



U.S. Army Corps
of Engineers

Louisiana Coastal Protection and Restoration

ENCLOSURE D

Existing Environmental Conditions

Preliminary Technical Report to Congress
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EXISTING ENVIRONMENTAL CONDITIONS

WETLANDS

Preliminary analysis of satellite imagery by the LSU Coastal Studies Institute indicates that Hurricane Katrina caused very heavy damage to the marshes south and east of Lake Borgne in St. Bernard Parish. Assessments by the U.S. Geological Survey indicates that approximately 40.9 square miles) of land in the Breton Sound Basin in Plaquemines Parish has been converted to open water. Approximately 19 square miles of land was lost in the Pontchartrain Basin.

Numerous environmental conditions, natural and artificial, have influenced the distribution and successional patterns of vegetated communities during Louisiana's coastal formation. Louisiana's vast wetlands have evolved into dynamic coastal ecosystems largely influenced by accretion, submergence, flooding, and salinity regime changes, to name a few. Storms such as Hurricanes Katrina and Rita, which made landfall in Louisiana on August 29, 2005 and September 24, 2005 respectively, are part of the evolution of coastal ecosystems. Hurricanes help form and alter the shape of coastlines and play a role in maintaining plant species diversity. Prior to the 2005 hurricane season, Louisiana led the nation in wetland loss, averaging some 25.3 square miles lost each year. Since 1932, the state has lost an estimated 1900 square miles of coastal wetlands.

Many of the wetland areas along the Louisiana coast experienced wetland loss prior to the 2005 hurricanes. While on ground inspections have not been completed, aerial photography indicates damage observed could further accelerate marsh loss in these coastal areas. Damages to marsh habitat can be seen as compressed marsh, marsh balls (marsh piled, rolled, or deformed), and sediment deposition in thicknesses that can kill vegetation or sink floating marsh (Dunbar et al. 1992; Jackson et al. 1992). Other wetland damage includes erosion, vegetative scour (plant roots being torn from soil surface), and salt burning (saline water killing or damaging salt-sensitive species) (Dunbar et al. 1992; Jackson et al. 1992; Stone et al. 1993; Stone et al. 1997; Lovelace and McPherson 1998). Storms and hurricanes, depending on strength and intensity, can also blow over, defoliate, and/or cause major structural damage to trees well beyond the coastal zone (Lovelace 1998).

Marshes

Marshes of the project area provide habitat and a food source for fish and wildlife species. The project area is comprised primarily of fresh (salinity range 0—3 ppt), intermediate (salinity range 2-5 ppt), brackish (salinity range 4-15 ppt), and saline marshes (salinity >12 ppt). The most common vegetation species of fresh marsh include alligator weed, common rush, maidencane, swamp knotweed, pickerelweed, bulltongue, cattail, and giant cutgrass. The most common vegetation species of intermediate marsh include of wiregrass, deer pea, bulltongue, wild millet, bullwhip, and sawgrass. The most common vegetation species of brackish marsh include coastal waterhyssop, dwarf spikesedge, saltmarsh morningglory, seashore paspalum, common reed, Olney bulrush, saltmarsh bulrush, and wiregrass (Chabreck and Condrey 1979). The most common vegetation species for saline marsh include smooth cordgrass, perennial glasswort, salt grass, black needlerush, and salt marsh bulrush. The marshes serve as a sediment trap, wildlife

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habitat, and as an estuarine fish and shellfish nursery. Marsh vegetation contributes organic detritus, which, along with other sources, forms the basis of the estuarine foodchain. The marsh also provides an important wintering and stop over point for migratory waterfowl and neotropical migrants, as well as habitat for wading and shore birds.

