4,500 acres in 1994.

Historic Land Loss - Of the original 35,290 acres of wetlands in this unit, 5820 acres (16.8%) were lost from 1932 to 1990. Causes of land loss in this unit include altered hydrology (from canals), wind and wave erosion, and subsidence. Some storm related loss has occurred and herbivory can be a problem. Most (76.6%) of the loss occurred between 1932 and 1974. Loss rates have decreased since 1974 and marsh type has changed primarily due to an influx of fresh water and sediment from the Atchafalaya River. Subsidence rates are 1.1-2.0 ft/century.

Future Land Loss Projections - Although land loss rates have decreased in this unit, altered hydrology, subsidence, wind and wave erosion, and herbivory continue to stress the area. If no action is taken in this unit, an additional 4,220 acres (14%) will be lost by 2050. Two CWPRRA projects have been implemented on Point au Fer Island which are expected to preserve 930 acres.

Fish and Wildlife Resources - Point au Fer Island provides brackish and intermediate marsh habitat for fish and wildlife. The island serves as a stopover for migratory birds and provides wintering habitat for approximately 144,000 waterfowl, including green-winged teal, gadwall, mallards, canvasbacks, coots, and pintails. These marshes also support resident populations of mottled ducks. These marshes have historically provided habitat for furbearers, particularly nutria and muskrat, and have been managed through marsh burning. American alligators and blue and snow geese are also found on the island.

The remaining saline marshes are feeding and nursery habitat for several fish and invertebrate species such as Atlantic croaker, red drum, spot, sand seatrout, southern flounder, spotted seatrout, Gulf menhaden, bay anchovy, white shrimp, brown shrimp, and blue crabs. Fishery species with increasing populations in the unit are red drum, black drum, Gulf menhaden, American oysters, brown shrimp, blue crabs, and Spanish mackerel. These populations are expected to stabilize in the future. The white shrimp have remained steady but are projected to increase. Species with decreasing populations are spotted seatrout, southern flounder, and largemouth bass. Although spotted seatrout and southern flounder are projected to remain steady, largemouth bass populations are expected to increase. Population trends for channel catfish are unknown.

Brown pelican and American alligator populations have increased over the last 10-20 years. Populations of other

waterfowl, raptors, nutria, muskrats, and other furbearers have been steady. By 2050, brown pelican populations are projected to increase. Nutria, muskrat other furbearer, and American alligator populations are projected to remain steady. In open water and marsh habitats, waterfowl populations are projected to remain steady. Raptor populations are projected to decline in marsh habitats.

Infrastructure - The Point au Fer unit has been the site of oil and natural gas activities since the early 1940's. As a result, several canals have been cut through the marshes primarily in the southern half of the island. There are no roads, railroads, or pipelines in this unit, although there are 140 oil and/or natural gas wells.

Previously Proposed Strategies - Previously proposed strategies have included managing hydrology in all marsh types, sediment diversions, and beneficial use of dredged material.

Coastal Use/Resource Objectives - Habitat objectives for the Point au Fer unit are intermediate, brackish, and saline marshes and their associated aquatic habitats. Resource objectives include saltwater finfish, furbearers, waterfowl, recreation and tourism, storm buffering capacity, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for the unit include maximizing land building in Atchafalaya Bay and dedicated delivery of sediment for marsh building.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss by over 50%. They are also projected to greatly enhance fresh, intermediate, brackish, and salt marshes and barrier islands in the unit, especially by improving sediment management and increasing the flow of the Atchafalaya River.

Mapping Unit and Programmatic Strategies - Beneficial use of dredged material and protecting bay, lake, and gulf shorelines (e.g., train a lobe of the Atchafalaya Delta into Four League Bay) are the mapping unit strategies adopted for this area. There are no programmatic strategies for the unit.

Atchafalaya Basin

Atchafalaya Subdelta

Location - The 62,226-acre unit is located in St. Mary Parish and includes the developing delta at the mouth of the Atchafalaya River in Atchafalaya Bay. The northern boundary is formed by the mainland marshes of St. Mary Parish. The western boundary marks the beginning of the waters affected by the Wax Lake Outlet outflow. The southern boundary is the Gulf of Mexico and the eastern boundary is Four League Bay and Point au Fer Island.

Habitat Description and Landscape Change - This unit has changed from open bay to subaerial land. The Atchafalaya Subdelta became subaerial after the 1972 flood. In 1995, the subaerial land in this delta consisted of 12,222 acres with an additional 12,866

acres of mudflats exposed at low tide. A significant part of this land area was created using dredged material from the Atchafalaya River navigational channel. This unit is part of the State's Atchafalaya Delta Wildlife Management Area.

Historic Land Loss - Subsidence in this unit is occurring at a rate of 1.1-2.0 ft/century. However, land in this unit continues to accrete through the natural delta building process of the Atchafalaya River and is being supplemented using dredged material from the Atchafalaya navigational channel.

Future Land Loss Projections - As much as 8,100 acres of land will be preserved or created by CWPPRA efforts. By 2050, it is estimated that an additional 36,350 acres of marsh will be gained.

Fish and Wildlife Resources - Fish and invertebrates in this unit include steady populations of red drum, black drum, Gulf menhaden, southern flounder, white shrimp, blue crab, and largemouth bass. Of these, southern flounder populations are expected to remain steady while the rest are projected to increase. The number of brown shrimp is decreasing and there is an increasing number of channel catfish. The brown shrimp population is expected to remain stable while the channel catfish population should continue to increase.

Brown pelican, wading bird, waterfowl, and American alligator populations have increased over the last 10-20 years. Populations of seabirds, nutria, muskrat, and other furbearers have remained stable, and are projected to remain stable

through 2050. Brown pelican and American alligator populations are projected to increase.

Infrastructure - This unit has 4.0 miles of natural gas pipelines and 106 oil and/or natural gas wells. It has no roads or railroads. A 20-ft deep by 400-ft wide navigation channel runs from the 20-ft contour in Atchafalaya Bay to the 20-ft contour in the Gulf of Mexico.

Previously Proposed Strategies - Previously proposed strategies for this unit include increasing Atchafalaya River flow, relocation of navigation channels, a sediment diversion, and beneficial use of dredge material.

Coastal Use/Resource Objectives - Habitat objectives for the Atchafalaya subdelta are freshwater marshes and their associated aquatic habitats and fastlands or other developed lands. Resource priorities are blue crabs, freshwater finfish, furbearers, waterfowl, nongame fish and wildlife, recreation and tourism, scientific study, storm buffering capacity, navigation, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for the subdelta include maximizing land building in Atchafalaya Bay and dedicated delivery of sediment for marsh building.

Benefits of Regional Strategies - These strategies are projected to cause a gain in marsh and forested wetlands in this unit by 2050.

Mapping Unit and Programmatic Strategies - Mapping unit strategies for the Atchafalaya Subdelta unit are

protecting bay and lake shorelines (e.g., train a lobe of the Atchafalaya Delta into Four League Bay) and beneficial use of dredged material. There are no suggested programmatic strategies for this area.

North Wax Lake Wetlands

Location - The 10,561-acre unit is located in St. Mary Parish. It is bordered on the south by the hurricane protection levee along the GIWW, and on the north by the Bayou Teche ridge.

Habitat Description and Landscape Change - The 1949 habitat type data indicates that the unit was 85% fresh marsh and 15% unclassified. The 1968 habitat type data indicates that the unit was 10% fresh marsh and 90% of the area was unclassified. In 1988, this unit was 6% fresh marsh, 56% cypress forest, 28% bottomland forest, 3% water, and the remainder was nonwetland.

Historic Land Loss - Historic land loss was primarily a result of direct removal. Approximately 580 acres of land were lost from 1932 through 1990. The land is subsiding at a rate estimated at 1.1-2.0 ft/century.

Future Land Loss Projections - By 2050, some 460 acres of marsh (16.6%) will be lost.

Fish and Wildlife Resources - The fish and invertebrate populations in the unit include increasing numbers of largemouth bass and channel catfish. These populations are expected to maintain their trends through 2050.

All waterfowl, raptor, nutria, muskrat, other furbearer, and American alligator populations have remained stable over the last 10-20 years while wading birds increased in abundance. By 2050, these populations are projected to remain stable, with the exception of waterfowl and raptor populations in hardwood forests, which are projected to decrease.

Infrastructure - This unit has 6.5 miles of primary, 1.0 mile of secondary, 31.5 miles of tertiary roads, as well as 10.6 miles of railroad. There are 49 oil and/or natural gas wells and 42.4 miles of pipeline, as well as one surface water intake for Berwick-Bayou Vista.

Previously Proposed Strategies - Navigation canal bank stabilization and management of fresh marsh hydrology have been strategies proposed in the past.

Coastal Use/Resource Objectives - Habitat objectives for North Wax Lake Wetlands are forested wetlands and associated aquatic habitats. Resource objectives for this unit are freshwater finfish, American alligators, furbearers, waterfowl, endangered species, forestry, recreation and tourism, water quality enhancement, storm buffering capacity, floodwater retention, navigation, oil and natural gas, and communities.

Regional Ecosystem Strategies - There are no regional strategies recommended for this unit.

Benefits of Regional Strategies - Not applicable.

Mapping Unit and Programmatic Strategies - A mapping unit strategy for

this area is to stabilize banks. There are no programmatic strategies.

Wax Lake Wetlands

Location - This 120,386-acre unit is located in St. Mary Parish. The unit's eastern border follows Bayou Shaffer and the Atchafalaya River. The southern border follows the Atchafalaya and East Cote Blanche bay shorelines. The Bayou Sale ridge comprises the western boundary and the hurricane protection levee along the GIWW to Morgan City marks the northern border.

Habitat Description and Landscape Change - In 1949, habitat type in this unit was approximately one third each of fresh, intermediate, and brackish marsh. The interior was intermediate marsh fringed by brackish marsh to the east, south, and west. Marshes along the northern shore were fresh. By 1968, most of the known habitat (about 70%) was fresh. Since 1973, this area has become completely fresh due to the influx of freshwater from the Atchafalaya River and Wax Lake Outlet. In 1988 this area was 36% fresh marsh, 8% cypress forest, 26% bottomland forest, and 21% water, with the remainder being nonwetland.

Historic Land Loss - Of the original 55,330 acres of wetlands in this unit, 11,720 (21.2%) acres were lost from 1932 to 1990. The majority (82.4%) of this loss occurred between 1932 and 1974. It should be noted that although there has been loss in this unit, there also has been land gain where the Atchafalaya River Basin has been filling in since 1973. Historic loss in this unit has been primarily from wind and wave

erosion, direct removal, and altered hydrology. Subsidence, estimated at 1.1-2.0 ft/century, is also a factor in land loss in this unit.

Future Land Loss Projections - Although the rate of land loss in this area has decreased since 1974, altered hydrology, subsidence, and wind and wave erosion will continue to degrade this area. These processes will be somewhat counteracted by the land already building in this unit. However, if no action is taken, approximately 5,860 more acres, or 13.4% of the area, will be lost by 2050. Of the 10,255 (1990) acres of swamp in this unit, none are expected to be lost by 2050. A feasibility study, the Lower Atchafalaya River Reevaluation Study, is being conducted and recommendations from this study may benefit this mapping unit.

Fish and Wildlife Resources - Fresh marsh habitats in this area support thousands of wintering waterfowl, resident mottled ducks, and wading birds. Numerous reptiles and amphibians are prevalent in this unit. Crawfish, killifish, and other small fish provide food for wading birds and support populations of bass and catfish. Gulf menhaden, largemouth bass, and channel catfish have maintained steady populations in this unit. While the Gulf menhaden population is projected to remain steady, the other two are projected to increase.

The brown pelican, wading bird, and American alligator populations have shown an increasing trend over the last 10-20 years. Other waterfowl, raptors, nutria, muskrat, and other furbearers have remained stable. By 2050, brown

pelican and American alligator populations are projected to increase. Other waterfowl, raptors, and furbearers are projected to remain stable, with the exception of raptors and woodland avifauna in the hardwood forests, in which a decline is projected.

Infrastructure - Much of the infrastructure in this unit is related to either navigation or flood control. The GIWW traverses the northern boundary of the unit. This 12-ft deep by 125-ft wide navigation channel is used primarily for commercial navigation and annual traffic averages more than 109 million tons. This navigation channel has contributed to alterations in hydrology within the unit and is the site of shoreline erosion. The Atchafalaya River and bayous Chene, Boeuf, and Black are maintained for navigation and harboring. The Wax Lake Outlet runs 16 miles from Bayou Teche to Atchafalaya Bay, effectively separating the eastern and western sections of the unit. Louisiana Highway 317, on the western border of the unit, is the major road within the unit. The unit contains 56.1 miles of oil and natural gas canals, some of which have been there since the late 1930's. There are 873 oil and/or natural gas wells in this unit. There are no railroads, but there are 4.3 miles of secondary and 30.8 miles of tertiary roads.

Previously Proposed Strategies - Proposed strategies for this unit have been to stabilize the banks of navigation channels, freshwater and sediment diversions, managing the hydrology of fresh and intermediate marshes, protecting bay and lake shorelines, and increasing Atchafalaya River flow.

Coastal Use/Resource Objectives - Habitat objectives for Wax Lake Wetlands are freshwater marshes and forested wetlands and associated aquatic habitats. Resource priorities include freshwater finfish, American alligators, furbearers, waterfowl, recreation and tourism, storm buffering capacity, navigation and port facilities, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for the mapping unit include maximizing land building in Atchafalaya Bay, stabilizing banks of navigation channels for water conveyance, and creating an artificial reef complex, include one extending from Point Chevreuil toward Marsh Island.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss. Most of these strategies are projected to enhance fresh marshes.

Mapping Unit and Programmatic Strategies - Mapping unit strategies for the area include stabilizing banks, protecting bay and lake shorelines, beneficial use of dredged material, and maintaining distributaries (e.g., Hog Bayou). There are no programmatic recommendations for this unit.

Wax Lake Outlet Subdelta

Location - This 65,895-acre unit is located in St. Mary Parish and includes the developing delta at the mouth of Wax Lake Outlet in Atchafalaya Bay. The northern boundary is formed by the mainland marshes of St. Mary Parish. The eastern boundary marks the beginning of the waters affected by the Lower Atchafalaya River outflow. The

southern boundary is the Gulf of Mexico and the western boundary extends southwest from Point Chevreuil.

Habitat Description and Landscape Change - The habitat of this unit is fresh marsh with extensive mudflats and shallow bay bottoms. The major water body in this unit is Atchafalaya Bay.

Historic Land Loss - This unit has changed from a completely open bay to include some fresh marsh. The Wax Lake Outlet Subdelta became subaerial after the 1972 flood. In 1995, the subaerial land in this delta consisted of 3,097 acres with an additional 9,787 acres of mudflats exposed at low tide. This unit is part of the State's Atchafalaya Delta Wildlife Management Area. Subsidence in the area is estimated at 1.1-2.0 ft/century.

Future Land Loss Projections - The Wax Lake Outlet Subdelta is expected to keep growing without any projects. The two deltas are projected to increase by over 30,000 acres by 2050.

Fish and Wildlife Resources - Most fisheries populations (red and black drum, Gulf menhaden, white shrimp, blue crab, and largemouth bass) in this area are stable and are projected to increase through 2050, but estuarine fish species use this area only during low river stages. The brown shrimp population has declined and the southern flounder population has remained stable. Both populations are expected to remain steady through 2050. The channel catfish population has increased over the past 10-20 years and should continue to increase in the future.

This unit is extremely important for wintering waterfowl and contains breeding habitat for mottled duck. It also supports wading birds and migrating shorebirds. The brown pelican, wading bird, and American alligator populations in this unit have shown an increasing trend over the last 10-20 years. Stable populations include seabirds, shorebirds, raptors, marsh avifauna, muskrat, nutria, and other furbearers. By 2050, brown pelican, waterfowl, and American alligator populations are projected to increase. Populations of other seabirds, raptors, and furbearers are projected to remain stable.

Infrastructure - A channel for flood control connects Wax Lake Outlet with Atchafalaya Bay (450-ft deep x 4000-ft wide). No roads or railroads are located within this unit. This unit has 162 oil and/or natural gas wells and 4.6 miles of pipelines in it.

Previously Proposed Strategies - Initiating an increase in Atchafalaya River flow and diversion of more sediments through Wax Lake Outlet have been proposed as strategies to increase wetland gain in this unit.

Coastal Use/Resource Objectives - Habitat objectives for the unit are freshwater marshes and their associated aquatic habitats. Resource priorities include shrimp, blue crabs, saltwater finfish, freshwater finfish, furbearers, waterfowl, recreation and tourism, scientific study, storm buffering capacity, navigation, and oil and natural gas.

Regional Ecosystem Strategies - The only strategies in this unit are to maximize land building in Atchafalaya Bay and dedicated delivery of sediment.

Benefits of Regional Strategies - This strategy is projected to enhance fresh marshes in this unit.

Mapping Unit and Programmatic Strategies - Protection of the Atchafalaya Bay shoreline is the only mapping unit strategy adopted for this unit. There are no programmatic strategies proposed for the Wax Lake Outlet Subdelta unit.

Teche-Vermilion Basin

Cote Blanche Wetlands

Location - This 82,331-acre unit is located within St. Mary Parish. Its northern boundary is a line following the Bayou Teche ridge. On the east, its boundary follows the Bayou Sale ridge. On the west, the boundary is a line following the Bayou Cypremort ridge. It has as its southern boundary the northern shoreline of West and East Cote Blanche bays.

Habitat Description and Landscape Change - In 1949, O'Neil classified the area as brackish and fresh marsh. Chabrek classified the area as fresh to brackish marsh in 1968, with a large quantity of unknown wetland type. In 1988 this unit was 53% fresh marsh, 3% intermediate marsh, 15% cypress forest, 12% bottomland forest, and 10% water.

Historic Land Loss - Total land loss for the period 1932-1990 was 8,480 acres. The majority of loss occurred during the period of 1956-1974 when the unit lost a total of 5,290 acres. Land losses from 1974 to 1990 total 1,260 acres. Most of this loss can be linked to the intensified oil field activity which resulted in the dredging of an extensive network of canals. These wide, deep channels such as the Humble and British-American canals penetrated the interior marsh and captured the flows historically carried by natural waterways. This action caused the water to exit the marsh at a faster rate, often causing erosion of organic soils. Prior to this activity, land loss was attributed to major storms (hurricanes) which impacted the area. Shoreline erosion along Cote Blanche Bay has been measured at 15-20 ft/yr in some areas. Erosion appears to be most severe along the northern shoreline of East Cote Blanche Bay near Marone Point. The dredging of shell reefs in this area may have exacerbated shoreline erosion. Subsidence in this unit is estimated to be 1.1-2.0 ft/century.

Future Land Loss Projections - It is estimated that by 2050 there will be a loss of 3,470 acres of marsh within the unit. This is a loss of approximately 7.5% of the total 1990 acreage within the unit. Projects in the unit authorized under the CWPPRA are projected to preserve and protect 2,710 acres to offset much of this loss. An estimated 12,430 acres of swamp were present in 1990. No swamp acreage is expected to be lost by 2050.

Fish and Wildlife Resources - This area supports a wide variety of wildlife and inland fish species. Migrating estuarine

organisms are provided nursery grounds in the shallow, near-shore ponds and other open water. Currently steady Gulf menhaden, largemouth bass, channel catfish, and blue crab populations are all expected to remain stable through 2050. Threatened and endangered species which might be found in the mapping unit include the Arctic peregrine falcon, bald eagle, and Kemp's Ridley sea turtle. The wading bird and American alligator populations have had an increasing trend over the last 10-20 years. Other waterfowl, bald eagle, raptor, nutria, muskrat, and other furbearer populations have remained stable. By 2050, the American alligator population is projected to increase, and other populations are projected to remain stable, with the exception of those of raptors and waterfowl in the hardwood forests, which are projected to decline.

Infrastructure - The USACE has constructed and maintains many flood control structures within the unit's boundary. Many of these consist of pumping plants in conjunction with gated culverts to offer flood protection. In addition, the Charenton Canal is also maintained as a flood control waterway which extends from the Charenton Floodgate to West Cote Blanche Bay. The GIWW is used mainly for navigation but has a tremendous impact on the hydrology in the unit. There are eight pumps ranging in capacity from 21 to 63 cfs that discharge within this unit from the St. Mary Area mapping unit. There are no primary or secondary roads, but there are 40.0 miles of tertiary roads and 0.1 miles of railroad. This unit has 266 oil and/or natural gas wells and 4.2 miles of pipeline. There are two

industrial groundwater intakes and one mining surface water intake.

Previously Proposed Strategies - The hydrologic management of fresh and intermediate marshes within the unit has taken precedence over all other previously proposed strategies. Bank stabilization of navigation channels has also been proposed. Several plans have proposed freshwater diversions, protection of bay and lake shorelines, and preservation of ridge function associated with canal spoil banks.

Coastal Use/Resource Objectives - Habitat objectives for the Cote Blanche Wetlands are freshwater marshes and their associated aquatic habitats. Resource objectives include shrimp, blue crabs, saltwater finfish, freshwater finfish, American alligators, furbearers, waterfowl, black bears, agriculture and grazing, recreation and tourism, water quality enhancement, storm buffering capacity, navigation, oil and natural gas, and communities.

Regional Ecosystem Strategies - Regional strategies affecting the Cote Blanche Wetlands unit include stabilizing banks of navigation channels, maintaining shoreline integrity and stabilizing critical areas of Cote Blanche Bay, optimizing GIWW flows into marshes while minimizing direct flows into bays, maintaining East and West Cote Blanche bays as brackish, and reducing sedimentation into bays.

Benefits of Regional Strategies - These strategies are projected to cause a gain in marsh in this unit by 2050. Optimizing GIWW flows is projected to enhance freshwater finfish populations. Bank

stabilization is projected to enhance storm buffering capacity, navigation, the oil and natural gas industry, and communities. Increased salinity is projected to detrimentally impact shrimp, freshwater finfish, American alligator, furbearer, and waterfowl abundance, agriculture and grazing, water quality, storm buffering capacity, the oil and natural gas industry, and communities. Reduced sedimentation is projected to enhance waterfowl and black bear populations, but detrimentally impact populations of freshwater finfish, American alligator, and furbearers, as well as storm buffering capacity, and the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Four mapping unit strategies (bank stabilization using dredged material, establishment and protection of ridge function, implementation of measures to protect bay and lake shorelines, and beneficial use of dredged material) have been adopted for this unit. No programmatic strategies were proposed for this unit.

