National Park Service
U.S. Department of the Interior

Cane River Creole National Historical Park
Natchitoches, Louisiana

ENVIRONMENTAL ASSESSMENT

Emergency Stabilization / Erosion Control on the Bank of Cane River Lake, Oakland Plantation

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Prepared for:
National Park Service
Southeast Regional Office
100 Alabama Street SW
Atlanta, Georgia 30303

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared for the National Park Service (NPS) to support the proposed bank stabilization of the Cane River Lake along the Oakland Plantation at Cane River Creole National Historical Park. The Oakland Plantation is approximately 44 acres and is located 10 miles south of Natchitoches, Louisiana. The proposed bank stabilization project is located along a thin strip of land along the west bank of the Cane River Lake. This area lies adjacent to Highway 494/119 and to the east of the Oakland Plantation. The National Environmental Policy Act (NEPA) of 1969 process was conducted in accordance with the NPS regulations for implementing NEPA, and it examined the consequences of this proposed project on the environment. This EA presents the alternatives considered during the NEPA process, the affected environment, the impacts associated with the proposed project, potential mitigation measures, environmental commitments, and the agency consultation and coordination conducted to support this project.

In October 2007, two heavy storms hit the Natchitoches area, bringing nearly 17 inches of rain over 36 hours. This heavy rain caused flooding damage at the Oakland Plantation and a major washout of several spots along the Cane River Lake bank and the roadside swale. Erosion has brought the lake bank to about 10 to 14 feet high, with gullies and scour washout spots apparent along the top of the bank down to the toe. Despite some previous attempts to stabilize the bank by the NPS staff, the bank has continued to severely erode. In addition to the erosion caused by the storm water runoff, erosion problems are occurring near the top and side of the bank. Although the lake does not have a substantial current flow, local boat traffic that travels along the lake creates wake that contributes to the erosion of the toe of the lake bank. Wave action is also created from the newly constructed seawalls along portions of the Cane River Lake which has contributed to the erosion of the bank.

The combination of storm water runoff and wave action has lead to the bank eroding off into the water. If the erosion remains untreated, existing utilities, trees, vegetations, and the adjacent State Highway 494/119 would be threatened. Existing utilities include aboveground power lines, as well as underground telephone and power lines. In addition to roadway and utility stability issues, the erosion can cause a traffic hazard.

The purpose of this project is to provide stabilization and erosion control on the bank of Cane River Lake along the thin strip of land located east of the Oakland Plantation. In order to protect the lake bank from further erosion caused by runoff, the drainage flow would be directed to two new drainage outfall chutes. The project would also create stabilization of the bank and toe in the project area. Existing non-native vegetation would need to be removed for construction. This exotic vegetation will be replaced with native wetland species. This will add to stabilization and a return of native species along the bank. Additionally the project will help to restore the natural view that is characteristic of the area, and preserve the cultural landscape in Cane River Creole National Historical Park.

This EA examines the consequences of four Action Alternatives and the No Action Alternatives. The four Action Alternatives proposed would stop the erosion from progressing beyond its current state; would stabilize the remaining lake side bank and toe; and would restore the natural

visual characteristics of the existing lake bank and preserve the cultural landscape. Each alternative includes drainage improvements including re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site. In addition, each alternative involves the removal of vegetation currently existing along the lake bank (most of which is non-native), restoration of the bank slope, and installation of a stabilization material along the toe of the bank. The bank stabilization material used for each of the Action Alternatives is the following:

- Preferred Action Alternative 1 – Turf Reinforcement Mat (TRM) System protected embankment with clay fill.
- Action Alternative 2 – Geogrid Reinforcement Embankment System protected with a Marine Mattress System.
- Action Alternative 3 – Sheet Pile Retaining Wall
- Action Alternative 4 – Compacted clay fill embankment above a riprap base protected with a TRM System.

The potential duration of the impacts (short-term or long-term), the intensity of the impacts (negligible, minor, moderate, or major), and the classification of the impacts (beneficial or adverse) were analyzed in detail for each project alternative. Cumulative effects were also considered. By comparing the Action Alternatives with the No Action Alternative, and identifying mitigation measures that would minimize adverse effects, this EA assists in the decision-making process.

Regardless of the alternative selected, the proposed project would create short-term, minor, adverse impacts to air quality, noise levels, soils, water quality, vegetation, wildlife, aquatic resources, historic viewshed, cultural landscape, aesthetics, public health, and safety, energy use, infrastructure (roadways and utilities), visitor use and experience, park operations. Impacts are associated with the use of construction equipment and the result of grading and excavating the project area. Impacts would last the duration of the construction period which would be approximately four to six months. Additional impacts during the construction period would include short-term, negligible impacts to hydrology and short-term, beneficial impacts to environmental justice.

Alternatives 1 and 2 would include the use of an inflatable dam and dewatering system during the construction phase of the project. Short-term, minor, adverse impacts to hydrology, and aquatic resources would be expected. Alternatives 3 and 4 include the placement of a sheet pile retaining wall (Alternative 3) or riprap (Alternative 4) into the lake bottom. Short-term, minor, adverse impacts to soils, water quality, and aquatic resources are expected from an increase in turbidity levels.

Upon completion of the bank stabilization long-term, beneficial impacts to soils, water quality, aquatic resources, archaeological resources, historic resources, and infrastructure would occur under all the Action Alternatives. It is expected that the severe erosion of the lake bank would no longer occur and would no longer pose a threat to the resources listed above. Long-term,

negligible impacts to hydrology and vegetation would also occur from the extension of the lake bank into the water and from the removal of four mature trees. Long-term, minor, adverse impacts to palustrine and riverine wetlands would occur due to the addition of fill material along the lake bank. The proposed project would have no effect to special status species, as no listed species were identified as occurring in the project area.

Additional long-term, beneficial impacts to floodplains, cultural landscapes, aesthetics, and visitor use and experience would occur under Alternatives 1, 2, and 4 upon completion of the bank stabilization project. Since the bank would be sloped at a gradual gradient and re-planted with native vegetation, the overall appearance of the area would be improved.

Alternative 3 includes the installation of a sheet pile retaining wall approximately five feet from the water's edge. Long-term, minor to moderate, adverse impacts to the floodplain, aquatic resources, cultural landscape, aesthetics, public health and safety, and visitor use and experience are expected. The sheet pile retaining wall would take away from the natural landscape of the area.

Under the No Action Alternative, the bank stabilization project would not occur. Erosion of the lake bank would continue from surface drainage runoff during storm events. Wave action from boating on the lake and the seawall would also continue to erode the bank. Long-term, minor to moderate, adverse impacts to soils, water quality, wetlands, vegetation, archaeological resources, historic resources, cultural resources, aesthetics, infrastructure, visitor use and experience, and park operations would occur. The continuation of the severe erosion would threaten these resources in the immediate future. No impacts air quality, noise levels, hydrology, wildlife, aquatic resources, special status species, environmental resources, public health and safety, and energy use are expected to occur under the No Action Alternative.

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ADA	Americans with Disabilities Act
APHN	Association for the Preservation of Historic Natchitoches
CAA	Federal Clean Air Act
CARI	Cane River National Historical Park
CEQ	Council on Environmental Quality
CO	Carbon Monoxide
CRWC	Cane River Waterway Commission
CRM	Office of Coastal Resource Management
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DBH	Diameter at Breast Height
DNR	Department of Natural Resources
DOI	Department of the Interior
EA	Environmental Assessment
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
LADEQ	Louisiana Department of Environmental Quality
LADOTD	Louisiana Department of Transportation and Development
LRRP	Land Resource Region
MHW	Mean High Water
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum
NEPA	National Environmental Protection Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Ocean and Atmospheric Administration
NO_X	Nitrogen Oxide
NPS	National Park Service NPS
NRCS	National Resources Conservation Services
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory

O_3	Ozone
Pb	Lead
PEPC	Planning, Environment, and Public Comment website (NPS)
$PM_{10}/PM_{2.5}$	Particulate Matter with size less than 10 μm^3 or 2.5 μm^3
ROW	Right-of-Way
SAV	Submerged Aquatic Vegetation
SEAC	Southeast Archeological Center
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SOF	Wetland Statement of Findings
TCP	Traditional Cultural Properties
TRM	Turf Reinforcement Mat
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WSR	Wild and Scenic Rivers Act

1.0 PURPOSE AND NEED

1.1 PROJECT LOCATION

The Cane River Creole National Historical Park (the park) is located in northwestern Louisiana, approximately 150 miles northwest of Baton Rouge and 70 miles southeast of Shreveport within the Natchitoches Parish, Louisiana (Figure 1-1). The park consists of two units, the Oakland Plantation and the Magnolia Plantation, totaling 63 acres. The Oakland Plantation is approximately 44 acres and is located on Cane River Lake ten miles south of the town of Natchitoches (Figure 1-2). The plantation includes the entire remaining core plantation infrastructure of 40 buildings ranging from the main house and the 1835 bottle garden to numerous outbuildings including the plantation store, large seed house, workshops, and pigeonniers. The authorized plantation boundary includes an additional 144 acres which is under private ownership. The National Park Service (NPS) has been authorized to acquire 10 more acres for a visitor center area on the property.

The Magnolia Plantation is approximately 19 acres and is located 10 miles south of the Oakland Plantation (Figure 1-2). The plantation is comprised of 22 outbuildings and dependencies, including the slave hospital/overseer's house, the plantation store, a blacksmith shop, and a large gin barn that houses a cotton press and two types of cotton gins. The remaining core plantation infrastructure, including the main house, formal entrance, and immediate outbuildings are privately owned and located adjacent to the park. Visitors can access both park units using State Highways Louisiana (LA) 494 and 119 via State Highway LA 1.

The park units are located within the Cane River Natural Heritage Area which was created about the same time as the park to complement and provide a culturally sensitive approach to preserving the heritage of the Cane River region through local partnership, thereby minimizing the amount of federal land acquisition and management. The Heritage Area includes 45,000 acres of mostly privately-owned land, including the Oakland and Magnolia Plantations, two nationally historic landmarks, three outlying historic sites, and many other area resources. The core of the heritage area begins just south of the city and follows the meanders of Cane River (approximately 1 mile on each side of the river) to a civil war site along the river known as Monettes Ferry. The heritage area is managed by the Natural Heritage Area Commission.

The proposed project is located along a thin strip of land along the west bank of the Cane River Lake. This area lies adjacent to State Highway LA 494/119 and to the east of the Oakland Plantation (Figure 1-3).