Past research of hurricane impacts to coastal environments clearly describes the impacts associated with the passage of hurricanes on coastal environments. Field evidence indicates the presence of sediment overwash, ripped and torn marsh, erosion of pond and lake margins, wrack (large amounts of plant debris) deposition, and lateral compression of marshes. Substantial sediment deposition associated with the passage of the storm seems to have resulted, in some cases, in the burial of the pre-storm surface and the smothering of vegetation. Extensive areas of marsh appear to have been pushed against firm barriers (for example, levees and firmly grounded marsh), resulting in a ridge and trough pattern. Areas of wrack have completely buried vegetation in some areas. Freshwater marsh species exposed to water, half as saline as seawater, have experienced a “burning” effect (aboveground portions of the plants are killed). In some marsh zones, unconsolidated or weakly rooted marsh has been eroded. As seen after Hurricane Andrew, differences in the vertical elevation, the amount of organic material and the amount of new sediment surface has likely created complex gradients of soil moisture, salinity, and nutrient availability.

Swamps

Forested wetlands in the project area are comprised primarily of swamp forest, bottomland hardwood forest, and wet pine flatwood forest. Extensive coastal swamps are found in the Pontchartrain, Barataria, Terrebonne, and Atchafalaya basins where they generally occupy the area between freshwater marshes and developed areas of higher elevation. Healthy cypress swamps occur only in freshwater areas experiencing minimal daily tidal action and where the salinity range does not exceed two parts per thousand (ppt). Both the bottomland hardwood forests and wet pine flatwoods occur only in fresh areas. Bottomland forests exist primarily in broad floodplains and distributary ridges of the Atchafalaya River and on the distributary ridges of the Mississippi River. Wet pine flatwoods in South Louisiana are generally found on poorly drained flats and depressional areas in the “Florida Parishes”.

Given the severity of Hurricanes Katrina and Rita, it is likely that forested wetlands throughout the Louisiana coast have received some amount of damage. Past research on impacts from Hurricane Andrew on forested landscapes varied greatly with forest type, canopy structure, topography, and location relative to the proximity of the storms path. The majority of loss of tree density and canopy was restricted to bottomland hardwood forest. The recovery of these forests will depend on the previous forest cover, type of damage, the specific environmental conditions created, and availability of seeds and seedlings. Initial reconnaissance suggests that forested wetlands occurring on isolated ridges within the eastern side of the project area, may not recover naturally as a result of what appears to be severely altered hydrology. Altered salinity gradients may make less salt tolerant species unable to become reestablished.

Cheniers

The Chenier Plain of southwestern Louisiana, with elevations of approximately 6 to 20 ft (2 to 6 m), extends from Sabine Pass, Texas to Southwest Point, Louisiana. The Chenier Plain consists of multiple shore-parallel, sand-rich ridges that are perched on and physically separated from one another by relatively finer-grained, clay-rich sediments. Oak trees (“cheniers” in French) grew on these ridges and gave the region its name. The Chenier Plain evolved during the Holocene as a sequence of progradational mudflats that were intermittently reworked into sandy or shell ridges to form the modern topography. Numerous cycles of deposition and erosion created alternating ridges separated by marshlands. These processes concentrated the coarse-grained sediments and formed shore-parallel ridges called “cheniers” (Gould and McFarlan 1959; Byrne et al. 1959). Introduction of new sediment by westward shifts of the Mississippi River Delta resulted in the isolation of these ridges by accretion of new material on the existing shoreline. Thus, repeated seaward growth and retreat along the Chenier Plain is a consequence of deltaic deposition farther east as well as the periodic cessation of sediment supply to the Chenier Plain as deltaic depocenters were abandoned. Currently, the Atchafalaya River is supplying the Chenier Plain with fine sediments by westward-directed longshore transport of fine-grained material.

Also known as chenier maritime forest, this is a natural community that formed on abandoned beach ridges primarily in southwest Louisiana, although abandoned beach ridges and stream levees in the southeast are also locally known as cheniers. Live oak and hackberry (also referred to as sugarberry) are the dominant canopy species, and other common species are red maple, sweet gum, water oak, green ash, and American elm. These species populate ridges composed primarily of reworked sand and shell that are normally four to five feet (1.2 to 1.5 m) above sea level. Cheniers serve as natural hydrologic buffers, providing some protection for the interior marshes against saltwater intrusion. Hurricane Rita’s storm surge pushed inland more than 20 miles, overtopping the cheniers by as much as 10 feet. The surge lifted and moved areas of floating fresh marsh in the western Terrebonne basin. Salt water became trapped behind the cheniers, possibly causing long term damage to fresh marsh.