East Cote Blanche Bay

Location - This 68,142-acre unit is located in St. Mary and Iberia parishes. It includes the entire East Cote Blanche Bay.

Habitat Description and Landscape Change - This unit is an open fresh to brackish water bay.

Historic Land Loss - Not applicable.

Future Land Loss Projections - Not applicable.

Fish and Wildlife Resources - This mapping unit hosts many fish and invertebrate species, including stable populations of red and black drum, Gulf menhaden, southern flounder, white shrimp, blue crab, and channel catfish. Of these, white shrimp and channel catfish are projected to increase, black drum and southern flounder are projected to decrease, and the rest are expected to remain stable. Declining species include spotted seatrout and brown shrimp, and these populations are expected to continue declining.

This unit also hosts high numbers of seabirds, moderate numbers of marsh waterfowl, and low numbers of brown pelicans. The brown pelican population has shown an increasing trend over the last 10-20 years, and is projected to continue this trend through 2050. Other waterfowl have shown a steady population trend, and this is projected to continue.

Infrastructure - There is no USACE-maintained infrastructure in this mapping unit. There are no primary or secondary roads or railroads in this unit, but there are 0.2 miles of tertiary roads. This unit has 184 oil and/or natural gas wells and 24.6 miles of crude oil pipeline. One drainage pump station discharges into this unit from the St. Mary Area mapping unit.

Previously Proposed Strategies - Two strategies that have previously been proposed for this unit include a freshwater diversion and building a reef zone utilizing dredged material

Coastal Use/Resource Objectives - Habitat objectives for the unit are

aquatic habitats. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, freshwater finfish, recreation and tourism, scientific study, aquifer recharge, water quality enhancement, navigation, and the oil and natural gas industry.

Regional Ecosystem Strategies -

Strategies for East Cote Blanche Bay are maintaining shoreline integrity and stabilizing critical areas of Vermilion Bay systems, maintaining East and West Cote Blanche bays as brackish, reducing sediment in bays, creating an artificial reef complex, (including one extending from Point Chevreuil toward Marsh Island), and optimizing GIWW flows into marshes while minimizing direct flow into bays.

Benefits of Regional Strategies - These strategies are generally projected to enhance the open water habitats in this unit, except for shoreline stabilization, which is compatible with the goals of the Coast 2050 Plan. Shrimp, blue crabs, American oysters, and finfish are generally projected to be enhanced by the restoration of the reef zone, shoreline stabilization, increased salinity, and reduced sediments. Recreation and tourism are projected to be enhanced by reef zone restoration. Aquifer recharging is projected to be negatively impacted by increased salinity. Water quality is projected to be enhanced by shoreline protection, but negatively impacted by increased salinity. Navigation is projected to be enhanced by reduced sediment. The oil and natural gas industry is projected to be negatively impacted by increased salinity.

Mapping Unit and Programmatic Strategies - Protecting bay and lake shorelines and the beneficial use of dredged material are two mapping unit strategies for East Cote Blanche Bay. Another mapping unit strategy is the maintenance of the Jaws sediment trapping project through 2050. There were no programmatic strategies recommended for this unit.

West Cote Blanche Bay

Location - This 96,141-acre unit is in St. Mary and Iberia parishes. It includes the entire West Cote Blanche Bay.

Habitat Description and Landscape Change - This unit is an open fresh-to-brackish water bay.

Historic Land Loss - Not applicable.

Future Land Loss Projections - Not applicable.

Fish and Wildlife Resources - This mapping unit hosts many fish and invertebrate species, including stable populations of red and black drum, Gulf menhaden, southern flounder, white shrimp, and blue crab. Of these, white shrimp populations are projected to increase, whereas black drum and southern flounder populations are projected to decline and the rest are projected to remain steady. Currently declining populations include spotted seatrout and brown shrimp and these populations are expected to continue declining.

The unit also hosts high numbers of seabirds, moderate numbers of marsh waterfowl, and low numbers of brown

pelicans. The brown pelican population has had an increasing trend over the last 10-20 years, and is projected to continue this trend through 2050. Other seabirds and waterfowl populations have shown steady trends, and this is projected to continue.

Infrastructure - There is no USACE-maintained infrastructure in this mapping unit. There are no roads, railroads, or pipelines in this unit, but there are 1,286 oil and/or natural gas wells.

Previously Proposed Strategies - The State's Blueprint and the CZM Plans proposed a freshwater diversion in this unit. The use of dredged material in a beneficial manner is an authorized project under CWPPRA.

Coastal Use/Resource Objectives - Habitat objectives for West Cote Blanche Bay are intermediate and brackish aquatic habitats. Resource priorities include shrimp, blue crabs, saltwater finfish, recreation and tourism, scientific study, aquifer recharge, water quality enhancement, navigation, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for the unit include maintaining shoreline integrity of the Teche/Vermilion Bay systems, maximizing GIWW flows into marshes and minimizing direct flows into bays, maintaining West Cote Blanche Bay as brackish, reducing sedimentation in bays, and creating an artificial reef complex including one from Point Chevreuil toward Marsh Island.

Benefits of Regional Strategies - These strategies are projected to enhance the open water habitats of this unit.

Shrimp, blue crab, and saltwater finfish populations are projected to be enhanced by navigation channel management to reduce fresh water and by shoreline protection. Shrimp populations are projected to be detrimentally impacted by increased salinity. Saltwater finfish populations are projected to be enhanced by reef zone restoration. The American oyster population is projected to be enhanced by navigation channel management to reduce fresh water, restoration of a reef zone, increased salinity, reduced sediment. The American oyster population is projected to be detrimentally impacted by the navigation channel management to increase fresh water. Navigation channel management to decrease fresh water is projected to have a detrimental impact on aquifer recharge and navigation. Navigation channel management to increase fresh water is projected to enhance scientific studies, aquifer recharging, and storm buffering capacity. Reef zone restoration is projected to greatly enhance scientific studies, storm buffering capacity, roads, levees, bridges, communities, and utilities. Shoreline protection is projected to enhance recreation and tourism, scientific studies, and storm buffering capacity, and greatly enhance roads, levees, bridges, communities, and utilities. Increased salinity and reduced sediments are projected to detrimentally impact storm buffering capacity and the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Two mapping unit strategies

adopted for the area are to protect bay and lake shorelines and the beneficial use of dredged material. There are no programmatic strategies proposed for this unit.

Marsh Island

Location - This 70,790-acre unit is located within Iberia Parish. The unit is an island bounded by Vermilion Bay and West Cote Blanche Bay on the north, East Cote Blanche Bay on the east, the Gulf of Mexico on the south, and Southwest Pass on the west.

Habitat Description and Landscape Change - In 1949, O'Neil listed the predominant habitat in the unit as being brackish marsh. Additionally, a considerable percentage was classified as excessively drained salt marshes. O'Neil also noted a small amount of sand and shell-deposited beach material along the southern shore of Marsh Island. In 1968, the overwhelmingly dominant marsh habitat type was brackish marsh. The northwestern portion of the unit contained a small amount of saline marsh habitat. In 1988, this unit was composed of 70% brackish marsh, 10% saline marsh, and 20% water.

Historic Land Loss - A total of 9,960 acres of land were lost from 1932 to 1990. Storm-related erosion has been the prevalent cause for interior wetland loss within the unit. The scouring effect of hurricane-driven winds and wave action are compounded in the unit because it is an island. Wave action is also a cause for edge erosion along the unit's shoreline. Altered hydrology within the unit is thought to be the

secondary cause for interior loss along with subsidence (estimated at 1.1-2.0 ft/century) and herbivory. The widening of Southwest Pass and the resulting increased erosion along the unit's western boundary have been the major causes of historic land loss.

Future Land Loss Projections - Marsh Island is projected to lose 7,290 acres (12.9%) of its marsh habitat through 2050. With the addition of CWPPRA-sponsored projects the projected loss will decrease to 11.8%, with the probability of 650 acres preserved under such projects.

Fish and Wildlife Resources - Many populations of finfish have decreased in abundance. Among these are red drum, black drum, spotted seatrout, southern flounder, and brown shrimp. These populations are expected to stabilize through 2050. White shrimp populations are stable and are expected to remain steady. The population of blue crabs is currently increasing and is expected to stabilize by 2050. This general decline in populations is attributed to water control structures. These structures protect inland wetlands from erosion by excessive tidal exchange. However, they also reduce ingress and egress of juvenile organisms to the wetlands. Currently stable populations of Gulf menhaden are expected to remain stable. The population of channel catfish is currently steady and is projected to increase.

Marsh Island is occasionally used as a loafing and feeding ground for the brown pelican, an endangered species. Talks are ongoing about the possible reintroduction of the whooping crane in

Louisiana. Marsh Island would likely be the choice for the possible release location for this endangered species. The Marsh Island mapping unit currently hosts stable populations of waterfowl, raptors, nutria, muskrats, other furbearers, and American alligators. By 2050, American alligator populations are projected to increase, whereas furbearer populations are projected to remain stable. In open water habitats, shorebird and wading bird populations are projected to remain stable, but in the brackish and salt marshes they are projected to decline.

Infrastructure - The LDWF has constructed and maintains various water control structures throughout the Marsh Island unit. These control structures attempt to lessen erosion caused by interior tidal runoff. Additionally, the southwestern portion of Marsh Island is semi-impounded by a series of levees and structures. The USACE maintains no known structures within the unit's boundary. In this mapping unit there are no roads or railroads. There are 45 oil and/or natural gas wells, but no pipelines.

Previously Proposed Strategies - In addition to the various water control structures provided by LDWF, there have been attempts to manage the hydrology of fresh to saline marshes by various other entities. Other plans have proposed to manage both fresh and intermediate marsh hydrology, as well as proposing shoreline protection, the use of dredged material, and providing for a reef zone within the unit. Brackish and saline marshes have also been the subject of ongoing restoration attempts

by individual marsh landowners and CWPPRA projects.

Coastal Use/Resource Objectives - Habitat objectives for the unit are fresh, intermediate, and brackish marshes and their associated aquatic habitats and barrier islands and chenier shorelines. Resource objectives include shrimp, blue crabs, American oysters, saltwater finfish, American alligators, furbearers, waterfowl, nongame fish and wildlife, endangered species, recreation and tourism, scientific study, storm buffering capacity, and oil and natural gas.

Regional Ecosystem Strategies - Regional strategies affecting the Marsh Island unit include maintaining shoreline integrity and stabilizing critical areas of the Vermilion Bay systems, reducing sedimentation in bays, maintaining the bays as brackish, and creating a reef complex, including one extending from Point Chevreuil toward Marsh Island.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss. All of these strategies are projected to enhance the fresh, intermediate, and brackish marshes and barrier shorelines in this unit.

Shrimp, blue crab, American oyster, saltwater finfish, American alligator, furbearer, waterfowl, nongame fish and wildlife, and endangered species populations are projected to be enhanced by reef zone protection and shoreline protection. Increased salinity is projected to enhance American oyster populations, but detrimentally impact shrimp, American alligators, furbearers, waterfowl, nongame fish, and wildlife populations. Reduced sediment is

projected to enhance American oyster, saltwater finfish, waterfowl, and endangered species populations, but detrimentally impact American alligator and furbearer populations. Reef zone protection and shoreline protection are projected to enhance recreation and tourism and storm buffering capacity. Most of these strategies will also enhance scientific studies and the oil and natural gas industry. Increased salinity and reduced sediment are projected to detrimentally impact storm buffering capacity and the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Two mapping unit strategies (protecting bay and lake shorelines with artificial reefs and beneficial use of dredged material) and one programmatic strategy (develop and support a comprehensive Barrier Shoreline/Island restoration/mitigation initiative, not limited to wetland issues) have been adopted for this unit.

Vermilion Bay Marsh

Location - This 121,598-acre unit is located within Vermilion and Iberia parishes. The unit's southern boundary is Vermilion Bay. The northern boundary is the Pleistocene Terrace. The Cypremort Point ridge is the eastern boundary, and Little Vermilion Bay is the southwestern boundary.

Habitat Description and Landscape Change - During the 1949 O'Neil survey, the Vermilion Bay Marsh was predominately brackish, with lesser amounts of fresh and saline marshes. A small amount of unknown marsh type was recorded at that time. By 1968,

brackish marsh was the predominant marsh type, and intermediate marsh was the second most prevalent habitat type. Fresh marsh had declined to a minimal amount, although the total acreage was not known because nearly a third of the habitat was not assessed. This small amount of fresh marsh was classified southwest of Patoutville. By 1988, this unit was classified as 5% fresh marsh, 25% intermediate marsh, 30% brackish marsh, 5% cypress forest, and 13% bottomland forest. Weeks Bayou and Bayou Petite Anse are natural bayous located within the unit. The Avery Canal and the GIWW are manmade navigation channels located within the unit. Additionally, naturally occurring salt domes are present in the Vermilion Bay Marsh area. Avery Island and Weeks Island are mined commercially for salt.

Historic Land Loss - From 1932 to 1990, there was an estimated loss of 16,220 acres of land within the unit. Historically and currently, this region has been subjected to interior erosion as a result of altered hydrology. Storm related losses have also been detrimental to the marsh ecosystem through scouring and increased water levels making the interior marsh susceptible to increased erosion. Oilfield exploration has contributed greatly to the decline of wetlands in the area both through altered hydrology due to location of pipeline canals and dredging of such canals. Subsidence (1.1-2.0 ft/century) seems to play at least a minimal role in interior wetland loss. The predominantly southeasterly winds in Louisiana have had a large impact on the unit's southern boundary. Wind and wave action have been substantial factors in the

deterioration of the unit's coastline and canal banks.

Future Land Loss Projections - By 2050, the Vermilion Bay Marshes are expected to lose 13,560 acres of marsh if no action is taken. Of the 5,960 acres of swamp in the unit in 1990, none are expected to be lost by 2050.

Fish and Wildlife Resources - Red drum, spotted seatrout, American oyster, brown shrimp, blue crab, largemouth bass, and channel catfish populations are all currently stable. Of these, largemouth bass and channel catfish populations are expected to increase, whereas red drum and blue crab populations are projected to remain steady and the others are expected to decline. Black drum and Gulf menhaden populations are currently declining. While the former are expected to continue declining, the latter are expected to increase, as are populations of white shrimp. Estuarine species use the fringing marshes of Vermilion Bay during the fall and winter.

Because the unit is made up of various habitat types, many species of mammals and waterfowl normally reside or winter in the unit. The wading bird and American alligator populations have shown increasing trends over the past 10-20 years. Other waterfowl, raptor, nutria, muskrat, and furbearer populations have remained stable. American alligator populations are projected to increase through 2050. Nutria, muskrat, other furbearer, raptor, and waterfowl populations are projected to remain stable, with the exception of populations of waterfowl and raptors in

hardwood forests, which are projected to decline.

Infrastructure - There are several man-made navigational canals throughout the unit. The GIWW was originally a 125-ft wide man-made navigation canal, but its banks have eroded to the point that the canal is several times as wide as its authorized dimensions. The Vermilion River is also used as a navigation waterway in addition to providing flood control and irrigation for agriculture purposes. Bayou Teche and the Vermilion River are two major naturally-occurring waterways which provide navigation, flood control, and irrigation for agriculture. Petit Anse, Tigre, and Carlin bayous are all used for recreational and commercial fishing. Additionally, three pumping stations within the St. Mary Area mapping unit discharge into this mapping unit. This unit has 16.7 miles of secondary and 55.5 miles of tertiary roads, as well as 6.8 miles of railroad. There are 967 oil and/or natural gas wells, but no pipelines. There are 17 groundwater intakes (12 industrial, four mining, and one for the Lydia Water System), and two surface water intakes (one mining and one industrial).

In addition to the infrastructure mentioned above, a U.S. Department of Energy Strategic Petroleum reserve facility is situated on the Weeks Island salt dome, about 14 miles south of New Iberia. It has a storage capacity of 11.1 million m³ of crude oil, but at the end of 1996, only 556,500 m³ were being stored at the facility.

Previously Proposed Strategies - Bank stabilization along the various navigation

channels and hydrologic management of the canals has been proposed or implemented by various agencies. Several CWPPRA projects have been planned and incorporated into the unit's wetland area. A funded CWPPRA project, PTV-18, protects over 13 miles of the southern boundary of the unit's shoreline and the mouth of Boston Canal. This project also restores and protects 378 acres of marsh habitat. Preserving and protecting ridge functions, protecting bay/lake shorelines, freshwater diversions, and managing the hydrology of the unit's fresh or brackish marshes have also been proposed.

Coastal Use/Resource Objectives - Habitat objectives for the Vermilion Bay Marsh unit are fresh, intermediate, and brackish marshes and their associated aquatic habitats as well as forested wetlands. Resource objectives include shrimp, blue crabs, saltwater finfish, freshwater finfish, American alligators, furbearers, crawfish, waterfowl, nongame fish and wildlife, endangered species, agriculture and grazing, recreation and tourism, scientific study, water quality enhancement, storm buffering capacity, navigation, oil and natural gas, roads, levees, bridges, communities, and utilities.

Regional Ecosystem Strategies - Strategies for the unit include stabilizing banks of navigation channels for water conveyance; dedicated delivery of sediment for marsh building; maintaining shoreline integrity and stabilizing critical areas of Vermilion Bay; optimizing GIWW flows into marshes while minimizing direct flows into bays; maintaining Vermilion, East

and West Cote Blanche bays as brackish; and reducing sedimentation into bays.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss by more than 50%. All of these strategies are projected to enhance the intermediate and brackish marshes in this unit. Forested wetlands are projected to be enhanced by all strategies except shoreline stabilization, which is projected to have no measurable influence.

Mapping Unit and Programmatic Strategies - Six mapping unit strategies (establish and protect ridge functions, bank stabilization, measures to protect bay and lake shorelines, rebuild the south bank of the GIWW at Weeks Bay to prevent breaching, beneficial use of dredged material, and placement of dredged material along the GIWW for additional hurricane protection) have been adopted for this unit. There are no programmatic strategies proposed for the Vermilion Bay Marsh unit.

Vermilion Bay

Location - This 129,259-acre unit is in St. Mary, Iberia, and Vermilion parishes. The unit includes all of Vermilion Bay, Weeks Bay, and Southwest Pass.

Habitat Description and Landscape Change - This unit is an open fresh-to-brackish water bay.

Historic Land Loss - Not applicable.

Future Land Loss Projections - Not applicable.

Fish and Wildlife Resources - This mapping unit hosts stable populations of red and black drum, Gulf menhaden, southern flounder, white shrimp, and blue crab. Whereas populations of white shrimp are expected to increase, populations of blue crab, Gulf menhaden, and red drum are projected to remain steady, and the others are projected to decline. Declining populations include spotted seatrout, American oysters, and brown shrimp, and these populations are expected to continue to decline.

It also hosts high numbers of seabirds, as well as pelicans and waterfowl. The brown pelican population has shown an increasing trend, and this is expected to continue through 2050. Other waterfowl populations have been stable, and are projected to remain stable through 2050.

Infrastructure - There is no USACE-maintained infrastructure in this mapping unit. There are no roads or railroads in this unit. There are 268 oil and/or natural gas wells and 43.4 miles of pipelines in the bay. One drainage pump station discharges into this unit from the St. Mary Area mapping unit.

Previously Proposed Strategies - The State's Blueprint proposed a freshwater diversion in this unit. The use of dredged material beneficially has also been proposed.

Coastal Use/Resource Objectives - Habitat objectives for Vermilion Bay are intermediate and brackish aquatic habitats. Resource priorities include shrimp, blue crabs, American oysters, saltwater finfish, recreation and tourism, scientific study, aquifer recharge, water

quality enhancement, navigation, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for this unit include maintaining shoreline integrity and stabilizing critical areas of the Teche/Vermilion Bay systems, maximizing GIWW flows into marshes and minimizing direct flows into bays, maintaining Vermilion Bay as brackish, and reducing sedimentation in bays.

Benefits of Regional Strategies - These strategies generally are compatible with the goals of the Coast 2050 program. Reducing sedimentation in bays and creating an artificial reef complex are projected to greatly enhance the open water habitats.

Shrimp and saltwater finfish populations are projected to be enhanced by shoreline protection. Shrimp populations are also projected to be detrimentally impacted by increased salinity. Blue crab populations are projected to be enhanced by bank rebuilding at Weeks Bay. Freshwater finfish, American alligator, furbearer, crawfish, waterfowl, nongame fish and wildlife, and endangered species populations are generally projected to be enhanced by all of the projects except increased salinity and reduced sediment. Increased salinity and decreased sediment are generally projected to detrimentally impact these populations, except for waterfowl and endangered species populations, which are projected to be enhanced by reduced sediment. Agriculture and grazing, storm buffering capacity, communities, and utilities are generally projected to be enhanced by all of the strategies except increased salinity

and reduced sediment. Increased sediment is projected to detrimentally impact water quality. Reduced sediment is projected to detrimentally impact storm buffering capacity, the oil and natural gas industry, and communities. Navigation is projected to be greatly enhanced by bank rebuilding at Weeks Bay.

Mapping Unit and Programmatic Strategies - The two mapping unit strategies adopted for this area are protecting bay and lake shorelines (i.e., the north shore of Little Vermilion Bay and Weeks Bay, and narrow the gap at the head of Little Vermilion Bay) and beneficial use of dredged material. There are no programmatic strategies for this unit.

Rainey Marsh

Location - This 68,254-acre unit is located in Vermilion Parish. It is bordered on the west by Freshwater Bayou Canal. The Gulf of Mexico is its southern boundary. It is bordered on the east and north by Vermilion Bay.

Habitat Description and Landscape Change - O'Neil reported in 1949 that the area was mostly brackish marsh with a small amount of intermediate and saline marsh present. He also reported a small amount of beach habitat. In 1968, the area was mostly brackish marsh, but intermediate marsh was present more than in 1949. There was no report of any beach habitat or saline marsh. By 1978, the amount of intermediate marsh had nearly returned to the 1949 coverage. In 1988, this area was 70% brackish marsh, 11% intermediate marsh, 4% saline marsh, and 12% water.

Historic Land Loss - Altered hydrology and major storms have been factors affecting land loss. Between 1932 and 1990, a total of 7,750 acres were lost. The highest period of land loss was between 1956 and 1974. This dramatic loss correlates with a high incidence of major hurricanes, such as Audrey and Betsy, which resulted in increased salinity, and a rapid expansion of oil and natural gas exploration activities. Between 1974 and 1990, some 2,520 acres of land were lost. Subsidence rates in Rainey Marsh are estimated at 1.1-2.0 ft/century.

