CHAPTER 2. STATE OVERVIEW

A. Geographic Context

1. Geography:

Louisiana is located in the south-central United States (U.S.) at the terminus of the Mississippi River. Alexandria, Baton Rouge, Lafayette, Lake Charles, Monroe, New Orleans, and Shreveport are the major cities.

The physiographic features of the state include forested uplands, alluvial plains, coastal marshes, prairies, and bluffs. Natural elevations range from below sea level along the coast to 535 feet in the northern uplands. Land cover in the northwestern and western part of the state consists mostly of upland, mixed evergreen/deciduous forests. The northeast and south-central parts of the state are heavily agricultural, with fragmented forests, including Bottomland Hardwood Forest. The southeastern part of the state, known as the Florida Parishes, consists primarily of upland forest dominated by evergreen/mixed hardwoods, and Longleaf Pine flatwoods. The southern portion of this region is dominated by marshes and forested wetlands. Southwestern Louisiana is dominated by agriculture and improved pasture, in the historical Coastal Prairie region, and upland or wetland scrub-shrub vegetation. The coastal portion of the state is made up of Freshwater, Intermediate, Brackish, and Salt Marshes and, increasingly, open water (Hartley et al. 2000).

Presently, nearly all of coastal Louisiana is retreating before the advance of the Gulf of Mexico due to the containment of the Mississippi River for navigation and flood control and other factors. The Mississippi and Atchafalaya river deltas are the only coastal areas with significant sediment accretion and delta formation. The floodplain of the Atchafalaya River, the largest distributary of the Mississippi River, holds the best example of forested wetlands in Louisiana and the largest remaining floodplain swamp in the country.

2. Geology:

Geologically, 80% of Louisiana's surface area consists of Quaternary Period sediments. Holocene alluvial sediments deposited by the Mississippi, Red, Ouachita, and other rivers constitute 55% of the surface area, and 25% of the state's surface is comprised of deposits associated with Pleistocene terraces. Tertiary Period sediments account for the other 20%, principally on the Sabine uplift (which lies in the northwest portion of the state), and in the north Louisiana salt-dome basin. Within this area, Cretaceous rocks are present in a few small exposures on the tops of salt domes that have surface expression along with wind-blown loess deposits.

During glacial episodes in the Quaternary, sea levels dropped and shorelines moved seaward. As a result, rivers flowing into the Gulf of Mexico would deposit their sediments farther offshore and fluvial deposits of sand, gravel, and silt, known as valley trains, were deposited in the lower Mississippi valley. Remnants of valley trains deposited in the late Pleistocene can be found along the western edge of the Mississippi River flood plain in northeastern Louisiana. Areas adjacent to the Mississippi River valley were covered by loess, a wind-blown silt derived from glaciofluvial deposits. Loess deposits up to several meters thick remain preserved in areas flanking the Mississippi River valley.

3. Coastal Zone:

Louisiana has over three million acres of coastal wetlands which constitute about 40% (USGS 2014) of the remaining coastal marsh in the lower 48 states. Louisiana's coastal zone can be divided into two distinct regions: the Chenier Plain, extending west from Vermilion Bay to Texas; and the Deltaic Plain, which extends from Vermilion Bay east to the Pearl River Basin on the Mississippi state line. Both areas were formed by historic patterns of sedimentation and erosion from the Mississippi River and its distributaries along with influences from the Gulf of Mexico. Over the past several thousand years, these fluvio-deltaic processes created more than four million acres of coastal wetlands and gave rise to one of the most productive ecosystems in the U.S. The Chenier Plain contains highly productive inland lakes and wetlands behind oak-covered remnant beach ridges (Cheniers) that parallel the coast. The Deltaic Plain is characterized by a vast system of low-lying wetlands and coastal Barrier Islands (Benoit 1997). These wetland ecosystems are of national significance in terms of their ability to support substantial commercial and recreational freshwater and marine fisheries. They also serve as a haven for shorebirds, waterbirds, waterfowl, and other wildlife.

Coastal Louisiana has one of the highest land loss rates in the U.S. Annual losses were estimated by the U.S. Army Corps of Engineers (USACE) to be 40-50 square miles during the late 1980s (Benoit 1997, Johnston et al. 1995), with losses averaging 16.76 square miles per year from 1985-2010 (CPRA 2012). Since the 1930s, coastal Louisiana has lost over 1.2 million acres of land and may lose up to 1.2 million additional acres over the next 50 years (CPRA 2012). Historic hydromodification of the Mississippi River for navigation and flood control, dredging canals for oil and gas exploration and pipeline installation, and dredging and filling for residential and commercial development have combined with natural factors such as hurricanes to produce such losses (Benoit 1997). Additionally, sea level rise, land subsidence, and erosion of barrier islands, which leave leeward areas less adequately buffered from wind and tidal influences, contribute to coastal wetland loss. The exploration for, extraction, and transport of crude oil, natural gas, and other minerals from state lands and waters, and from the federally-controlled Outer Continental Shelf, have required the development of an extensive network of access canals, pipelines, and drilling sites. These activities have contributed greatly to land loss and to ecosystem alterations from ensuing saltwater intrusion (Benoit 1997).

4. Coastal Zone Facts:

Historical Land Loss in Coastal Louisiana - Louisiana has lost 1,900 square miles of land since the 1930s (Barras et al. 1994, Barras et al. 2003, Dunbar et al. 1992). Currently Louisiana has 40% of the total coastal marsh and accounts for 90% of the coastal marsh loss in the lower 48 states (Dahl 2000, Field et al. 1991, USGS 2014).

Current Rate of Coastal Land Loss - Between 1985 and 2010, wetland loss was approximately 17 square miles per year- that is the equivalent of approximately one football field lost every hour. The projected loss over the next 50 years, with current restoration efforts taken into account, is estimated to be approximately 1,750 square miles (CPRA 2012).

Population Living in the Coastal Parishes - In 2012, over 2 million residents- more than 60% of the state's population according to U.S. Census Bureau (USCB) estimates- lived in Louisiana's coastal parishes (USCB 2014).

Louisiana Energy Facts - Among the 50 states, the following are statistics for Louisiana's Primary Energy Production for 2011. Although production is statewide, much comes from the coastal parishes.

	Crude Oil	**Natural Gas**
Including Outer Continental Shelf Production	Ranks 1st	Ranks 2nd
Excluding Outer Continental Shelf Production	Ranks 5th	Ranks 4th

Waterborne Commerce - Louisiana coastal wetlands provide storm protection for ports that carry nearly 450 million tons of waterborne commerce annually, which accounts for 20% of all waterborne commerce in the U.S. Five of the fifteen largest ports in the U.S. are located in Louisiana (USACE 2010).

Commercial Fishing - In 2013, Louisiana commercial landings exceeded one billion pounds with a dockside value of $399 million, which accounts for approximately 30% of the total catch by weight in the lower 48 States (NOAA 2013).

Fur Harvest - Trapping in Louisiana coastal wetlands generates approximately $1.75 million annually (LDWF 2008b).

Alligator Harvest - The Louisiana alligator harvest is valued at approximately $109 million annually (LDWF 2008a).

Waterfowl - Louisiana's coastal wetlands provide habitat for over 5 million migratory waterfowl (LDWF 2011).

Note: The above-listed coastal zone facts change regularly and are only current as of 01/15/2015.

5. Climate:

The climate in Louisiana is relatively mild due to the subtropical influence of the Gulf of Mexico and cooler, drier air from the central plains. Summers tend to be hot and humid and winters are mild. Monthly temperatures range from an average high of 93.3 °F in the summer to an average low of 36.2 °F in the winter. Average yearly precipitation ranges from 66 inches in the southeast to 48 inches in the northwest. The growing season is roughly 220 days in length. Louisiana is impacted by tropical weather disturbances with an average frequency of one tropical storm every 1.6 years, one hurricane every 3.3 years, and a major hurricane every 14 years (Roth 1998). For information on potential changes to Louisiana's climate and possible impacts to Species of Greatest Conservation

Need (SGCN), refer to Chapter 7.

B. Land Ownership and Population Trends

1. Land Ownership:

The state of Louisiana covers 31.4 million acres, of which 3.8 million acres are covered by water (NRCS 2000). Roughly 7% of the state is in federal or state ownership and 93% is privately owned (Hartley et al. 2000). The high degree of private land ownership highlights the vital role private landowners can play in the conservation of the state's wildlife and fisheries resources.

Forestlands cover 48% (13.8 million acres) of the state's land area (LDAF 2004). Private, non-industrial landowners own 62% of the state's forestland, forest-product industries own 29%, and the remaining 9% is in state or federal ownership (LDAF 2004). Agricultural lands cover 42% (11.5 million acres) of the state's land area with 73% (8.4 million acres) of those lands classified as actual crop, pasture or rangelands, 26% (3.0 million acres) classified as other rural lands and 1% (250,007 acres) classified as Conservation Reserve Program (CRP) land (NRCS 2000, 2005).