Figure 1-1. Location of Cane Creole National Historical Park

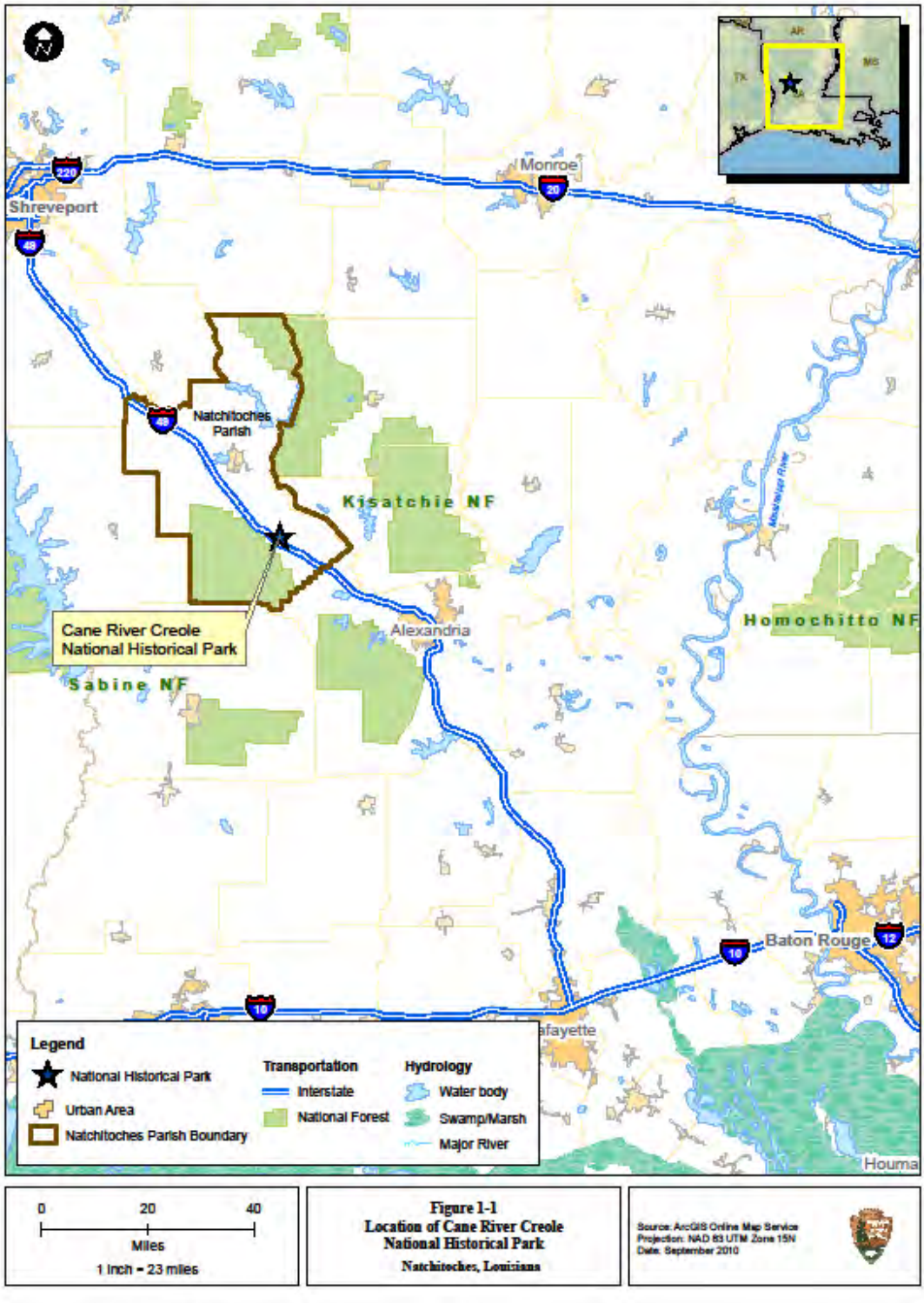


Figure 1-2. Location of the Oakland and Magnolia Plantations

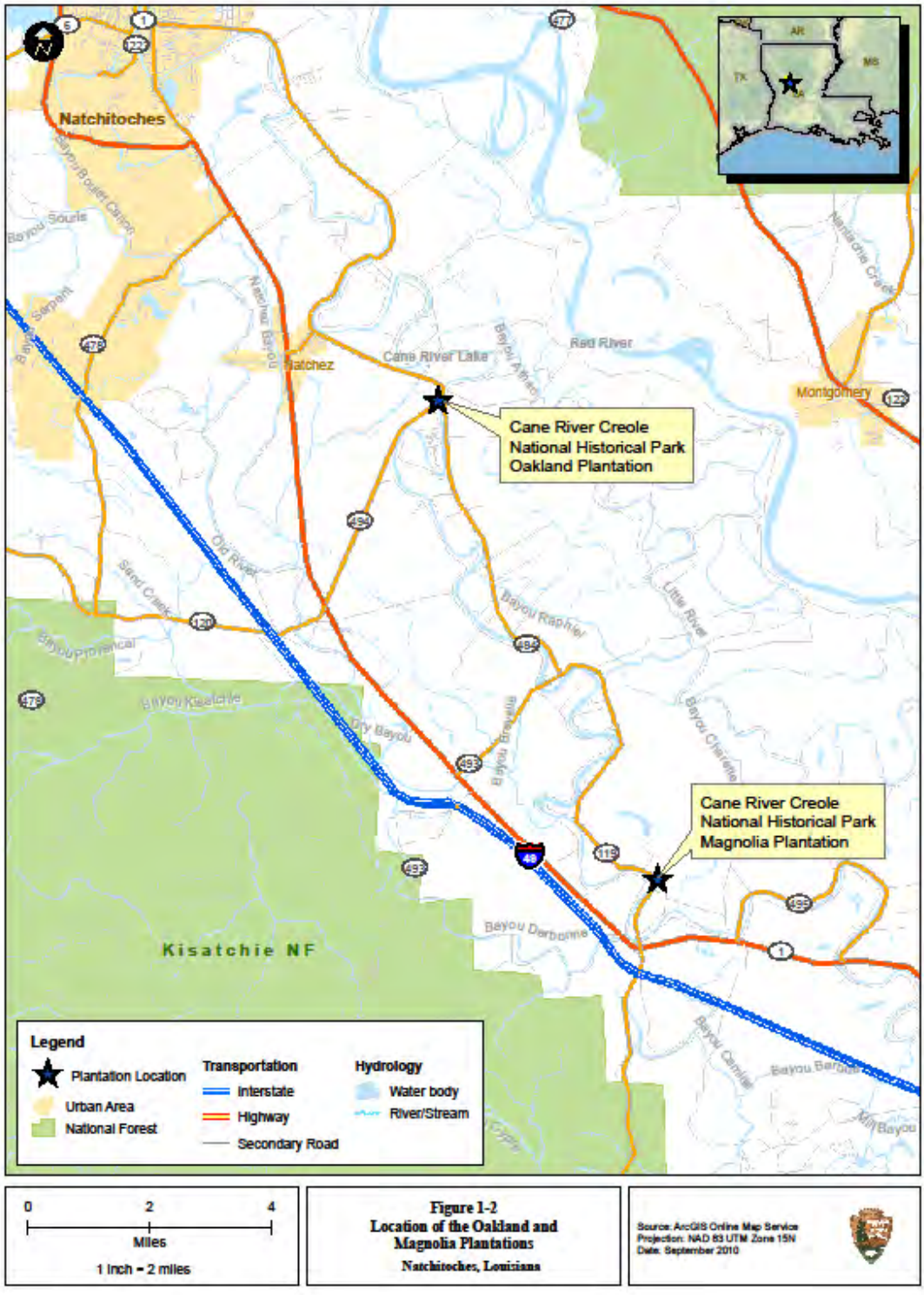
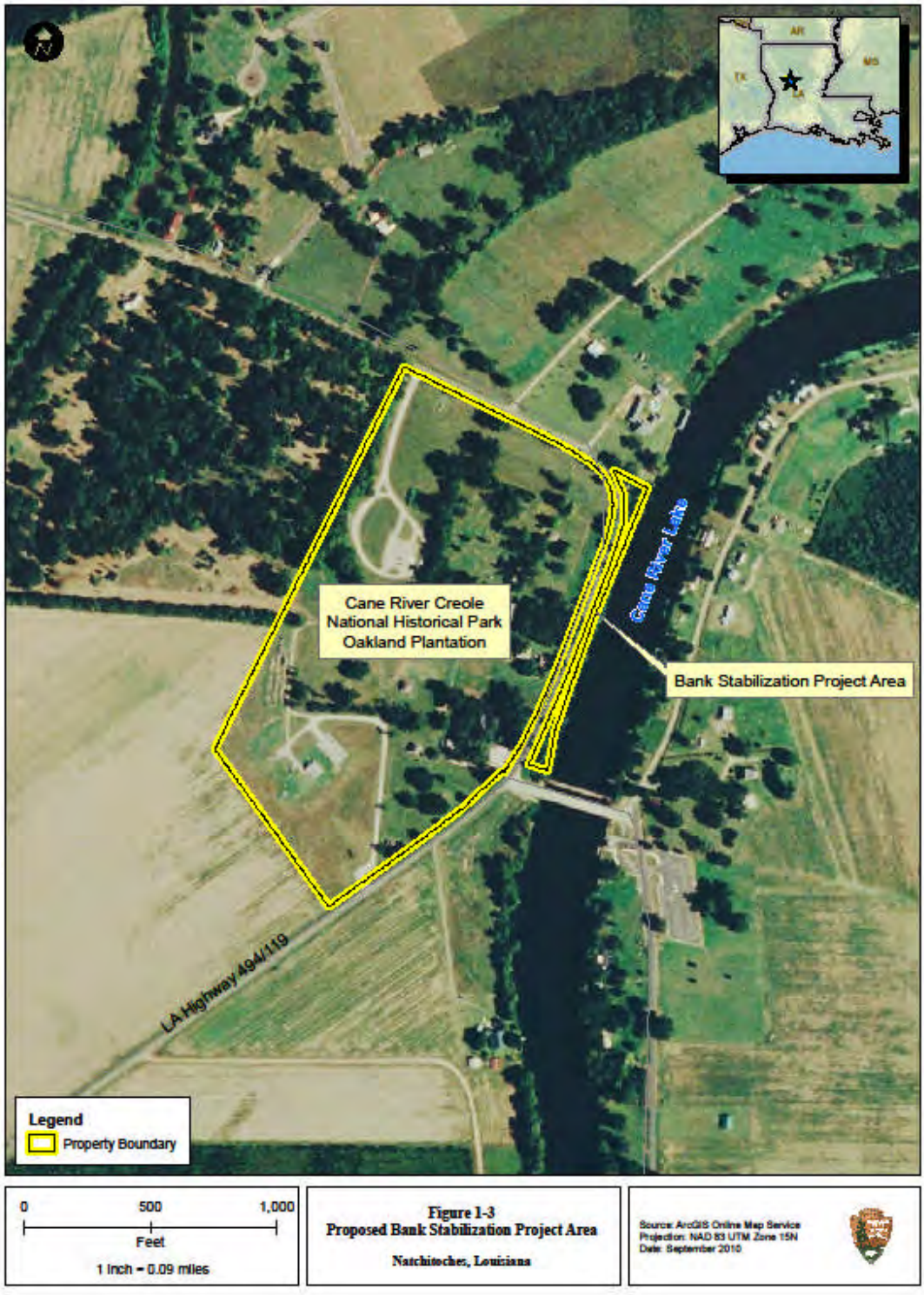


Figure 1-3. Proposed Bank Stabilization Project Area



1.2 PURPOSE OF AND NEED FOR THE PREFERRED ALTERNATIVE

In October 2007, two heavy storms hit the Natchitoches area, bringing nearly 17 inches of rain over 36 hours. This heavy rain caused flooding damage at the Oakland Plantation and a major washout of several spots along the Cane River Lake bank and the roadside swale (Figure 1-3 and Figure 1-4). Erosion has increased the steepness of the lake bank, causing it to have a slope of less than 1 (V): 1 (H) in some places, with gullies and scour washout spots apparent along the top of the bank down to the toe (HNTB 2009). Despite some previous attempts to stabilize the bank by the NPS staff, the bank has continued to severely erode.

Figure 1-4. Erosion in roadside swale

Figure 1-5. Erosion along the lake bank

The highly eroded areas are located at or near the existing storm water discharge points to the Cane River Lake. At the north end of the project site, severe erosion due to the high velocity of storm water discharge exiting the cross drain pipes caused a large portion of the lake bank to washout. Similarly, a small washout occurred south of the plantation store near a discharge area of an existing cross drain pipe. The erosion of the bank along Cane River Lake has reduced the top of the bank to as narrow as approximately 10 feet from the edge of the roadway pavement.