Future Land Loss Projections - It is predicted that if current trends continue, this area will suffer loss of land that could amount to 13.4% (7,840 acres) of the total area by 2050. The southern boundary of this area will continue to suffer from erosive actions of the Gulf of Mexico along the entire length of the shoreline.

Fish and Wildlife Resources - This area supports stable populations of red drum, black drum, Gulf menhaden, southern flounder, white shrimp, blue crab, largemouth bass, and channel catfish. Whereas populations of largemouth bass and channel catfish are expected to increase and the southern flounder and black drum populations are expected to decline, all others are projected to remain stable. Brown shrimp and American oyster populations are declining and are projected to continue to do so.

This area is unique in that it contains two wildlife sanctuaries, the Paul J. Rainey Wildlife Refuge and the Louisiana State Wildlife Refuge and Game Preserve. In

the recent past, over 270 species of birds have been sighted on the Paul J. Rainey Wildlife Refuge and, at times, more than 250,000 ducks and geese spend their winter months on the Louisiana State Wildlife Refuge and Game Preserve.

The American alligator population in this unit has increased in the recent past, and is expected to continue to do so through 2050. Waterfowl, raptor, nutria, muskrat, and other furbearer populations have been stable over the last 10-20 years. In open water habitats, these populations are projected to remain stable. In intermediate and brackish marshes, however, the raptor and waterfowl populations are projected to decline while furbearer populations are projected to remain stable.

Infrastructure - The major USACE infrastructure in this area is Freshwater Bayou Canal and Lock. This 12-ft deep, 125-ft wide channel is for navigation purposes, while the lock is operated to minimize saltwater intrusion into the Mermentau Basin. Its average annual traffic from 1984 to 1993 was 341,000 tons. There are no primary or secondary roads or railroads in this unit, but there are 2.8 miles of tertiary roads. This unit has 131 oil and/or natural gas wells and 1.9 miles of natural gas pipeline.

Previously Proposed Strategies - Many plans have proposed to protect ridges, develop a reef zone, manage navigation channels, and protect bay and lake shorelines. The Cheniere au Tigre demonstration project (PTV-5) is an authorized CWPPRA effort that will attempt to provide shoreline protection to the beach area in the unit. The major thrust for reaching favorable habitat will

be in the areas of fresh water and brackish marshes with their associated habitats and the protection of the chenier shorelines.

Coastal Use/Resource Objectives - Habitat objectives for Rainey Marsh include freshwater, intermediate, and brackish marshes and their associated aquatic habitats, and chenier shorelines. Resource objectives of the unit are shrimp, blue crabs, saltwater finfish, American alligators, furbearers, waterfowl, nongame fish and wildlife, agriculture and grazing, scientific study, storm buffering capacity, navigation, and oil and natural gas.

Regional Ecosystem Strategies - Strategies for this unit include stabilizing banks of navigation channels for water conveyance, dedicated delivery of sediment for marsh building, maintaining shoreline integrity and stabilizing critical areas of the Vermilion Bay system, optimizing GIWW flows into marshes while minimizing flows into bays, and reducing sedimentation in bays.

Benefits of Regional Strategies - These strategies are projected to reduce future wetland loss. These strategies are projected to enhance fresh, intermediate, and brackish marshes and barrier shorelines in this unit.

Shrimp, blue crab, and saltwater finfish populations are projected to be enhanced by optimizing GIWW flows and shoreline protection. Increased salinity is projected to detrimentally impact shrimp, American alligator, furbearer, waterfowl, and nongame fish and wildlife populations. Reduced sediment

is projected to detrimentally impact American alligator, furbearer populations, and enhance waterfowl populations. The other strategies are generally projected to enhance American alligator, furbearer, waterfowl, and nongame fish and wildlife populations. Agriculture, grazing, and storm buffering capacity are generally projected to be enhanced by most of the strategies, except for increased salinity and reduced sediment. Increased salinity is projected to be detrimental to agriculture, storm buffering capacity, and the oil and natural gas industry. Reduced sediment is projected to be detrimental to storm buffering capacity and the oil and natural gas industry.

Mapping Unit and Programmatic Strategies - Six mapping unit strategies (establishment and protection of ridge functions, bank stabilization, establishment of an artificial reef, measures to stabilize critical reaches of Cheniere au Tigre and bays, protecting and restoring Southwest Pass points, and beneficial use of dredged material) and one programmatic strategy (implementation of additional studies on the influence of river water) have been adopted for this mapping unit.

Big Woods

Location - This 15,658-acre unit is located in Vermilion Parish south of Abbeville. It is composed of Big Woods, Palmeto, and Maple islands, and the surrounding swamps and marshes between Theall, Esther, and Bancker. The unit also extends along either side of the Vermilion River south to the GIWW.

Habitat Description and Landscape Change - Historical habitat information is not available for this unit. Currently, the unit is in a low, poorly drained area consisting of remnants of abandoned meanders of the Vermilion River. In 1988 this unit was 52% bottomland forest, 4% cypress forest, 8% fresh marsh, 24% agriculture/pasture, and 2% water.

Historic Land Loss - There are no land loss data for this unit. Subsidence is occurring at a rate of 1.1-2.0 ft/century.

Future Land Loss Projections - There are no data available for land loss projections in this unit.

Fish and Wildlife Resources - Wildlife resources for this area are typical for swamp and bottomland hardwoods. This unit hosts high numbers of marsh avifauna, with low numbers of other waterfowl, raptors, furbearers, and American alligators. All of these populations have been stable over the last 10-20 years, except for wading birds, which have increased. By 2050, all populations are projected to remain stable, except for the raptors and waterfowl in the hardwood forests, which are projected to decline. No fisheries data exist to evaluate or predict trends.

Infrastructure - The communities of Esther, Ferry, and Bancker are located within this unit. Louisiana Highway 82 to Esther is the major thoroughfare here. The southeastern portion of the unit has a large network of canals originating primarily from oil and natural gas activities that began in the 1950's. There are no primary or secondary roads, but

there are 1.8 miles of tertiary roads. There are 106 oil and/or natural gas wells and 1.3 miles of pipeline.

Previously Proposed Strategies -The only past strategy for this unit is establishing and protecting ridge function.

Coastal Use/Resource Objectives - Habitat objectives for Big Woods are forested wetlands and their associated aquatic habits and fastlands or other development lands. Resource priorities include furbearers, waterfowl, nongame fish and wildlife, agriculture and grazing, recreation and tourism, aquifer recharge and freshwater supply, storm buffering capacity, oil and natural gas infrastructure, roads, levees, bridges, and communities.

Regional Ecosystem Strategies - Resource strategies for the unit include maximizing GIWW flows into marshes and minimizing direct flows into bays,

and stabilizing banks of navigation channels for water conveyance.

Benefits of Regional Strategies - Introducing sediment-laden water into the unit and restoring the hydrology will greatly enhance the forested wetlands and will enhance the fastland areas. Adding sediment to this area will enhance both forested wetlands and fastlands.

Introducing sediment-laden water will also help provide healthy marsh that will act as a storm buffer which will enhance communities and enhance furbearer, waterfowl, nongame fish and wildlife, endangered species populations, and recreation and tourism.

Mapping Unit and Programmatic Strategies - A mapping unit strategy for Big Woods is to establish and protect ridge function. The programmatic strategy for the area is to protect the ground water between Perry Ridge and Big Woods (recharge area) from saltwater intrusion.

SECTION 4

PRIOR AND PREDICTED LAND LOSS, PREVIOUS STRATEGIES AND COAST 2050 STRATEGIES

Wetland Loss Table

Calculation of Rate of Loss in the Absence of Restoration

There are two databases showing land loss in coastal Louisiana.

- The database developed by the National Wetlands Research Center of the U.S. Geological Survey (USGS) covers the entire coast, indicates habitat types, and shows loss and gain from 1956 to 1990.
- The database developed by the New Orleans District of the U.S. Army Corps of Engineers (USACE) covers the coastal marshes over a 60-year period of record, divided into four time intervals. The product of this database is a set of seven maps depicting the location of land loss per time period. The database is highly consistent, because the same two geologists determined the land/water interface for all periods. However, it does not cover all of the cypress swamps, does not include the drainage of the Sabine River, and does not show habitat types.

In 1991, as part of the CWPPRA planning process, an interagency group

of marsh experts gathered to discuss which database to use to project marsh loss for the Louisiana Coastal Wetlands Restoration Plan (published in 1993). The group determined that the USACE database was the most appropriate to use to project future loss, because it had the most extensive loss record and the land/water interface had been consistently delineated. Since land gain was infrequent and localized, the group determined that this parameter was not necessary to project future losses.

The 1991 interagency group chose 1974 through 1990 as the most appropriate base period to determine future loss. The average loss statewide was slightly more than 30 square miles per year from 1974 to 1983. The loss dropped to just over 25 square miles per year in the most recently analyzed time period, 1983 to 1990. There are significant uncertainties in any 60-year projection into the future—rate of sea level rise, frequency of hurricanes and floods, rate of development, etc. The group determined that including the higher 1974-1983 loss with the 1983-1990 loss would compensate for a possible increase in sea level rise. They also felt that the 1974-1990 loss rate most accurately reflected the post-1990 loss rate. Thus, this rate was used in the 1993 CWPPRA "Louisiana Coastal Wetlands Restoration

Plan" and in subsequent feasibility studies conducted under CWPPRA.

Subsequently, as part of feasibility studies done under CWPPRA, another group of marsh experts (including some members of the 1991 group) analyzed the loss patterns on the USACE land loss maps. The group drew polygons around areas where loss patterns seemed to have the same cause. The acres lost in each polygon of similar loss were determined for each of the four time periods. The annual percent of marsh loss between 1974 and 1990 was determined for each polygon. For projection purposes, these rates were assumed to continue into the future.

During the Coast 2050 planning process, local experts on Coast 2050 Regional Planning Teams adjusted a few of the 1974-1990 loss rates to account for one-time losses and false loss associated with extremely high water levels.

Another adjustment during the Coast 2050 process was done because the USACE database included only land to water changes, and therefore did not show embankments of dredged material along channels as land loss. To partially correct this, the most extensive spoil banks, those along the Mississippi River Gulf Outlet, were measured and counted as loss. Since the Louisiana Coastal Wetlands Restoration Plan is now in place, all future loss due to development will be mitigated. Thus, the 1974-1990 loss due to canals, borrow pits, etc. was not included in the rate to be used for projections. Since the Sabine River watershed was not covered by the USACE database, the 1978-1990 loss

rate from the USGS database was used in that area.

The USACE database covered all habitats in the coastal area, including the extensive agricultural and residential areas adjacent to the Mississippi River and Bayou Lafourche. The polygons of similar loss included these non-wetland areas. The Coast 2050 experts realized that including these developed areas in the base from which loss was determined produced an inaccurately low loss rate, since the loss rate should apply only to wetlands acreage. Accordingly, the USGS database was used to determine the acres of marsh in 1990 in each polygon. All loss on the USACE loss maps was determined to be in marsh. The adjusted 1974-1990 loss rate was applied to the acres of marsh in 1990 and then to the remaining acres of marsh each year from 1991 through 2050. This determined the acres remaining in 2050 for each polygon, if no restoration occurred.

Adjustment for Restoration Projects

There is one large freshwater diversion from the Mississippi River at Caernarvon and a second under construction at Davis Pond. There are nearly 60 coastal restoration projects authorized on the first six CWPPRA Priority Lists. All these projects either reduce future marsh loss or create marsh. For CWPPRA projects, the additional acres present in the project area at the end of 20 years (as determined by the Wetland Value Assessment) were used to determine the benefits between 1990 and 2010. Then, the longevity of each project (as determined by the CWPPRA

Environmental Working Group) was used to determine the marsh loss reduction/marsh gain for each project for years 2011 through 2050. If the project had longevity of greater than 50 years, the WVA benefits were continued until 2050. If the longevity was less than 30 years, after year 30, the loss rate was returned to the 1974-1990 rate. For the Caernarvon Freshwater Diversion, the benefits from the EIS were used. For the Davis Pond Freshwater Diversion, the benefits from the March 11, 1998 fact sheet were used.

The benefitted acreage in each polygon was calculated as described above. This acreage was then subtracted from the acres projected to be lost. This determined the net amount of marsh to be lost in each polygon.

Location of Lost Land

In order to determine where within each polygon the above loss might be located, the 1993 LANDSAT image was used. The polygons, diversion, and CWPPRA project boundaries were obtained from the Louisiana Department of Natural Resources (DNR). The Natural Systems Engineering Laboratory at LSU developed the prediction maps. They selectively modified parts of the LANDSAT image to reflect the net acreage of marsh lost in each polygon by 2050.

Each 25 m pixel on the image contained brightness based on combining bands from the original LANDSAT data. Each cell was assigned a pseudo color—dark blue for the lowest end of the brightness range and bright white for the highest end. Generally, solid marsh areas had a

high brightness while open water had a low brightness. Areas with an intermediate brightness were assumed to be broken marsh with brightness corresponding to the percentage of land. Brightness was then used as land/water boundary criteria. Areas with brightness higher than the criterion were considered land and those with lower brightness were classified as water.

In order to make the image "lose" land, the criterion for land was then adjusted to a higher value that resulted in less land in the image. This was done iteratively until the amount of land in each polygon matched the acreage predicted to remain in that polygon in 2050 (Table 4-1). Reducing the brightness criterion removed land from the image. The amount of land preserved by CWPPRA projects and the river diversions was then added back to the image in each polygon. In order to clearly indicate the land lost and gained through 2050, maps were printed to show the base marsh in green, the areas to be lost in red, and areas of gain in black. The result is a map of coastal Louisiana that indicates what marsh areas may be lost or gained by 2050. Refer to Figures 1-1 and 1-2 in the Coast 2050 main report. The overall results of the projection also are presented in Chapter 5 of the report.

Prediction of Loss Through 2050 by Mapping Unit

The USGS database was used to determine the acres of swamp and various types of marsh in each mapping unit in 1990 (Table 4-1). The USACE database was used to determine historic losses and the rate of loss from 1974-

1990 for each mapping unit. The benefits of the CWPPRA projects and freshwater diversions were also determined by mapping unit and habitat type. The habitat types to be lost were estimated by superimposing the 2050 loss projection maps onto the 1990 habitat maps. This methodology assumes that the location of future habitat zones will not shift. Since these zones have shifted both north and south in the past, the assumption that they will remain as they were in 1990 is simplistic. Since the USACE database did not include swamps, academics with experience in analyzing swamp loss were contacted and their help was used to determine the amount of swamp predicted to be lost in each mapping unit.

Previously Proposed Strategies Table

Data in this table (Table 4-2) came from an extensive review of past coastal restoration plans, studies, and current projects. Following are the sources and citations for each of the abbreviated footnotes in the table:

Blueprint

Gagliano, S.M. 1994. An environmental-economic blueprint for restoring the Louisiana coastal zone: The state plan. Report of the Governor's Office of Coastal Activities, Science Advisory Panel Workshop. Coastal Environments, Inc., Baton Rouge, La.

CCEER

van Heerden, I.L. 1994. A long-term comprehensive management plan for coastal Louisiana to ensure sustainable biological productivity, economic growth, and the continued existence of its unique culture and heritage. Center for Coastal, Energy, and Environmental Resources, Louisiana State University. Baton Rouge, La.

Coalition to Restore Coastal Louisiana

Coalition to Restore Coastal Louisiana. 1989. Coastal Louisiana: Here today and gone tomorrow? A citizen's program for saving the Mississippi River Delta region to protect its heritage, economy, and environment. Baton Rouge, La. 70 pp.

CWPPRA Basin Report

Louisiana Coastal Wetlands Conservation and Restoration Task Force. 1993. Coastal Wetlands Planning, Protection, and Restoration Act: Louisiana Coastal Wetlands Restoration Plan. Main report and environmental impact statement. Louisiana Coastal Wetlands Conservation and Restoration Task Force, Baton Rouge, La.

Gagliano and van Beek, 1993

Gagliano, S.M., and J.L. van Beek.
1993. A long-term plan for
Louisiana's coastal wetlands.
Louisiana Department of Natural
Resources, Office of Coastal
Restoration, Baton Rouge, La.

PPL 1-6 Projects

These were projects that were approved to be included on the CWPPRA Priority Project Lists 1-6 and submitted to the U.S. Congress. Not all of these projects have been built. Some are in a planning phase, and some have not yet made it to that stage.

**Region 3 Coast 2050
Strategies Tables**

These (Tables 4-3, 4-4, and 4-5) are the final Regional, Mapping Unit, and Programmatic strategies that were formulated and finalized during the year and a half long Coast 2050 process. These strategies were formulated through a joint Federal, State, and local effort that involved agency officials and members of the public.

Table 4-1. Region 3 wetland loss.

TERREBONNE BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
Black Bayou Wetlands	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932 Acres lost 1932-1956 Acres lost 1956-1974 Acres lost 1974-1983 Acres lost 1983-1990	N/D N/D N/D N/D N/D
Chacahoula Swamps	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932 Acres lost 1932-1956 Acres lost 1956-1974 Acres lost 1974-1983 Acres lost 1983-1990	N/D N/D N/D N/D N/D
Verret Wetlands	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932 Acres lost 1932-1956 Acres lost 1956-1974 Acres lost 1974-1983 Acres lost 1983-1990	N/D N/D N/D N/D N/D
Pigeon Swamps	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932 Acres lost 1932-1956 Acres lost 1956-1974 Acres lost 1974-1983 Acres lost 1983-1990	N/D N/D N/D N/D N/D

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Causes of loss*	Projected acres lost by 2050	
Black Bayou Wetlands	Subsidence - 1, C Altered hydrology - 1, H Flooding - 1, H, C	Acres marsh in 1990	160
		Acres marsh lost by 2050	0
		Acres swamp 1990	16,270
		Acres swamp lost by 2050	6,510
		% 1990 wetland acres lost	39.6
Chacahoula Swamps	Altered hydrology - 1, H, C Flooding - 1, H, C Subsidence - 2, H, C	Acres marsh in 1990	270
		Acres marsh lost by 2050	0
		Acres swamp 1990	37,300
		Acres swamp lost by 2050	14,920
		% 1990 wetland acres lost	39.7
Verret Wetlands	Flooding - 1, H, C Subsidence - 2, H, C Lack of sed. and f.w. - X Herbivory - X	Acres marsh in 1990	250
		Acres marsh lost by 2050	0
		Acres swamp 1990	57,700
		Acres swamp lost by 2050	23,080
		% 1990 wetland acres lost	39.8
Pigeon Swamps	Altered hydrology - 1, H Flooding - 1, C Lack of sed. and f.w. - X	Acres marsh in 1990	10
		Acres marsh lost by 2050	0
		Acres swamp 1990	5,500
		Acres swamp lost by 2050	2,200
		% 1990 wetland acres lost	39.9

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
Fields Swamp	Fresh	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	24,200
				Acres lost 1932-1956	1,610
				Acres lost 1956-1974	800
				Acres lost 1974-1983	300
				Acres lost 1983-1990	760
Devil's Swamp	Unknown	Forested	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	2,380
				Acres lost 1932-1956	0
				Acres lost 1956-1974	520
				Acres lost 1974-1983	240
				Acres lost 1983-1990	250
St. Louis Canal	Fresh	Fresh Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	17,880
				Acres lost 1932-1956	10
				Acres lost 1956-1974	1,330
				Acres lost 1974-1983	930
				Acres lost 1983-1990	1,180
Savoie	Unknown	Forested Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	2930
				Acres lost 1932-1956	0
				Acres lost 1956-1974	20
				Acres lost 1974-1983	60
				Acres lost 1983-1990	250

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Causes of loss*	Projected acres lost by 2050
Fields Swamp	Wake/wave erosion - 1, C	Acres marsh in 1990 20,730
	Direct removal - 1, H	Acres marsh lost by 2050 3,210
	Altered hydrology - X	Acres swamp 1990 580
	Storm-related loss - X	Acres swamp lost by 2050 0
		Acres marsh preserved by CWPPRA 200
		% 1990 wetland acres lost CWPPRA 14.1
Devil's Swamp	Wake/wave erosion - 1, C	Acres marsh in 1990 1,370
	Direct removal / fire - 1, H	Acres marsh lost by 2050 865
	Altered hydrology - X	Acres swamp 1990 200
	Subsidence - X	Acres swamp lost by 2050 0
		% 1990 wetland acres lost 55.1
St. Louis Canal	Subsidence - 1, H, C	Acres marsh in 1990 14,430
	Altered hydrology - 1, H, C	Acres marsh lost by 2050 5,020
	Lack of sed. and f.w. - X	Acres swamp 1990 1,090
		Acres swamp lost by 2050 0
		% 1990 wetland acres lost 32.3
Savoie	Flooding - 1, H, C	Acres marsh in 1990 2,600
	Altered hydrology - 2, H, C	Acres marsh lost by 2050 860
	Direct removal - X, C	Acres swamp 1990 340
	Lack of sed. and f.w. - X	Acres swamp lost by 2050 0
		% 1990 wetland acres lost 29.3

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
South Bully Camp Marsh	Brackish	Saline	High 2.1 to 3.5 ft per century	Acres marsh in 1932	41,890
				Acres lost 1932-1956	2,450
				Acres lost 1956-1974	3,100
				Acres lost 1974-1983	3,000
				Acres lost 1983-1990	2,125
North Bully Camp Marsh	Intermediate	Brackish Fresh	High 2.1 to 3.5 ft per century	Acres marsh in 1932	32,020
				Acres lost 1932-1956	1,500
				Acres lost 1956-1974	5,760
				Acres lost 1974-1983	3,440
				Acres lost 1983-1990	2,140
NHSC Wetlands	Fresh	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	5,160
				Acres lost 1932-1956	10
				Acres lost 1956-1974	710
				Acres lost 1974-1983	840
				Acres lost 1983-1990	200
Caillou Marshes	Intermediate Brackish Saline	Brackish Saline	High 2.1 to 3.5 ft per century	Acres marsh in 1932	53,840
				Acres lost 1932-1956	2,090
				Acres lost 1956-1974	7,790
				Acres lost 1974-1983	2,700
				Acres lost 1983-1990	805
Montegut	Fresh Intermediate Brackish Swamp	Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	14,070
				Acres lost 1932-1956	280
				Acres lost 1956-1974	3,440
				Acres lost 1974-1983	2,780
				Acres lost 1983-1990	1,830