2. Population Trends:

Louisiana experienced a 1.4% increase in its population from 2000-2010 (USCB 2014). Much of this increase stems from urbanization of cities and is not reflective of overall parish-wide population increases. Areas of the state that experienced some of the greatest increases due to residential development include Ascension, Livingston, St. Tammany, and Tangipahoa parishes, which together comprise a large portion of the East Gulf Coastal Plain Ecoregion (EGCP). In contrast, many parishes in the Upper West Gulf Coastal Plain (UWGCP) and the upper portion of the Mississippi River Alluvial Plain (MRAP) show declining population trends (Fig. 2.1) Habitat fragmentation, degradation, and loss due to the continued population growth and associated development throughout Louisiana are some of the greatest threats to the state's wildlife and fisheries resources.

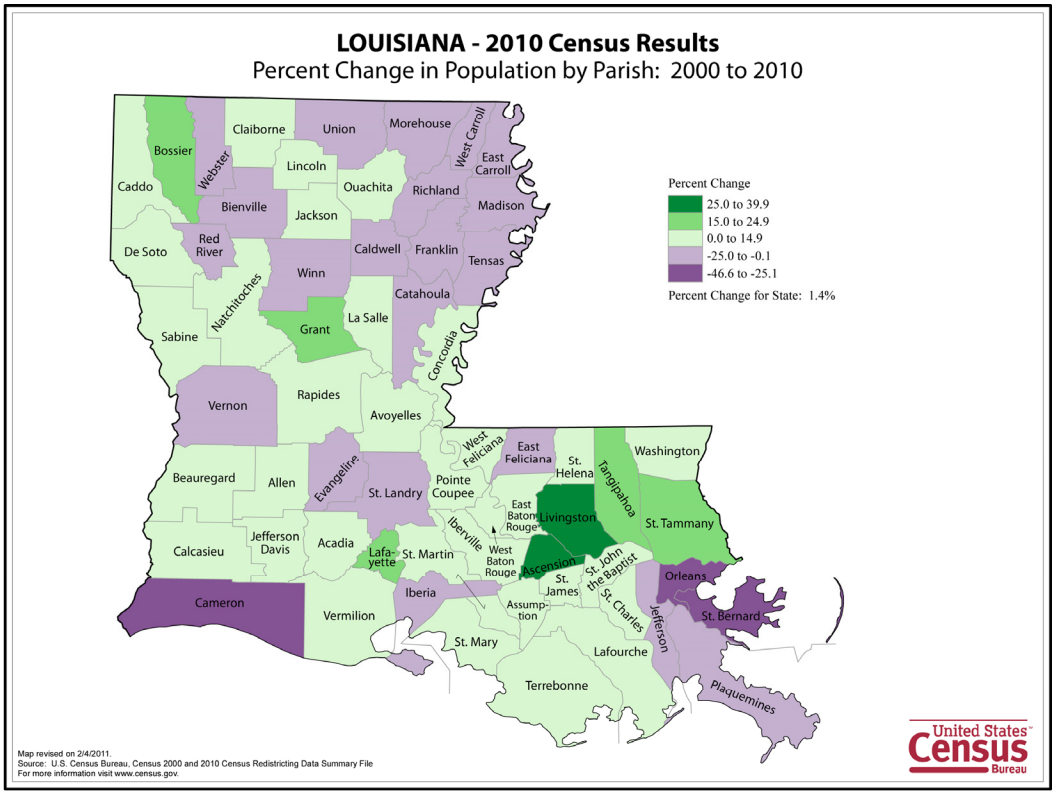

Figure 2.1. Louisiana's population trends by parish from 2000 to 2010.

C. Recent Trends in Consumptive and Non-consumptive Recreational Use in Louisiana

Sportspersons and wildlife watchers across the U.S. spend $144.7 billion annually, 1% of the Nation's gross domestic product. In the southeastern region of the country, 16% of the population identify themselves as anglers, 7% as hunters, and 26% of the population participates in wildlife viewing activities (DOI et al. 2011).

Data provided by the latest National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (DOI et al. 2011) show that for the year 2011, 1.7 million people participated in fishing, hunting, and wildlife-watching activities in Louisiana. These activities resulted in roughly $2.2 billion in expenditures with the majority spent on equipment (45%) and trip-related (45%) expenses. A total of 825,000 anglers participated in fishing and 18.1 million recreational fishing trips were made. Total expenditures were $807 million with 66% trip-related, 30% for equipment, and 4% for other expenses. A total of 277,000 people participated in hunting and 5.2 million hunting trips were made. Total hunting expenditures were $564 million with 43% trip-related, 31% spent on equipment, and 26% for other expenses. A total of 1,010,000 people participated in wildlife-watching activities and 4.9 million trips were made. Total expenditures were $543 million with 51% spent on equipment, 41% trip-related and 8% for other expenses.

D. Ecological Regions and Aquatic Drainage Basins in the State

1. Terrestrial Systems:

Louisiana contains a highly diverse ecological landscape and the physiographic distribution of species often corresponds to ecological boundaries. Areas which share similar ecological attributes such as vegetation, soils, geology, climate, hydrology, and wildlife can be classified as ecoregions. Using an ecoregion approach to conservation planning will allow the Louisiana Department of Wildlife and Fisheries (LDWF) to facilitate the implementation of the Wildlife Action Plan (WAP) by identifying research and information needs, assessing environmental resources, determining regional conservation goals, and maximizing the limited resources currently available for SGCN. For species and habitats, this strategy will follow the ecoregional habitat classification developed by The Nature Conservancy (TNC), which is adapted from Bailey (1995) and modified by the Louisiana Natural Heritage Program (LNHP) (Fig. 2.2). Below are summaries of each ecoregion and major public landowners.

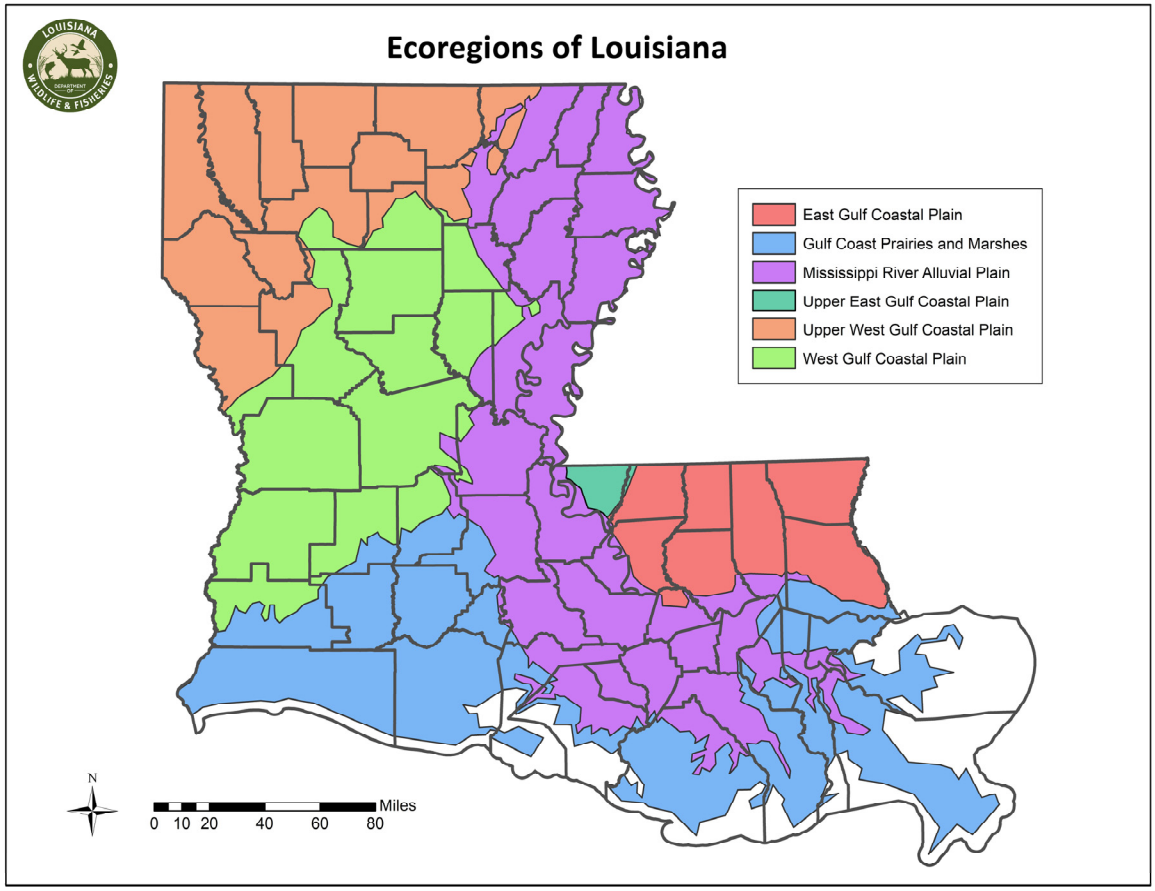

Figure 2.2 Ecoregions of Louisiana

a. East Gulf Coastal Plain

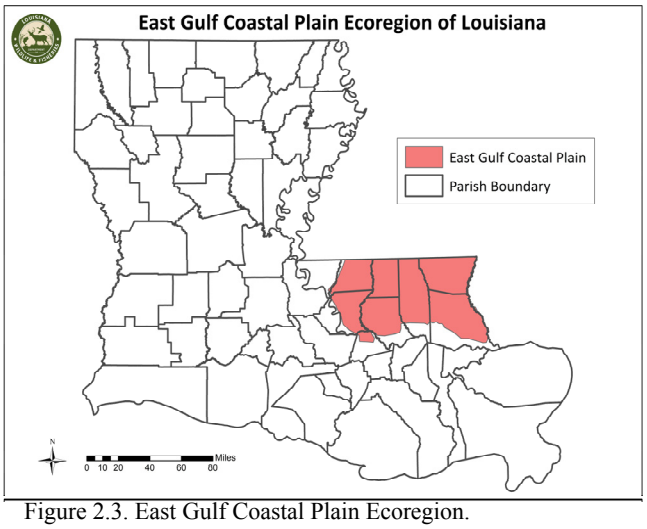

Figure 2.3. East Gulf Coastal Plain Ecoregion.