In addition to the erosion caused by the storm water runoff, erosion problems are occurring near the top and side of the bank. Although the lake does not have a substantial current flow, local boat traffic that travels along the lake creates wake that contributes to the erosion of the toe of the lake bank. Wave action bouncing off of the newly constructed seawalls along portions of the Cane River Lake has contributed to the erosion of the bank, particularly along the toe of the bank.

The combination of storm water runoff and wave action has lead to the bank eroding off into the water. If the erosion remains untreated, existing utilities, vegetation, and the adjacent State Highway LA 494/119 would be threatened. Existing utilities include aboveground power lines, as well as underground telephone and power lines. In addition to roadway and utility stability issues, the erosion and steep slope of the bank can cause a traffic hazard if a vehicle were to swerve off the road or if an accident were to occur.

The purpose of this project is to provide stabilization and erosion control on the bank of Cane River Lake along the thin strip of land located east of the Oakland Plantation. In order to protect the lake bank from further erosion caused by runoff, the drainage flow would be directed to two new drainage outfall chutes. The project would also create stabilization of the bank and toe in the project area. Existing non-native vegetation would need to be removed for construction. This exotic vegetation will be replaced with native wetland species. This will add to stabilization and a return of native species along the bank. Additionally the project will help to restore the natural view that is characteristic of the area, and preserve the cultural landscape of the park.

1.3 PURPOSE AND SIGNIFICANCE OF THE PARK

Park purpose statements are based on park legislation and legislative history and NPS policies. The statements reaffirm the reasons why the area was set aside by Congress and provide the foundation for park management and use.

The purposes of the Cane River Creole National Historical Park are as follows:

- Assist in the preservation and interpretation of, and education concerning, the diverse Creole cultures and histories of the Cane River region.

- Provide technical assistance in historic preservation and heritage conservations to a broad range of public and private landowners and organizations.

Park significance statements address what makes the park special, why the park is important to the natural and cultural heritage, and how it differs from other parks in the country. These statements are not an inventory of significant resources in the park; rather, they describe the importance and distinctiveness of the park's resources viewed in regional, national, and international contexts.

Cane River Creole National Historical Park is significant because of the following:

- It illustrates a convergence of French, Spanish, African, Indian, and American cultures, and the evolution of Creole culture which is unique to the region.
- The plantations reflect completeness in their historic settings and landscapes, structures, furnishings and original artifacts in an inclusive manner that represents all of the people connected to these places.
- It demonstrates a succession of agricultural and labor systems, changing technologies, and evolving social practices over three centuries.

- The plantations reflect completeness in their historic settings, including landscapes, outbuildings, structures, furnishings, and artifacts.

1.4 PROJECT HISTORY AND BACKGROUND

1.4.1 Project History

Cane River Lake is an oxbow lake that was created when what was then the main channel of the current Red River was dammed in 1916 to create a recreational waterway (HNTB 2010). The Cane River Lake channel is about 60 miles long, from north of Natchitoches to the Red River, which is inclusive of the dammed portion.

The two plantations within the park have a rich history. The Oakland plantation was once the home of the Prud'homme family, who owned the property for nine generations. In 1789, the grandson of Prud'homme, Jean Pierre Emmanuel received a land grant on the Red River, which became the Bermuda plantation, later named the Oakland plantation. It was with the invention of the cotton gin in 1793 that Jean Pierre Emmanuel moved to growing cotton rather than tobacco.

Originally, the plantation was over 3,400 acres, most of which was devoted to growing cotton. This large cotton plantation was home to a vast workforce of enslaved workers. In 1840, there were nearly 150 enslaved workers sharing the plantation with the owner's family, and the families of the overseers.

The Civil War brought changes to the area. The isolation of cotton markets by the Union forces cut off the connection of these plantations to their markets. In response, Southern Confederate troops burned the cotton in order to prevent its seizure by the Union troops. When the Union troops arrived in Natchitoches, they took grain stores and slaves. As they retreated, they burned many of the plantations.

Many of the plantation's former workers and their descendants returned to Oakland as sharecroppers, often remaining in the same houses as their ancestors. Although the Oakland plantation survived the war, pests and low cotton prices kept things meager at the plantation, and eventually mechanical equipment replaced human labor. In 1994, Congress designated the park (Oakland and Magnolia Plantations) as a National Historical Park.

Today Cane River is enjoyed as a recreation site for boating, fishing, and swimming, as well as jet skiing, water skiing, and recreational barging. The narrowness of the river means that boat wakes have caused serious erosion damage. This erosion was made much worse by two severe storms that occurred in late October 2007. These two heavy storms occurred within 36 hours of each other, with rainfall reaching 17 inches from both storms. This resulted in a major washout of this thin strip of land in the park. This strip of land is about 1 acre, 1,190 feet long, with width varying along the side from 18 to 147 feet.

1.4.2 Project Background

1.4.2.1 Previous Planning

Some previous work has been completed to assess the severity of erosion, and to come up with solutions for the erosion problem. A list of previous studies is below:

- On 8 September 2009, NPS issued "Emergency Stabilization/Erosion Control on the Bank of Cane River (PMIS 154979)". Pursuant to this report, a site assessment was completed on September 17, 2009 along the west bank of Cane River, to the east of the Oakland plantation. This assessment was completed at the project site (HNTB 2009).

- On 4 January 2010, Southeast Archeological Center (SEAC) Archeologists Stephen Drew Wise and Michael Seibert submitted a trip report describing archeological testing prior to emergency stabilization and erosion control on the bank of Cane River at the Oakland Plantation (SEAC 2010).

1.4.2.2 Scoping

Scoping is an effort to involve agencies and the general public in determining the scope of issues to be addressed in the environmental document. Scoping includes consultation with any interested agency, or any agency with jurisdiction by law or expertise to obtain early input. More detail on the scoping process can be found in Section 7.0 *Public Involvement and Agency Coordination.*

External Scoping is the process used to gather public input. A consultation letter was mailed to local and federal agencies on 3 August 2010 requesting consultation and comments regarding the proposed project at the park. Comments were received from three agencies (Appendix A). For this project, a scoping newsletter was mailed to 54 individuals, organizations, stakeholders, and agencies on 12 June 2010 in order to notify the public that an environmental assessment (EA) is being completed for this project. The newsletter provided the project history, current conditions, a project description, the NEPA processes and a description of the public scoping period (Appendix B). The public had the opportunity to comment on the proposed project for a total of 32 days (12 June 2010 through 14 July 2010) using the NPS Planning, Environment, and Public Comment (PEPC) website. No public comments were received.

This EA will be released for public comment for a period of 30 days. Comments on the EA will be summarized and responded to in an Errata sheet to be appended to the Finding of No Significant Impact (FONSI), assuming there are no issues that may lead to significant impacts from the Preferred Alternative. Following the completion of the EA, the FONSI would be signed and dated by the NPS Regional Director.

1.5 ISSUES

Issues can be defined as the relationship between the alternatives and the human, physical, and natural environment (NPS 2001). Issues are used to define which environmental resources may experience either negative or beneficial consequences from an action. They do not predict the degree or intensity of potential consequences that might result from an action.

No issues were identified during the public scoping period. No comments were received during the public scoping period.

1.6 IMPACT TOPICS

1.6.1 Derivation of Impact Topics

Potential impact topics were identified based on legislative requirements, executive orders, topics in *Director's Order (DO) #12 and Handbook* (NPS 2001), NPS *Management Policies* (NPS 2006), guidance from NPS, and resource information specific to the park. A summary of impact topics analyzed and dismissed from further analysis is provided below, along with the rationale for their inclusion or dismissal.

1.6.2 Impact Topics Included in this Document

The following impact topics have the potential to be affected by the proposed project and are evaluated in detail in this EA:

Air Quality – During the short-term construction phase of the project, the operation of construction equipment would generate some criteria pollutant emissions, including carbon monoxide and particulate matter.

Noise – The construction phase of this project is expected to create minor and short-term noise impacts at the site.

Soils – The existing soils within the project area would be altered during bank stabilization activities.

Prime and Unique Farmlands –Soils at the site meet the criteria for prime or unique farmland.

Topography – The proposed project would include beneficial impacts to the topography of the area due to the grading and excavation of the bank.

Water Resources – The bank stabilization construction within the Cane River Lake may potentially impact the hydrology and water quality of the river.

Floodplains – Portions of the proposed project area are located within the 100-year floodplain.

Wetlands – Emergent and riverine wetlands are located within the proposed project location. Wetland plantings within the project area are proposed as well as a wetland mitigation plan to offset wetland impacts associated with the Preferred Alternative.

Submerged Aquatic Vegetation (Seagrasses) – Submerged aquatic vegetation (SAV) was observed during a site visit (11 and 12 May 2010).

Vegetation – Existing vegetation would be removed during the construction phase of the proposed project. Following construction, native vegetation would be replanted along the lake bank.

Wildlife - The proposed project may temporarily affect wildlife in the area during the construction phase.

Aquatic Resources – The proposed project may potentially affect aquatic resources within the Cane River Lake during construction.

Species of Special Status – Letters to the U.S. Fish and Wildlife Service (USFWS) and Louisiana Department of Natural Resources (DNR) were mailed on 3 August 2010 requesting information on special status species in the project area.

Archaeological Resources – The construction phase of the project could have long-term impacts on subsurface archaeological deposits if they exist in the project area.

Historic Resources – The construction phase of the project would have a short-term, adverse impact on the viewshed of historic resources in the area. The 1860's viewshed is a priority of the proposed project and after construction the proposed project area would be allowed to return to its natural state, which would have a beneficial impact on the surrounding historic resources.

Cultural Landscapes – As with historic resources, the construction phase of the project would have a short-term, adverse impact on the cultural landscape of Oakland Plantation. Preserving the cultural landscape is a priority of the proposed project and after construction the proposed project area would be allowed to return to its natural state, which would have a beneficial impact on the Cane River cultural landscape.

Environmental Justice – The category of environmental justice was retained to thoroughly analyze the presence of minority or low-income populations in the vicinity of the project. However, no disproportionate impacts are expected.

Aesthetics – Aesthetics at the site may be temporarily altered during construction but the protection of the 1860's viewshed would remain a priority of the proposed project. Beneficial impacts would occur by returning the site back to a natural, vegetated state, where the aesthetics of the visual environment and historical landscape could once again be enjoyed by visitors.

Public Health and Safety – The Preferred Alternative may impact the health and safety of park staff and visitors during the construction portion of the proposed action.

Energy Requirements and Conservation – Energy requirements at the park related to this project are associated with the construction phase of the project and can be characterized as minimal and short-term.

Infrastructure – During the construction period, short-term impacts are expected to the roadways and utilities within the project area.

Visitor Use and Experience – The proposed project would cause minor alterations to visitor experience at the park during construction, but would provide long-term improvements to visitor use and experience.

Park Operations – Operations at the park would be temporarily impacted during construction of the proposed bank stabilization.

1.6.3 Impact Topics Dismissed from Further Analysis

Coastal Zone – The Coastal Zone Management Act (CZMA) of 1972 was put in place by congress to conserve, restore, and enhance precious coastal resources. The Louisiana DNR Office of Coastal Resources Management (CRM) is responsible for implementing the program on Louisiana coastlines. The Louisiana State and Local Coastal Resources Management Act was enacted in 1978. The act established the Coastal Zone Management Plan (CZMP), which gives the Louisiana DNR the power to manage and regulate development and resources in coastal zones. Natchitoches Parish, which includes the park and proposed project area are not included within Louisiana's coastal zone, and this topic is therefore dismissed from further analysis (LADNR 2009).