WILDLIFE

The biodiversity characterizing coastal Louisiana is nationally significant. Coastal Louisiana contains an estimated 30% of the coastal marshes of the contiguous United States; a little more than half of the 30% occurs within the project area impacted by Hurricanes Katrina and Rita. Louisiana’s coastal wetlands provide important habitats for various life cycle phases for over 50 rare, threatened, or endangered species. Coastal Louisiana’s marshes, swamps, and associated habitats support millions of neotropical birds and other migratory species such as rails, gallinules, shorebirds, wading birds, waterfowl, and numerous songbirds. The rigors of long distance flight require most migratory birds to rest and refuel several times before they reach their final destination. Vast areas of wetlands occurring in the project area provide essential stopover habitat on their annual migration routes. During the spring, many of these birds are on their way to nesting areas further north. Migration in the fall is important since it provides resting and refueling habitat prior to crossing the Gulf of Mexico. These advantages greatly enhance survival of individual migrating birds, increases in population size, and in time, survival potential for the species as a whole.

The project area also plays an important role in the fur industry, which has placed coastal Louisiana as one of the leaders in fur-production for North America. Common furbearers include nutria, mink, muskrat, raccoon, and river otter. The coastal marshes, swamps, and cheniers also support game mammals such as white-tailed deer and swamp rabbit and smaller mammals such as bats, mice, and squirrels. Louisiana marshes provide abundant habitat for many reptiles, most notably the American alligator. The swamps and fresh/intermediate marshes support many amphibians, especially various frog species.

The largest impact on wildlife within the project area is the impact to the habitat affected. The majority of wildlife species can survive and will return if they have habitat left. In isolated areas, some species populations may experience stressors leading to minor die-offs associated with disease, but overall, wildlife populations are resilient. Quantitative data on wildlife populations occurring in the project area do not exist for post hurricane conditions.

FISHERIES AND ESSENTIAL FISH HABITAT

Essential Fish Habitat (EFH) consists of “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity”[Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Public Law 104-297)]. Specific categories of EFH (<http://www.gsmfc.org/efh.html>) include all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), including the sub-tidal vegetation (seagrasses and algae) and adjacent inter-tidal vegetation (marshes and mangroves). Fisheries and EFH are publicly significant because of the high value that the public places on the seafood and the recreational and commercial opportunities EFH provides.

Much of the project area is in coastal wetlands, which are habitat for small resident fishes and shellfishes such as least killifish, rainwater killifish, sheepshead minnow, mosquitofish, sailfin molly, grass shrimp, and others. Those species are typically found along marsh edge or among submerged aquatic vegetation, and provide forage for a variety of fish and wildlife. Coastal marshes within the levee plan area also provide nursery habitat for many estuarine-dependent commercial and recreational fishes and shellfishes. Because of the protection and abundant food afforded by those wetlands, they are critical to the growth and production of species such as blue crab, white shrimp, brown shrimp, Gulf menhaden, Atlantic croaker, red drum, spotted seatrout, black drum, sand seatrout, spot, southern flounder, striped mullet, and others. Those species are generally most abundant in the brackish and saline marshes; however, blue crab, Gulf menhaden, Atlantic croaker, and several other species also utilize fresh and low-salinity marshes.

The Gulf of Mexico Fishery Management Council lists the following Federally managed species or species groups as being potentially found in coastal Louisiana: brown shrimp, pink shrimp, white shrimp, Gulf stone crab, red drum, Spanish mackerel, and gray snapper.

Coastal wetlands provide nursery and foraging habitat that supports economically important marine fishery species such as spotted seatrout, southern flounder, Atlantic croaker, gulf menhaden, striped mullet, and blue crab. These species serve as prey for other Federally

managed fish species such as mackerels, snappers, groupers, billfishes, and sharks. EFH encompasses all the wetlands and bays along the Louisiana coast and is obviously an important consideration in the development of any hurricane protection plan. Data are not yet available for impacts to EFH from Hurricanes Katrina and Rita.