The EGCP ecoregion extends from southwestern Georgia across western Florida, southern Alabama, and Mississippi, and into the Florida Parishes of Louisiana. It occurs in all or parts of East Feliciana, East Baton Rouge, Ascension, Livingston, St. Helena, Tangipahoa, St. Tammany, and Washington Parishes (Fig. 2.3). There is a transition of natural community types across this ecoregion. The western parishes of East Baton Rouge, Livingston, and Ascension feature flat topography and fertile soils, historically supporting Hardwood Flatwoods and Spruce Pine-Hardwood Flatwoods, with Bottomland Hardwood Forests occurring in riparian areas. Eastern Longleaf Pine Flatwoods Savannas were once one of the predominant natural community types in the southeastern Florida Parishes, which have very infertile soils. Also found in the EGCP are Bayhead Swamps, Eastern Upland Longleaf Pine Woodlands, Eastern Hillside Seepage Bogs, and Slash Pine-Pondcypress-Hardwood Woodlands. Cypress-Tupelo-Blackgum Swamps and Small Stream Forests occur throughout the ecoregion. Table 2.1 lists the primary habitats of the ecoregion.

Table 2.1. Primary Habitats of the East Gulf Coastal Plain Ecoregion

Habitat
Eastern Longleaf Pine Flatwoods Savanna
Eastern Upland Longleaf Pine Woodland
Mixed Hardwood-Loblolly Pine/Hardwood Slope Forest
Shortleaf Pine/Oak-Hickory Woodland
Bottomland Hardwood Forest
Small Stream Forest
Slash Pine-Pondcypress/Hardwood Woodland
Live Oak-Pine-Magnolia Forest
Bayhead Swamp/Forested Seep
Cypress-Tupelo-Blackgum Swamp
Spruce Pine-Hardwood Flatwood
Batture
Coastal Live Oak-Hackberry Forest
Southern Mesophytic Hardwood Forest
Canebrake
EGCP Flatwoods Pond
Xeric Sandhill Woodland
Eastern Hillside Seepage Bog

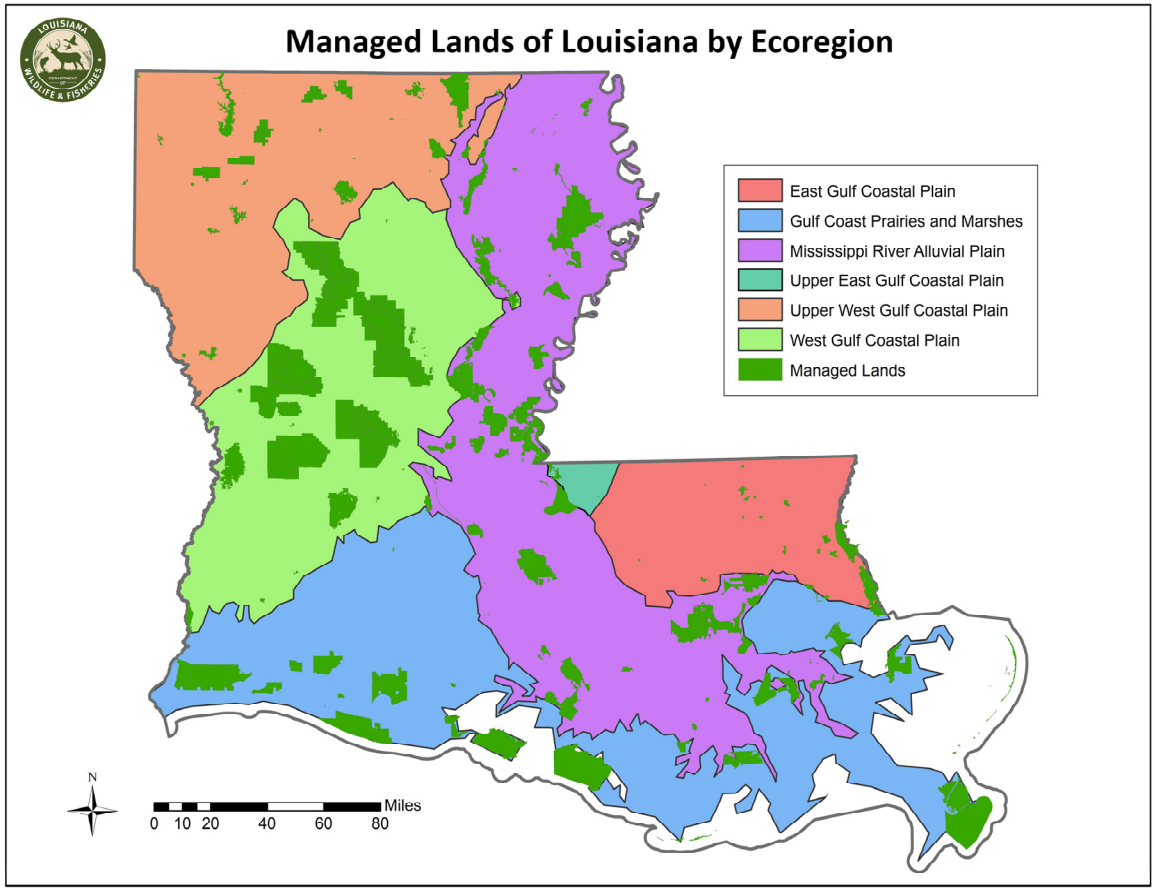

Figure 2.4. Managed areas in Louisiana by Ecoregion

Managed areas within Louisiana comprise 3.3 million acres and are found in all ecoregions of the state (Fig. 2.4). In the EGCP, federal lands include Camp Villere National Guard Base, Bogue Chitto National Wildlife Refuge (NWR) and the northern parts of Big Branch Marsh NWR. Wildlife Management Areas (WMAs) and Refuges include Hutchinson Creek, Sandy Hollow, Waddill, Lake Ramsey, Tangipahoa Parish School Board, and Pearl River WMAs, and St Tammany Refuge. State parks include Tickfaw, Fairview-Riverside, and Fontainebleau. State historic sites include Port Hudson and Centenary.

As one of the areas of Louisiana with the greatest human population growth rate, the EGCP will continue to experience the pressures of urban expansion and this poses the challenge of balancing the needs of wildlife with those of humans.

b. Upper East Gulf Coastal Plain

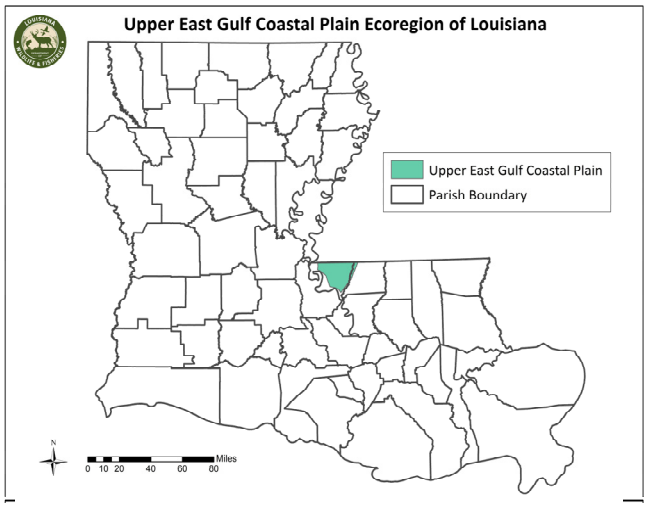

Figure 2.5. Upper East Gulf Coastal Plain Ecoregion.

The Upper East Gulf Coastal Plain (UEGCP) ecoregion includes portions of five states from western Kentucky and Tennessee south through Mississippi and Alabama and into Louisiana in West Feliciana Parish (Fig. 2.5). Within this small area of the state, Southern Mesophytic Hardwood Forest is the predominant natural community type that developed on loess hills with steep ravines and intermittent or spring-fed streams. Other associated community types include Hardwood Slope Forests and Mixed Hardwood-Loblolly Pine Forests. Bottomland Hardwood Forests, Small Stream Forests, and Cypress-Tupelo-Blackgum Swamps also are found in low-lying areas of this ecoregion with level to gentle topography. Table 2.2 lists the primary habitats within the ecoregion. The only state WMA in this ecoregion is Tunica Hills. Other state properties include Locust Grove and Audubon State Historic sites and Tunica Hills State Preservation Area.