Geology – Although the proposed project would include excavation activities, the proposed project would not create impacts to the geology of the project area.

Designated Natural Areas – There are no Designated Natural Areas in the vicinity of the Oakland Plantation at the Cane River Creole National Historical Park.

Land Use –The NPS owns the narrow strip of vegetated land adjacent to the Cane River Lake. The land is currently a forested buffer between the lake and State Highway LA 494/119. The proposed project would not change the existing land use of the project area.

Ecologically Critical Areas - There are no Critical Wildlife Areas in the vicinity of the Oakland Plantation at the Cane River Creole National Historical Park.

Wild and Scenic Rivers – There are no designated wild and scenic rivers at the site as defined in the Wild and Scenic Rivers (WSR) Act (16 U.S.C. 1271-1287). Additionally, no study rivers defined as "designated for potential addition to the national wild and scenic rivers system" by the WSR Act are located in the vicinity of the site (NWSR 2010).

Natural or Depletable Resource Requirements and Conservation Potential - Consideration of this topic is required by 40 CFR 1502.16. The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development (NPS 2006b, 124). Essentially, "sustainability" is the concept of living within the environment with the least impact on the environment. The objectives of sustainability are to design facilities to minimize adverse effects on natural and cultural values; to reflect the environmental setting and to maintain facilities to promote their resilience; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. The proposed project would not result in an appreciable loss of natural or depletable resources.

Traditional Cultural Properties - There are no known Traditional Cultural Properties in the area; therefore, no impacts would occur. A traditional cultural property is defined generally as one that is eligible for inclusion in the National Register of Historic Places (NRHP) because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and important in preserving the cultural identity of the community (Parker and King 1998). There are no known Traditional Cultural Properties in the vicinity of Oakland Plantation.

Indian Sacred Sites and Indian Trust Resources – According to the Bureau of Indian Affairs, there are no Indian Sacred Sites or Indian Trust Resources in the immediate vicinity of the site.

Hazardous, Toxic, and Radioactive Substances – There are no hazardous, toxic, or radioactive substances involved with the proposed project. During agency consultation, the Louisiana DNR indicated that no oil, gas, or injection wells are located within the proposed project area (Appendix A).

Socioeconomic Resources – The Preferred Alternative would not affect resources outside the park boundaries, such as demographics, economy, housing, or land use. A minor temporary increase in jobs may occur during construction; however, this would be a negligible impact on local socioeconomic conditions.

1.7 RELATIONSHIPS TO OTHER PROJECTS AND PLANNING

As part of the environmental analysis and consideration of potential direct, indirect, and cumulative impacts, other planned projects in the region were identified that may cumulatively affect resources within the park or the waterways surrounding the park. Other projects occurring or scheduled to occur in the near future within the vicinity of the Preferred Alternative include:

- **Seawall Construction** – Landowners along the Cane River Lake have recently constructed seawalls to protect their property from erosion. Seawalls may create additional erosion on the opposite lake bank from the wave action bouncing off of the constructed seawalls.
- **Shell Beach** – A parking lot and boat ramp were built at Shell Beach in 2007. Shell Beach is located on the east bank of the Cane River Lake near the Old Bermuda Bridge.
- **Road Maintenance** – The Louisiana Department of Transportation and Development (LADOTD) maintains the roadways and repairs ditches along State Highway LA 494/119.

- **Historic Shell Beach Bridge –** The historic Shell Beach Bridge is owned and operated by the Cane River Waterway Commission. The bridge is currently closed, but may need repairs in the future.

1.8 APPLICABLE LAWS AND REGULATIONS

Applicable Federal policies, executive orders and regulations, and how they relate to the resources originally considered are listed in Table 1-1 below. In addition, NPS *Management Policies* (NPS 2006b) was used for guidance for numerous impact topics. Other regulations specific to NPS include the Director's Orders listed below, and NPS Organic Act of 1916.

Table 1-1. Applicable Federal Laws and Regulations

Resource	Relevant Laws and Regulations
Aesthetics	NPS Organic Act
Air Quality	Clean Air Act NPS Organic Act
Aquatic Resources	Magnuson-Stevens Fishery Conservation and Management Act Marine Mammal Protection Act Fish and Wildlife Coordination Act
Coastal Barriers	Coastal Barrier Resources Act
Coastal Zone Management	Coastal Zone Management Act
Cultural, Historic, and Archaeological Resources	National Historic Preservation Act Archaeological Resources Protection Act Director's Order #28 NPS Organic Act
Ecologically Critical Areas	Endangered Species Act
Energy Requirements and Conservation	Energy Policy Act Executive Orders 13031, 13123, 13149
Environmental Justice	Executive Order 12898
Floodplains	Executive Order 11988 Director's Order #77-2
Indian Sacred Sites and Indian Trust Resources	Department of the Interior (DOI) Secretarial Orders No. 3206, 3175 Director's Orders #66 and #71B Executive Orders 13007, 13175
Noise	Director's Order #47 Noise Control Act
Park Operations	NPS Organic Act
Prime and Unique Farmlands	Farmland Protection Policy Act Memorandum on Prime and Unique Agricultural Lands and NEPA (CEQ 1980)
Public Health and Safety	Architectural Barriers Act

Resource	Relevant Laws and Regulations
	Americans with Disabilities Act (ADA) Director's Orders #42 and #83 Executive Order 13045
Socioeconomic Resources	Director's Orders #2 and #12
Soils, Geology, Topography	National Cooperative Soil Survey Standards
Terrestrial Resources	Migratory Bird Treaty Act Wilderness Act Executive Order 13112
Threatened and Endangered Species	Endangered Species Act NPS Organic Act
Visitor Use and Experience	NPS Organic Act Director's Order #12
Water Quality, Hydrology	Clean Water Act Rivers and Harbors Appropriation Act Executive Order 12088 Estuary Protection Act
Wetlands	Executive Order 11990 Clean Water Act Executive Order 12088 Director's Order #77-1 Rivers and Harbors Appropriation Act
Wild and Scenic Rivers	Wild and Scenic Rivers Act Director's Order #46
Wildlife	Migratory Bird Conservation Act; Migratory Bird Treaty Act

1.9 REQUIRED PERMITS, LICENSES, CERTIFICATIONS, AND ASSESSMENTS

The following are a list of required permits needed for the proposed project:

- U.S. Army Corps of Engineers (USACE) Section 10 Rivers and Harbors Appropriation Act of 1899 Permit
- USACE Section 404 Permit
- USACE Section 401 Water Quality Certification
- NPS Wetlands and Floodplains Statement of Findings (SOF)
- LADOTD Right-of-Way Permit Application

1.10 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA was prepared in accordance with National Environmental Policy Act (NEPA) guidelines, and it examines the consequences of the proposed action on the environment. This document analyzes the short-term, long-term, and cumulative effects of the Action Alternatives, along with the "no action alternative." By comparing the Action Alternatives with the no action

alternative, and identifying mitigation measures that would minimize adverse effects, this EA may assist stakeholders in the decision-making process.

1.11 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

Chapter 1 discusses the location and background of the project, the history of the park, the purpose and need of the project, the scope of the EA, the organization of the EA, impact topics considered, evaluated, and dismissed, and applicable statutory and regulatory requirements. Chapter 2 discusses the Action Alternatives, the no action alternative, the environmentally preferred alternative, and the alternatives that were considered but dismissed. Chapter 3 describes the affected environment. This chapter discusses physical, natural, cultural, and human resources in relation to the alternatives. Chapter 4 presents the environmental consequences for the described alternatives to physical, natural, cultural, and human resources. Chapter 5 discusses the mitigation measures that would minimize adverse impacts. Chapter 6 describes the environmental commitments including the unavoidable adverse impacts and irreversible or irretrievable commitments of resources. Chapter 7 discusses the public involvement and scoping process as well as agency consultation and coordination that occurred throughout the NEPA process. Chapter 8 includes a list of document preparers, Chapter 9 includes the references, and the appendices follow the main report.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter provides a detailed description of the No Action Alternative, the Preferred Alternative, the other Action Alternatives, the Environmentally Preferred Alternative, and the alternatives considered but dismissed.

2.1. NO ACTION ALTERNATIVE

The No Action Alternative is required for the NEPA process to review and compare feasible alternatives to the existing baseline conditions. Under the No Action Alternative, the NPS would not reconstruct or stabilize the existing lake bank along Cane River Lake. Erosion of the lake bank would continue from surface drainage runoff during storm events. Wave action from boating on the lake and the seawall would also continue to erode the bank. The continuing erosion of the project site would become more severe if the problem is not remediated. If the erosion remains untreated, existing utilities, vegetation, and the adjacent State Highway LA 494/119 would be threatened.

2.2. ACTION ALTERNATIVES

The proposed project includes the reconstruction and stabilization of the eroded shoreline along Cane River Lake. A total of four conceptual design alternatives (Action Alternatives) are being proposed for the stabilization of the shoreline and will be analyzed in this EA. The design alternatives proposed would stop the erosion from progressing beyond its current state; would stabilize the remaining lake side bank and toe; and would restore the natural visual characteristics of the existing lake bank and preserve the cultural landscape. Each alternative involves the removal of vegetation currently existing along the lake bank (most of which is non-native), restoration of the bank slope, and installation of a stabilization material along the toe of the bank. All of the alternatives would require some minor earthwork activities within the State Highway LA 494/119 right-of-way and construction of a drainage outfall chute. A construction staging area would be located on the Oakwood Plantation and within the water. Following construction, the NPS would restore the natural look and native vegetation of the area by replanting with native shrubs, grasses, and small trees. The proposed alternative design layouts are depicted in Figures 2-1 through 2-4 and cross sectional profiles for each design are located in Appendix C.