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Causes of loss*	Projected acres lost by 2050
South Bully Camp Marsh	Wind/wave erosion - 1	Acres marsh in 1990 31,550
	Altered hydrology - 2	Acres lost by 2050 12,990
	Storm-related loss - 3	% 1990 wetland acres lost 41.2
North Bully Camp Marsh	Subsidence - 1, C	Acres marsh in 1990 19,180
	Direct removal - 2, H	Acres lost by 2050 10,485
	Altered hydrology - 2, C	Acres preserved CWPPRA 1900
	Storm-related loss - 3	% 1990 wetland acres lost CWPPRA 45
	Wind/wave erosion - 3, C	
	Lack of sed. and f.w. - X	
NHSC Wetlands	Direct removal - 1, H	Acres marsh in 1990 3,400
	Altered hydrology - 2, H & 1, C	Acres marsh lost by 2050 1,990
	Wind/wave erosion - 2, C	Acres swamp 1990 6,030
	Impoundment - X	Acres swamp lost by 2050 0
	Lack of sed. and f.w. - X	% 1990 wetland acres lost 21.1
Caillou Marshes	Altered hydrology - 1, H, C	Acres marsh in 1990 40,455
	Wind/wave erosion - 2, H, C	Acres lost by 2050 9,960
	Subsidence - 2, C	% 1990 wetland acres lost 24.6
	Direct removal - 3, H	
	Lack of sed. and f.w. - X	
Montegut	Subsidence - 1, H, C	Acres marsh in 1990 5,740
	Altered hydrology - 1, H, C	Acres lost by 2050 4,000
	Lack of sed. and f.w. - X	% 1990 wetland acres lost 69.7

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
Terrebonne Marshes	Intermediate Brackish Saline	Brackish Saline	High 2.1 to 3.5 ft per century	Acres marsh in 1932	54,700
				Acres lost 1932-1956	5,840
				Acres lost 1956-1974	6,760
				Acres lost 1974-1983	8,200
				Acres lost 1983-1990	3,470
Boudreaux	Fresh Intermediate	Fresh Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	27,845
				Acres lost 1932-1956	1,640
				Acres lost 1956-1974	3,260
				Acres lost 1974-1983	2,770
				Acres lost 1983-1990	2,660
Pelto Marshes	Saline	Saline	High 2.1 to 3.5 ft per century	Acres marsh in 1932	56,315
				Acres lost 1932-1956	5,210
				Acres lost 1956-1974	4,000
				Acres lost 1974-1983	3,880
				Acres lost 1983-1990	1,710
GIWW	Fresh	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	40,930
				Acres lost 1932-1956	1,170
				Acres lost 1956-1974	12,330
				Acres lost 1974-1983	2,900
				Acres lost 1983-1990	1,740

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Causes of loss*	Projected acres lost by 2050
Terrebonne Marshes	Wind/wave erosion - 1	Acres marsh in 1990 30,430
	Subsidence - 1, H, C	Acres lost by 2050 19,620
	Storm-related loss - 1	% 1990 wetland acres lost 64.5
	Altered hydrology - 2	
	Lack of sed. and f.w. - X	
Boudreaux	Subsidence - 1, C	Acres marsh in 1990 17,515
	Altered hydrology - 2, C & 1, H	Acres marsh lost by 2050 10,130
	Wind/wave erosion - 2, C	Acres swamp 1990 1,910
	Storm-related loss - X, H, C	Acres swamp lost by 2050 0
	Lack of sed. and f.w. - X	Ac marsh preserved by CWPPRA 580
		% 1990 wetland acres lost CWPPRA 49.2
Pelto Marshes	Wind/wave erosion - 1, H, C	Acres marsh in 1990 41,515
	Subsidence - 1, H, C	Acres lost by 2050 14,600
	Altered hydrology - 2, H, C	% 1990 wetland acres lost 35.2
	Storm-related loss - X	
	Lack of sed. and f.w. - X	
GIWW	Wake/wave erosion - 1, C	Acres marsh in 1990 22,790
	Flooding - 1, C	Acres marsh lost by 2050 9,940
	Altered hydrology - 1, H, C	Acres swamp 1990 22,620
	Direct removal - 1, H	% 1990 wetland acres lost 21.9
	Wind/wave erosion - 2, C	
	Herbivory - X	

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
Penchant	Fresh Intermediate	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	145,910
				Acres lost 1932-1956	1,660
				Acres lost 1956-1974	30,590
				Acres lost 1974-1983	5,570
				Acres lost 1983-1990	1,780
Mechant/de Cade	Brackish	Brackish Saline	High 2.1 to 3.5 ft per century	Acres marsh in 1932	68,750
				Acres lost 1932-1956	2,340
				Acres lost 1956-1974	8,100
				Acres lost 1974-1983	2,370
				Acres lost 1983-1990	1,360
Avoca	Fresh	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	7,630
				Acres lost 1932-1956	2,480
				Acres lost 1956-1974	1,260
				Acres lost 1974-1983	1,070
				Acres lost 1983-1990	190
Atchafalaya Marshes	Brackish	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	48,060
				Acres lost 1932-1956	2,100
				Acres lost 1956-1974	2,220
				Acres lost 1974-1983	770
				Acres lost 1983-1990	470
Point au Fer	Brackish	Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	35,290
				Acres lost 1932-1956	1,740
				Acres lost 1956-1974	2,720
				Acres lost 1974-1983	840
				Acres lost 1983-1990	520

Table 4-1. Region 3 wetland loss (Cont.).

TERREBONNE BASIN	Causes of loss*	Projected acres lost by 2050
Pechant	Flooding - 1, C	Acres marsh in 1990 106,310
	Altered hydrology - 2, H, C	Acres marsh lost by 2050 20,670
	Subsidence - 3, H, C	Acres swamp 1990 1,250
	Herbivory - X	Acres swamp lost by 2050 0
	Lack of sed. and f.w. - X	Ac marsh preserved by CWPPRA 1,310
		% 1990 wetland acres lost CWPPRA 18.0
Mechant/de Cade	Subsidence - 1	Acres marsh in 1990 54,580
	Altered hydrology - 2	Acres marsh lost by 2050 11,150
	Wind/wave erosion - 3	Acres swamp 1990 280
	Storm-related loss - X	Acres swamp lost by 2050
	Herbivory - X	Ac marsh preserved by CWPPRA 240
	Lack of sed. and f.w. - X	% 1990 wetland acres lost CWPPRA 19.9
Avoca	Impoundment - 1, H	Acres marsh in 1990 2,630
	Wake/wave erosion - 2, H	Acres marsh lost by 2050 1,850
	Wind/wave erosion - X, C	Acres swamp 1990 1,180
	Subsidence - X, H	Acres swamp lost by 2050 0
		% 1990 wetland acres lost 48.6
Atchafalaya Marshes	Storm-related loss - 1, H, C	Acres marsh in 1990 42,680
	Altered hydrology - 2, H	Acres lost by 2050 3,680
	Wind/wave erosion - 3, H, C	% 1990 wetland acres lost 8.6
	Herbivory - X, C	
Point au Fer	Altered hydrology - 1	Acres marsh in 1990 30,050
	Subsidence - 2	Acres lost by 2050 4,220
	Wind/wave erosion - 2, C	Acres preserved CWPPRA 930
	Storm-related loss - X	% 1990 wetland acres lost CWPPRA 10.9
	Herbivory - X	

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

ATCHAFALAYA BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
North Wax Lake Wetlands	Fresh	Forested	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	3,340
				Acres lost 1932-1956	250
				Acres lost 1956-1974	140
				Acres lost 1974-1983	60
				Acres lost 1983-1990	130
Wax Lake Wetlands	Fresh Intermediate Brackish	Fresh	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	55,330
				Acres lost 1932-1956	6,130
				Acres lost 1956-1974	3,530
				Acres lost 1974-1983	1,370
				Acres lost 1983-1990	690
Atchafalaya Subdelta	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	N/D
				Acres lost 1932-1956	N/D
				Acres lost 1956-1974	N/D
				Acres lost 1974-1983	N/D
				Acres lost 1983-1990	N/D

Table 4-1. Region 3 wetland loss (Cont.).

ATCHAFALAYA BASIN	Causes of loss*	Projected acres lost by 2050	
North Wax Lake Wetlands	Direct removal - 1	Acres marsh in 1990	2,770
		Acres marsh lost by 2050	460
		Acres swamp 1990	2,340
		Acres swamp lost by 2050	0
		% 1990 wetland acres lost	9
Wax Lake Wetlands	Wind/wave erosion - 1 Direct removal - 2 Altered hydrology - 3 Subsidence - X	Acres marsh in 1990	43,610
		Acres marsh lost by 2050	5,860
		Acres swamp 1990	10,255
		Acres swamp lost by 2050	0
		% 1990 wetland acres lost	10.9
Atchafalaya Subdelta	Altered hydrology - X Storm-related loss - X Herbivory - X	Acres marsh in 1990	2,430
		Acres gained by 2050	36,350
		Acres preserved CWPPRA	8080
		% 1990 wetland acres lost CWPPRA	-1,828 (gain)

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-1. Region 3 wetland loss (Cont.).

TECHE-VERMILION BASIN	Major habitat types in 1949	Habitat changes 1949-1988/1990	Subsidence rate	Approximate acres lost	
Cote Blanche Wetlands	Fresh Brackish	Fresh Intermediate Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	54,640
				Acres lost 1932-1956	1,930
				Acres lost 1956-1974	5,290
				Acres lost 1974-1983	900
				Acres lost 1983-1990	360
Vermilion Bay Marsh	Brackish Saline	Intermediate Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	89,460
				Acres lost 1932-1956	4,500
				Acres lost 1956-1974	5,350
				Acres lost 1974-1983	3,010
				Acres lost 1983-1990	3,360
Marsh Island	Brackish Saline	Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	69,430
				Acres lost 1932-1956	3,490
				Acres lost 1956-1974	4,140
				Acres lost 1974-1983	1,300
				Acres lost 1983-1990	1,030
Rainey Marsh	Brackish	Intermediate Brackish	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	68,170
				Acres lost 1932-1956	1,420
				Acres lost 1956-1974	3,810
				Acres lost 1974-1983	840
				Acres lost 1983-1990	1,680
Big Woods	Unknown	Unknown	Intermediate 1.1 to 2 ft per century	Acres marsh in 1932	N/D
				Acres lost 1932-1956	N/D
				Acres lost 1956-1974	N/D
				Acres lost 1974-1983	N/D
				Acres lost 1983-1990	N/D

Table 4-1. Region 3 wetland loss (Cont.).

TECHE-VERMILION BASIN	Causes of loss*	Projected acres lost by 2050
Cote Blanche Wetlands	Wind/wave erosion - 1,C	Acres marsh in 1990 46,160
	Altered hydrology - 1,H	Acres marsh lost by 2050 3,470
	Wake/wave erosion - 2,C	Acres swamp 1990 12,430
	Storm-related loss - 2,H&C	Acres swamp lost by 2050 0
	Direct removal - 3,H	Ac marsh preserved by CWPPRA 2,710
	Lack of sed. and f.w. - X	% 1990 wetland acres lost CWPPRA 1.3
Vermilion Bay Marsh	Wake/wave erosion - 1, C	Acres marsh in 1990 73,240
	Altered hydrology - 1, H, C	Acres marsh lost by 2050 13,560
	Direct removal - 1, H	Acres swamp 1990 5,960
	Wind/wave erosion - 2, H, C	Acres swamp lost by 2050 0
	Storm-related loss - 2, H, C	% 1990 wetland acres lost 17.1
	Subsidence - X	
Marsh Island	Storm-related loss - 1, C	Acres marsh in 1990 56,470
	Altered hydrology - 1, H, C	Acres lost by 2050 7,290
	Wind/wave erosion - 2, C	Acres preserved CWPPRA 650
	Subsidence - X	% 1990 wetland acres lost CWPPRA 11.8
	Herbivory - X	
Rainey Marsh	Wake/wave erosion - 1, C	Acres marsh in 1990 58,415
	Direct removal - 1, H	Acres lost by 2050 7,840
	Altered hydrology - 1, H	% 1990 wetland acres lost 13.4
	Storm-related loss - 1, H, C	
	Wind/wave erosion - 2, H, C	
	Herbivory - X	
Big Woods	Wake/wave erosion - 1, C	Acres marsh in 1990 N/D
	Herbivory - 1, C	Acres lost by 2050 N/D
	Flooding - 2, C	% 1990 wetland acres lost N/D
	Lack of sed. and f.w. - X	

* H= historic cause, C= current cause, X= not a priority cause, but a factor in land loss presently and in the past

Table 4-2. Region 3 previously proposed strategies.

	DEFENSIVE					
REGION 3	CRITICAL DEFENSE LINE			MANAGE NAV. CHANNELS		FRESHWATER DIVERSIONS
MAPPING UNITS	Create/ Restore Barrier Islands	Preserve land bridges	Preserve/ protect ridge function	Manage hydrology	Stabilize banks	
Atchafalaya Marshes					1	
Avoca					1,4,5	4
Black Bayou Wetlands						
Boudreaux			1	4		6
Bully Camp (N and S)			1	6		2,3,4,6
Caillou Marshes			1			
Chacahoula Swamp						2
Devil's Swamp					4	4
Fields Swamp					1	4
Four League Bay						4
GIWW				4	1,4,5	3,4
Mechant/de Cade			1,4,5			4
Montegut			1			
NHSC Wetlands				1,3,4	1,3,4,6	

1 = Blueprint

2 = CCEER

3 = Coalition to Restore Coastal LA

4 = CWPPRA Basin Report

5 = Gagliano and van Beek

6 = PPL 1-6 projects

Table 4-2. Region 3 previously proposed strategies (Cont.).

	DEFENSIVE				
REGION 3	MANAGE HYDROLOGY			DEVELOP REEF ZONE	PROTECT BAY/LAKE SHORELINE
MAPPING UNITS	Swamps	Fresh/intermediate marsh	Brackish/saline marsh		
Atchafalaya Marshes		1,5			4
Avoca					
Black Bayou Wetlands					
Boudreaux		4,6	4		
Bully Camp (N and S)		4	4	1,5	1
Caillou Marshes			4	5	
Chacahoula Swamp					
Devil's Swamp	4				
Fields Swamp					
Four League Bay					
GIWW	1	1,4,5			
Mechant/de Cade		4,6	4,6	5	4
Montegut			4		
NHSC Wetlands	4	4	4		

1 = Blueprint

2 = CCEER

3 = Coalition to Restore Coastal LA

4 = CWPPRA Basin Report

5 = Gagliano and van Beek

6 = PPL 1-6 projects

Table 4-2. Region 3 previously proposed strategies (Cont.).

	OFFENSIVE			
REGION 3	INCREASE ATCHAFALAYA FLOW	RELOCATE NAVIGATION CHANNELS	SEDIMENT DIVERSIONS (or pumping)	USE OF DREDGED MATERIAL
MAPPING UNITS				
Atchafalaya Marshes	2,3			
Avoca	2,3			6
Black Bayou Wetlands				
Boudreaux				
Bully Camp (N and S)			1,5	4,6
Caillou Marshes				4
Chacahoula Swamp				
Devil's Swamp				4
Fields Swamp				
Four League Bay			1,4,5	
GIWW				4
Mechant/de Cade			1,5	4
Montegut				4
NHSC Wetlands				4

1 = Blueprint

2 = CCEER

3 = Coalition to Restore Coastal LA

4 = CWPPRA Basin Report

5 = Gagliano and van Beek

6 = PPL 1-6 projects

Table 4-2. Region 3 previously proposed strategies (Cont.).

	DEFENSIVE					
REGION 3	CRITICAL DEFENSE LINE			MANAGE NAV. CHANNELS		FRESHWATER DIVERSIONS
MAPPING UNITS	Create/ Restore Barrier	Preserve land bridges	Preserve/ protect ridge function	Manage hydrology	Stabilize banks	
Pelto Marshes				1,3	1,3,4	
Penchant			4,6	4	1,4	1,3,4,6
Pigeon Swamps						
Point au Fer						
Savoie						4
St. Louis Canal			1			2,3
Terbonne Marshes			1		1,3	
Verret Wetlands						3
Timbalier Island Shorelines	1,2,3,4,5,6					
Isles Dernieres Shorelines	1,2,3,4,5,6					
Atchafalaya Subdelta						
N. Wax Lake Wetlands					1	
Wax Lake Outlet Subdelta						
Wax Lake Wetlands					1	1
Big Woods			4			
Cote Blanche Wetlands			1,4		1,5	4
E. Cote Blanche Bay						1
Marsh Island						
Rainey Marsh			1,5		4	
Vermilion Bay						1
Vermilion Bay Marsh			1	4,6	1,4,5,6	4
W. Cote Blanche Bay						1

1 = Blueprint

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Table 4-2. Region 3 previously proposed strategies (Cont.).

	DEFENSIVE				
REGION 3	MANAGE HYDROLOGY			DEVELOP REEF ZONE	PROTECT BAY/LAKE SHORELINE
MAPPING UNITS	Swamps	Fresh/intermediate marsh	Brackish/saline marsh		
Pelto Marshes				1,5	1
Penchant	4	1,5,6			4
Pigeon Swamps					
Point au Fer		4,6	4,6		
Savoie	4	4			
St. Louis Canal					
Terbonne Marshes			4,6	1,4,5	1
Verret Wetlands	4	4			4,6
Timbalier Island Shorelines					4,6
Isles Dernieres Shorelines					
Atchafalaya Subdelta					
N. Wax Lake Wetlands		1			
Wax Lake Outlet Subdelta					
Wax Lake Wetlands		1,5			4
Big Woods					
Cote Blanche Wetlands		1,4,5,6			4,6
E. Cote Blanche Bay					
Marsh Island		4,6	4,6	4,6	
Rainey Marsh				1	1,4
Vermilion Bay					
Vermilion Bay Marsh		4	4		4,6
W. Cote Blanche Bay					

1 = Blueprint

2 = CCEER

3 = Coalition to Restore Coastal LA

4 = CWPPRA Basin Report

5 = Gagliano and van Beek

6 = PPL 1-6 projects

Table 4-2. Region 3 previously proposed strategies (Cont.).

	OFFENSIVE			
REGION 3	INCREASE ATCHAFALAYA FLOW	RELOCATE NAVIGATION CHANNELS	SEDIMENT DIVERSIONS (or pumping)	USE OF DREDGED MATERIAL
MAPPING UNITS				
Pelto Marshes				4
Penchant	2		2	4
Pigeon Swamps				
Point au Fer			1,5	4
Savoie				
St. Louis Canal				
Terrebonne Marshes			1,5	4
Verret Wetlands				4
Timbalier Island Shorelines				4,6
Isles Dernieres Shorelines				4,6
Atchafalaya Subdelta	3	1,5	1,4,5	4,6
N. Wax Lake Wetlands				
Wax Lake Outlet Subdelta	3		1,4,5	
Wax Lake Wetlands	2,3		4	
Big Woods				
Cote Blanche Wetlands				
E. Cote Blanche Bay				6
Marsh Island				4,6
Rainey Marsh				
Vermilion Bay				4,6
Vermilion Bay Marsh				
W. Cote Blanche Bay				6

1 = Blueprint

2 = CCEER

3 = Coalition to Restore Coastal LA

4 = CWPPRA Basin Report

5 = Gagliano and van Beek

6 = PPL 1-6 projects

Table 4-3. Region 3 regional ecosystem strategies.

Restore Swamps	
1	Improve hydrology and drainage in the Verret Subbasin
Restore/Sustain Marshes	
2	Maximize land building in Atchafalaya Bay
3	Lower water levels in the upper Penchant marshes
4	Increase transfer of Atchafalaya River water to lower Penchant tidal marshes
5	Enhance Atchafalaya River water influence to central Terrebonne marshes (Bayou DuLarge to Bayou Terrebonne)
6	Establish multi-purpose hydrologic control of Houma Navigation Canal
7	Stabilize banks of navigation channels for water conveyance
8	Dedicated delivery of sediment for marsh building by any means feasible e.g., Deliver sand from offshore to build marsh in Timbalier Bay area
9	Build land in upper Timbalier Subbasin by sediment diversion from the Mississippi River via a conveyance channel
Protect Bay/Lake Shorelines	
10	Maintain shoreline integrity and stabilize critical areas of Teche-Vermilion Bay systems including the gulf shorelines
11	Maintain shoreline integrity in Caillou, Terrebonne, and Timbalier bays
Restore Barrier Islands and Gulf Shorelines	
12	Restore and maintain the Isles Dernieres and Timbalier barrier island chains
Special Concerns and Opportunities	
Resolve Vermilion-Cote Blanche Bays Salinity and Turbidity	
13	Optimize Gulf Intracoastal Waterway flows into marshes and minimize direct flow into bays
14	Maintain Vermilion, East and West Cote Blanche bays as brackish
15	Reduce sedimentation in bays
16	Create an artificial reef complex, including one extending from Point Chevreuil toward Marsh Island

Table 4-4. Region 3 mapping unit strategies.

SOUTH BULLY CAMP MARSH	
1	Protect Bay/Lake Shorelines
	e.g., Reef zone, breakwaters, oyster reefs, use oyster shells from shucking plants
2	Establish/Protect Ridge Function
3	Beneficial Use of Dredged Material
NORTH BULLY CAMP MARSH	
4	Establish/Protect Ridge Function
5	Protect Bay/Lake Shorelines
6	Beneficial Use of Dredged Material
7	Hurricane and Flood Protection
	e.g., Maintain an apron of marshes outside the levees where possible
ST. LOUIS CANAL	
8	Establish/Protect Ridge Function
9	Stabilize Banks
MONTEGUT	
10	Establish/Protect Ridge Function
11	Beneficial Use of Dredged Material
12	Beneficial Use of Pump Outfall
TERREBONNE MARSHES	
13	Establish/Protect Ridge Function
14	Stabilize Banks (Bayou Terrebonne)
15	Protect Bay/Lake Shorelines
16	Beneficial Use of Dredged Material
TIMBALIER ISLAND SHORELINES	
17	Protect Bay/Gulf Shorelines
18	Beneficial Use of Dredged Material (Fill Abandoned Canals)
BOUDREAUX	
19	Establish/Protect Ridge Function
20	Beneficial Use of Dredged Material
21	Protect Bay/Lake Shorelines
PELTO MARSHES	
22	Stabilize Banks (Houma Navigation Canal)
23	Protect Bay/Lake Shorelines
24	Beneficial Use of Dredged Material
FIELDS SWAMP	
25	Stabilize Banks
26	Beneficial Use of Dredged Material
27	Beneficial Use of Pump Outfall

Table 4-4. Region 3 mapping unit strategies (Cont.).