Table 2.2 Primary Habitats of the Upper East Gulf Coastal Plain Ecoregion

Habitat
Southern Mesophytic Hardwood Forest
Small Stream Forest
Mixed Hardwood-Loblolly Pine/Hardwood Slope Forest
Cypress-Tupelo-Blackgum Swamp
Bottomland Hardwood Forest

c. Mississippi River Alluvial Plain

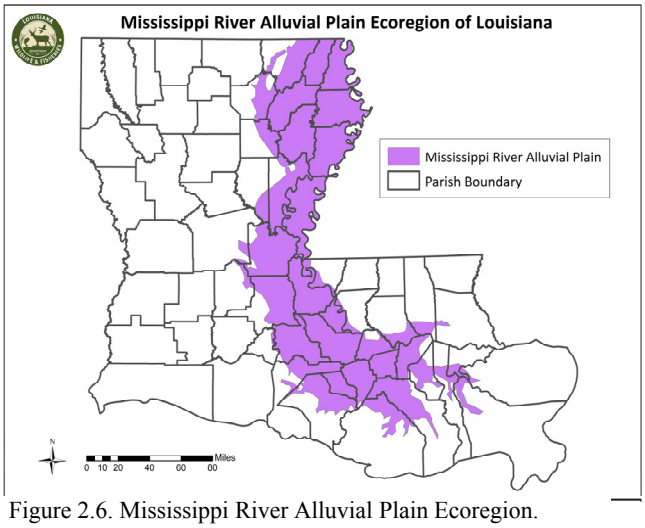

Figure 2.6. Mississippi River Alluvial Plain Ecoregion.

The MRAP ecoregion extends from the southern tip of Illinois down through southeastern Missouri, encompasses all of eastern Arkansas, the delta region of Mississippi and into northeast Louisiana then south along the Mississippi River to where bottomland forests meet coastal marshes. This ecoregion includes all or portions of East Carroll, West Carroll, Morehouse, Ouachita, Richland, Madison, Franklin, Caldwell, Tensas, Catahoula, LaSalle,

Concordia, Avoyelles, Rapides, Evangeline, St. Landry, Pointe Coupee, West Feliciana, West Baton Rouge, East Baton Rouge, Iberville, St. Martin, Lafayette, Iberia, St. Mary, Assumption, Terrebonne, Lafourche, St. James, Ascension, St. John the Baptist, Livingston, Tangipahoa, St. Charles, Jefferson, Orleans, Plaquemines, and St. Bernard Parishes (Fig. 2.6). The MRAP, rich in alluvial sediments, is known primarily for Bottomland Hardwood Forests as well as associated Cypress-Tupelo-Blackgum Swamps. In addition, the northeastern portion of this ecoregion contains both Wet and Mesic Hardwood Flatwoods which are found on Macon Ridge. Table 2.3 lists the primary habitats within the ecoregion.

Table 2.3. Primary Habitats of the Mississippi River Alluvial Plain Ecoregion.

Habitat
Barrier Island Live Oak Forest
Bottomland Hardwood Forest
Batture
Cypress-Tupelo-Blackgum Swamp
Hardwood Flatwoods
Live Oak Natural Levee Forest
Salt Dome Hardwood Forest
Coastal Mangrove-Marsh Shrubland
Brackish Marsh
Canebrake
Freshwater Floating Marsh
Freshwater Marsh
Intermediate Marsh
Mississippi Terrace Prairie
Salt Marsh
Vegetated Pioneer Emerging Delta
Macon Ridge Green Ash Pond
River Delta Freshwater Submersed Aquatic Vegetation
Sandbar

Federal lands include Indian Bayou WMA (USACE), Black Bayou Lake, Handy Break, Tensas River, Bayou Cocodrie, Catahoula Lake, Lake Ophelia, Grand Cote, Cat Island, Atchafalaya, and Bayou Teche NWRs. Wildlife Management Areas include Bayou Macon, Big Colewa Bayou, Floy McElroy, Russell Sage, Big Lake, Buckhorn, Boeuf, Dewey W. Wills, Richard K. Yancey, Grassy Lake, Spring Bayou, Pomme De Terre, Thistlethwaite, Sherburne, Joyce, Manchac, Maurepas Swamp, Acadiana Conservation Corridor, Attakapas Island, and Elm Hall. Ben Lily Conservation Area is located in this ecoregion. State parks include Chemin-A-Haut, Lake Bruin, Lake Fausse Point, and Cypremort Point. State historic sites include Winter Quarters, Marksville, and Longfellow-Evangeline. Poverty Point is a World Heritage site located in Pioneer, LA.

d. Upper West Gulf Coastal Plain

The UWGCP ecoregion extends from south-central and south-western Arkansas to the extreme southeastern portion of Oklahoma and south into eastern Texas east to parts of northern Louisiana. It occurs in all or portions of Caddo, Bossier, Webster, Claiborne, Union, Morehouse, Ouachita, Lincoln, Jackson, Bienville, Natchitoches, Red River, Sabine, and DeSoto Parishes (Fig. 2.7).

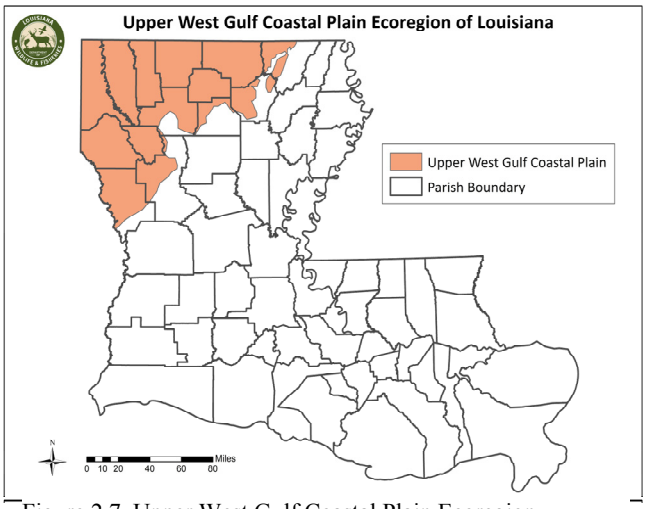

Figure 2.7. Upper West Gulf Coastal Plain Ecoregion.

The UWGCP was once recognized as the Shortleaf Pine-Oak-Hickory Woodland region of Louisiana, existing on sandy and clayey uplands north of the range of Longleaf Pine in the West Gulf Coastal Plain (Newton, 1972). Upon settlement, the majority of the Shortleaf Pine was logged and has been replaced most recently by Loblolly Pine plantations. However, some natural stands of Shortleaf Pine-Oak-Hickory Woodland still exist in this ecoregion. Xeric Sandhill Woodlands occur on xeric sands in the UWGCP. Hardwood Slope Forests and Mixed Hardwood-Loblolly Forests develop on more mesic soils. Wet bottomlands include natural communities such as Bayhead Swamps, Small Stream Forests, Bottomland Hardwood Forests, and Cypress-Tupelo-Blackgum Swamps. Table 2.4 lists the primary habitats within the ecoregion.

Federal lands include the upper parts of Red River, Upper Ouachita, and D'Arbonne NWRs, and the Caney Ranger District of Kisatchie National Forest (KNF). Military lands include Barksdale Air Force Base (AFB), and the Louisiana Army National Guard's Camp Minden. Wildlife Management Areas include Soda Lake, Bayou Pierre, Bodcau, Loggy Bayou, Jackson-Bienville, and Sabine. State Parks include Lake Claiborne, Lake D'Arbonne, Lake Bistineau, and North Toledo Bend. State historic sites include Mansfield, Los Adaes, and Fort Jessup.

Table 2.4. Primary Habitats of the Upper West Gulf Coastal Plain Ecoregion.
Habitat
Shortleaf Pine/Oak-Hickory Woodland
Mixed Hardwood-Loblolly Pine/Hardwood Slope Forest
Western Upland Longleaf Pine Woodland
Small Stream Forest
Bottomland Hardwood Forest
Bayhead Swamp
Cypress-Tupelo-Blackgum Swamp
Xeric Sandhill Woodland
Hardwood Flatwoods
Calcareous Prairie
Calcareous Forest
Batture
Canebrake
Sandstone Glade/Barren
West Gulf Coastal Plain Muck Bog
Western Hillside Seepage Bog
Sparta Sand Pond
Saline Prairie

e. West Gulf Coastal Plain

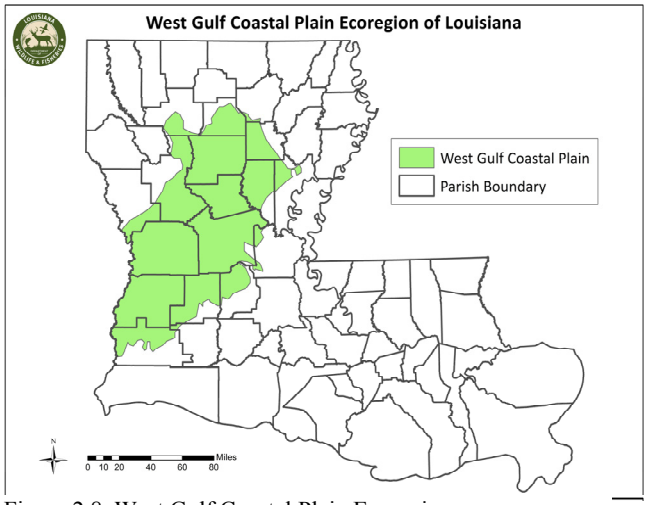

Figure 2.8. West Gulf Coastal Plain Ecoregion.