2.2.1. Alternative 1: Turf Reinforcement Mat Protected Embankment (Preferred Alternative)

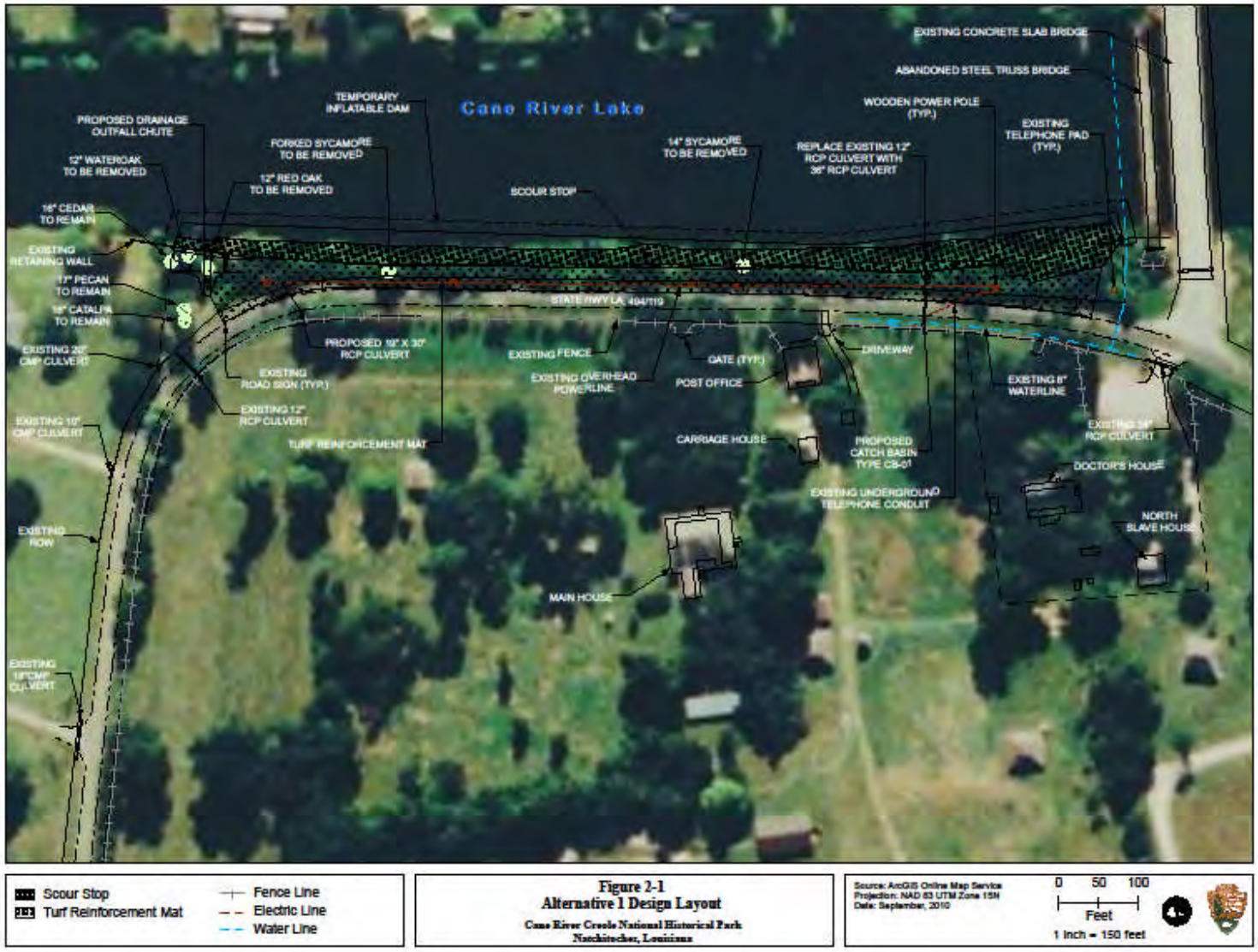
Proposed drainage improvements under the Preferred Alternative would include re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site (Figure 2-1). A new drainage outfall chute would be constructed at the outlet location of the two existing cross drain pipes. The chute would run from the road side swale to the toe of the lake bank, and would be reinforced with a permanent Turf Reinforcement Mat (TRM). The swale would need to be re-graded to restore the original profile. This would prevent sheet flow out of the swale, and direct the discharge water to the new chutes.

In order to maintain the natural aesthetic look of the project site and to provide adequate stabilization of the lake bank, a TRM system would be installed along the lake bank and along the channel of the chute. The TRM structure consists of three layers of polypropylene and a layer of coconut fibers. The mats along with the root reinforcement of seeded or planted vegetation, resist damage from wave energy and high velocity surface flows. The compacted clay fill would be placed at a slope of 1.7(H):1(V) on the face of the existing embankment (Figure 2-1). The embankment footprint would be extended approximately 5.6 feet into the lake. The face of the compacted clay fill would be lined with a TRM to prevent erosion of the fill material. The roadway shoulder would be sloped at 8(H):1(V) and the area between it and the top of the new lake bank would be graded to gradually slope down into the lake to allow for natural water flow into the lake. This would allow for natural drainage, rather than drainage through a lakeside ditch. The TRM can withstand high scour from water flow, and would therefore prevent erosion of the bank. A geosynthetic scour mat would be placed at the toe of the embankment to prevent erosion at the toe. It is estimated that the construction of the bank would last approximately four to six months. The cross sectional profile for Alternative 1 is located in Appendix C.

The project site would need to be cleared of vegetation in preparation for the fill and installment of the TRM. After the installation is complete, the area would be re-vegetated. The proposed re-vegetation plan would include two planting techniques: hydro-seeding and container planting. Only native species to the area would be used during the replanting. Hydro-seeding would be utilized on the steep slopes. The first seed mix would be a slope stabilizing native grass mix sown into 12 inches of topsoil and below a turf reinforcement mat. In more upland areas, potential species include Indian grass (*Sorghastrum nutans*); the second seed mix would include a wetland edge mix below the scour stop to the edge of the lake. Potential species include river cane (*Arundinaria gigantea*) and giant cutgrass (*Zizaniopsis miliacea*). Container plants would include three-gallon shrubs on 12 inches of top soil. Potential species include common buttonbush (*Cephalanthus occidentalis*), swamp dogwood (*Cornus amomum*), elderberry (*Sambucus* sp.), blackhaw viburnum (*Viburnum prunifolium*), spicebush (*Lindera* sp.), and fragrant sumac (*Rhus aromatica*). Proper establishment of the native plants is essential to help anchor the soil and stabilize the lake bank. It is estimated that full vegetative cover can be reestablished in two years.

Under the Preferred Alternative, since the park would be constructing a new embankment below the normal water elevation at the lake, a temporary inflatable dam and dewatering system would be installed until the base can be built above the existing water surface. In addition, due to the steep condition of the existing lake bank, a barge would be required in order to perform construction near the water edge. An additional staging area would be located on park property. The initial earthwork activities along State Highway LA 494/119 may require temporary closures on the northbound lane of the highway and temporary relocation of existing utilities.

Figure 2-1. Alternative 1 Design Layout



2.2.2. Alternative 2: Vegetated Reinforcement Embankment

Proposed drainage improvements under Alternative 2 would be the same as Alternative 1, the Preferred Alternative. Drainage improvements would include re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site (Figure 2-2).

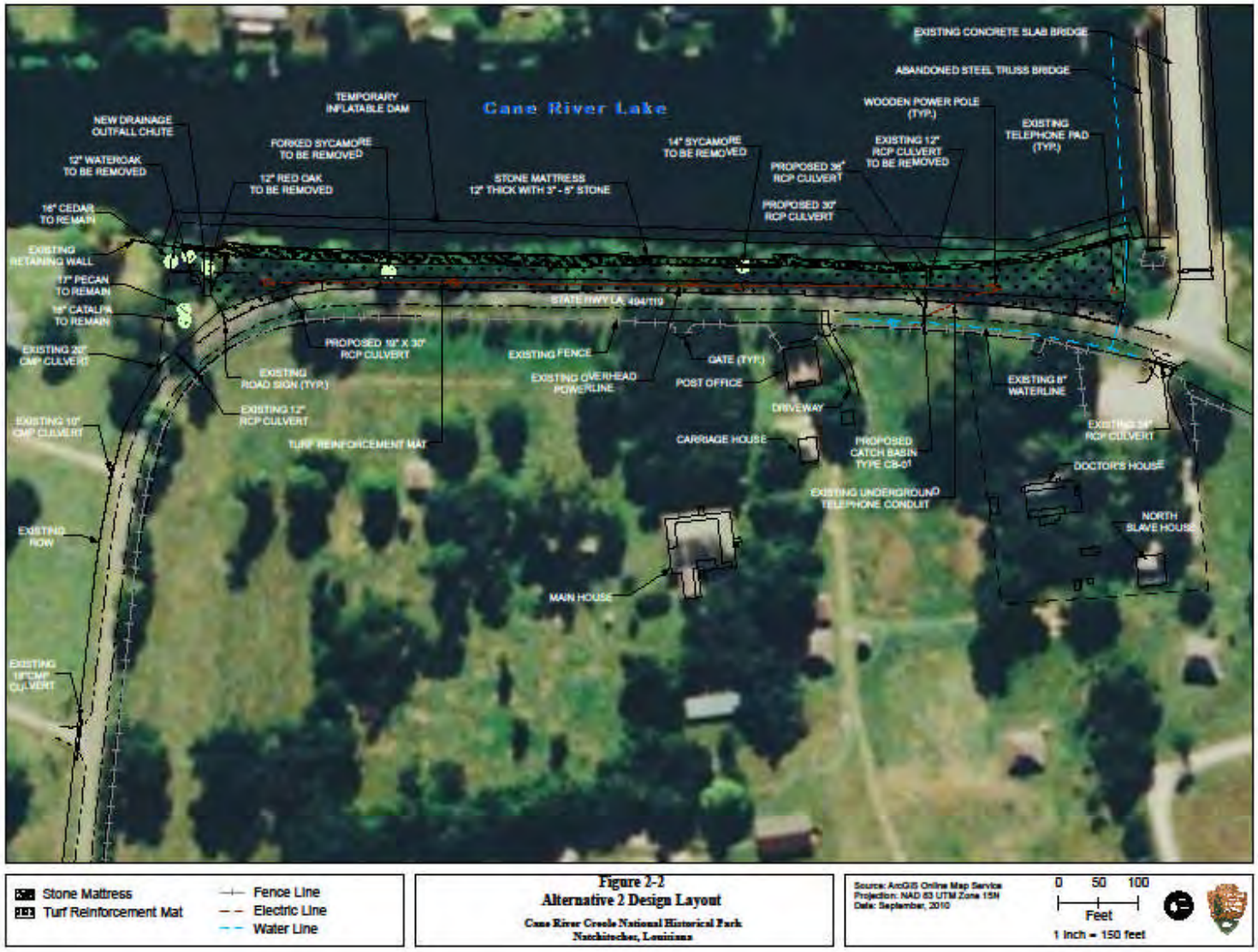
Alternative 2 consists of restoring the lake bank with a geogrid reinforced embankment system and protecting the new ground surface with a TRM system. The geogrid reinforced retaining wall system would be composed of geogrid, geotextile, and wire form baskets. The geogrid protects the new lake bank from internal stability failure and erosion, while the wire form baskets give permanent facial stability in fill placement and compaction.

The toe of the new lake bank would be protected with a Marine Mattress system. The Marine Mattress system would consist of 12 inches of 3-5 inch stones encapsulated in geogrid and geotextile layers. The marine mattress would protect the lower bank from erosion caused by water movement down the lake bank and drainage outfall chutes, as well as from wave impacts of boat wakes. The existing bank slope would be returned to a 1.65(H):1(V) and the toe of the embankment footprint would be extended approximately 14 feet into the lake. The backfill would consist of free draining common fill (stone) and granular fill. A drainage ditch would also be located at the top of the embankment with a 4(H): 1(V) slope near the edge of the existing roadway and a 3(H):1(V) slope near the edge of the existing embankment. It is estimated that the construction of the bank would last approximately four to six months. The cross sectional profile for Alternative 2 is located in Appendix C.

The site would need to be cleared of vegetation in preparation for the installation of the geogrid reinforcement and TRM systems. After the installation is complete, the area would be re-vegetated. The proposed re-vegetation plan would include four planting techniques: hydro-seeding, container plantings, super cell plugs, and deep cell plugs. Hydro-seeding and container planting techniques and species would be the same as the Preferred Alternative. The super cell plugs would be eight-inch cell plants on 12 inches of topsoil and the deep cell plugs would be five-inch plugs installed on two levels. Plugs would be similar species as those listed above under the Preferred Alternative. Proper establishment of the native plants is essential to help anchor the soil and stabilize the lake bank. It is estimated that full vegetative cover can be reestablished in two years.

Under Alternative 2, since the park would be constructing a new embankment below the normal water elevation at the lake, a temporary inflatable dam and dewatering system would be installed until the base can be built above the existing water surface. In addition, due to the steep condition of the existing lake bank, a barge would be required in order to perform construction near the water edge. An additional staging area would be located on park property. The initial earthwork activities along State Highway LA 494/119 may require temporary closures on the northbound lane of the highway and temporary relocation of existing utilities.