THREATENED AND ENDANGERED SPECIES

This resource is institutionally (legally) significant because of: the Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940. Endangered (E) or threatened (T) species are technically significant because the status of such species provides an indication of the overall health of an ecosystem. These species are publicly significant because of the desire of the public to protect them and their habitats.

Of the 26 Endangered (E) or Threatened (T) species listed in Louisiana, 16 are listed in the southern tier of parishes that comprise the project area. Listed species in the project area include two species of mammals, four species of birds, seven species of reptiles, two species of fish, and one plant:

Mammals:	West Indian manatee (E) Louisiana black bear (T)
Birds:	Bald eagle (T) Brown pelican (E) Piping plover (T) Red-cockaded woodpecker (E)
Reptiles:	Gopher tortoise (T) Green sea turtle (T) Ringed sawback (map) turtle (T) Loggerhead sea turtle (T) Leatherback sea turtle (E) Hawksbill sea turtle (E) Kemp's Ridley sea turtles (E)
Fishes:	Gulf sturgeon (T) Pallid sturgeon (E)
Plants:	Louisiana quillwort (E).

The threatened Louisiana black bear is primarily associated with forested wetlands; however, it utilizes a variety of habitat types, including marsh, spoil banks, and upland forests. Remaining Louisiana black bear populations occur in the Tensas River Basin, the Upper Atchafalaya River Basin, and coastal St. Mary and Iberia Parishes. The primary threats to the species are continued loss of bottomland hardwoods and fragmentation of remaining forested tracts. Louisiana black bears, particularly pregnant females, normally den from December through April. Preferred den sites include bald cypress and water tupelo trees with visible cavities, that have a diameter at breast height (dbh) of 36 inches or greater, and which occur in or along rivers, lakes, streams, bayous, sloughs, or other water bodies. Both actual den trees and candidate den trees (dbh of

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36 inches or greater) are protected through the final listing rule published on January 7, 1992, in Volume 576, No. 4 of the Federal Register.

Federally listed as endangered, West Indian manatees occasionally enter Lakes Pontchartrain and Maurepas, and associated coastal waters and streams, during the summer months. Manatees have been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. They have also been occasionally observed elsewhere along the Louisiana Gulf Coast. The manatee has declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

Threatened bald eagles nest in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include Lake Verret Basin south to Houma, the southern marshes/ridge complex from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also over-winter, and infrequently nest near large lakes in central and northern Louisiana. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

Endangered brown pelicans are currently known to nest on Raccoon Point on Isles Dernieres, Queen Bess Island, Plover Island (Baptiste Collette), and islands in the Chandeleur chain. Pelicans change nesting sites as habitat changes occur. Thus, pelicans may also be found nesting on mud lumps at the mouth of South Pass (Mississippi River Delta) and on small islands in St. Bernard Parish. In winter, spring, and summer, nests are built in mangrove trees or other shrubby vegetation, although occasional ground nesting may occur. Brown pelicans feed in shallow estuarine waters, using sand pits and offshore sand bars as rest and roost areas. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

Federally listed as a threatened species, the piping plover as well as its designated critical habitat, occur along the Louisiana coast. Piping plovers over-winter in Louisiana, and may be present for 8 to 10 months. They arrive from the breeding grounds as early as late July and remain until late March or April. Piping plovers feed extensively on intertidal beaches, mudflats, sandflats, algal flats, and wash-over passes with no or very sparse emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Roosting areas may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. In most areas, wintering piping plovers are dependent on a mosaic of sites distributed throughout the landscape, because the suitability of a particular site for foraging or roosting is dependant on local weather and tidal conditions. Plovers move among sites as environmental conditions change.

The endangered red-cockaded woodpecker (RCW) nests in open, park-like stands of mature (i.e., greater than 60 years of age) pine trees containing little hardwood understory or midstory. RCWs can tolerate small numbers of overstory hardwoods or large midstory hardwoods at low densities found naturally in many southern pine forests, but they are not tolerant of dense

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hardwood midstories resulting from fire suppression. The woodpeckers excavate roost and nest cavities in large living pines (i.e., dbh 10 inches or greater). The cavity trees and the foraging area within 200 feet of those trees are known as a cluster. Foraging habitat is defined as pine and pine-hardwood (i.e., 50% or more of the dominant trees are pines) stands over 30 years of age that are located contiguous to and within 1.5 miles of the cluster.