The West Gulf Coastal Plain (WGCP) ecoregion occurs from central Louisiana into eastern Texas. It includes all or portions of Ouachita, Jackson, Caldwell, Catahoula, LaSalle, Rapides, Avoyelles, Evangeline, Allen, Jefferson Davis, Calcasieu, Beauregard, Vernon, Sabine, Natchitoches, Grant, Winn, and Bienville Parishes (Fig. 2.8). This ecoregion is distinguished by a wide range of natural community types but is primarily known for its Longleaf Pine woodlands. In the central portion of this ecoregion, Western Upland Longleaf Pine Woodlands are found in association with Hardwood Slope Forests, and Mixed Hardwood-Loblolly Forests. Bayhead Swamps and Western Hillside Seepage Bogs occur along slopes and at lower elevations. The WGCP contains unique geologic formations occurring in northeast to southwest bands across the ecoregion from Caldwell to Vernon Parish. These uplifted formations, the Jackson, Catahoula, Cook Mountain, and Fleming formations, present distinctive soil types and conditions which influenced the development of natural community types along these formation bands. Depending on the formation type and degree of uplift, calcareous clays, sandstones, saline deposits, siltstones and ironstones have shaped the development of natural communities such as the Calcareous Forests, Calcareous Prairies, Saline Prairies, and Sandstone Glades/Barrens of

this ecoregion. The south and southwestern portions of the WGCP ecoregion in Louisiana are known for Western Longleaf Pine Flatwoods Savannas and associated Flatwoods Ponds. This portion of the ecoregion is the transition zone between Louisiana's Coastal Prairies and Upland Longleaf Pine Woodlands. Table 2.5 lists the primary habitats within the ecoregion.

Table 2.5. Primary Habitats of the West Gulf Coastal Plain Ecoregion.

Habitat
Hardwood Flatwoods
Shortleaf Pine/Oak-Hickory Woodland
Mixed Hardwood-Loblolly Pine/Hardwood Slope Forest
Western Upland Longleaf Pine Woodland
Small Stream Forest
Bottomland Hardwood Forest
Western Longleaf Pine Flatwoods Savanna
Bayhead Swamp
Cypress-Tupelo-Blackgum Swamp
Calcareous Prairie
Xeric Sandhill Woodland
Calcareous Forest
Saline Prairie
Sandstone Glade/Barren
Canebrake
West Gulf Coastal Plain Muck Bog
Flatwoods Pond
Batture
Sparta Sand Pond
Western Hillside Seepage Bog

Federal lands include the lower portions of Red River NWR and the Calcasieu, Catahoula, Kisatchie, and Winn Ranger Districts of KNF. Military lands include Fort Polk, Peason Ridge, and Camp Beauregard. Wildlife Management Areas include Clear Creek, Sabine Island, Walnut Hills, Marsh Bayou, Alexander State Forest, West Bay, Little River, Elbow Slough, and Sicily Island. State Parks include Jimmie Davis, Chicot, South Toledo Bend, Hodges Gardens, and Sam Houston Jones.

f. Gulf Coast Prairies and Marshes

The Gulf Coast Prairies and Marshes (GCPM) ecoregion occupies the coastal zone of the Gulf of Mexico and stretches from Mexico north through Texas and into Louisiana. In Louisiana it occurs from the southwest portion of Louisiana's Coastal Prairie region and southwest coast, extending east along the entire coastal area to southeast Louisiana. The GCPM occurs in all or portions of Lafayette, Acadia,

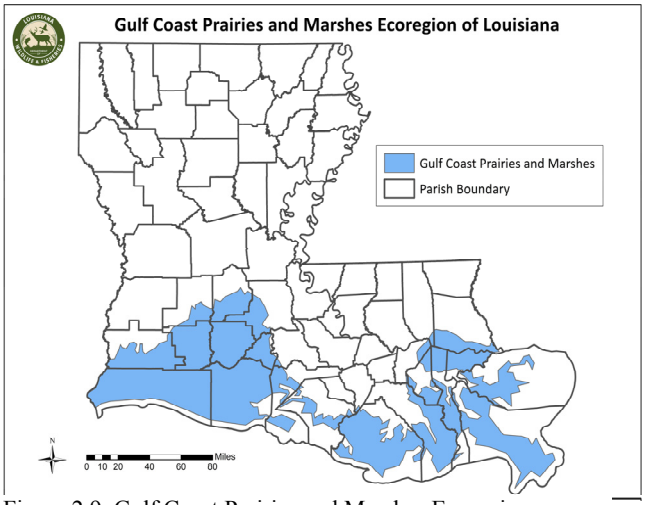

Figure 2.9. Gulf Coast Prairies and Marshes Ecoregion.

St. Landry, Evangeline, Allen, Jefferson Davis, Calcasieu, Cameron, Vermilion, Iberia, St. Mary, Terrebonne, Lafourche, St. Charles, St. John the Baptist, Jefferson, Plaquemines, St. Bernard, Orleans, St. Tammany, and Tangipahoa Parishes (Fig. 2.9).

As its name implies, this ecoregion's boundaries are defined by the Coastal Prairie and marsh natural community types. Louisiana's Coastal Prairies, once encompassing an estimated 2.5 million acres in the southwest portion of the state, now are considered critically imperiled with approximately 3,500 acres remaining. The coastal marsh areas are comprised of Salt, Brackish, Intermediate, and Freshwater Marsh types across the coastal region. Associated natural communities include Cypress-Tupelo-Blackgum Swamps, Coastal Live Oak-Hackberry Forests (Cheniers) of the southwest coast, Live Oak Natural Levee Forests of the southeast coast, and some Bottomland Hardwood Forests. Also, Salt Dome Hardwood Forests are unique to the south-central coast occurring on salt domes in this area. Table 2.6 lists the primary habitats within the ecoregion.

Federal lands include Jean Lafitte National Historic Park and Sabine, Cameron Prairie, Lacassine, Shell Keys, Mandalay, Bayou Sauvage, Breton, and Delta NWRs. Wildlife Management Areas include, Atchafalaya Delta, Pointe-Aux-Chenes, Salvador, Timken, Wisner, Pass-A-Loutre, and Biloxi. State Wildlife Refuges include Rockefeller, State, Elmer's Island, Marsh Island, and Isle Dernieres Barrier Island. White Lake Wetlands Conservation Area is also in this ecoregion. State Parks include Bayou Segnette, Grand Isle, Palmetto Island, and St. Bernard.

Table 2.6. Primary Habitats of the Gulf Coast Prairies and Marshes Ecoregion.

Habitat
Brackish Marsh
Batture
Freshwater Marsh
Intermediate Marsh
Salt Marsh
Barrier Island
Coastal Prairie
Vegetated Pioneer Emerging Delta
Bottomland Hardwood Forest
Coastal Live Oak-Hackberry Forest
Salt Dome Hardwood Forest
Coastal Dune Grassland/Shrub Thicket
Cypress-Tupelo-Blackgum Swamp
Coastal Mangrove-Marsh Shrubland
Live Oak Natural Levee Forest
Live Oak-Pine-Magnolia Forest
Small Stream Forest
Western Longleaf Pine Flatwoods Savanna
Prairie Pothole
Freshwater Floating Marsh
Louisiana Beach
Sandbar
Barrier Island Live Oak Forest

2. Aquatic Systems:

a. Freshwater

Louisiana's abundant bayous, rivers, lakes, reservoirs, and wetlands provide virtually unlimited fishing, hunting, boating and other recreational opportunities which are major contributors to the state's economy. Today, freshwater resources are in high demand for domestic water supplies, irrigation for agriculture, and other residential and industrial uses.

Louisiana has more surface water available (84%) than any other state (XU 2004) and contains over 66,294 miles of rivers and streams, 1,078,031 acres (1,684 square miles) of lakes and reservoirs, 5,550,951 acres (9,191 square miles) of fresh and tidal wetlands, and 4,899,840 acres (7,656 square miles) of estuaries (LDEQ 2012). The Mississippi River and its major tributary, the Red River, along with other major river systems (Ouachita, Black, Calcasieu, Atchafalaya, Sabine, Pearl, Vermilion, and Mermentau), combine to incorporate more than 2,300 miles of navigable waterways.