Figure 2-2. Alternative 2 Design Layout



2.2.3. Alternative 3: Sheet Pile Retaining Wall

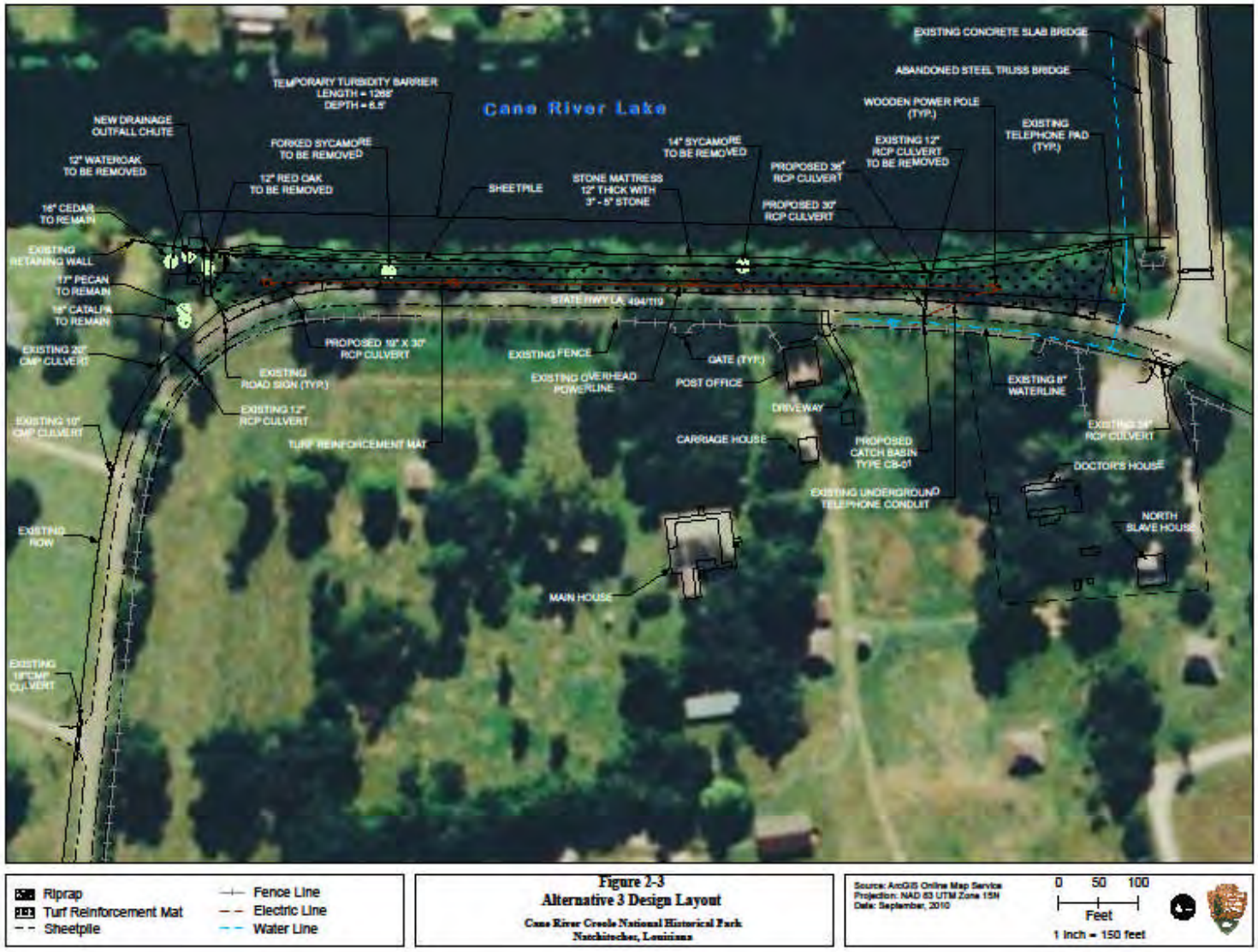
Proposed drainage improvements under Alternative 3 would be the same as the Preferred Alternative, including re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site (Figure 2-3).

Alternative 3 consists of restoring the lake bank by installing a cantilevered sheet pile wall and constructing an embankment slope of 2(H):1(V) behind the sheet pile wall that would be lined with a TRM to prevent erosion of the embankment material. A 12-inch thick marine mattress would be placed on the lake side of the sheet pile wall to prevent erosion. The sheet pile would be placed approximately 5 feet from the existing toe of the lake. The backfill would consist of free draining fill material. Drainage behind the sheet pile wall would be provided by a perforated pipe that would be covered with geotextile fabric, preventing free draining backfill or other debris from entering and clogging the pipe. It is estimated that the construction of the bank would last approximately four to six months. The cross sectional profile for Alternative 3 is located in Appendix C.

The site would need to be cleared of vegetation in preparation for the installation of the sheet pile wall and TRM systems. After the installation is complete, the area would be re-vegetated. The proposed re-vegetation plan would include three planting techniques: hydro-seeding, container plantings, and super cell plugs. Hydro-seeding and container planting techniques would be the same as the Preferred Alternative. The super cell plugs would be similar to Alternative 2. Potential native species would be the same as those described above under the Preferred Alternative. Proper establishment of the native plants is essential to help anchor the soil and stabilize the lake bank. It is estimated that full vegetative cover can be reestablished in two years.

Under Alternative 3, to limit impacts to water quality in the lake water from sediment and silt, a temporary turbidity barrier would be required during the clearing and grubbing phase and until new grass can be established along the new lake bank. In addition, due to the steep condition of the existing lake bank, a barge would be required in order to perform construction near the water edge. An additional staging area would be located on park property. The initial earthwork activities along State Highway LA 494/119 may require temporary closures on the northbound lane of the highway and temporary relocation of existing utilities.

Figure 2-3. Alternative 3 Design Layout



2.2.4. Alternative 4: Turf Reinforcement Mat Protected Embankment with Riprap

Proposed drainage improvements under Alternative 4 would be the same as the Preferred Alternative, which includes re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site (Figure 2-4).

Alternative 4 consists of restoring the existing and eroded lake bank with compacted clay fill embankment above a riprap/stone base and protecting it with a TRM system. This alternative consists of excavating the existing slope and placing riprap at a slope of 1.6(H):1(V). The toe of the embankment footprint would extend approximately 8.5 feet into the lake. A longitudinal stone dike would be constructed along the lake bank toe and compacted clay fill would be placed on top of the riprap or stone base. The embankment would be lined with a TRM system to prevent erosion. A geotextile would be used as a separator at the clay/stone interface. A drainage ditch would also be located at the top of the embankment with a 4(H):1(V) slope near the edge of the existing roadway and a 3(H):1(V) slope near the edge of the existing embankment. It is estimated that the construction of the bank would last approximately four to six months. The cross sectional profile for Alternative 4 is located in Appendix C.

The site would need to be cleared of vegetation in preparation for the installation of the sheet pile wall and TRM systems. After the installation is complete, the area would be re-vegetated. The proposed re-vegetation plan would be the same as Alternative 3. Three planting techniques: hydro-seeding, container plantings, and super cell plugs would be used. Potential native species would be the same as those described above under the Preferred Alternative. Proper establishment of the native plants is essential to help anchor the soil and stabilize the lake bank. It is estimated that full vegetative cover can be reestablished in two years.

Under Alternative 4, to limit impacts to water quality in the lake water from sediment and silt, a temporary turbidity barrier would be required during the clearing and grubbing phase and until new grass can be established along the new lake bank. In addition, due to the steep condition of the existing lake bank, a barge would be required in order to perform construction near the water edge. An additional staging area would be located on park property. The initial earthwork activities along State Highway LA 494/119 may require temporary closures on the northbound lane of the highway and temporary relocation of existing utilities.

Figure 2-4. Alternative 4 Design Layout

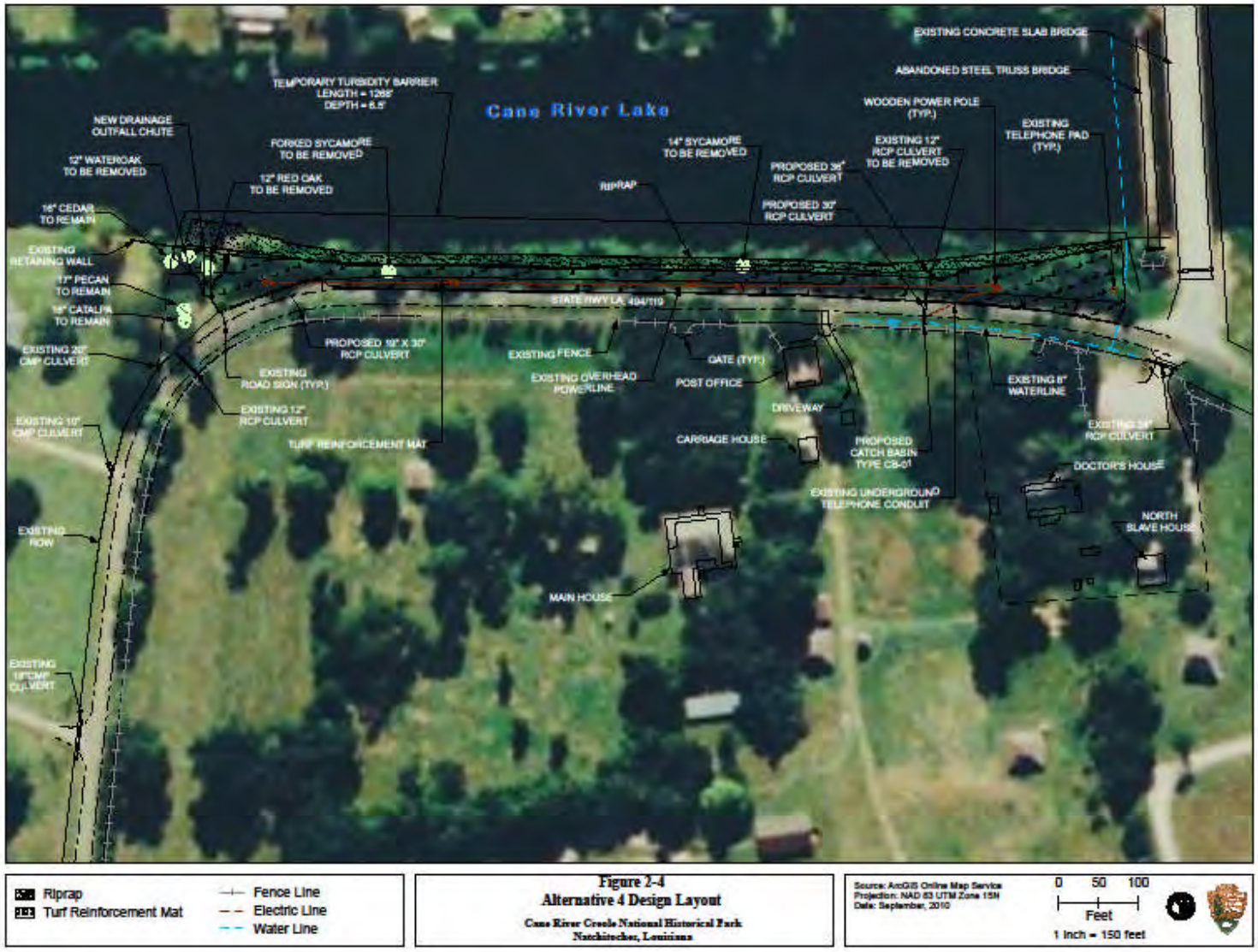


Table 2-1. Comparison of Action Alternatives Design

Alternative	Preferred Alternative 1 (Turf Reinforcement Mat Protected Embankment)	Alternative 2 (Vegetated Reinforcement Embankment)	Alternative 3 (Sheet Pile Retaining Wall)	Alternative 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Drainage Improvements	- Re-grading of roadway drainage ditches - Installation of culvert crossings - New culvert outfall into lake - New drainage outfall chute into lake (north of project site)	-Same as Alternative 1	-Same as Alternative 1	-Same as Alternative 1
Bank Stabilization	- Compacted clay fill - Turf reinforcement mat system protecting bank - Geosynthetic mat at toe	- Free draining common fill (stone) and granular fill - Geogrid reinforced embankment protected with TRM -Marine Mattress system at toe	- Free draining common fill -Cantilevered sheet pile wall with fill behind, protected with TRM - Marine mattress on lake side of sheet pile wall	- Compacted clay fill over riprap, protected with TRM - Stone dike at toe of embankment, separated from clay with geotextile fabric
Toe of Embankment	- Embankment footprint extended 5.6 feet into the lake	- Embankment footprint extended 14 feet into the lake	- Embankment footprint extended 5 feet into the lake	- Embankment footprint extended 8.5 feet into the lake
Slope of Bank	1.7 (H): 1 (V)	1.65 (H): 1 (V)	2 (H): 1 (V)	1.6 (H): 1 (V)
Temporary Dam	Temporary dam needed	Temporary dam needed	No dam needed	No dam needed
Re-vegetation	Re-vegetation with native trees, shrubs, and grasses	Re-vegetation with native trees, shrubs, and grasses	Re-vegetation with native trees, shrubs, and grasses	Re-vegetation with native trees, shrubs, and grasses