DEVIL'S SWAMP	
28	Stabilize Banks (GIWW)
NHSC WETLANDS	
29	Stabilize Banks
30	Beneficial Use of Dredged Material
CAILLOU MARSHES	
31	Establish/Protect Ridge Function
32	Beneficial Use of Dredged Material
ISLES DERNIERES SHORELINES	
33	Protect Bay/Gulf Shorelines
34	Beneficial Use of Dredged Material (Fill Abandoned Canals)
VERRET WETLANDS	
35	Beneficial Use of Pump Outfall (Minimize Impact to Penchant Flotant Marshes)
CHACHOULA SWAMPS	
36	Stabilize Banks
BLACK BAYOU WETLANDS	
37	Stabilize Banks
AVOCA	
38	Establish/Protect Ridge Function
39	Stabilize Banks
40	Beneficial Use of Dredged Material
GIWW	
41	Stabilize Banks (Buffer on Channel Side)
42	Beneficial Use of Dredged Material
PENCHANT	
43	Establish/Protect Ridge Function
44	Stabilize Banks
45	Protect Bay/Lake Shorelines
46	Beneficial Use of Dredged Material
MECHANT/DE CADE	
47	Establish/Protect Ridge Function
48	Stabilize Banks
49	Protect Bay/Lake Shorelines
50	Beneficial Use of Dredged Material
ATCHAFALAYA MARSHES	
51	Stabilize Banks
52	Protect Bay/Lake Shorelines e.g., Train a lobe of the Atchafalaya Delta towards Four League Bay
53	Beneficial Use of Dredged Material
POINT AU FER	
54	Beneficial Use of Dredged Material
55	Protect Bay/Lake/Gulf Shorelines e.g., Train a lobe of the Atchafalaya Delta towards Four League Bay

Table 4-4. Region 3 mapping unit strategies (Cont.).

ATCHAFALAYA SUBDELTA	
56	Protect Bay/Lake/Gulf Shorelines
	e.g., Train a lobe of the Atchafalaya Delta toward Four League Bay
57	Beneficial Use of Dredged Material
NORTH WAX LAKE WETLANDS	
58	Stabilize Banks
WAX LAKE WETLANDS	
59	Stabilize Banks
60	Protect Bay/Lake Shorelines
61	Beneficial Use of Dredged Material
62	Maintain Distributaries
	e.g., Hog Bayou
WAX LAKE OUTLET SUBDELTA	
63	Protect Bay/Lake Shorelines
	e.g., Keep Wax Lake Outlet open
MARSH ISLAND	
64	Protect Bay/Lake/Gulf Shorelines
	e.g., Establish artificial reefs
65	Beneficial Use of Dredged Material
RAINEY MARSH	
66	Establish/Protect Ridge Function
	e.g., Cheniers
67	Stabilize Banks of Navigation Canals and Critical Gulf Shorelines
68	Protect Bay/Lake/Gulf Shorelines
	e.g., Protect and restore Southwest Pass shoreline
	e.g., Stabilize critical reaches of Chenier au Tigre and bays
	e.g., Establish artificial reefs
69	Beneficial and Dedicated Use of Dredged Material
BIG WOODS	
70	Establish/Protect Ridge Function
EAST COTE BLANCHE BAY	
71	Protect Bay/Lake Shorelines
72	Beneficial Use of Dredged Material
73	Maintain the Jaws Terracing Project Through the Year 2050

Table 4-4. Region 3 mapping unit strategies (Cont.).

WEST COTE BLANCHE BAY	
74	Protect Bay/Lake Shorelines
75	Beneficial Use of Dredged Material
COTE BLANCHE WETLANDS	
76	Establish/Protect Ridge Function
77	Stabilize Banks
	e.g., Rebuild south banks of GIWW
78	Protect Bay/Lake Shorelines
79	Beneficial Use of Dredged Material
VERMILION BAY MARSH	
80	Establish/Protect Ridge Function
81	Stabilize Banks of Navigation Channels and Canals
	e.g., Rebuild south banks of GIWW
82	Protect Bay/Lake Shorelines
	e.g., Rebuild south bank of the GIWW at Weeks Bay to prevent breach
83	Beneficial Use of Dredged Material
	e.g., Place dredged material along GIWW for additional hurricane protection
VERMILION BAY	
84	Protect Bay/Lake Shorelines
	e.g., Narrow the gap of the head of Little Vermilion Bay
	e.g., Stabilize critical areas of Little Vermilion Bay and Weeks Bay
85	Beneficial Use of Dredged Material

Table 4-5. Region 3 programmatic recommendations.

COAST-WIDE	
1	Prevent the negative effects of shell dredging in all regions
2	Conduct additional studies on the influence of river water, leveraging existing studies already underway and expanding the measurement criteria
3	Water hyacinth mitigation - to prevent marsh erosion coastwide
4	Develop and support a comprehensive Barrier Shoreline/Island restoration/mitigation initiative, not limited to wetland issues
RESTORE/SUSTAIN WETLANDS--REGIONAL STRATEGIES	
5	Establish multi-purpose control of HNC (FW and sediment distribution, salinity control, hurricane protection, and navigation)
ST. LOUIS CANAL	
6	Flood protection
DEVIL'S SWAMP	
7	Maintain levees
8	Water quality improvement
BIG WOODS	
9	Protect ground water between Perry/Big Woods (recharge area) from saltwater intrusion
TIMBALIER ISLAND SHORELINES	
10	Eliminate any new dredging of canals on the islands
11	Directional drilling to prevent new development footprints on the land
12	Oilfield companies - help to restore island
FIELD'S SWAMP	
13	Wake limit control
ISLES DERNIERES SHORELINES	
14	Directional drilling to prevent new development footprints on the islands
15	Eliminate any new dredging of canals on the islands
16	Oilfield companies - help to restore islands
NORTH HOUMA SHIP CANAL WETLANDS	
17	Amend Falgout Canal Project water management plan
18	Flood protection for both sides of channel
19	Wake limit control established and enforced
MECHANT/DE CADE	
20	Water quality/wastewater management

SECTION 5

INFRASTRUCTURE

Roads

Road data was gathered from the U.S. Geological Survey (USGS) digital line graph information. The scale was 1:100,000, and the data was derived from 1983 1:100,000 quadrangle maps. The lengths of the State primary, secondary, and tertiary roads were clipped out of the master database for each mapping unit with a Geographic Information System (GIS) computer program. In the case that a primary, secondary, or tertiary road formed the boundary of two mapping units, that common road length was applied to both mapping units. The technical work was performed by Jay Edwards, USGS, National Wetlands Research Center - Coastal Restoration Field Station, Baton Rouge, Louisiana.

Railroads

Railroad data was gathered from the U.S. Geological Survey (USGS) digital line graph information. The scale was 1:100,000, and the data was derived from 1983 1:100,000 quadrangle maps. The lengths of the railroads were clipped out of the master database for each mapping unit with a GIS computer program. The technical work was performed by Jay Edwards, USGS, National Wetlands Research Center - Coastal Restoration Field Station, Baton Rouge, Louisiana.

Pipelines

Data for pipelines was gathered from the 1987 Louisiana Geological Survey (LGS) pipelines database. The data source is an LGS industry survey conducted in 1987. The survey was sent to all pipeline operators in the coastal zone, querying the operators for information about pipelines they had laid in the coastal zone, and this dataset represents the responses to that survey. Approximately 60% of the companies that were laying pipelines at that time responded to the survey. However, this does not necessarily translate into 60% of the pipelines, because each company does not operate an equal amount of pipelines. For example, a company that did not respond could lay and operate 75% of the pipelines in the coastal zone or in a particular area of the coastal zone. Because we do not know for sure how incomplete the set is, these data are only meant to be an index to the activity that was going on by the responding operators at the time the survey was taken and should be used with caution. Technical work was done by Jay Edwards, USGS, National Wetlands Research Center - Coastal Restoration Field Station, Baton Rouge, Louisiana.

Oil and/or Natural Gas Wells

Oil and natural gas well data came from the Louisiana Department of Natural

Resources (DNR) Coastal Use Permit database. This electronic database is maintained by the Coastal Management Division (CMD) of the Office of Coastal Restoration and Management, DNR, Baton Rouge, Louisiana. It shows all permits issued for oil and gas well construction in the coastal zone since 1981. This database is complete, and the data presented can be used as an index to oil and gas activity since that year.

Drainage Pump Stations

This data was gathered from the following source:

Himel, W., J. Reed, and D. Clark. 1991. Atlas and database of pump locations for the study of the use of runoff discharges in coastal Louisiana for wetland quality and water quality enhancement. Louisiana Department of Natural Resources. 220 pp.

The information in this report was compiled from local parish governments, CMD field investigators, drainage districts, 1:24,000 scale quadrangle maps, and the 1978 U.S. Fish and Wildlife Service habitat maps. Pump locations were pencilled in on quadrangle maps and later digitized into INFOCAD GIS software.

Water Intakes

Water intake data was compiled from a 1996 USGS database of water intakes in the coastal zone. The source for this data was the 1996 USGS Surface Water Quality Meeting Proceedings. The dataset was built by Christina Saltus,

USGS, National Wetlands Research Center - Coastal Restoration Field Station, Baton Rouge, Louisiana.

Navigation Channels

This information was compiled and presented by Mike Liffman and Robin Roberts of the Louisiana Sea Grant College Program, Wetland Resources Building, Louisiana State University, Baton Rouge, Louisiana. The following sources were used to gather the information:

U.S. Army Corps of Engineers, New Orleans District. 1993. Navigation maps of the Atchafalaya River system. Third edition.

U.S. Army Corps of Engineers, Lower Mississippi Valley Division. 1994. Flood control and navigation maps of the Mississippi River. Mississippi River Commission, 60th edition reprint.

U.S. Army Corps of Engineers and Water Resources Support Center. 1995. Waterborne commerce of the United States: Part 2 - waterways and harbors gulf coast, Mississippi River system and Antilles.

U.S. Army Corps of Engineers and Water Resources Support Center. 1997. Navigation Data Center Publications and U.S. Waterway CD: Volume 3. CD-ROM [machine-readable data file].

Battle Creek, MI: Defense
Logistics Services Center.

Port Installations

This information was compiled and presented by Mike Liffman and Robin Roberts of the Louisiana Sea Grant College Program, Wetland Resources Building, Louisiana State University, Baton Rouge, Louisiana. Information was gathered in March and April 1998 through personal communication with the following individuals: Davie Breaux, Greater Lafourche Port Commission; Charles Coppels, Vinton Harbor and Terminal Port; John Dixon, West Calcasieu Port, Harbor, and Terminal District; Jerry Hoffpauir, Morgan City Harbor and Terminal District; Ed Kelly, West Cameron Port Commission; Todd Pellegrin, Terrebonne Port Commission; Roy Pontiff, Port of Iberia District; Phil Prejean, West St. Mary Parish Port, Harbor, and Terminal District; Joseph Schexnaider, Twin Parish Port Commission. The following

publications provided additional ports information:

U.S. Army Corps of Engineers. 1990. The ports of Baton Rouge and Lake Charles, Louisiana. Port Series No. 21, Revised 1990. Prepared by the Water Resources Support Center. Washington, D.C.: U.S. Government Printing Office.

U.S. Army Corps of Engineers. 1990. The ports of New Orleans, Louisiana. Port Series No. 21, Revised 1990. Prepared by the Water Resources Support Center. Washington, D.C.: U.S. Government Printing Office.

U.S. Army Corps of Engineers. 1991. Mississippi River ports above and below New Orleans. Port Series No. 20A, Revised 1991. Prepared by the Water Resources Support Center. Washington, D.C.: U.S. Government Printing Office.

Region 3 Mapping Unit Infrastructure Summaries (In Alphabetical Order)

Assumption West Area

1. Roads (miles):
 Primary: 0.5
 Secondary: 37.5
 Tertiary: 231.3

2. Railroads (miles): 23.5

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	0.9	10
Product	Active	Union Carbide Pipeline Co. (UCAR)	0.6	6
Natural Gas	Active	Koch Industries, Inc.	0.2	12
Natural Gas	Active	Koch Industries, Inc.	7.9	26
Natural Gas	Active	Koch Industries, Inc.	20.8	30
Product	Active	Union Carbide Pipeline Co. (UCAR)	5.2	8

Total pipeline length: 35.6 miles

4. Oil and/or Natural Gas Wells: 110

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Industry	Groundwater
Industry	Groundwater

Groundwater intakes: 2 Surface water intakes: 0

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Boeuf - Bayou Boeuf Long Drainage Canal and Enlargements of Bayou Chene	Improvement of existing streams along the land side of the East Atchafalaya Basin Protection Levee from the Bayou Sorrel Lock to the vicinity of Lake Palourde, a new land cut around the east side of L. Palourde to B. Boeuf, and the enlargement of B. Boeuf. Minimum channel depth of 9 ft x 100 ft for drainage and navigation from the Intracoastal Waterway to the levee borrow pit.	Navigation	Navigation
Bayou Lafourche and Lafourche-Jump Waterway	Waterborne commerce statistics include the section of B. Lafourche which extends 50 miles from Lockport, LA to the Gulf of Mexico. Controlling depths are 19 ft MLG in the Bar Channel and Jetty Channel, 8 ft MLG to Leeville and Golden Meadow, and 7 ft MLG to Larose and Lockport.	Navigation - In 1995, this section of B. Lafourche carried 3.8 million tons of freight (729,000 tons foreign and 3.1 million tons domestic).	Commercial and recreational navigation

8. Port Installations: No major port or terminal installations within this unit.

Atchafalaya Marshes

1. Roads (miles):

Primary: 0.0

Secondary: 0.0

Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	0.8	6
Natural Gas	Active	Koch Industries, Inc.	4.5	8
Natural Gas	Active	Koch Industries, Inc.	7.7	16
Natural Gas	Active	Louisiana Intrastate Gas Corporation	0.4	6

Total pipeline length: 13.4 miles

4. Oil and/or Natural Gas Wells: 251
5. Drainage Pump Stations: None
6. Water Intakes: None
7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor	Navigation

8. Port Installations: No major port or terminal installations in this unit.

Atchafalaya Subdelta

1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 0.0
2. Railroads (miles): 0.0
3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	0.2	6
Natural Gas	Active	Louisiana Intrastate Gas Corporation	3.8	6

Total pipeline length: 4.0 miles

4. Oil and/or Natural Gas Wells: 106

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River	Channel 20 ft deep x 200 ft wide from the 20 ft contour in Atchafalaya Bay to the 20 ft contour in the Gulf of Mexico.	Navigation	Navigation
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor	Navigation

8. Port Installations: No major port or terminal installations in this unit.

Avoca

1. Roads (miles):

Primary: 0.0

Secondary: 0.0

Tertiary: 14.0

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	6.5	8

Total pipeline length: 6.5 miles

4. Oil and/or Natural Gas Wells: 19

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor	Navigation

8. Port Installations: No major port or terminal installations within this unit.

Bayou Black Wetlands

1. Roads (miles):

Primary: 1.8
 Secondary: 0.0
 Tertiary: 14.7

2. Railroads (miles): 0.4

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	3.2	10
N/A	Abandoned or Inactive	Koch Industries, Inc.	2.4	8
Natural Gas	Active	Koch Industries, Inc.	2.2	2
Natural Gas	Active	Koch Industries, Inc.	2.2	4
Natural Gas	Active	Koch Industries, Inc.	2.1	6
Natural Gas	Active	Koch Industries, Inc.	1.9	24
Natural Gas	Active	Koch Industries, Inc.	1.7	30

Total pipeline length: 15.7 miles

4. Oil and/or Natural Gas Wells: 100

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Industry	Groundwater
Industry	Groundwater

Groundwater intakes: 2 Surface water intakes: 0

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Big Woods

1. Roads (miles):

Primary: 0.0

Secondary: 0.0

Tertiary: 1.8

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	0.7	8
Product	Active	Enron LA Energy Company	0.5	6
Natural Gas	Active	Koch Industries, Inc.	0.1	3

Total pipeline length: 1.3 miles

4. Oil and/or Natural Gas Wells: 106

5. Drainage Pump Stations: None

6.. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Teche and Vermilion River	A channel 8 ft deep x 80 ft wide from the 8 ft depth contour line in Vermilion Bay to Lafayette, LA.	Navigation - In 1995, carried 2.5 million tons of freight traffic.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Boudreaux

1. Roads (miles):

Primary: 0.0

Secondary: 13.6

Tertiary: 14.1

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	9.3	12
Product	Active	Dow USA	8.6	6
Natural Gas	Active	Koch Industries, Inc.	7.6	20
Product	Active	Dow USA	6.3	8
Natural Gas	Active	Koch Industries, Inc.	5.8	4
Natural Gas	Active	Koch Industries, Inc.	4.8	6
Product	Active	Dow USA	1.5	3
Natural Gas	Active	Koch Industries, Inc.	0.4	16

Total pipeline length: 44.3 miles

4. Oil and/or Natural Gas Wells: 253

5. Drainage Pump Stations: 3

6. Water Intakes:

Operator	Type
Industry	Groundwater

Groundwater intakes: 1

Surface water intakes: 0

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Little Caillou Bayou	A channel 5 ft deep x 40 ft wide from Bayou Terrebonne to Robinson Canal (20 miles).	Navigation - average annual traffic from 1984-93 was 920,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Caillou Marshes

1. Roads (miles):

Primary: 0.0
 Secondary: 0.0
 Tertiary: 5.9

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	11.9	12
Natural Gas	Active	Koch Industries, Inc.	2.7	4
Product	Active	Dow USA	1.4	3
Natural Gas	Active	Koch Industries, Inc.	0.4	6

Total pipeline length: 16.4 miles

4. Oil and/or Natural Gas Wells: 235

5. Drainage Pump Stations: 1

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Houma Navigation Canal	A channel 15 ft deep x 150 ft wide from Houma (mile 40.5) to the Gulf of Mexico (mile 0).	Navigation - average annual traffic from 1984-93 was 1,284,000 tons.	Commercial navigation
Bayous Le Carpe, Pelton, and Grand Caillou	Extends 16.3 miles from the GIWW to Bayou Dulac through bayous Le Carpe, Pelton, and Grand Caillou. Controlling depths are 8 ft MLG in bayous Le Carpe and Grand Caillou and 6 ft in Bayou Pelton.	Navigation - In 1995, carried 393,000 tons of freight.	Commercial and recreational navigation

8. Port Installations: No major port or terminal installations within this unit.

Chacahoula Swamps

1. Roads (miles):

Primary: 7.5
 Secondary: 0.0
 Tertiary: 49.8

2. Railroads (miles): 7.7

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	6.5	30
Natural Gas	Active	Koch Industries, Inc.	6.1	24
Natural Gas	Active	Koch Industries, Inc.	4.4	10
Natural Gas	Active	Koch Industries, Inc.	0.6	26

Total pipeline length: 17.6 miles

4. Oil and/or Natural Gas Wells: 435

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Industry	Groundwater
Industry	Groundwater
Industry	Surface Water

Groundwater intakes: 2 Surface water intakes: 1

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Cote Blanche Wetlands

1. Roads (miles):

 Primary: 0.0
 Secondary: 0.0
 Tertiary: 40.0

2. Railroads (miles): 0.1

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	1.4	8
Natural Gas	Active	Koch Industries, Inc.	1.1	30
Crude Oil	Active	Exxon Pipeline Company	1.0	4
Crude Oil	Active	Exxon Pipeline Company	0.7	12

Total pipeline length: 4.2 miles

4. Oil and/or Natural Gas Wells: 266

5. Drainage Pump Stations: 8

6. Water Intakes:

Operator	Type
Industry	Groundwater
Mining	Surface Water
Industry	Groundwater

Groundwater intakes: 2 Surface water intakes: 1

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Charenton Canal	Canal 30 ft deep x 75 ft wide extending from the Charenton Floodgate to West Cote Blanche Bay	Flood Control	
Franklin Canal	Connects Franklin to the GIWW.	Navigation	Navigation
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Teche Marina, LTD	Bayou Teche	12		2
St. Mary Seafood	W. St. Mary Port Canal	30		1
Totals		42	0	3

Devil's Swamp

1. Roads (miles):

Primary: 14.0
 Secondary: 0.1
 Tertiary: 117.5

2. Railroads (miles): 3.4

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	6.0	2
Natural Gas	Active	Koch Industries, Inc.	5.0	10
Natural Gas	Active	Koch Industries, Inc.	1.8	8
Natural Gas	Active	Koch Industries, Inc.	1.7	4
Product	Active	Dow USA	1.5	4
Natural Gas	Active	Koch Industries, Inc.	1.1	16
Product	Active	Dow USA	0.9	6
N/A	Abandoned or Inactive	Exxon Pipeline Company	0.4	4

Total pipeline length: 18.4 miles

4. Oil and/or Natural Gas Wells: 118

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

East Cote Blanche Bay

1. Roads (miles):

Primary: 0.0
 Secondary: 0.0
 Tertiary: 0.2

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Crude Oil	Active	Exxon Pipeline Company	24.6	12

Total pipeline length: 24.6 miles

4. Oil and/or Natural Gas Wells: 184

5. Drainage Pump Stations: 1

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Fields Swamp

1. Roads (miles):

 Primary: 9.6

 Secondary: 0.5

 Tertiary: 56.0

2. Railroads (miles): 0.5

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	12.5	12
Natural Gas	Active	Koch Industries, Inc.	6.4	8
Natural Gas	Active	Koch Industries, Inc.	5.3	10
Product	Active	Dow USA	4.9	4
Natural Gas	Active	Koch Industries, Inc.	2.2	30
N/A	Abandoned or Inactive	Exxon Pipeline Company	0.9	4
Natural Gas	Active	Bridgeline	0.2	14

Total pipeline length: 32.4 miles

4. Oil and/or Natural Gas Wells: 202

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Industry	Surface Water
Industry	Surface Water

Groundwater intakes: 0 Surface water intakes: 2

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Four League Bay

1. Roads (miles):

Primary: 0.0
 Secondary: 0.0
 Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	0.1	8

Total pipeline length: 0.1 miles

4. Oil and/or Natural Gas Wells: 63

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

GIWW (Gulf Intracoastal Waterway)