A vast array of levees has been constructed for flood protection and to channelize water flow in the rivers for navigation. Louisiana has more than 2,000 miles of levees as well as other flood control structures along these rivers. The present conditions of the Red and Pearl Rivers are heavily influenced by locks and dams constructed for navigation and to control water levels. The Sabine, Pearl, Atchafalaya, Ouachita and Black Rivers have all undergone alterations to their natural flow regime.

Riparian areas, found immediately adjacent to stream banks, consist of fairly narrow strips of land to broader bottoms that represent a transition between drier upland areas and streams. Forested riparian areas perform important ecological and environmental services. Riparian areas reduce the amount of sediment and nutrients that reach streams in surface runoff, provide wildlife habitat and wildlife corridors, and lower water temperatures by providing shade. Riparian zones also protect against stream bank erosion, reduce flood peaks by storing flood waters, provide a source of detritus and woody debris for aquatic and terrestrial organisms, and remove and store carbon from the atmosphere. These areas are therefore critical for maintaining healthy streams.

Man-made water bodies account for over one million surface acres of water. Toledo Bend Reservoir, located on the Louisiana/Texas border, is the largest man-made body of water in the South and fifth largest in surface acres in the U.S. The reservoir covers 186,000 acres and has a controlled storage capacity of 4,477,000 acre-feet (1.4 trillion gallons) at conservation pool (172.0 ft. MSL). The reservoir was formed when the Sabine River was impounded for hydroelectric purposes, water supply, and recreation. Many of the state's lakes are small natural oxbows, which are remnants of rivers cut off from the active river channel following course alterations.

b. Water Quality Assessments:

The Louisiana Department of Environmental Quality (LDEQ) completed sampling of all twelve of Louisiana's watershed management basins in 2012. A total of 479 water body management subsegments within the state were monitored once per month for a full year (LDEQ 2012). Designated use categories for the waters of Louisiana are: agriculture, drinking water supply, ecological significance, fish and wildlife propagation, outstanding natural resource, oyster production, and primary and secondary contact recreation. Water quality assessments for fish and wildlife propagation for the four major water body categories in Louisiana are listed in Table 2.7. Some of the major causes for water bodies not supporting their designated uses are: high levels of fecal coliform bacteria, low dissolved oxygen, unsuitable levels of total suspended solids, turbidity, siltation, metals, pesticides, and total dissolved solids. For the water quality assessments given for each basin in Chapter 5, only the designated use that is deemed most relevant to SGCN, fish and wildlife propagation, is addressed.

Table 2.7. Summary of Fish and Wildlife Propagation Assessments for Louisiana's water bodies (Reported in miles/acres (water body count)).

	Fully Supporting	Not Supporting	Not Assessed	Total Size for Designated Use
Rivers and Streams	2,661 (88)	6,574 (248)	32 (3)	9,267 (339)
Lakes	39,458 (11)	616,430 (50)	2,322 (4)	658,210 (65)
Estuaries	1,212 (17)	3,742 (35)	0	4,954 (52)
Wetlands	622,720 (3)	402,560 (3)	51,733 (10)	1,077,013 (16)

Source: Louisiana Department of Environmental Quality (2012)

c. Louisiana's Natural and Scenic Rivers:

Louisiana's Natural and Scenic River System (System) is one of the nation's largest, oldest, most diverse, and unique state river protection initiatives. It encompasses 57 streams or stream segments totaling over 3,000 miles in length (LDWF 2014) (Table 2.8, Fig. 2.10). In the early 1970's the Louisiana Natural and Scenic River Act (Act) was passed by the Louisiana State Legislature, creating the System and setting certain requirements for a river to meet for inclusion in the program. The System was developed for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regimes of certain free-flowing Louisiana streams. The Act also contains a regulatory component, and designated the LDWF Secretary to administer the System.

Six activities are prohibited on designated Natural and Scenic Rivers because of their detrimental ecological impacts on the streams. These prohibited uses include, (1) channelization, (2) clearing and snagging, (3) channel realignment, (4) reservoir construction, (5) commercial clear cutting of trees within 100 feet of the ordinary low water mark, and (6) use of a motor vehicle or other wheeled or tracked vehicle on a system stream, except for direct crossings by immediately adjacent landowners.

Scenic River Permits are required for all activities on or near System Rivers that may detrimentally impact the ecological integrity, scenic beauty, or wilderness qualities of those rivers. These permits, when granted, contain specific conditions aimed at preserving the stream's natural character and quality. Activities that must be permitted include, but are not limited to:

- Bridge, pipeline, and power line crossings
- Bulkheads, piers, dock, and ramp construction
- Waste water discharges
- Land development adjacent to the river

Table 2.8. Area, scenic rivers, and percent land use of aquatic basins in Louisiana.

			Major Land Uses (%)		
Basin	**Area (miles)^2**	**Scenic Rivers**	**Forested**	**Agriculture**	**Urban**
Atchafalaya	2,374	0	19	15	1
Barataria	2,520	1	1	10	3
Calcasieu	4,270	9	51	26	3
Mermentau	4,786	0	8	57	2
Mississippi	1,886	0	20	18	3
Ouachita	7,644	11	59	29	2
Pearl	914	7	47	24	4
Pontchartrain	7,637	23	26	12	5
Red	7,500	5	54	30	3
Sabine	3,257	1	54	14	2
Terrebonne	3,979	0	11	14	2
Vermilion — Teche	47	2	16	47	4

Source: Louisiana Department of Environmental Quality (1993) and LNHP database.

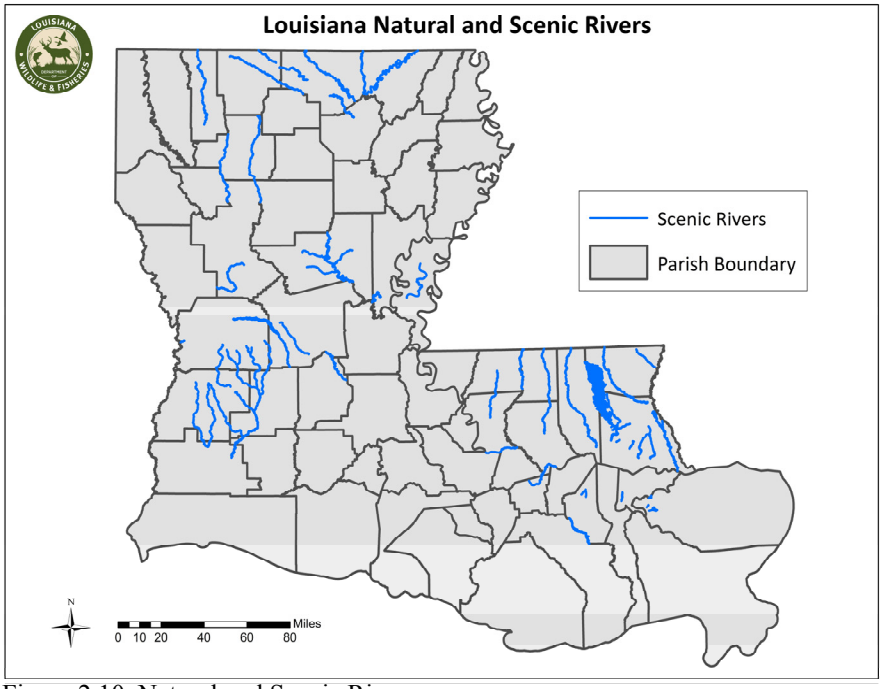

Figure 2.10. Natural and Scenic Rivers

d. Management Basins:

Louisiana has twelve water quality management basins delineated by the natural drainage patterns of the state's major river basins (Fig. 2.11). Each water quality management basin is subdivided into stream segments in which the hydraulic and water quality characteristics are fairly constant. Land use in the basins is dominated by silviculture and agriculture, although the percentage of urban use is considerable in the Pontchartrain Basin (Table 2.8). The Pearl and Pontchartrain Basins have the highest aquatic species diversity, relative to their area and, along with the Mississippi Basin contain the highest number of SGCN (Table 2.9).

Table 2.9 Aquatic basins and associated aquatic SGCN listed by taxa.