2.3. MITIGATION MEASURES OF THE ACTION ALTERNATIVES

Mitigation measures are taken to lessen the adverse effects of the action alternatives. Due to the preferred alternative and associated environmental impacts, mitigation will be required for impacts to soils, noise, water quality, wetlands, vegetation, aquatic resources, public health and safety, and infrastructure. Mitigation measures are discussed in detail in Chapter 5, and summarized below:

- **Soils –** The removal of vegetation along the Cane River Lake bank will result in exposed soils during construction, presenting the possibility for erosion at the proposed project area. To minimize impacts, measures would be used to prevent or reduce soils from erosion and to minimize soil erosion entering Cane River Lake.
- **Noise -** Construction activities would produce noise at the project site. Impacts to noise would be mitigated by restricting construction activities to daylight hours.
- **Water Quality** – Because disturbed sediments are susceptible to erosion and can impact water quality, best management practices and sediment and erosion control measures would be used during the implementation of the proposed project.
- **Wetlands** – Impacts to wetlands are anticipated as a result of the material revetment and from fill to be placed on the Cane River Lake bank. A wetland mitigation plan has been proposed which is included in the Wetlands Statement of Findings (SOF) in Appendix D.
- **Vegetation -** To minimize the impacts to vegetation, following the installation of the bank stabilization material, the project area would be re-vegetated with native plants.
- **Aquatic Resources -** To minimize the impacts to aquatic resources, sediment and erosion controls would be implemented.
- **Public Health and Safety -** To reduce the risk of injuries, the project area would be blocked off or barricaded from public access.
- **Infrastructure -** To minimize impacts to traffic delays, barricades could be placed around the active construction site, which would allow traffic to use both the north and south bound lanes. If closures were necessary, detour signage could be used at the site

2.4. ALTERNATIVES CONSIDERED BUT DISMISSED

Additional alternatives were identified during the internal scoping process. These alternatives were dismissed from further analysis due to technical feasibility, potential for major environmental impacts to the park, and conflicts with the purpose and need of the project. Table 2-2 includes a description of the dismissed alternatives and justification for dismissal.

Table 2-2. Alternatives Considered But Dismissed

Alternative	Description	Reasons for Dismissal
Alternative A	Turf reinforcement mat protected embankment (with stone toe)	-May not meet USACE long-term stability criteria -Does not meet Cane River Lake Waterway Commission (CRWC) criteria -Impact of shoreline changed -No medium/large tree growth

Alternative	Description	Reasons for Dismissal
Alternative B	Turf reinforcement mat protected embankment (with scour stop toe)	-May not meet USACE long-term stability criteria -Soil stabilization issues -Does not meet CRWC criteria -No medium/large tree growth
Alternative C	Vegetated reinforcement embankment (with stone toe)	-May not meet USACE long-term stability criteria -Does not meet CRWC criteria -Concerns about boat damage from stone toe -Erosion issues not fully solved, may be future problems
Alternative D	Vegetated reinforcement embankment (with scour stop toe)	-May not meet USACE long-term stability criteria -Does not meet CRWC criteria -Impact of shoreline changed -Erosion issues not fully solved, may be future problems
Alternative E	Sheet pile retaining wall	-Cost of the alternative -Alternative causes concern over boater safety -Extent and appearance of the steel sheet pile
Alternative F	Turf reinforcement mat protected embankment (with riprap base)	-May not meet USACE long-term stability criteria -Does not meet CRWC criteria -Visual impact of shoreline changed -Constructability issues (steepest solution) -Concerns over boat strike and safety of riprap
Alternative G	Use wood seawall / trees for protected embankment	-May not meet USACE long-term stability criteria -Visual impact of shoreline changed -Erosion issues not fully solved, may be future problems -Concerns from CRWC
Alternative H	Use articulated concrete mat or gunnite surface stabilization	-Visual impact of shoreline changed -Erosion issues not fully solved, may be future problems -Slope too steep to install gunnite (need 1:1, have 1:4 slope)
Alternative I	Drop stone on embankment at washout areas (USCOE idea)	-Concerns from CRWC -Impact of shoreline changed -Erosion issues not fully solved, may be future problems -Riprap area cannot be re-vegetated
Alternative J	Use wood or composite retaining wall with fill behind (similar to Alt 3)	-Extent and appearance of the steel sheet pile -Poses many concerns over boater safety -Wood or composite retaining walls will require multiple replacements before useful life of project is met

Alternative	Description	Reasons for Dismissal
Alternative K	Use turf reinforcement mat protected embankment with wood or composite wall to reduce riprap	-Constructability issues (steepest solution) -Wood or composite retaining walls will require multiple replacements before useful life of project is met -Visual impacts of shoreline changed -Does not meet CRWC criteria
Alternative L	Use soldier pile retaining wall with fill behind (similar to Alt 3)	-Poses maintenance issues along weak spots of retaining wall -Extent and appearance of retaining wall -Concerns over boater safety -Concerns over boat damage from stone toe
Alternative M	Use stone columns along the edge of the road	-Existing areas not fully solved, may be future problems and added maintenance -Impact of shoreline changed -Cost of alternative -Concerns over boater safety
Alternative N	Use micropiles or jet grouting to reinforce embankment	-Constructability issues due to steepness -Cost of alternative -Concerns over boater safety -Existing areas not fully solved, may be future soil stabilization problems
Alternative O	Use sheet pile closer to road with no additional fill to restore the lake bank or removal of existing vegetation required & underground drainage system	-Existing areas not fully solved, may be future problems -Cost of alternative -Risk of future loss of additional historic landscape -Concerns from CRWC
Alternative P	Move the road to a new location	-Existing areas not fully solved, may be future problems -Cost and schedule requirements of alternative -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition
Alternative Q	Give the land between the road and lake to the Natchitoches Police Jury and let them solve the problem	-Doesn't address purpose and need of project -Won't solve erosion and instability issues in timely manner -Parish's objective in resolving issue disregards the Park's mission to restore area to natural condition

Alternative	Description	Reasons for Dismissal
Alternative R	Close the road and allow the erosion to naturally continue	-Doesn't address purpose and need of project -Will stop traffic flow on road, causing major disruptions -Probably will not be approved by LADOTD -Concerns from CRWC
Alternative S	Sell the land between the road and lake to concessionaire and let them develop it for their use	-Doesn't address purpose and need of project -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition -Concerns from LADOTD, NPS, and CRWC
Alternative T	Give the land between the road and lake to the Louisiana Department of Transportation and let them solve the problem	-Doesn't address purpose and need of the project -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition -Concerns from LADOTD, NPS, and CRWC
Alternative U	Do partial sheet pile and solve road drainage areas	-Doesn't address purpose and need of the project -Impact of shoreline changed -Concerns from NPS and CRWC
Alternative V	Create earth retention system at road shoulder and re-grade at road shoulder only	-Cost of alternative -Impact of shoreline changed -Existing eroded lake bank is not mitigated -Concerns from NPS and CRWC

2.5. SELECTION OF THE PREFERRED ALTERNATIVE

To select the Preferred Alternative, a Value Analysis Workshop was conducted on 22 and 23 June 2010. A Value Analysis is an organized, creative process, which focuses attention on the requirements of a project for the purposes of achieving essential functions and attendant benefits at the lowest, total costs for materials, equipment, staffing, energy usage, facilities, maintenance, etc. During the Value Analysis the team reviewed the design alternatives, considered cost estimates, and prepared a function-logic diagram. A function-logic diagram describes the essential functions of the project that would enhance the park's mission. Certain value analysis analytical tools and methods were used during the two day workshop to focus the team on the issues, problems, and opportunities presented by the proposed project.

The Value Analysis workshop focused on the following:

- Develop the Preferred Alternative for the proposed project by using Choosing by Advantages.
- Review options to maximize the project's useful life (50-100 years).
- Create options within the project budget.
- Identify opportunities to improve the value of the project.

The Preferred Alternative was selected by using the Choosing by Advantages process. In this process, decisions are based on the importance of the advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and the weighing of the importance of each advantage. The factors used to evaluate the proposed alternatives for the bank stabilization project included the following:

- Protect cultural and natural resources.
- Improve efficiency of park operations.
- Provide cost-effective, environmentally responsible, and otherwise beneficial development for the park.

Alternative 1, which includes drainage system improvements, the installation of compacted clay fill lined with a TRM system, the installation of a geosynthetic scour mat at to the toe of the bank, and the re-vegetation of the bank was selected as the Preferred Alternative. Alternative 1 was selected because this alternative would be better at preventing erosion from boat traffic and would meet the long-term needs of the project. Additionally, Alternative 1 would require the least amount of maintenance from park staff and it would best preserve the cultural landscape of the area.

2.6. ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria from Section 2.7 (D) of NPS DO-12. These are the same criteria outlined in NEPA, which is guided by the Council on Environmental Quality (CEQ) regulations. CEQ regulations provide direction that "the environmentally preferable alternative is the alternative that will best promote the national environmental policy as expressed in Section 101(b) of NEPA." Generally, this means the alternative that causes the least damage to the biological and physical environment. It also means the alternative that best protects, preserves, and enhances historic, cultural and natural resources.

Consistency with Section 101(b) of NEPA

NPS policy requires the identification of an environmentally preferable alternative to aid NPS decision-makers in choosing among the alternatives. The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed by NEPA. This includes alternatives that meet the six goal statements of Section 101(b) of NEPA, which are listed in Table 2-3. A summary of the alternatives and whether each would meet the goal statements is also presented in Table 2-3.

Table 2-3. Selection of the Environmentally Preferred Alternative

NEPA GOAL STATEMENT	NO ACTION ALTERNATIVE	PREFERRED ALTERNATIVE 1 (Turf Reinforcement Mat Protected Embankment)	ALTERNATIVE 2 (Vegetated Reinforcement Embankment)	ALTERNATIVE 3 (Sheet Pile Retaining Wall)	ALTERNATIVE 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
(1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.	Interferes with achieving this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.
(2) Assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.	Interferes with achieving this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Interferes with achieving this goal.	Contributes toward meeting this goal.
(3) Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.	Interferes with achieving this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Interferes with achieving this goal.	Contributes toward meeting this goal.
(4) Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.	Interferes with achieving this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Interferes with achieving this goal.	Contributes toward meeting this goal.
(5) Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.	Interferes with achieving this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.
(6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.	Contributes toward meeting this goal.