- 1. Roads (miles):
 - Primary: 3.2
 - Secondary: 0.0
 - Tertiary: 6.2
- 2. Railroads (miles): 3.8
- 3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	17.0	8
Natural Gas	Active	Koch Industries, Inc.	10.6	24
Natural Gas	Active	Koch Industries, Inc.	9.0	20
Product	Active	Dow USA	6.0	4
Natural Gas	Active	Koch Industries, Inc.	6.0	30
Product	Active	Dow USA	2.7	6
Natural Gas	Active	Koch Industries, Inc.	2.3	8
Natural Gas	Active	Koch Industries, Inc.	1.7	6
Natural Gas	Active	Koch Industries, Inc.	0.9	2
Natural Gas	Active	Koch Industries, Inc.	0.2	4

Total pipeline length: 56.4 miles

- 4. Oil and/or Natural Gas Wells: 506
- 5. Drainage Pump Stations: None
- 6. Water Intakes: None
- 7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor	Navigation
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Isles Dernieres Shorelines

1. Roads (miles):

Primary: 0.0

Secondary: 0.0

Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines: None

4. Oil and/or Natural Gas Wells: 11

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Lafourche West Area

1. Roads (miles):

Primary: 6.2

Secondary: 79.0

Tertiary: 434.2

2. Railroads (miles): 11.5

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	19.5	12
Natural Gas	Active	Koch Industries, Inc.	9.4	30
N/A	Abandoned or Inactive	Exxon Pipeline Company	7.2	4
Natural Gas	Active	Bridgeline	4.7	14
Natural Gas	Active	Koch Industries, Inc.	2.6	20
Natural Gas	Active	Southern Natural Gas Company	2.4	16
Natural Gas	Active	Panhandle Eastern Corporation	2.1	20
Natural Gas	Active	Koch Industries, Inc.	2.0	10
Crude Oil	Active	Exxon Pipeline Company	1.2	6
Natural Gas	Active	Koch Industries, Inc.	1.1	4
Natural Gas	Active	Koch Industries, Inc.	0.2	2
Natural Gas	Active	Bridgeline	0.2	12
Natural Gas	Active	Koch Industries, Inc.	0.1	8
Natural Gas	Active	Southern Natural Gas Company	0.0	6

Total pipeline length: 52.7 miles

4. Oil and/or Natural Gas Wells: 473

5. Drainage Pump Stations: 7

6. Water Intakes:

Operator	Type
Industry	Surface Water
Industry	Surface Water

Groundwater intakes: 0 Surface water intakes: 2

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation
Bayou Lafourche	Permanent closure at head of bayou; Channel 9 ft deep x 100 ft wide from Golden Meadow (mile 21.9) to Leeville (mile 13.0); Channel 12 ft deep x 125 ft wide from Leeville (mile 13.2) to the Gulf of Mexico with a jettied entrance at Belle Pass extending to the 12 ft depth contour line in the Gulf of Mexico; closure of Pass Fourchon.	Navigation - average annual traffic from 1984-93 was 1,389,000 tons.	Navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Bobby Lynn's Marina	Bayou Lafourche	32		2
Bayou Blue Marina	Bayou Blue	20		2
Griffin's Station & Marina	Bayou Lafourche	10		
Charlie's Hardison & Son's, Inc.	Bayou Lafourche	1		1
Totals		63	0	5

Marsh Island

1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 0.0
2. Railroads (miles): 0.0
3. Pipelines: None
4. Oil and/or Natural Gas Wells: 45
5. Drainage Pump Stations: None
6. Water Intakes: None
7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Mechant/de Cade

1. Roads (miles):

Primary: 0.0
Secondary: 0.0
Tertiary: 11.0

2. Railroads (miles): 0.0

3. Pipelines: None

4. Oil and/or Natural Gas Wells: 223

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Montegut

1. Roads (miles):

Primary: 0.0
Secondary: 6.7
Tertiary: 21.6

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	7.4	20
Natural Gas	Active	Koch Industries, Inc.	4.6	16
Natural Gas	Active	Koch Industries, Inc.	3.1	12
Natural Gas	Active	Koch Industries, Inc.	2.2	4
Product	Active	Dow USA	2.1	8
Natural Gas	Active	Panhandle Eastern Corporation	1.3	20
Natural Gas	Active	Koch Industries, Inc.	0.7	36
Natural Gas	Active	Koch Industries, Inc.	0.3	30

Total pipeline length: 21.7 miles

4. Oil and/or Natural Gas Wells: 112

5. Drainage Pump Stations: 3

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Terrebonne	Controlling depth of 6 ft.	Navigation - In 1995, carried 230,000 tons of freight traffic	Commercial and recreational navigation
Bayou Little Caillou	Extends 20.6 miles from Bayou Terrebonne to Robinson Canal. Controlling depths are 1 ft MLG from mile 0 - 6, 4 ft MLG to the Chauvin bridge, and 5 ft MLG to Robinson Canal.	Navigation - In 1995, carried 523,000 tons of freight traffic	Commercial and recreational navigation

8. Port Installations: No major port or terminal installations within this unit.

North Bully Camp Marsh

1. Roads (miles):

Primary: 0.0

Secondary: 1.2

Tertiary: 3.3

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Bridgeline	11.5	14
Natural Gas	Active	Panhandle Eastern Corporation	6.6	20
Crude Oil	Active	Exxon Pipeline Company	4.2	4
Natural Gas	Active	Koch Industries, Inc.	3.5	36
Natural Gas	Active	Bridgeline	3.4	12
Natural Gas	Active	Koch Industries, Inc.	3.1	6
Natural Gas	Active	Southern Natural Gas Company	3.1	12
Natural Gas	Active	Southern Natural Gas Company	2.4	16
Natural Gas	Active	Koch Industries, Inc.	1.4	20
Natural Gas	Active	Koch Industries, Inc.	0.9	4
Natural Gas	Active	Koch Industries, Inc.	0.7	2
Crude Oil	Active	Exxon Pipeline Company	0.1	6

Total pipeline length: 40.9 miles

4. Oil and/or Gas Wells: 982
5. Drainage Pump Stations: None
6. Water Intakes: None
7. Navigation Channels: No USACE-maintained channels.
8. Port Installations: No major port or terminal installations within this unit.

North Houma Ship Canal Wetlands

1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 18.5
2. Railroads (miles): 1.2
3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	3.7	12
Natural Gas	Active	Koch Industries, Inc.	2.9	20
Natural Gas	Active	Koch Industries, Inc.	2.5	6
Product	Active	Dow USA	2.2	8
Natural Gas	Active	Koch Industries, Inc.	0.9	4

Total pipeline length: 12.2 miles

4. Oil and/or Natural Gas Wells: 28
5. Drainage Pump Stations: 1
6. Water Intakes:

Operator	Type
Industry	Surface Water

Groundwater intakes: 0 Surface water intakes: 1

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Waterway from GIWW to Bayou Dulac	Channel 10 ft deep x 45 ft wide in Bayou Le Carpe from the GIWW to the Houma Navigation Canal and 5 ft deep x 40 ft wide in Bayou Pelton and Bayou Grand Caillou from the Houma Navigation Canal to Bayou Dulac (16.3 miles).	Navigation - average annual traffic from 1984-93 was 386,000 tons.	Commercial navigation
Houma Navigation Canal	Channel 15 ft deep x 150 ft wide from Houma (mile 40.5) to the Gulf of Mexico (mile 0).	Navigation - average annual traffic from 1984-93 was 1,294,000 tons.	Commercial navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Coco Marina	HNC			
Sunshine Marina	Off HNC from Grand Caillou Bayou	1		1
Boudreaux's Marina	HNC	1		1
Totals		2	0	2

North Wax Lake Wetlands

1. Roads (miles):

Primary: 6.5
 Secondary: 1.0
 Tertiary: 31.5

2. Railroads (miles): 10.6

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	6.9	8
Natural Gas	Active	Bridgeline	5.7	20
Natural Gas	Active	Bridgeline	5.5	16
Natural Gas	Active	Southern Natural Gas Company	4.9	12
Product	Active	Dow USA	4.3	8
Natural Gas	Active	Bridgeline	3.4	30
Crude Oil	Active	Exxon Pipeline Company	2.1	12
Product	Active	Dow USA	2.0	6
Natural Gas	Active	Southern Natural Gas Company	1.6	30
Natural Gas	Active	Koch Industries, Inc.	1.5	26
Product	Active	Dow USA	1.5	6
Natural Gas	Active	Bridgeline	0.9	12
Natural Gas	Abandoned or Inactive	Southern Natural Gas Company	0.9	16
Natural Gas	Active	Koch Industries, Inc.	0.6	20
Crude Oil	Active	Exxon Pipeline Company	0.3	8
Product	Active	Dow USA	0.2	3
Natural Gas	Active	Koch Industries, Inc.	0.1	30

Total pipeline length: 42.4 miles

4. Oil and/or Natural Gas Wells: 49

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Berwick-Bayou Vista WW	Surface Water

Groundwater intakes: 0 Surface water intakes: 1

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Pelto Marshes

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 11.3
 - Tertiary: 6.5
- 2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	1.8	12

Total pipeline length: 1.8 miles

- 4. Oil and/or Natural Gas Wells: 1,761
- 5. Drainage Pump Stations: 1
- 6. Water Intakes: None
- 7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Houma Navigation Canal	Channel 15 ft deep x 150 ft wide from Houma (mile 40.5) to the Gulf of Mexico (mile 0).	Navigation - average annual traffic from 1984-93 was 1,284,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations in this unit.

Penchant

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 6.9
- 2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	10.2	16
Natural Gas	Active	Koch Industries, Inc.	6.8	8
Product	Active	Dow USA	5.8	8
Natural Gas	Active	Koch Industries, Inc.	5.2	6
Natural Gas	Active	Koch Industries, Inc.	5.1	30
Natural Gas	Active	Koch Industries, Inc.	4.8	10
Natural Gas	Active	Koch Industries, Inc.	3.1	20
Product	Active	Dow USA	1.6	6

Total pipeline length: 42.6 miles

4. Oil and/or Natural Gas Wells: 620

5. Drainage Pump Stations: None

6. Water Intakes:

Operator	Type
Mining	Surface Water

Groundwater intakes: 0 Surface water intakes: 1

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor.	Commercial and recreational navigation
Atchafalaya River, Morgan City to the Gulf of Mexico	Section of the Atchafalaya River extending from Morgan City to the Gulf of Mexico. Controlling depths are 15 ft MLG in the Bar Channel and 14 ft in the Bay Channel.	Navigation - In 1995, carried 4.2 million tons of freight traffic.	Commercial and recreational navigation

8. Port Installations: No major port or terminal installations within this unit.

Pigeon Swamps

1. Roads (miles):

Primary: 0.0
Secondary: 0.0
Tertiary: 4.7

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Southern Natural Gas Company	5.6	30
Natural Gas	Active	Southern Natural Gas Company	5.6	20
Product	Active	Union Carbide Pipeline Co. (UCAR)	1.7	6
Product	Active	Dow USA	1.2	10

Total pipeline length: 14.1 miles

4. Oil and/or Natural Gas Wells: 23

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
GIWW, Morgan City to Port Allen Route	Extends 64.1 miles from Morgan City, LA to Port Allen, LA. Controlling depth is 10 ft MLG .	Navigation - In 1995, carried 25.5 million tons of freight traffic.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Point au Fer

1. Roads (miles):

Primary: 0.0
Secondary: 0.0
Tertiary: 0.0

2. Railroads (miles): 0.0
3. Pipelines: None
4. Oil and/or Natural Gas Wells: 140
5. Drainage Pump Stations: None
6. Water Intakes: None
7. Navigation Channels: No USACE-maintained channels.
8. Port Installations: No major port or terminal installations within this unit.

Rainey Marsh

1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 2.8
2. Railroads (miles): 0.0
3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	1.9	36

Total pipeline length: 1.9 miles

4. Oil and/or Natural Gas Wells: 131
5. Drainage Pump Stations: None
6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Freshwater Bayou	Channel 12 ft deep x 125 ft wide between the GIWW near the Vermilion River to the Gulf of Mexico following the channels of Schooner Bayou, Sixmile Canal, Belle Island Canal, and Freshwater Bayou including a 16 ft deep x 84 ft wide x 600 ft long lock near Beef Ridge.	Navigation - average annual traffic from 1984-93 was 341,000 tons.	Commercial navigation

8. Port installations: No major port or terminal locations within this unit.

St. Mary Area

1. Roads (miles):

Primary: 8.4
 Secondary: 21.6
 Tertiary: 160.0

2. Railroads (miles): 19.4

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Crude Oil	Active	Exxon Pipeline Company	11.3	12
Natural Gas	Active	Koch Industries, Inc.	4.3	26
Product	Active	Dow USA	0.5	6

Total pipeline length: 16.1 miles

4. Oil and/or Natural Gas Wells: 107

5. Drainage Pump Stations: 18

6. Water Intakes:

Operator	Type
Glencoe Comm. WTR Sys.	Groundwater
Industry	Groundwater
Commercial	Surface Water
Commercial	Surface Water
Industry	Surface Water

Groundwater intakes: 2 Surface water intakes: 3

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation
GIWW, Morgan City to Port Allen Route	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour.	Navigation and harbor	Navigation
Atchafalaya River	Channel 20 ft deep x 200 ft wide from the 20 ft contour in Atchafalaya Bay to the 20 ft contour in the Gulf of Mexico (15.75 miles).	Navigation	Navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Morgan City Harbor & Terminal District	Atchafalaya River, GIWW, Bayou Boeuf	3-6	1,200	
Berwick Engine Service Co.	Lower Atchafalaya River			
LA. Fuel and Supply Co.	Lower Atchafalaya River			
Berwick Bay Shipyard	Lower Atchafalaya River			
Kelsite Corp.	Lower Atchafalaya River			
C.S. Thorgusen	Lower Atchafalaya River			
Milwhite Mud Co. (Milchem)	Berwick Bay			
Riverside Seafoods, Inc.	Berwick Bay			
Pan-Marine Service	Berwick Bay			
Tigre Island Fuel Service, Inc.	Berwick Bay			
J. Hebert	Berwick Bay			
Brady's Engine Co.	Berwick Bay			
Avenson Marine Shop	Berwick Bay			
St. Mary Armature Works	Berwick Bay			
Casso Fisheries, Inc.	Berwick Bay			
Western Geological Co.	Berwick Bay			
Vincent Guzzeta	Berwick Bay			
Bariod Products	Berwick Bay			
Stewart Supply, Inc.	Berwick Bay			
Guillot Diesel Works	Berwick Bay			
Berwick Bay Transportation	Berwick Bay			
Jerry Theriot Marine and Bottled Gas Services	Berwick Bay			
Gulf Diesel Works	Berwick Bay			
Berwick Bay Oil Co.	Berwick Bay			
Magcobar Drilling and Mud Service	Berwick Bay			
General Gas Co.	Berwick Bay			
American Towing Co.	Berwick Bay			
Texas Co.	Berwick Bay			
Dowell Co.	Berwick Bay			
Offshore Mud Movers, Inc.	Berwick Bay			
Tidex, Inc.	Berwick Bay			
IMC Drilling Mud	Berwick Bay			
Offshore Moorings, Inc.	Berwick Bay			
Garber Bros. Offshore Drilling	Berwick Bay			
Morgan City Diesel Services, Inc.	Berwick Bay			
Bailey Basin Seafood, Inc.	Berwick Bay			

Port Installations (Cont.):

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Aucoin Fisheries	Berwick Bay			
Solar Shipyard and Boatways	Berwick Bay			
AI-Ray Engine Service	Berwick Bay			
Templets Shipyard	Berwick Bay			
Ayo Machine Shop	Berwick Bay			
Stevens Diesel Service	Berwick Bay			
Walston Stoute Machine Shop	Berwick Bay			
Municipal Light and Water Plant	Berwick Bay			
Lopez Machine Shop	Berwick Bay			
Divcon, Inc.	Berwick Bay			
Atchafalaya Shipbuilding Co.	Berwick Bay			
Conrad Industries, Inc.	Berwick Bay			
Johnny's Propeller Shop	Berwick Bay			
Gaudet Towing Co., Inc.	Berwick Bay			
Chester Henry Boat Rentals	Berwick Bay			
H.P. Overhultz Barge Rentals	Berwick Bay			
D.J. Mayon Boat Rentals	Berwick Bay			
Intracoastal Shipyard, Inc.	Berwick Bay			
F & S Boat Corp.	Berwick Bay			
Morgan City Machine Works	Berwick Bay			
Twin City Fisherman Co-Op Association, Inc.	Berwick Bay			
Rio Fuel & Supply, Inc. (Esso Products)	Berwick Bay			
Les Levy Oil & Supply, Inc.	Berwick Bay			
Mar-Vac Gulf Corp. (Gulf Oil Corp.)	Berwick Bay			
The Texas Co.	Berwick Bay			
St. Mary Wholesale Grocery Co.	Berwick Bay			
P.U. Melancon, Inc. Boat Rentals	Berwick Bay			
La. Quick Freeze and Cold Storage	Berwick Bay			
U.S. Coast Guard	Berwick Bay			
City of Morgan City	Berwick Bay			
Guarisco Enterprises Inc.	Berwick Bay			
General Mud	Berwick Bay			
Louisiana Mud Co.	Berwick Bay			
Radcliff Shell Products Co.	Berwick Bay			
Twenty Grand Marine Base	Berwick Bay			
Morgan City Freezer and Cold Storage, Co.	Berwick Bay			
Petroleum Dist. Co.	Berwick Bay			
West St. Mary Parish Port, Harbor, and Terminal District	GIWW		1,550	
Totals		3-6	2,750	

St. Louis Canal

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 3.9
 - Tertiary: 12.1

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	7.1	20
Natural Gas	Active	Southern Natural Gas Company	6.5	6
Natural Gas	Active	Southern Natural Gas Company	5.6	16
Natural Gas	Active	Panhandle Eastern Corporation	2.1	20
Natural Gas	Active	Koch Industries, Inc.	0.8	30
Natural Gas	Active	Koch Industries, Inc.	0.5	6

Total pipeline length: 22.6 miles

- 4. Oil and/or Natural Gas Wells: 39
- 5. Drainage Pump Stations: None
- 6. Water Intakes: None
- 7. Navigation Channels: No USACE-maintained channels.
- 8. Port Installations: No major port or terminal installations within this unit.

Savoie

- 1. Roads (miles):
 - Primary: 12.0
 - Secondary: 0.0
 - Tertiary: 32.1

2. Railroads (miles): 0.8

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	2.9	10
Natural Gas	Active	Koch Industries, Inc.	1.8	4
Natural Gas	Active	Koch Industries, Inc.	0.4	2

Total pipeline length: 5.1 miles

4. Oil and/or Natural Gas Wells: 31

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Terrebonne	Controlling depth of 6 ft.	Navigation - In 1995, carried 230,000 tons of freight traffic.	Commercial and recreational navigation

8. Port Installations: No major port or terminal installations within this unit.

South Bully Camp Marsh

1. Roads (miles):

Primary: 0.0

Secondary: 8.5

Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Crude Oil	Active	Exxon Pipeline Company	19.8	8
Natural Gas	Active	Koch Industries, Inc.	11.6	16
Natural Gas	Active	Koch Industries, Inc.	8.6	36
Natural Gas	Active	Bridgeline	6.9	12
Natural Gas	Active	Koch Industries, Inc.	4.9	6
Natural Gas	Active	Koch Industries, Inc.	4.5	12
Crude Oil	Active	Chevron Pipeline Company	1.8	20
Crude Oil	Active	Exxon Pipeline Company	1.5	12
Product	Active	Dow USA	0.5	3

Total pipeline length: 60.1 miles

4. Oil and/or Natural Gas Wells: 1,416

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Lafourche	Permanent closure at head of bayou; Channel 9 ft deep x 100 ft wide from Golden Meadow (mile 21.9) to Leeville (mile 13.0); Channel 12 ft deep x 125 ft wide from Leeville (mile 13.2) to the Gulf of Mexico with a jettied entrance at Belle Pass extending to the 12 ft depth contour in the Gulf of Mexico. Closure of Pass Fourchon.	Navigation - average annual traffic from 1984-93 was 1,389,000 tons	Commercial navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Boudreaux's Motel	Texaco Canal	14		1

Terrebonne Area

1. Roads (miles):

Primary: 37.7
 Secondary: 71.4
 Tertiary: 529.5

2. Railroads (miles): 31.6

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	23.2	12
Natural Gas	Active	Koch Industries, Inc.	9.5	30
Natural Gas	Active	Koch Industries, Inc.	9.3	16
Product	Active	Dow USA	7.3	6
Natural Gas	Active	Koch Industries, Inc.	6.5	4
Natural Gas	Active	Koch Industries, Inc.	6.3	6
Natural Gas	Active	Koch Industries, Inc.	4.5	10
Natural Gas	Active	Koch Industries, Inc.	4.2	24
Natural Gas	Active	Koch Industries, Inc.	2.9	20
Natural Gas	Active	Koch Industries, Inc.	2.8	2
Product	Active	Dow USA	2.1	8
Product	Active	Dow USA	1.9	3
Natural Gas	Active	Koch Industries, Inc.	0.2	8
Natural Gas	Active	Southern Natural Gas Company	0.0	16

Total pipeline length: 80.7 miles

4. Oil and/or Natural Gas Wells: 473

5. Drainage Pump Stations: 14

6. Water Intakes:

Operator	Type
Houma WTR Sys.	Surface Water
Commercial	Groundwater
Industry	Surface Water

Groundwater intakes: 1 Surface water intakes: 2

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Bayou Terrebonne	Controlling depth of 6 ft.	Navigation - In 1995, carried 230,000 tons of freight traffic.	Commercial and recreational navigation
Bayous Le Carpe, Pelton, and Grand Caillou	Extends 16.3 miles from the GIWW to Bayou Dulac through bayous Le Carpe, Pelton, and Grand Caillou. Controlling depths are 8 ft MLG in bayous Le Carpe and Grand Caillou and 6 ft in Bayou Pelton.	Navigation - In 1995 carried 393,000 tons of freight traffic.	Commercial and recreational navigation
Bayou Little Caillou	Extends 20.6 miles from Bayou Terrebonne to Robinson Canal. Controlling depths are 1 ft MLG from mile 0 - 6, 4 ft MLG to the Chauvin bridge, and 5 ft MLG to Robinson Canal.	Navigation - In 1995, carried 523,000 tons of freight traffic.	Commercial and recreational navigation
GIWW	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation
Houma Navigation Canal	Channel 15 ft deep x 150 ft wide from Houma (mile 40.5) to the Gulf of Mexico (mile 0).	Navigation - average annual traffic from 1984-93 was 1,284,000 tons.	Commercial navigation
Bayou Du Large	USACE will clear and snag from Grand Pass to Falgout Canal.	Navigation	Commercial fishing

8. Port Installations: No major port or terminal installations within this unit.

Terrebonne Marshes

1. Roads (miles):

Primary: 0.0
 Secondary: 13.2
 Tertiary: 6.1

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Panhandle Eastern Corporation	48.0	20
Natural Gas	Active	Koch Industries, Inc.	12.8	12
Product	Active	Dow USA	9.3	8
Natural Gas	Active	Koch Industries, Inc.	8.5	36
Natural Gas	Active	Koch Industries, Inc.	5.6	16
Product	Active	Dow USA	1.7	4
Product	Active	Dow USA	0.9	6
Natural Gas	Active	Koch Industries, Inc.	0.8	20
Natural Gas	Active	Koch Industries, Inc.	0.6	4
Natural Gas	Active	Koch Industries, Inc.	0.4	6

Total pipeline length: 88.6 miles

4. Oil and/or Natural Gas Wells: 2,647

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Little Caillou Bayou	Channel 5 ft deep x 40 ft wide from Bayou Terrebonne to Robinson Canal (20 miles).	Navigation	Navigation
Bayou Terrebonne	Channel 6 ft deep x a suitable width from Bush Canal to the St. Louis Cypress Company bridge at Houma (24.1 miles).	Navigation - average annual traffic from 1984-93 was 169,900 tons.	Commercial and recreational navigation
Houma Navigation Canal	Channel 15 ft deep x 150 ft wide from Houma (mile 40.5) to the Gulf of Mexico (mile 0). Channel 18 ft deep x 300 ft wide in the Gulf of Mexico from mile 0 to the 18-ft depth contour line.	Navigation -average annual traffic from 1984-93 was 1,284,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Timbalier Island Shorelines

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 0.0
- 2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Crude Oil	Active	Chevron Pipeline Company	9.5	20
Natural Gas	Active	Koch Industries, Inc.	1.3	12
Natural Gas	Active	Chevron Pipeline Company	0.5	12
Natural Gas	Active	Panhandle Eastern Corporation	0.1	20
Natural Gas	Active	Koch Industries, Inc.	0.1	6
Natural Gas	Active	Koch Industries, Inc.	0.1	16

Total pipeline length: 11.6 miles

- 4. Oil and/or Natural Gas Wells: 258
- 5. Drainage Pump Stations: None
- 6. Water Intakes: None
- 7. Navigation Channels: No USACE-maintained channels.
- 8. Port Installations: No major port or terminal installations within this unit.