The gopher tortoise, Federally listed as a threatened species, is associated with areas that have well-drained, sand or gravel soils appropriate for burrow establishment, ample sunlight for nesting, and understory vegetation suitable for foraging (i.e., grasses and forbs). Gopher tortoises prefer “open” longleaf pine-scrub oak communities that are thinned and burned every few years. They also inhabit existing maintained transmission rights-of-way within Washington, Tangipahoa, and St. Tammany Parishes. The gopher tortoise is the only native tortoise found in the southeastern United States. Habitat degradation (lack of thinning or burning on pine plantations) and conversion to agriculture or urbanization have contributed to the decline of that species. That habitat decline has concentrated remaining gopher tortoise populations along pipeline and powerline right-of-ways within their range.

The ringed sawback turtle, also known as the ringed map turtle, Federally listed as a threatened species is found only in the Pearl River system of Louisiana and Mississippi. Preferred habitat for the turtle is typically riverine with a moderate current with numerous basking logs. The river must be wide enough to allow sun penetration for several hours. Nesting habitat consists of large high sand and gravel bars adjacent to the river. Good water quality is necessary for the production of snails and other mollusks on which the turtle feeds. Threats to habitat include navigation and flood control measures that often require the removal of logs, snags, and river bars to facilitate water flows. Floodplain clearing and channelization of tributary streams to facilitate water flows can increase turbidity and siltation, which impacts the turtle’s primary prey of snails and other mollusks.

Endangered and threatened sea turtles forage in the nearshore waters, bays, and sounds of Louisiana. The endangered Kemp's Ridley sea turtle occurs mainly in the coastal areas of the Gulf of Mexico and northwestern Atlantic. Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy or muddy water bottoms. Small turtles are generally found nearshore from May through October. Adults and juveniles move offshore to deeper, warmer water during the winter. Between the East Gulf Coast of Texas and the Mississippi River Delta, Kemp's Ridelies use nearshore waters, ocean sides of jetties, small boat passageways through jetties, and dredged and natural channels. They have been observed within both Sabine and Calcasieu Lakes. Threatened loggerhead sea turtles nest within the continental United States from Louisiana to Virginia, with major nesting concentrations occurring on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida. In Louisiana, loggerheads are known to nest on the Chandeleur Islands. Nesting and hatching dates for the loggerhead in the northern Gulf of Mexico are from May 1 through November 30.

The Gulf sturgeon, federally listed as a threatened species, is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf Coast between the Mississippi River and the Suwanee River, Florida. In Louisiana, Gulf sturgeons have been

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reported at Rigolets Pass, rivers and lakes of the Lake Pontchartrain basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and sub-adults may be found in those rivers and streams until November, and in estuarine or marine waters during the remainder of the year. Sturgeons less than two years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations such as those caused by water control structures that limit and prevent spawning, poor water quality, and over-fishing have negatively affected this species.

The pallid sturgeon is an endangered fish found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to riverine conditions that can be described as large, free-flowing, turbid water with a diverse assemblage of physical habitats that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dam construction has affected this species throughout its range.

The endangered Louisiana quillwort, a small, grass-like aquatic plant, is found in St. Tammany and Washington Parishes as well as in two counties in Mississippi. It appears to be restricted to sandy soils and gravel bars in or near shallow blackwater streams and overflow channels in riparian woodland/bayhead forests of pine flatwoods and upland longleaf pine. The Louisiana quillwort is extremely vulnerable because of its small population size and habitat loss from actions which affect the hydrology or stability of the streams it inhabits.