Basin	Amphibian	Crustacean	Inland Fish	Insect	Marine Fish	Mollusk	Reptile	Total
Atchafalaya	0	1	8	0	14	2	11	36
Barataria	0	4	3	0	15	1	8	31
Calcasieu	1	8	6	2	10	7	11	45
Mermentau	1	5	3	1	10	1	11	32
Mississippi	0	5	20	0	15	13	12	65
Ouachita	1	4	17	10	0	23	5	60
Pearl	1	7	20	2	13	14	13	70
Pontchartrain	1	6	11	3	14	16	10	61
Red	1	8	15	11	0	11	5	51
Sabine	1	7	10	1	11	9	12	51
Terrebonne	0	4	2	0	15	0	10	31
Vermilion-Teche	0	5	2	0	14	4	10	35

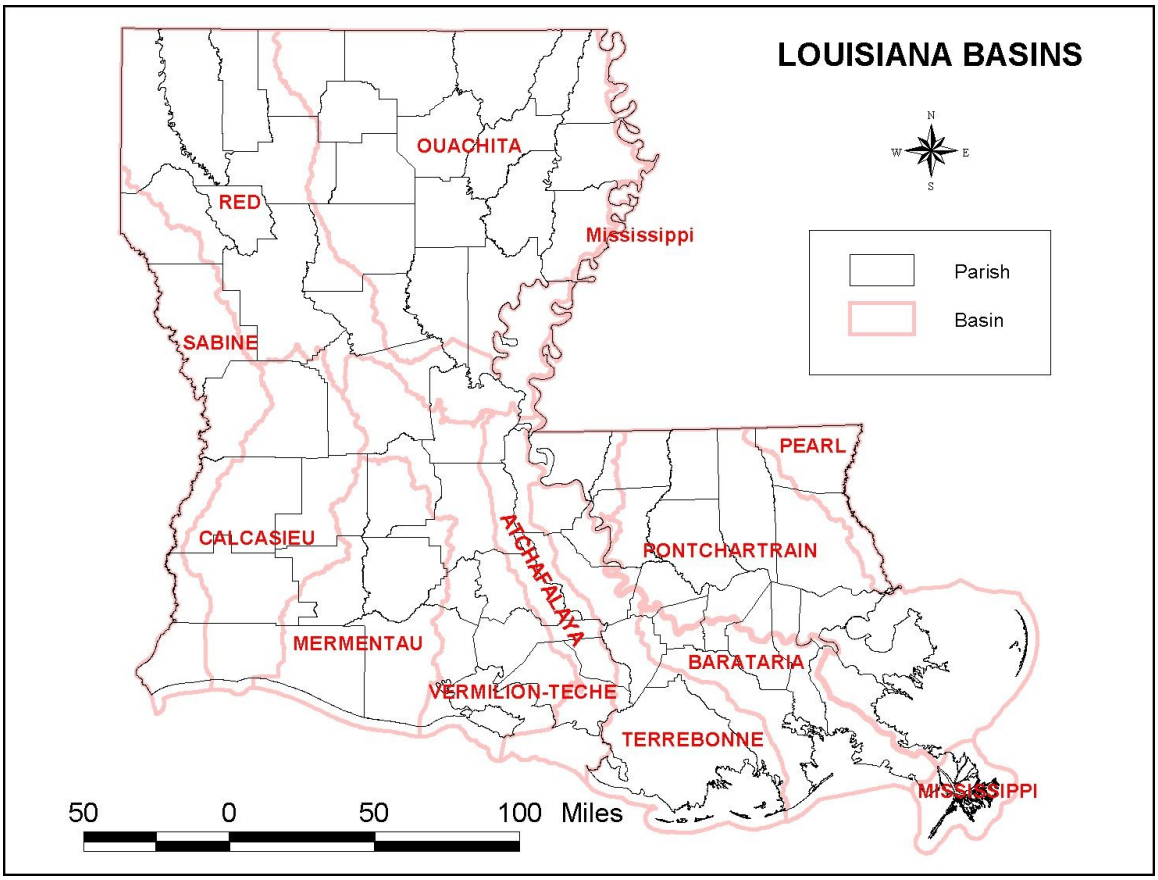

Figure 2.11. Aquatic basins in Louisiana.

1. *Atchafalaya Basin*

The Atchafalaya River Basin is located in south-central Louisiana. The Atchafalaya River, a distributary of the Red, Black, and Mississippi Rivers, presently carries about 30% of the combined flow of those three rivers. The basin is well-defined by a system of levees which surround it on the north, east, and west. The entire basin serves as a major floodway for the Mississippi River. The Atchafalaya Basin is predominantly Bottomland Hardwood Forest and Cypress-Tupelo-Blackgum Swamp, and constitutes the largest contiguous freshwater swamp in the U.S. However, the lower distributary area contains Freshwater, Intermediate, Brackish, and Salt Marsh, as well as Vegetated Pioneer Emerging Delta at the Atchafalaya and Wax Lake Deltas. These deltas represent the most significant accretion on the Louisiana coast. The beneficial use of dredge spoil resulting from the maintenance of navigation channels within these deltas has resulted in the creation of multiple islands that are utilized by colonial nesting waterbirds.

2. *Barataria Basin*

The Barataria Basin lies in the eastern coastal region of the state. This basin is bounded on the north and east by the lower Mississippi River, on the west by Bayou Lafourche, and on the south by the Gulf of Mexico. The major receiving waterbody in this basin is Barataria Bay. The Barataria Basin consists largely of Bottomland Hardwood Forest and Freshwater to Brackish Marshes, having some Salt Marsh on the fringes of Barataria Bay. Elevations in this basin range from minus two feet to four feet above sea level. This basin contains some of the most productive barrier islands in Louisiana for nesting birds, as well as the only occurrence of Barrier Island Live Oak Forest in the state. Bayou des Allemands is the only designated natural and scenic river to occur in this basin.

3. *Calcasieu Basin*

The Calcasieu River Basin is located in southwest Louisiana and is aligned in a north-south direction. Headwaters of the Calcasieu River are in the hills west of Alexandria. The river flows south for about 160 miles to the Gulf of Mexico. The mouth of the river is about 30 miles east of the Texas-Louisiana state line. This basin encompasses a portion of the prairie region of southwest Louisiana, and Bottomland Hardwood Forest and Cypress-Tupelo-Blackgum Swamps are found along the river and its tributaries. The landscape in this basin varies from pine-wooded hills in the upper end to Brackish and Salt Marshes in the lower reaches around Calcasieu Lake. There are nine designated natural and scenic rivers found in this basin including: Barnes Creek, Beckwith Creek, Bundicks Creek, Calcasieu River, Drake's Creek, Hickory Branch, Six Mile Creek, Ten Mile Creek, and Whiskey Chitto Creek.

4. *Mermentau Basin*

The Mermentau River Basin is located in southwestern Louisiana and encompasses

the prairie region of the state and a section of the coastal zone. The Mermentau River Basin is bounded on the north and east by the Vermilion-Teche River Basin, on the west by the Calcasieu River Basin, and on the south by the Gulf of Mexico. Little of the historic Coastal Prairie habitat remains and the dominant habitat type is agricultural land. Bottomland Hardwood Forest and Cypress-Tupelo-Blackgum Swamps occur along the Mermentau and its larger tributaries. Freshwater, Intermediate, and Brackish Marshes constitute the majority of coastal wetlands in this basin with some Salt Marsh along the Gulf of Mexico.

5. *Mississippi Basin*

The upper Mississippi River forms the boundary between Louisiana and Mississippi, flowing in a southerly direction. The lower Mississippi River flows southeasterly through the southeastern section of Louisiana. The upper Mississippi does not receive tributary flow from the Louisiana side, which is leveed. Tributaries do enter from Mississippi, including the Yazoo, Black, Homochitto, and Buffalo Rivers and Bayou Pierre. Tributary flow is received by the lower Mississippi from Thompson's Creek, Bayou Sara, and Tunica and Monte Sano Bayous between the Old River Control Structure and Baton Rouge. The river is leveed on both the east and west banks from Baton Rouge below Monte Sano Bayou to Venice. This stretch of the river is also heavily industrialized, receiving numerous industrial discharges from Baton Rouge to New Orleans. The birdsfoot delta of the Mississippi, where it flows into the Gulf, consists of fresh and intermediate marshes. The habitat of the upper portion of the basin, within the levee-created Batture lands, contains mostly Bottomland Hardwood Forests and agricultural lands. The Mississippi River delta is losing land faster than any other area in the world due to anthropogenic factors including flood control and navigational modifications.

6. *Ouachita Basin*

The Ouachita River's source is located in the Ouachita Mountains of west-central Arkansas near the Oklahoma border. Most of the basin consists of rich, alluvial plains cultivated in cotton and soybeans. Natural habitats in this basin consist primarily of Bottomland Hardwood Forests and Hardwood Flatwoods. Bayou Bartholomew contains the state's highest fish and mollusk diversity, and contains several federally listed mollusks. Eleven designated natural and scenic rivers are found in this basin, which include Bayou Bartholomew, Bayou D'Arbonne, Bayou D 'Loutre, Big Creek, Corney Bayou, Fish Creek, Little River, Middle Fork of Bayou D'Arbonne, Ouachita River, Saline Bayou (Catahoula and LaSalle parishes), and Trout Creek.

7. *Pearl Basin*

The Pearl River Basin lies along the southeastern Louisiana–southwestern Mississippi border. This basin is bordered on the north by the Mississippi state line, by the Pearl River to the east, and on the west and south by the Lake Pontchartrain Basin. Elevations in the basin range from 350 feet above sea level in the northwest portion to sea level at the southern end. Correspondingly, the vegetation varies from pine forests and

Bottomland Hardwood Forest to Freshwater and Brackish Marsh.