Vermilion Bay

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 0.0
 - Tertiary: 0.0
- 2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Natural Gas	Active	Koch Industries, Inc.	10.3	6
Natural Gas	Active	Koch Industries, Inc.	10.0	36
Product	Active	Union Carbide Pipeline Co. (UCAR)	7.3	6
Natural Gas	Active	Koch Industries, Inc.	6.4	36
Natural Gas	Active	Koch Industries, Inc.	4.7	16
Natural Gas	Active	Koch Industries, Inc.	2.7	30
Crude Oil	Active	Exxon Pipeline Company	2.0	4

Total pipeline length: 43.4 miles

4. Oil and/or Natural Gas Wells: 268

5. Drainage Pump Stations: 1

6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Freshwater Bayou	Channel 12 ft deep x 125 ft wide between the GIWW near the Vermilion River to the Gulf of Mexico following the channels of Schooner Bayou, Sixmile Canal, Belle Isle Canal, and Freshwater Bayou including a 16 ft deep x 84 ft wide x 600 ft long lock near Beef Ridge.	Navigation - average annual traffic from 1984-93 was 341,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations within this unit.

Vermilion Bay Marsh

1. Roads (miles):

Primary: 0.0

Secondary: 16.7

Tertiary: 55.5

2. Railroads (miles): 6.8

3. Pipelines: None

4. Oil and/or Natural Gas Wells: 967

5. Drainage Pump Stations: 3

6. Water Intakes:

Operator	Type
Industry	Groundwater
Industry	Groundwater
Lydia WTR Sys.	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Groundwater
Industry	Surface Water
Industry	Groundwater
Mining	Surface Water
Mining	Groundwater
Mining	Groundwater
Mining	Groundwater
Industry	Groundwater
Mining	Groundwater

Groundwater intakes: 17 Surface water intakes: 2

7. Navigation Channels: No USACE-maintained channels.

Project Name	Project Features	Purpose	Primary User
Bayou Vermilion	Channel 8 ft deep x 80 ft wide from Vermilion Bay to the GIWW and 9 ft deep x 100 ft wide from the GIWW to Lafayette.	Navigation (annual average traffic from 1984-93 was 999,000 tons), flood control, and irrigation.	Commercial navigation
Petit Anse, Tigre, and Carlin Bayous	Channel 9 ft deep x 80 ft wide in Bayou Petit Anse from the GIWW to the north end of Avery Island (mile 6.1); Channel 9 ft deep x 80 ft wide in Bayou Carlin from its mouth to Lake Peigneur (mile 7.6); Channel 7 ft deep x 60 ft wide in Avery Canal from Weeks Bay to the GIWW (mile 2.7).	Navigation (average annual traffic from 1984-93 was 2,042,000 tons), commercial fishing, and recreation.	Commercial fishing vessels, recreational boaters, hunters, and fishermen
Bayou Teche and Vermilion River	New channel 8 ft deep x 80 ft wide from the 8 ft depth contour in Vermilion Bay to the GIWW.	Navigation, flood control, and irrigation.	Navigation
Gulf Intracoastal Waterway (GIWW)	Canal 12 ft deep x 125 ft wide.	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Port of Iberia District	New Iberia Drainage and Navigation Canal	15	3,000	
Acadiana Marina	Freshwater Bayou	1		1
Bayview Marina	Vermilion & Cote Blanche Bays	100		
Shell Morgan Landing, Inc.	GIWW	1		
Don's Boat Landing	Boston Canal	18		2
Cove Marina	Vermilion Bay			
Beacon Point Marina	Vermilion Bay	18		
Bob's Bayou Black Marina, Inc.	Shell Barge Canal	1		4
Cannon's Shade Tree Boat Launch	Bayou Black			4
Terrebonne Port Commission	GIWW, Bayou Terrebonne, Houma Navigation Canal			
Totals		154	3,000	11

In addition to the infrastructure mentioned above, a U.S. Department of Energy Strategic Petroleum Reserve facility is situated on the Weeks Island salt dome, about 14 miles south of New Iberia. It has a storage capacity of 11.1 million m³ of crude oil, but at the end of 1996, only 556,500 m³ were being stored at the facility.

Verret Wetlands

- 1. Roads (miles):
 - Primary: 0.0
 - Secondary: 16.0
 - Tertiary: 62.5

- 2. Railroads (miles): 0.0

- 3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	22.3	10
Natural Gas	Active	Bridgeline	11.0	20
Natural Gas	Active	Bridgeline	11.0	30
Natural Gas	Active	Koch Industries, Inc.	10.0	30
Product	Active	Union Carbide Pipeline Co. (UCAR)	6.0	6
Natural Gas	Active	Koch Industries, Inc.	4.9	12
Natural Gas	Active	Koch Industries, Inc.	2.3	26
Natural Gas	Active	Bridgeline	1.3	6
Product	Active	Dow USA	1.2	8
Product	Active	Union Carbide Pipeline Co. (UCAR)	0.6	8
Product	Active	Dow USA	0.2	4

Total pipeline length: 70.8 miles

- 4. Oil and/or Gas Wells: 499
- 5. Drainage Pump Stations: None
- 6. Water Intakes:

Operator	Type
St. Mary WTR Dist. 3	Surface Water
Industry	Surface Water

Groundwater intakes: 0 Surface water intakes: 2

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
GIWW, Morgan City to Port Allen Route	Extends 64.1 miles from Morgan City, LA to Port Allen, LA. Controlling depth is 10 ft MLG.	Navigation - In 1995, carried 25.5 million tons of freight traffic.	Commercial navigation

8. Port Installations:

Installation	Waterway	Berths	Berthing Space (ft.)	Launching Ramps
Lake End Park and Campground	Lake Palourde	20		2

Wax Lake Outlet Subdelta

1. Roads (miles):

Primary: 0.0
 Secondary: 0.0
 Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	3.5	4
Natural Gas	Active	Koch Industries, Inc.	1.1	16
Natural Gas	Active	Koch Industries, Inc.	0.0	26

Total pipeline length: 4.6 miles

4. Oil and/or Natural Gas Wells: 162

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

Wax Lake Wetlands

1. Roads (miles):
 - Primary: 0.0
 - Secondary: 4.3
 - Tertiary: 30.8
2. Railroads (miles): 0.0
3. Pipelines:

Type	Status	Operator	Length (miles)	Size (inches)
Product	Active	Dow USA	16.4	4
Natural Gas	Active	Koch Industries, Inc.	7.8	16
Natural Gas	Active	Koch Industries, Inc.	7.7	26
Natural Gas	Active	Southern Natural Gas Company	6.8	12
Product	Active	Dow USA	4.7	6
Product	Active	Dow USA	3.5	8
Crude Oil	Active	Exxon Pipeline Company	2.7	12
Natural Gas	Active	Southern Natural Gas Company	2.5	4
Natural Gas	Active	Koch Industries, Inc.	2.0	12
Natural Gas	Active	Koch Industries, Inc.	0.8	8
Natural Gas	Active	Bridgeline	0.6	30
Natural Gas	Active	Bridgeline	0.6	20

Total pipeline length: 56.1 miles

4. Oil and/or Natural Gas Wells: 873
5. Drainage Pump Stations: None
6. Water Intakes: None

7. Navigation Channels:

Project Name	Project Features	Purpose	Primary User
Atchafalaya River and Bayous Chene, Boeuf, and Black	Channel 20 ft deep x 400 ft wide (except in Bayou Boeuf where the channel is 300 ft wide) from the U.S. Highway 90 crossing over Bayou Boeuf to the Gulf of Mexico via the GIWW, Bayou Chene, the Avoca Island Cutoff, the Lower Atchafalaya River, and the existing project across Atchafalaya Bay to the 20 ft depth contour line.	Navigation and harbor	Navigation
Wax Lake Outlet	Channel 45 ft deep x 300 ft wide from Six Mile Lake to ½ mile below Bayou Teche and 45 ft deep x 400 ft wide from ½ mile below Bayou Teche to Atchafalaya Bay (15.7 miles).	Navigation - average annual traffic from 1984-93 was 109,385,000 tons.	Commercial navigation

8. Port Installations: No major port or terminal installations in this unit.

West Cote Blanche Bay

1. Roads (miles):

Primary: 0.0
 Secondary: 0.0
 Tertiary: 0.0

2. Railroads (miles): 0.0

3. Pipelines: None

4. Oil and/or Natural Gas Wells: 1,286

5. Drainage Pump Stations: None

6. Water Intakes: None

7. Navigation Channels: No USACE-maintained channels.

8. Port Installations: No major port or terminal installations within this unit.

SECTION 6

WETLAND DEVELOPMENT/PERMITTED ACTIVITIES

The following account of impacts from development activity comes from Louisiana's Coastal Use permit data and reflects impacts to wetlands as well as nonwetland habitat. No data are available to correlate permit type with extent of impact in wetlands.

In November 1997, the Louisiana Department of Natural Resources (DNR), in cooperation with the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service and the Environmental Protection Agency, developed the *Louisiana Coastal Wetlands Conservation Plan*. Included in this document is an account of development-related activities in wetlands over the past approximately 15 years. The coast of Louisiana had its highest level of wetland development in the period between 1980 and 1985, whereas the period between 1990 and 1995 showed the lowest development losses.

Importantly, acreage losses per issued permit dropped as well. Data from DNR show that annual losses peaked in 1983 at 2,735 acres, with a low of 196 acres in 1990. Average annual wetland losses for the period 1982-1995 are estimated at 843 acres. This corresponded with an annual average of 860 permits issued between 1980 and 1995: 941 permits per year between 1980 and 1985; 793 permits per year between 1985 and 1990; and 846 permits per year between 1990 and 1995. Regions 2 and 3 have sustained and continue to sustain the greatest impact

from permit/development activity. Total acres disturbed in Region 3 declined slightly from 1980 through 1995 (2,541, 2,507, and 2,498 acres, respectively, for 1980-1985, 1980-1990, and 1990-1995).

Oil and gas development has greatly dominated the activities associated with permitted losses in coastal Louisiana. For instance, of the 4,706 permits issued between 1980 and 1985, 3,911 (83.1%) were for oil and gas activity. Between 1985 and 1990, 2,844 (71.7%) of the total 3,964 permits issued were for oil and gas. Finally, for the period between 1990 and 1995, a total of 4,229 permits were issued, of which 2953 (69.8%) were for oil and gas. Nevertheless, no attempt has been made to correlate rates of loss per permit with specific activity types (i.e., oil/gas, development of fast land, bulkheads, etc.).

High levels of permit activity corresponded with severe wetlands losses in Region 3. Like Region 2, permit activity was dominated by the oil and gas industry. Permit activity was high in the reporting period between 1980 and 1985 (1,665), lower between 1985 and 1990 (1,599), and increased to 1,798 for the period between 1990-1995. Activity has been widespread throughout coastal marshes, with Vermilion Bay Marsh, Pelto, Mechant/de Cade, Terrebonne Marshes, Penchant, Wax Lake Wetlands, West Cote Blanche Bay, and the Bully Camp mapping units showing the highest activity.

SECTION 7

FISH AND WILDLIFE

Methodology for Historic Trends in Fisheries Production

In order to assess the recent trends and future projections of fishery populations within the Coast 2050 study area, four broad species assemblages were established based on salinity preferences. These assemblages were marine, estuarine dependent, estuarine resident, and freshwater. Within each of the four assemblages, guilds of fishery organisms were established. As used in this document, guilds are groupings of ecologically similar species identified by a single, representative species and, hereafter, the terms guild and species are used interchangeably. Fishery guilds common to coastal Louisiana, within each salinity-preference assemblage are:

- Spanish mackerel guild - marine;
- red drum, black drum, spotted seatrout, gulf menhaden, southern flounder, white shrimp, brown shrimp, and blue crab guilds - estuarine dependent;
- American oyster guild - estuarine resident; and
- largemouth bass and channel catfish guilds - freshwater.

In a broad sense, each of the 12 guilds is uniquely identified by the combination of the representative species' habitat preference, salinity preference, primary

habitat function, seasonal occurrence in the estuary, and spawning or migratory seasons. Habitat and life history information is based on available scientific literature specific to the northwestern Gulf of Mexico, but is somewhat generalized to accommodate the establishment of guilds.

Once the species representing each fishery guild was identified, population changes of each species were assessed and displayed by using a matrix for each of the four coastal regions. The matrices display mapping units and guilds and, within the mapping units, provide information on the population stability (recent change trends) and population projections for each species group (Table 7-1). The discussion of fishery population projections follows this section. Most of the recent trend information was provided by fishery biologists of the Louisiana Department of Wildlife and Fisheries (LDWF). The assessments were based on LDWF fishery independent sampling data and personal observation of area fisheries biologists, and generally span a period of 10 to 20 years. Staff of LDWF believe that, due to selectivity of sample gear, the trend information is most reflective of recent changes in the subadult portion of each guild.

The projections of possible future changes in fishery production for coastal

Louisiana are based solely on landscape change model predictions discussed in the main report. The key parameters in making those projections were percent and pattern of wetland loss in each mapping unit. Numerous other factors which could not be forecast, such as changes in water quality, fishery harvest levels, wetland development activities (e.g., dredging and filling), and blockages of migratory pathways also could negatively impact fishery production. These factors and the potentially great inaccuracy in predicting land loss 50 years into the future, especially when considering landscape changes at a mapping unit scale, limit the precision of the predicted changes in fishery production.

Information provided in the matrix was developed through the collaborative effort of the LDWF and the National Marine Fisheries Service (NMFS). Contributors to this effort for Region 3 were Vince Guillory, Roy Moffet, Martin Bourgeois, Steve Hein, Paul Meier, Pete Juneau, Paul Cook and Glenn Thomas of the LDWF and Rickey Ruebsamen and Richard Hartman of the NMFS.

Methodology for Wildlife Functions, Status, Trends, and Projections

Louisiana's coastal wetlands, extending from the forested wetlands at the upper end to the barrier shorelines bordering the gulf, provide a diverse array of habitats for numerous wildlife communities. In addition to fulfilling all life-cycle needs for many resident

species, coastal wetlands provide wintering or stopover habitat for migratory waterfowl and many other birds. The bald eagle and brown pelican, protected by the Endangered Species Act, are recovering from very low populations over the last three decades. These two species are projected to continue to increase in the future, independent of near-term wetland changes. The fate of other species groups in coastal Louisiana will be influenced by habitat conditions within their areas. The prediction of extensive land loss and habitat change by the year 2050 prompted an examination of the effect of such losses and changes on the abundance of wildlife.

To assess habitat functions and the status, recent trends and future projections of wildlife abundance within the Coast 2050 study area, 21 prominent wildlife species and/or species groups were identified:

- Brown pelican
- Bald eagle
- Seabirds, such as black skimmer, royal tern, common tern, and laughing gull
- Wading birds, such as great blue heron, snowy egret, and roseate spoonbill
- Shorebirds, such as piping plover, black-necked stilt, American avocet, and willet
- Dabbling ducks, such as mallard, gadwall, mottled duck, and wood duck
- Diving ducks, such as greater scaup, ring-necked duck, redhead, and canvasback
- Geese, such as snow goose, white-fronted goose, and Canada goose

- Raptors, such as northern harrier, peregrine falcon, and American kestrel
- Rails, gallinules, and coots, such as king rail, sora rail, and purple gallinule
- Other marsh and open water residents, such as anhinga, least bittern, and seaside sparrow
- Other woodland residents, such as pileated woodpecker, Carolina chickadee, and belted kingfisher
- Other marsh and open water migrants, such as tree swallow, barn swallow, and Savannah sparrow
- Other woodland migrants, such as hermit thrush, American robin, and cedar waxwing
- Nutria
- Muskrat
- Mink, otter, and raccoon
- Rabbits
- Squirrels
- White-tailed deer, and
- American alligator

A matrix was developed for each region to present the habitat function and the status, trend, and projection for the above listed species and/or species groups for each habitat type within each mapping unit (Table 7-2).

“Habitat functions” considered were nesting (Ne), wintering area (W), stopover habitat (St), and multiple functions (Mu). “Status” categories included the following: not historically present (NH), no longer present (NL), present in low numbers (Lo), present in moderate numbers (Mo), and present in high numbers (Hi). Not historically present means that the species or species group has not been present in the given area for over about 50 years. No longer

present means that the species or species group was present in the given area sometime during the last 50 years, but is not currently present.

“Trend” refers to changes in abundance over the last ten to 20 years, and “projection” refers to a prediction of changes in wildlife abundance through the year 2050; “trend” and “projection” categories include steady (Sy), decrease (D), increase (I) and unknown (U).

“Habitat Types” reflect 1988 conditions and include the following: open water (OW); aquatic bed (AB); fresh marsh (FM); intermediate marsh (IM); brackish marsh (BM); saline marsh (SM); fresh swamp (FS); hardwood forest (HF); barrier beach (BB); agriculture/upland (AU). Habitat types comprising less than 5% of a unit are shown only if that habitat type is particularly rare or important to wildlife in the given planning unit.

“Habitat function,” “status,” and “trend” information displayed in each regional matrix represents common understandings of the selected species and/or species groups, field observations, some data, and recent habitat changes. “Projection” information is based almost exclusively on the predicted conversion of marsh to open water and the gradual relative sinking and resultant deterioration of forested habitat throughout the study area. Such predictions may or may not prove to be accurate. Additionally, numerous other factors including water quality, harvesting level, and habitat changes elsewhere in the species’ range can not be predicted and were not considered in these projections.

Therefore, the projections are to be viewed and used with caution.

and Quin Kinler (Natural Resources Conservation Service).

The matrices were compiled by Gerry Bodin (U.S. Fish and Wildlife Service)

The individuals responsible for synthesizing the information displayed in each regional matrix are identified below:

Species or Species Group	Individuals	Agency Affiliation
Brown Pelican, Bald Eagle	Tom Hess	LDWF
	Larry McNease	LDWF
	Terry Rabot	U.S. Fish and Wildlife Service
Seabirds, wading birds, shorebirds, raptors, rails, gallinules, coots, other marsh and open water residents, other woodland residents, other marsh and open water migrants, other woodland migrants	Bill Vermilion	LDWF
Puddle ducks, diving ducks, geese	Robert Helm	LDWF
Nutria, muskrat, mink, otter, raccoon, American alligator	Noel Kinler	LDWF
	Larry McNease	LDWF
Rabbits, squirrels, white-tailed deer	Mike Olinde	LDWF
	Dave Moreland	LDWF
	Quin Kinler	Natural Resources Conservation Service

Table 7-1. Region 3 fish and invertebrate population status and 2050 change.