NATIONAL AND STATE WILDLIFE REFUGES

Within the project area, the US Fish and Wildlife Service manages the following eight National Wildlife Refuges (NWR): Bogue Chitto, Bayou Sauvage, Mandalay, Big Branch, Delta, Lacassine, Cameron Prairie, and Sabine. In addition, the State of Louisiana manages 11 Wildlife Management Areas (WMA): Pearl River, Biloxi, Pass-A-Loutre, Wisner, Pointe Aux Chene, Atchafalaya Delta, Lake Boeuf, Elm Hall, Salvador, Attakapas, and Sabine Wetlands; two State Wildlife Refuges (SWR): Rockefeller, and Marsh Island, as well as nine State Parks: Fontainebleau, Bayou Segnette, Grand Isle, Lake Fausse Point, Fort Pike, St. Bernard, Cypremort Point, Longfellow Evangeline, and Sam Houston Jones. The National Park Service manages the Jean Lafitte National Park and Preserve which has six separate sites throughout southern Louisiana preserving natural and historic features.

These refuges contain a variety of different habitats, including fresh and brackish marshes, bottomland hardwood forests, cypress-tupelo swamps, sloughs, bayous, lagoons, canals, cheniers, and upland forests with live oaks and loblolly pines. The saline marshes serve as estuarine nurseries for various fish species, crabs, and shrimp. Freshwater lagoons, bayous, and ponds serve as production areas for largemouth bass, crappie, bluegill, and catfish. The diverse habitats meet the needs of 340 bird species during various seasons of the year. Peak waterfowl populations use the wetland areas during the fall, winter, and early spring months. The production of valuable wildlife foods is dependent on the varying degrees of inundation during the growing season. A variety of woody plant species occur in these periodically flooded areas,

and all exhibit some degree of survival in soils which are inadequately drained and aerated. Plant communities range from the bald cypress and water tupelo associated with longer periods of flooding, to the live oak and loblolly pine on the highest floodplain areas.

CULTURAL RESOURCES

Coastal Louisiana in the area of this project is rich in prehistoric and historic cultural resources. Parts of this and other related project areas have been surveyed for cultural resources as an element of numerous projects conducted by the New Orleans District and other agencies. Relevant projects have included Lake Pontchartrain and Vicinity Hurricane Protection Project, New Orleans to Venice, Morganza to the Gulf, Alexandria to the Gulf, Atchafalaya, coastal projects, and the Gulf Intrastate Waterway. Numerous archeological and historical sites have been identified as a result of these investigations. Information about these historic sites is found in the Louisiana State Historic Preservation Office's databases.

Known historic sites include prehistoric and historic archeological sites, shipwrecks, cemeteries, standing structures, historic districts, industrial structures, military sites, and other significant historic sites. These sites are concentrated in areas of relatively high elevation suitable for human occupation.

The potential for additional sites eligible for the National Register of Historic Places is high in some areas. Archeological, historical and architectural investigations for this project will be designed to identify additional historic sites and develop a strategy to avoid impacts or mitigate for impacts. This strategy will be fully coordinated with the State Historic Preservation Office, the Advisory Council on Historic Preservation and other interested parties. A Programmatic Agreement for this project may be necessary to achieve compliance with the National Historic Preservation Act of 1966 and Corps of Engineers regulations. This strategy will address other types of historic properties that have not always been the subject of studies in coastal Louisiana to include cultural landscapes and new historic districts and expansions of existing historic districts.

RECREATION

Louisiana's mild climate, abundance of natural resources and unique and colorful history create an environment conducive to a variety of outdoor recreation activities.

Present day recreational activities are deeply rooted in the historical, vocational, and cultural traditions of southern Louisiana. The hundreds of local and regional festivals celebrated throughout the coastal area illustrate their focus on harvests of rice, sugar cane, shrimp, crawfish, oysters, and alligators. Festivals also celebrate cultures and heritages such as Cajun, Native American, African American, and many European cultures. Music festivals such as the Jazz and Heritage Festival, which celebrates the rich musical history of the area, attract visitors from around the world.

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The project area is rich in renewable resources and serves as home to thousands of wildlife species that attract individuals for many types of recreational activities. Throughout the project area, the public has access to fresh, estuarine, and marine resources for fishing, hunting, boating, swimming, camping, bird watching, crabbing, and crawfishing. Traditional non-consumptive recreation includes, but is not limited to, tennis, golf, zoos, aquariums, sports fields, cycling, RV-ing, camping, hiking, wildlife viewing, photography, and bird watching. In addition to the Wildlife Management Areas and Wildlife Refuges, there are also many local and parish parks and playgrounds scattered through the project area.