Seven Louisiana designated natural and scenic rivers lie within the basin, including Pushepatapa Creek, the Bogue Chitto River, Holmes Bayou, Bradley Slough, Wilson Slough, Morgan River, and the West Pearl River.

8. *Pontchartrain Basin*

The Lake Pontchartrain Basin, located in southeastern Louisiana, consists of the tributaries and distributaries of Lake Pontchartrain, a large estuarine lake. The basin is bounded on the north by the Mississippi state line, on the west and south by the east bank Mississippi River levee, on the east by the Pearl River Basin, and on the southeast by Breton and Chandeleur Sounds. This basin includes Lake Borgne, Breton Sound, Chandeleur Sound, and the Chandeleur Island chain. The wooded uplands in the northern part of the basin consists of both pine and hardwood forests. The southern portions of the basin consist of Cypress-Tupelo-Blackgum Swamps, Bottomland Hardwood Forests, and Brackish and Salt Marshes. The marshes of the southeastern part of the basin constitute one of the most-rapidly eroding areas along the Louisiana coast. Elevations in this basin range from minus five feet at New Orleans to over two hundred feet near the Mississippi border. This basin contains the highest number of designated natural and scenic rivers in the state, with 23. These include the Abita River, the Amite River, Bashman Bayou, Bayou Bienvenue, Bayou Cane, Bayou Chaperon, Bayou Chinchuba, Bayou Dupre, Bayou Labranche, Bayou Lacombe, Bayou Liberty, Bayou Manchac, Bayou St John, Bayou Trepagnier, Blind River, the Bogue Falaya River, the Comite River, Lake Borgne Canal, Pirogue Bayou, the Tangipahoa River, the Tchefuncte River and tributaries, Terre Beau Bayou and the Tickfaw River.

9. *Red Basin*

The Red River has its origin in eastern New Mexico and flows across portions of Texas, Oklahoma, and Arkansas before entering northwestern Louisiana. The river flows southward to Shreveport, where it turns southeastward and flows for approximately 160 miles to its junction with the Atchafalaya River. From the Arkansas state line to Alexandria, the Red River is contained within high banks which range from 20 to 35 feet above low water level. Below Alexandria, the river flows through a flat alluvial plain that is subject to backwater flooding during periods of high water. There are a wide variety of habitats found in this basin from Oxbow Lakes to Calcareous Prairies. Much of the area adjacent to this river and its tributaries is composed of Bottomland Hardwood Forest and Cypress-Tupelo-Blackgum Swamp. The Oxbows along the Red River were formed by the Great Raft which extended from the Arkansas state line south for 165 miles. This log jam was removed in the mid 1800s and as a result Silver, Soda and Cross Lakes were drained. A dam was installed on Cross Lake to maintain water levels. Designated natural and scenic rivers include Bayou Cocodrie (Concordia Parish), Bayou Dorcheat, Bayou Kisatchie, Black Lake Bayou, and Saline Bayou (Bienville, Winn, and Natchitoches parishes).

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10. *Sabine Basin*

The Sabine River Basin lies along the Texas-Louisiana border. The basin stretches from the Texas state line near Shreveport to Sabine Lake and the Gulf of Mexico. It is bounded on the east by the Red River Basin and Calcasieu River Basin. Elevation varies greatly along the length of the river, with areas near the coast at or near sea level. Characteristic vegetation ranges from mixed forests in the upper basin to Bottomland Hardwood Forest in the mid-section and Intermediate, Brackish and Salt Marshes in the lower end. Toledo Bend Reservoir is located in the Sabine Basin along the Louisiana-Texas border. The reservoir extends approximately 65 miles from the dam to the vicinity of Logansport. This reservoir is the 5th largest in the U.S., with an average surface area of 186,000 acres. The reservoir was created to provide a water supply, hydroelectric power, and for recreation. Pearl Creek is the only designated scenic and natural river in this basin.

11. *Terrebonne Basin*

The Terrebonne Basin covers 1,712,500 acres in south-central Louisiana, bordered by Bayou Lafourche to the east, the Atchafalaya Basin floodway to the west, the Mississippi River to the north, and the Gulf of Mexico to the south. This basin varies in width from 18 to 70 miles. This basin is bounded on the west by the Atchafalaya River Basin and on the east by the Mississippi River and Bayou Lafourche. The topography of the entire basin is lowland, and all the land is subject to flooding except the natural levees along major waterways. The coastal portion of the basin consists of Freshwater, Intermediate, Brackish, and Salt Marshes, as well as Barrier Islands, including the Isles Dernieres Barrier Island Refuge and East Timbalier Island NWR. The Isle Dernieres Barrier Islands Refuge consists of a series of barrier islands, including Wine Island, East Island, Trinity Island, Whiskey Island, and Raccoon Island.

12. *Vermilion – Teche Basin*

The Vermilion-Teche River Basin lies in south-central Louisiana. The upper end of the basin lies in the central part of the state near Alexandria, and the basin extends southward to the Gulf of Mexico. The basin is bordered on the north and northeast by a low escarpment and the lower end of the Red River Basin. The Atchafalaya River Basin is to the east, and the Mermentau River Basin is to the west. Water in this basin is managed primarily for agricultural uses; as a result there are sedimentation, dissolved oxygen, and turbidity issues in these river systems. The wooded uplands of the northern part of the basin consist of both upland pine and Bottomland Hardwood Forest. The central and southern portions of the basin consist largely of agricultural lands and the coastal zone is a mixture of Fresh, Intermediate, and Brackish Marshes. Designated natural and scenic rivers found in this basin include Bayou Cocodrie (Rapides and Evangeline parishes) and Spring Creek.

e. Marine

Marine habitats are generally seaward of the Gulf Intracoastal Waterway (GIWW) and extend out to the three-mile limit. Louisiana's coastal zone is divided into seven coastal study areas by LDWF's Marine Fisheries Section (Fig. 2.12).

Coastal marshes and beaches occupy a transition zone between the open water of the Gulf of Mexico, and the upland forests and grasslands north of the immediate coast. Within this coastal zone, a variety of natural and anthropogenic processes contribute to the dynamic nature of these habitats. Louisiana's marshes are extremely productive habitats, and provide shelter for the juvenile stages of many marine species. Coastal forests provide invaluable stopover habitat for Neotropical migrant landbirds.

Louisiana's estuarine and marine habitats are characterized by dynamic salinity regimes, riverine sedimentation patterns, and high productivity. The Mississippi River and its distributary the Atchafalaya River are the ecological drivers of these systems, providing sediment and nutrients to coastal estuaries and fueling high productivity. Estuarine systems in southeastern Louisiana represent the remnants of five major cycles of delta building, resulting in large regressive delta formations dominated by organic sedimentation. The coastal marsh component of these estuaries is also experiencing the highest rate of wetland loss in the nation. Southwest Louisiana is dominated by relict beach ridges with interspersed marshes. Coastal water bodies in this region are enclosed estuaries rather than the expansive open bays of the southeast. These estuaries are heavily impacted by human marsh management and navigational changes to the landscape.

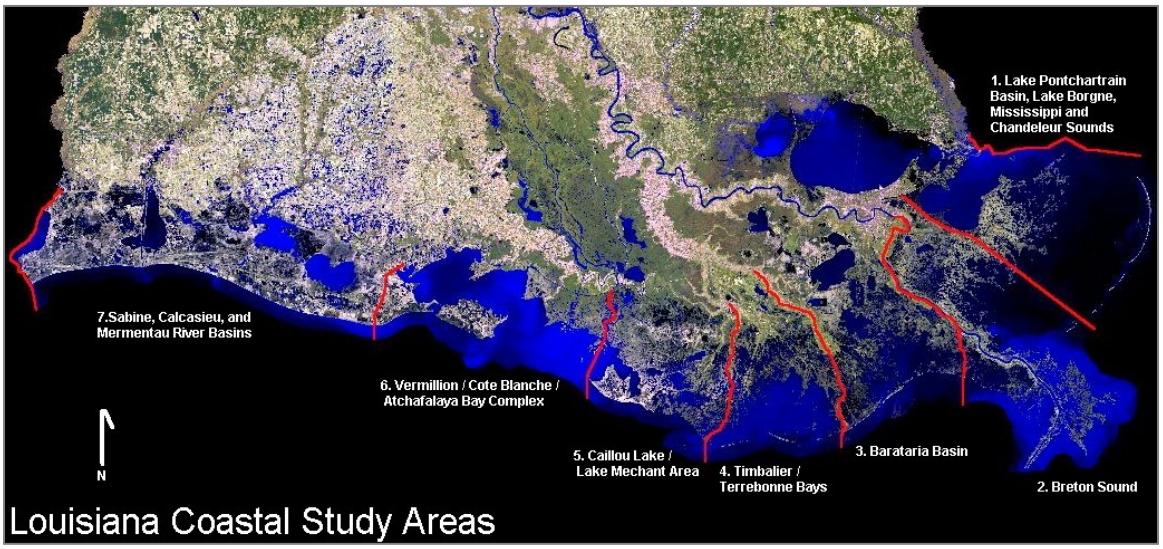

Figure 2.12. Louisiana's coastal study areas.