Mapping Unit	Fish and Invertebrate Guilds (Species)												Comments
	Red drum	Black drum	Spotted seatrout	Gulf menhaden	Southern flounder	American oyster	White shrimp	Brown shrimp	Blue crab	Spanish mackerel	Largemouth bass	Channel catfish	
	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	
Atchafalaya Marshes	Sy/Sy	Sy/Sy	Sy/Sy	Sy/Sy	Sy/Sy	NA/NA	Sy/Sy	NA/NA	Sy/Sy	Sy/D	Sy/I	Sy/I	Lower river only, estuarine species primarily in fall and winter
Avoca	NA/NA	NA/NA	NA/NA	I/D	I/Sy	NA/NA	NA/NA	NA/NA	I/D	NA/NA	U/U	U/U	
Black Bayou Wetlands	NA/NA	NA/NA	NA/NA	I/I	I/NA	NA/NA	NA/NA	NA/NA	I/I	NA/NA	D/I	U/U	
Boudreaux	I/D	I/D	D/D	I/D	D/D	I/I	Sy/D	I/D	I/D	NA/NA	D/I	D/I	
N. Bully Camp	I/D	I/D	D/D	D/D	D/D	D/I	D/D	D/D	I/D	I/I	NA/NA	NA/NA	
S. Bully Camp	I/D	I/D	D/D	D/D	D/D	D/D	D/D	D/D	I/D	I/I	NA/NA	NA/NA	
Caillou Marshes	I/D	I/D	D/D	D/D	D/D	D/D	Sy/D	I/D	I/D	I/I	D/D	U/U	
Chacahoula Swamps	NA/NA	NA/NA	NA/NA	I/I	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	Sy/I	Sy/I	
Devil's Swamp	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	Sy/I	Sy/I	
Fields Swamp	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	Sy/I	Sy/I	
Four League Bay	I/Sy	I/Sy	D/D	I/Sy	D/D	I/D	Sy/Sy	I/Sy	I/Sy	U/U	D/I	U/U	
GIWW	NA/NA	NA/NA	NA/NA	I/D	I/D	NA/NA	NA/NA	NA/NA	I/D	NA/NA	Sy/I	Sy/I	
Mechant/De Cade	I/D	I/D	D/D	I/D	D/D	I/I	Sy/D	I/D	I/D	I/I	D/Sy	D/Sy	
Montegut	I/D	I/D	D/D	I/D	D/D	I/I	Sy/D	I/D	I/D	NA/NA	D/I	D/I	Influenced by water control structures
NHSC Wetlands	I/D	I/D	I/D	I/D	I/D	NA/NA	I/D	I/D	I/D	NA/NA	D/I	D/I	
Pelto Marshes	I/D	I/D	D/D	D/D	D/D	D/Sy	D/D	D/D	I/D	I/I	D/D	D/D	
Penchant	I/Sy	I/Sy	D/D	D/Sy	D/D	D/I	D/Sy	D/Sy	I/Sy	NA/NA	D/I	U/U	

NOTES: Steady=Sy, Decrease=D, Increase=I, Unknown=U, Not Applicable=NA

Table 7-1. Region 3 fish and invertebrate population status and 2050 change (Cont.).

Fish and Invertebrate Guilds (Species)													
	Red drum	Black drum	Spotted seatrout	Gulf menhaden	Southern flounder	American oyster	White shrimp	Brown shrimp	Blue crab	Spanish mackerel	Largemouth bass	Channel catfish	
Mapping Unit	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Comments
Pigeon Swamps	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	U/U	NA/NA	U/U	U/U	
Point au Fer	I/Sy	I/Sy	D/Sy	I/Sy	D/Sy	I/I	Sy/I	I/Sy	I/Sy	I/Sy	D/I	U/U	
Savoie	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	Sy/I	Sy/I	
St Louis Canal	I/D	I/D	D/D	I/D	D/D	I/Sy	Sy/D	I/D	I/D	NA/NA	D/I	D/I	
Terrebonne Marshes	I/D	I/D	D/D	D/D	D/D	D/Sy	D/D	D/D	I/D	I/I	NA/NA	NA/NA	
Verrett Wetlands	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	I/I	NA/NA	U/I	U/I	
Timbalier Island Shorelines	D/D	D/D	D/D	D/D	D/D	D/D	D/D	D/D	D/D	I/I	NA/NA	NA/NA	
Isles Dernieres Shorelines	D/D	D/D	D/D	D/D	D/D	D/D	D/D	D/D	D/D	I/I	NA/NA	NA/NA	
Atchafalaya Subdelta	Sy/I	Sy/I	NA/NA	Sy/I	Sy/Sy	NA/NA	Sy/I	D/Sy	Sy/I	NA/NA	Sy/I	I/I	Support of estuarine species is river stage-dependent
N. Wax Lake Wetlands	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	I/I	I/I	Fresh marsh, overflow swamp
Wax Lake Outlet Subdelta	Sy/I	Sy/I	NA/NA	Sy/I	Sy/Sy	NA/NA	Sy/I	D/Sy	Sy/I	NA/NA	Sy/I	I/I	Support estuarine species during low water stages-fall and winter
Wax Lake Wetlands	NA/NA	NA/NA	NA/NA	Sy/Sy	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	Sy/I	Sy/I	Only shoreline supports estuarine species during low water stages
Big Woods	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA	U/U	U/U	Fresh swamp
Cote Blanche Wetlands	NA/NA	NA/NA	NA/NA	Sy/Sy	NA/NA	NA/NA	NA/NA	NA/NA	Sy/Sy	NA/NA	Sy/Sy	Sy/Sy	Better habitat during low water years
E. Cote Blanche Bay	Sy/Sy	Sy/D	D/D	Sy/Sy	Sy/D	NA/NA	Sy/I	D/D	Sy/Sy	NA/NA	NA/NA	Sy/I	Better habitat during low water years
Marsh Island	D/Sy	D/Sy	D/Sy	Sy/Sy	D/Sy	NA/NA	Sy/Sy	D/Sy	I/Sy	NA/NA	NA/NA	Sy/I	Weirs, impoundments, and gates causing loss of habitat

NOTES: Steady=Sy, Decrease=D, Increase=I, Unknown=U, Not Applicable=NA

Table 7-1. Region 3 fish and invertebrate population status and 2050 change (Cont.).

Fish and Invertebrate Guilds (Species)													
	Red drum	Black drum	Spotted seatrout	Gulf menhaden	Southern flounder	American oyster	White shrimp	Brown shrimp	Blue crab	Spanish mackerel	Largemouth bass	Channel catfish	
Mapping Unit	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Trend/ Projection	Comments
Rainey Marsh	Sy/Sy	Sy/Sy	NA/NA	Sy/Sy	Sy/D	NA/NA	Sy/Sy	NA/NA	Sy/Sy	NA/NA	Sy/I	Sy/I	Eastern portion is more viable estuarine fishery habitat
Vermilion Bay	Sy/Sy	Sy/D	D/D	Sy/Sy	Sy/D	D/D	Sy/I	D/D	Sy/Sy	NA/NA	NA/NA	NA/NA	Strongly influenced by Atchafalaya River flows
Vermilion Bay Marsh	Sy/Sy	D/D	Sy/D	D/Sy	NA/NA	Sy/D	U/I	Sy/D	Sy/Sy	NA/NA	Sy/I	Sy/I	Higher use by estuarine species in fall and winter, mainly edge habitat
W. Cote Blanche Bay	Sy/Sy	Sy/D	D/D	Sy/Sy	Sy/D	NA/NA	Sy/I	D/D	Sy/Sy	NA/NA	NA/NA	NA/NA	Habitat conditions influenced by Atchafalaya River discharge

NOTES: Steady=Sy, Decrease=D, Increase=I, Unknown=U, Not Applicable=NA

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.

Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers

Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions

Trends (since 1985) / Projections (through 2050): Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																							
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.				
Terrebonne Basin																																										
Pigeon Swamps	OW	5	NH				NH				St	Lo	Sy	Sy		NH			NH				W	Lo	Sy	Sy		NH				NH				NH				NH		
	FS	52	NH				NH								Ne	Hi	I	Sy	NH				Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy		NH		
	HF	38	NH				NH									NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
Verret Wetlands	OW	25	NH				NH				St	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy
	FS	49	NH				Ne	Hi	I	I		NH			Ne	Hi	I	Sy	NH				Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy		NH		
	HF	23	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
Chacahoula Swamps	FS	76	NH				Ne	Mo	Sy	Sy		NH			Ne	Hi	I	Sy	NH				Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy		NH		
	HF	21	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
Black Bayou Wetlands	FS	78	NH				NH					NH			Mu	Hi	I	Sy	NH				Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy		NH		
	HF	18	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
Savoie	FM	23	NH				Ne	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	43	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
	AU	30	NH				NH					NH			Sy	Lo	I	Sy	St	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	Sy		NH		
Devil's Swamp	FM	11	NH				Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	I	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	32	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
	AU	54	NH				NH					NH			St	Lo	I	Sy	St	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			Mu	Mo	Sy	Sy		NH		
Fields Swamp	OW	10	NH				NH				St	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy
	FM	41	NH				NH				Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	30	NH				NH					NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	I	D		NH		
	AU	18	NH				NH					NH			St	Lo	I	St	St	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	Sy		NH		

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.

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Trends (since 1985) / Projections (through 2050): Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988		Avifauna (cont.)												Furbearers								Game Mammals								Reptiles																							
	Habitat	% of Unit	Other Marsh/OW Residents				Other Wood-land Resid.				Other Marsh/OW Migrants				Other Wood-land Migrants				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator											
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.												
Terrebonne Basin																																																						
Pigeon Swamps	OW	5	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH																				Mu	Mo	I	I
	FS	52	Ne	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
	HF	38		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
Verret Wetlands	OW	25	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy		NH																											Mu	Lo	Sy	Sy
	FS	49	Ne	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
	HF	23		NH			Ne	Hi	Sy	Sy		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
Chacahoula Swamps	FS	76	Ne	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
	HF	21		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
Black Bayou Wetlands	FS	78	Ne	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
	HF	18		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	I				
Savoie	FM	23	Ne	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	Sy				
	HF	43		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D	Mu	Mo	I	Sy				
	AU	30		NH			Ne	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
Devil's Swamp	FM	11	Ne	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy								
	HF	32		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	I	Sy				
	AU	54		NH			Ne	lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	Sy								
Fields Swamp	OW	10	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy								
	FM	41	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy								
	HF	30		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy								
	AU	18		NH			Ne	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy								

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Mapping Unit	1988		Avifauna (cont.)												Furbearers								Game Mammals								Reptiles															
	Habitat	% of Unit	Other Marsh/OW Residents				Other Wood-land Resid.				Other Marsh/OW Migrants				Other Wood-land Migrants				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.								
St. Louis Canal	OW	16	NH					Mu	Mo	Sy	Sy			NH				Mu	Mo	Sy	Sy			Mu	Lo	Sy	Sy			NH					NH				Mu	Mo	I	Sy				
	FS	32	Ne	Lo	Sy	D		Ne	Mo	Sy	D			Mu	Lo	Sy	D		Mu	Lo	Sy	D			Mu	Lo	Sy	Sy			NH					Mu	Lo	Sy	Sy	Mu	Mo	I	Sy			
	IM	18	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH						Mu	Lo	Sy	Sy			NH					Mu	Lo	Sy	Sy	Mu	Mo	I	Sy			
	BM	7	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH						Mu	Mo	Sy	Sy			NH					Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy			
	HF	20		NH				Ne	Hi	Sy	D			NH				Mu	Hi	Sy	D			Mu	Lo	Sy	Sy			NH					Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy				
North Bully Camp Marsh	OW	50	Mu	Mo	Sy	Sy		NH						Mu	Mo	Sy	Sy		NH					Mu	Lo	D	Sy			NH					NH				Mu	Lo	D	D				
	FM	5	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Mo	D	Sy			NH					Mu	Lo	Sy	D	Mu	Lo	D	Sy				
	IM	6	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	Sy			NH					Mu	Lo	Sy	D	Mu	Lo	D	Sy				
	BM	30	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	Sy			NH					Mu	Lo	Sy	D	Mu	Lo	D	D				
South Bully Camp Marsh	OW	75	Mu	Mo	Sy	Sy		NH						Mu	Mo	Sy	D		NH					Mu	Lo	D	D			NH					NL				Mu	Lo	D	D				
	SM	23	Mu	Hi	D	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	D			NH					NL				Mu	Lo	D	D				
Timbalier Isl. Shorelines	OW	76	Mu	Mo	Sy	Sy		NH						Mu	Mo	Sy	Sy		NH					NL						NH					NL				NL							
	SM	8	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	D			NH					NL				NL							
	HF	5		NH				Mu	Mo	Sy	D			NH				St	Mo	Sy	D			Mu	Lo	D	D			NH						NL				NL						
	BB	11		NH				NH						NH					NH						NH		D	D			NH					NH				NH						
Montegut	OW	56	Mu	Mo	Sy	Sy		NH						Mu	Mo	Sy	Sy		NH					Mu	Lo	D	D			NH						NH				Mu	Lo	D	D			
	IM	7	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	D			NH							Mu	Lo	Sy	D	Mu	Mo	Sy	D		
	BM	25	Mu	Hi	Sy	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	D			NH							Mu	Lo	Sy	D	Mu	Lo	D	D		
	AU	6		NH				Ne	Lo	Sy	Sy			NH				Mu	Lo	Sy	Sy			Mu	Lo	D	D			NH								Mu	Lo	D	D					
Terrebonne Marshes	OW	85		NH				NH						NH					NH						NH					NH								NH			NL					
	SM	12	Mu	Hi	D	D		NH						Mu	Hi	Sy	D		NH					Mu	Lo	D	D			NH							NL			Mu	Lo	D	D			

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.

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Trends (since 1985) / Projections (through 2050): Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																											
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules							
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.								
Boudreaux	OW	48	W	Lo	I	I	NH				Mu	Mo	Sy	Sy	NH				NH				W	Lo	D	D	W	Lo	Sy	D		NH				W	Lo	Sy	D							
	IM	13		NH			NH				Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Lo	D	D	W	Lo	Sy	D		NH			Mu	Lo	Sy	D	W	Lo	Sy	D				
	BM	20		NH			NH				Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Lo	D	D	W	Lo	Sy	D		NH			Mu	Lo	Sy	D	W	Lo	Sy	D				
	HF	9		NH			Ne	Lo	Sy	Sy		NH				NH				NH				Mu	Lo	D	D	W	Lo	Sy	D		NH			Mu	Hi	Sy	D		NH					
Pelto Marshes	OW	70	W	Hi	I	I	NH				Mu	Hi	Sy	Sy		NH				NH			W	Lo	D	D	W	Lo	Sy	D		NH				NH			W	Lo	Sy	D				
	SM	24		NH			NH				Mu	Hi	D	D	Mu	Hi	D	D	Mu	Hi	D	D	W	Lo	D	D	W	Lo	Sy	D		NH				NH			W	Lo	Sy	D				
Isles Dernieres Shorelines	OW	78	W	Hi	I	I	NH				Mu	Hi	Sy	Sy		NH				NH			W	Lo	D	D	W	Lo	Sy	D		NH				NH				NH						
	SM	9	Ne	Hi	I	I	NH				Mu	Hi	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Lo	D	D	W	Lo	Sy	D		NH				NH			W	Lo	D	D				
	HF	6		NH			NH					NH			Ne	Mo	Sy	D						NH				NH					NH			St	Lo	Sy	D		NH					
NHSC Marshes	OW	16		NH			NH				Mu	Hi	Sy	D	St	Lo	Sy	D	Mu	Hi	Sy	D		NH			W	Lo	Sy	D	W	Lo	Sy	D		NH				NH			W	Lo	Sy	D
	IM	14		NH			NH				Mu	Lo	Sy	Sy	Mu	Mo	I	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	D	W	Lo	Sy	D		NH			Mu	Lo	Sy	Sy	W	Lo	Sy	D				
	FS	28		NH			NH					NH			Ne	Mo	I	Sy		NH			W	Lo	Sy	D	W	Lo	Sy	D		NH			Mu	Mo	I	Sy	Mu	Lo	Sy	D				
	HF	26		NH			NH					NH				NH				NH				Mu	Lo	Sy	D		NH				NH			Mu	Hi	I	D		NH					
Caillou Marshes	OW	53	W	Hi	I	I	NH				Mu	Mo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy				
	BM	13		NH			NH				Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
	SM	34		NH			NH				Mu	Mo	Sy	D	Mu	Mo	I	Sy	Mu	Hi	Sy	D	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy				
Mechant/de Cade	OW	46	W	Hi	I	I	NH				Mu	Mo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH				NH			W	Mo	Sy	Sy				
	IM	14		NH			NH				Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy				
	BM	29		NH			NH				Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy				
	FS	1		NH			Ne	Lo	Sy	Sy		NH				NH				NH			Ne	Lo	Sy	Sy	W	Mo	Sy	Sy		NH				NH				NH						

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Mapping Unit	1988 Habitat		Avifauna																																							
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.				
Penchant	OW	19	NH			NH				Mu	Mo	Sy	Sy	NH				NH				W	Hi	Sy	D	W	Hi	Sy	D	W	Mo	I	D	NH			W	Hi	Sy	Sy		
	FM	67	NH			Ne	Mo	I	I	Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	D	W	Hi	Sy	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Hi	Sy	Sy	
	HF	9	NH			NH				NH				NH				NH				W	Mo	Sy	Sy	NH				NH				Mu	Hi	I	D	NH				
GIWW	OW	17	NH			NH				Mu	Lo	Sy	Sy	NH				NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				NH			Mu	Mo	Sy	Sy		
	FM	36	NH			NH				Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Lo	Sy	D	Mu	Mo	Sy	Sy	
	FS	31	NH			Ne	Hi	I	I	NH				Mu	Hi	I	Sy	NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Mo	I	Sy	NH				
Avoca	HF	14	NH			NH				NH				NH				NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Hi	I	D	NH				
	OW	42	NH			NH				Mu	Lo	Sy	Sy	NH				NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				NH			W	Hi	Sy	Sy		
	AB	16	NH			NH				NH				NH				NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				NH			Mu	Hi	Sy	Sy		
Atchafalaya Marshes	FM	17	NH			NH				Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	
	FS	8	NH			Ne	Hi	I	I	NH				Mu	Hi	I	Sy	NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	
	HF	16	NH			NH				NH				NH				NH				W	Mo	Sy	Sy	W	Mo	Sy	Sy	NH				Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	
Four League Bay	OW	9	W	Lo	I	I	NH			Mu	Mo	Sy	Sy	NH				NH				W	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Lo	I	I	NH			Mu	Mo	Sy	Sy		
	FM	55	NH			Ne	Mo	I	I	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Lo	I	I	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	
	IM	19	NH			NH				Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Lo	I	I	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	
Point au Fer	HF	15	NH			NH				NH				NH				NH				W	Lo	Sy	Sy	NH				W	Lo	I	I	Mu	Hi	Sy	D	NH				
	OW	98	W	Hi	I	I	NH			Mu	Mo	Sy	Sy	NH				NH				W	Lo	Sy	Sy	W	Mo	Sy	Sy	NH				NH			W	Lo	Sy	Sy		
	IM	11	NH			NH				Mu	Mo	Sy	D	Mu	Mo	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	Sy	
Four League Bay	BM	55	NH			NH				Mu	Mo	Sy	D	Mu	Mo	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	Sy	
	SM	10	NH			NH				Mu	Mo	Sy	D	Mu	Mo	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy		
	BB	1	NH			NH				Mu	Mo	D	D	St	Lo	Sy	D	Mu	Hi	Sy	D	NH				NH				NH				NH			NH					

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Mapping Unit	1988 Habitat		Avifauna																																													
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules									
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.										
Atchafalaya Basin																																																
Atchafalaya Subdelta	OW	95	W	Lo	I	I		NH				Mu	Hi	Sy	Sy		NH					NH				W	Hi	I	I	W	Hi	I	I	W	Mo	I	I		NH			W	Lo	Sy	Sy			
	FM	3		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	I	W	Hi	I	I	W	Mo	I	I	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy						
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH																
West N. Wax Lake Wetlands	FM	17		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy		NH				NH							Mu	Lo	Sy	Sy		NH				
	FS	16		NH				NH				NH			Mu	Hi	I	Sy		NH			Mu	Lo	Sy	Sy		NH				NH								Mu	Mo	Sy	Sy		NH			
	HF	55		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH								Mu	Hi	Sy	D		NH			
	AU	11		NH				NH				NH			St	Lo	Sy	Sy	St	Lo	Sy	Sy		NH				NH				NH									Mu	Mo	Sy	Sy		NH		
East N. Wax Lake Wetlands	FS	35		NH				NH				NH			Mu	Hi	I	Sy		NH			Mu	Lo	Sy	Sy		NH				NH								Mu	Mo	Sy	Sy		NH			
	HF	56		NH				Ne	Lo	Sy	Sy		NH			NH				NH			Mu	Lo	Sy	Sy		NH				NH								Mu	Hi	Sy	D		NH			
Wax Lake Wetlands	OW	18	W	Lo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH				NH			W	Lo	Sy	Sy		
	FM	38		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH				Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	
	FS	8		NH				Ne	Lo	Sy	Sy		NH			Mu	Hi	I	Sy		NH		Mu	Mo	Sy	Sy		NH				NH								Mu	Mo	Sy	Sy		NH			
	HF	34		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH								Mu	Hi	Sy	D		NH			
Wax Lk. Outlet Subdelta	OW	97	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Hi	I	I	W	Hi	I	I	W	Mo	I	I		NH							W	Lo	Sy	Sy		
	FM	2		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	I	W	Hi	I	I	W	Mo	I	I	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy						
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	I	Sy	Mu	Hi	Sy	Sy		NH				NH				NH																
Teche/Vermilion Basin																																																
Cote Blanche Wetlands	OW	10		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH											W	Lo	Sy	Sy		
	FM	54		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH								Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	
	FS	15		NH				Ne	Lo	Sy	Sy		NH			Mu	Hi	I	Sy		NH		Mu	Lo	Sy	Sy		NH				NH									Mu	Mo	Sy	Sy		NH		
	HF	17		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				
East Cote Blanche Bay	OW	100	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH												
West Cote Blanche Bay	OW	100	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH												
Marsh Island	OW	20		NH				NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH							Mu	Lo	Sy	Sy		

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Mapping Unit	1988 Habitat		Avifauna (cont.)												Furbearers								Game Mammals								Reptiles																				
	Type	% of Unit	Other Marsh/OW Residents				Other Wood-land Resid.				Other Marsh/OW Migrants				Other Wood-land Migrants				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator								
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.													
	BM	70	Mu	Hi	Sy	D	NH			Mu	Hi	Sy	D	NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	SM	10	Mu	Hi	Sy	D	NH			Mu	Hi	Sy	D	NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
Vermilion Bay Marsh	OW	13	Mu	Mo	Sy	Sy	NH			Mu	Mo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH			NH			NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy						
	FM	5	Mu	Hi	Sy	Sy	NH			Mu	Hi	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
	IM	25	Mu	Hi	Sy	Sy	NH			Mu	Hi	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
	BM	30	Mu	Hi	Sy	Sy	NH			Mu	Hi	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
	FS	5	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy					
	HF	18		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy					
Vermilion Bay	OW	99	Mu	Mo	Sy	Sy	NH			Mu	Mo	Sy	Sy	NH			NH			NH			NH			NH			NH			NH			NH			NH			NH			NH							
Big Woods	FM	8	Mu	Hi	Sy	Sy	NH			Mu	Hi	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy				
	HF	60		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy					
	AU	25	Mu	Lo	Sy	Sy	Ne	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy						
Rainey Marsh	OW	12	Mu	Mo	Sy	Sy	NH			Mu	Mo	Sy	Sy	NH			Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy	Mu	NH			NH			NH			Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy					
	IM	11	Mu	Hi	Sy	D	NH			Mu	Hi	Sy	D	NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy				
	BM	70	Mu	Hi	Sy	D	NH			Mu	Hi	Sy	D	NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy				

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