AESTHETICS

The project area includes areas of agricultural fields, forests, and marshes along with miles of rivers, lakes, bays, and bayous. Land types are predominately floodplain and coastal marsh with some higher elevation areas in the Slidell area, and the chenier ridges in southwestern Louisiana. The floodplain land is predominately flat, containing poorly drained areas covered with forests of oak, gum, and cypress. The better-drained land is predominately used for croplands and cattle grazing. Most of the project area contains coastal marshland at or slightly above at sea level. Soils are organic marsh peat, mucks, clay, and some sandy beaches. Moss-covered trees line numerous bayous in the wetlands. Water in the bayous is normally slow moving and heavy brown in color. Tree types typically found in the project area include pine and live oak on the upland areas and in the lower areas water oak, hickory, magnolia, cypress, ash, maple, elm, willow, sycamore, beech, yellow poplar, cottonwood, gum, hackberry, and tallow. Wetlands are typically beautiful large expansive picturesque areas offering visitors seclusion and tranquility. These wetlands provide observers with a vast array of plant and animal life to identify and enjoy. Bird watching, ecological study, and nature photography in these aesthetic areas are highly sought after activities.

WATER QUALITY

Historic and current water quality issues for rivers and streams in coastal Louisiana include the transport of nutrients, pesticides, synthetic organic compounds, trace elements, suspended sediment, and bacteria.

Hurricanes Katrina and Rita resulted in the flooding of many parts of the region including the urban areas of Greater New Orleans with water from Lake Pontchartrain and the Gulf of Mexico. Southern and eastern parishes of southeast Louisiana were inundated with storm surge. Coastal communities in southwestern Louisiana, such as Cameron and Holly Beach, were severely impacted by storm surges from Hurricane Rita. Immediately following the storm event, several Federal and state agencies began analyzing the effects of the storm and the subsequent flooding on water quality in the Pontchartrain Basin and the Mississippi Sound.

Within the project area, temporary impacts to water quality due to the hurricanes would likely be associated with the potential transport of organics, petroleum hydrocarbons, and metals into water bodies from spills and floodwaters of urban and industrial areas. Dissolved concentrations of these parameters have not been detected in the floodwaters discharged from New Orleans.

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Of nearly 400 water samples analyzed for nearly 200 chemicals, only a small number of samples contained concentrations of chemicals that exceeded the levels of concern for short-term (90 days) dermal contact and incidental ingestion (USEPA 2005). Elevated levels of *E. coli*, polycyclic aromatic hydrocarbons, petroleum hydrocarbons, some pesticides, and some metals have been found in the sediment within the floodwater areas. Continued data collection would be necessary to facilitate long-term ecological and environmental health assessments.

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

A review of Federal and state agencies' databases reveals numerous hazardous, toxic, and radioactive waste (HTRW) sites of concern within the vicinity of the project area. The Federal agencies' databases revealed numerous sites under CERCLA, RCRA waste generators, RCRA Corrective Action (CORRACTS) list, RCRA non-CORRACTS treatment, storage or disposal facilities, and sites listed under the National Response center for incidents involving oil and chemical spills. The State's databases revealed numerous inactive and abandoned sites, landfills, and leaking underground storage tanks. In addition to these known areas of concern, a large number of unknown/unidentified environmental sites of concern are likely located within the project area.

Due to the large number of sites of concern, compilation of a list of sites of concern for the entire project area is not practicable. Addressing existing HTRW sites of concern for the project area would require a review of site specific as well as plan specific information. As strategies become more defined, detailed HTRW analyses would be performed to further evaluate and eliminate potential HTRW problem sites within the vicinity of the project area.

Phase I Initial Site Assessments (ISAs) would be performed in the project area in future planning phases to facilitate early identification and appropriate consideration of potential Hazardous, Toxic, and Radioactive Waste (HTRW) problems.

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