The No Action Alternative would not meet the management goals and objectives of this park unit. In addition, the No Action Alternative does not fulfill the provisions of the NEPA goals, as summarized in Table 2-3. Although the No Action Alternative would not create any additional disturbance, the existing conditions would continue without providing long-term environmental protection of the Cane River Lake bank.

Alternatives 1, 2 and 4 meet the NEPA goals identified above; however, Alternative 1 was selected as the Environmentally Preferable Alternative for the proposed bank stabilization project. Alternative 1 would meet park purposes and NEPA goals by providing long-term environmental protection of the bank of Cane River Lake, protecting important cultural resources, and providing visitor safety, as well as assuring aesthetically and culturally pleasing surroundings. Alternative 1 is the environmentally preferred alternative because it would be providing the best protection to historic resources for which the park was established and contributing towards improving visitor safety at the park. Under all alternatives, the bank would be extended into Cane River Lake. Alternative 1 would be extended five feet, which is the least intrusive of all alternatives.

2.7. COMPARISON OF ALTERNATIVES

Table 2-4 compares and contrasts the alternatives, including the degree to which each alternative accomplishes the purpose or fulfills the need identified in the Purpose and Need section.

Table 2-4. Comparative Summary of Alternatives

PROJECT OBJECTIVES	**NO ACTION ALTERNATIVE**	**PREFERRED ALTERNATIVE 1** (Turf Reinforcement Mat Protected Embankment)	**ALTERNATIVE 2** (Vegetated Reinforcement Embankment)	**ALTERNATIVE 3** (Sheet Pile Retaining Wall)	**ALTERNATIVE 4** (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Need: Provide stabilization and erosion control along the lake bank	No bank stabilization would occur. The bank would continue to severely erode.	Stabilization and erosion control would occur through the drainage improvements, placement of a TRM system, and re-vegetation of the bank slope.	Stabilization and erosion control would occur through the drainage improvements, placement of a Marine Mattress system, and re-vegetation of the bank slope.	Stabilization and erosion control would occur through the drainage improvements, installation of the retaining wall, and re-vegetation of the bank slope.	Stabilization and erosion control would occur through the drainage improvements, placement of riprap and a TRM system, and re-vegetation of the bank slope.
Need: Restore the natural view characteristic to the area via native vegetation replanting	No alteration of the vegetation would occur. Non-native species would continue to exist.	The natural view of the lake bank would be restored via native vegetation replanting and reducing the slope of the bank.	The natural view of the lake bank would be restored via native vegetation replanting and reducing the slope of the bank.	The natural view of the lake bank would not be restored due to placement of a sheet pile retaining wall.	The natural view of the lake bank would be restored via native vegetation replanting and reducing the slope of the bank.
Need: Preserve cultural landscape in the park	The project area would not be restored and the cultural landscape of the park would remain unchanged.	The cultural landscape of the park would be improved by planting the native vegetation and reducing the erosion of the bank.	The cultural landscape of the park would be improved by planting the native vegetation and reducing the erosion of the bank.	The cultural landscape of the park would be impacted by the placement of the sheet pile retaining wall along the lake bank.	The cultural landscape of the park would be improved by planting the native vegetation and reducing the erosion of the bank.

2.8. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-5 summarizes the direct and indirect impacts to the resources at the park for the Action Alternatives and the No Action Alternative.

Table 2-5. Summary of Environmental Consequences

Resource	**No Action Alternative**	**Preferred Alternative 1** (Turf Reinforcement Mat Protected Embankment)	**Alternative 2** (Vegetated Reinforcement Embankment)	**Alternative 3** (Sheet Pile Retaining Wall)	**Alternative 4** (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Air Quality	-No impact	-Short-term, minor, adverse impact from dust and pollutants during construction activities -No impact after completion of construction	-Short-term, minor, adverse impact dust and pollutants during construction activities -No impact after completion of construction	-Short-term, minor, adverse impact from dust and pollutants during construction activities -No impact after completion of construction	-Short-term, minor, adverse impact from dust and pollutants during construction activities -No impact after completion of construction
Noise	-No impact	-Short-term, minor, adverse impact from construction noise -No impact after completion of construction	-Short-term, minor, adverse impact from construction noise -No impact after completion of construction	-Short-term, minor, adverse impact from construction noise -No impact after completion of construction	-Short-term, minor, adverse impact from construction noise -No impact after completion of construction
Soils	-Long-term, moderate, adverse effects from continued erosion	-Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from erosion mitigation and re-vegetation	-Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from erosion mitigation and re-vegetation	-Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from erosion mitigation and re-vegetation	-Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from erosion mitigation and re-vegetation
Topography	-Long-term, moderate, adverse impact from topography changes	-Long-term, beneficial impacts from restoration of a natural slope	-Long-term, beneficial impacts from restoration of a natural slope	-Long-term, beneficial impacts from restoration of a natural slope	-Long-term, beneficial impacts from restoration of a natural slope
Hydrology	-No impact	-Short-term, minor impact from use of dam for construction -Long-term, negligible impacts from changes in water elevation and drainage	-Short-term, minor impact from use of dam for construction -Long-term, negligible impacts from changes in water elevation and drainage	-Short-term, negligible impact from barge used for construction staging -Long-term, negligible impacts from changes in water elevation and drainage	-Short-term, negligible impact from barge used for construction staging -Long-term, negligible impacts from changes in water elevation and drainage

Resource	No Action Alternative	Preferred Alternative 1 (Turf Reinforcement Mat Protected Embankment)	Alternative 2 (Vegetated Reinforcement Embankment)	Alternative 3 (Sheet Pile Retaining Wall)	Alternative 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Water Quality	-Long-term, moderate, adverse impact from erosion causing increased turbidity	-Short-term, minor, adverse impact from increased turbidity during construction -Long-term, beneficial impact from erosion control	-Short-term, minor, adverse impact from increased turbidity during construction -Long-term, beneficial impact from erosion control	-Short-term, minor, adverse impact from increased turbidity during construction -Long-term, beneficial impact from erosion control	-Short-term, minor, adverse impact from increased turbidity during construction -Long-term, beneficial impact from erosion control
Floodplains	-No impact	-Long-term, beneficial impact from restoration of natural 100-year floodplain function	-Long-term, beneficial impact from restoration of natural 100-year floodplain function	-Long-term, moderate, adverse impact from impediment of natural 100-year floodplain function	-Long-term, beneficial impact from restoration of natural 100-year floodplain function
Wetlands	-Long-term, moderate, adverse impact from loss of wetlands from erosion	-Long-term, minor, adverse impact from loss of wetlands -Long-term, beneficial impacts from bank stabilization and re-vegetation	-Long-term, minor, adverse impact from loss of wetlands -Long-term, beneficial impacts from bank stabilization and re-vegetation	-Long-term, minor, adverse impact from loss of wetlands -Long-term, beneficial impacts from bank stabilization and re-vegetation	-Long-term, minor, adverse impact from loss of wetlands -Long-term, beneficial impacts from bank stabilization and re-vegetation
Vegetation	-Long-term, moderate, adverse impact from erosion damage	-Short-term, minor, adverse impact from vegetation clearing -Long-term, negligible impact from mature tree removal	-Short-term, minor, adverse impact from vegetation clearing -Long-term, negligible impact from mature tree removal	-Short-term, minor, adverse impact from vegetation clearing -Long-term, negligible impact from mature tree removal	-Short-term, minor, adverse impact from vegetation clearing -Long-term, negligible impact from mature tree removal
Wildlife	-No impact	-Short- to long-term, minor, adverse impact from construction activities and vegetation removal	-Short- to long-term, minor, adverse impact from construction activities and vegetation removal	-Short- to long-term, minor, adverse impact from construction activities and vegetation removal	-Short- to long-term, minor, adverse impact from construction activities and vegetation removal
Aquatic Resources	-No impact	-Short-term, minor, adverse impact from construction activities	-Short-term, minor, adverse impact from construction activities	-Short-term, minor, adverse impact from construction activities	-Short-term, minor, adverse impact from construction activities

Resource	No Action Alternative	Preferred Alternative 1 (Turf Reinforcement Mat Protected Embankment)	Alternative 2 (Vegetated Reinforcement Embankment)	Alternative 3 (Sheet Pile Retaining Wall)	Alternative 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Aquatic Resources (continued)		-Long-term beneficial impact from water quality improvements	-Long-term beneficial impact from water quality improvements	-Long-term moderate, adverse impact from loss of bank habitat -Long-term, beneficial impact from water quality improvement and new habitat creation	-Long-term beneficial impact from water quality improvements
Species of Special Status	-No impact	-No impact	-No impact	-No impact	-No impact
Archeological Sites	-Long-term, indirect, minor adverse impact from continued erosion	-Long-term, beneficial impact from prevention of further erosion	-Long-term, beneficial impact from prevention of further erosion	-Long-term, beneficial impact from prevention of further erosion	-Long-term, beneficial impact from prevention of further erosion
Historic Resources	-Long-term, indirect, minor, adverse impact from continued erosion	-Short-term, minor, adverse impact from clearing of vegetation and construction -Long-term, beneficial impact from prevention of further erosion and re-vegetation	-Short-term, minor, adverse impact from clearing of vegetation and construction -Long-term, beneficial impact from prevention of further erosion and re-vegetation	-Short-term, minor, adverse impact from clearing of vegetation and construction -Long-term, beneficial impact from prevention of further erosion and re-vegetation	-Short-term, minor, adverse impact from clearing of vegetation and construction -Long-term, beneficial impact from prevention of further erosion and re-vegetation
Cultural Landscapes	-Long-term, indirect, minor, adverse impact from continued erosion	-Short-term, minor, adverse impact from clearing of vegetation -Long-term, beneficial impact from erosion prevention and re-vegetation	-Short-term, minor, adverse impact from clearing of vegetation -Long-term, beneficial impact from erosion prevention and re-vegetation	-Short-term, minor, adverse impact from clearing of vegetation -Long-term, minor, adverse impact on cultural landscape viewshed from sheet pile retaining wall	-Short-term, minor, adverse impact from clearing of vegetation -Long-term, beneficial impact from erosion prevention and re-vegetation
Environmental Justice	-No impact	-Short-term, beneficial impact from job creation during construction period	-Short-term, beneficial impact from job creation during construction period	-Short-term, beneficial impact from job creation during construction period	-Short-term, beneficial impact from job creation during construction period

Resource	No Action Alternative	Preferred Alternative 1 (Turf Reinforcement Mat Protected Embankment)	Alternative 2 (Vegetated Reinforcement Embankment)	Alternative 3 (Sheet Pile Retaining Wall)	Alternative 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Aesthetics	-Long-term, moderate, adverse impact from erosion	-Short-term, minor, adverse impact from vegetation clearing	-Short-term, minor, adverse impact from vegetation clearing	-Short-term, minor, adverse impact from vegetation clearing	-Short-term, minor, adverse impact from vegetation clearing
Aesthetics (continued)		-Long-term, beneficial impact from lake bank appearance improvement	-Long-term, beneficial impact from lake bank appearance improvement	-Long-term, moderate, adverse impact from sheet pile retaining wall	-Long-term, beneficial impact from lake bank appearance improvement
Public Health and Safety	-No impact	-Short-term, minor, adverse impact during construction activities	-Short-term, minor, adverse impact during construction activities	-Short-term, minor, adverse impact during construction activities -Long-term, minor, adverse impact from installation of sheet pile retaining wall	-Short-term, minor, adverse impact during construction activities
Energy Requirements	-No impact	-Short-term, minor adverse impact due to construction energy use	-Short-term, minor adverse impact due to construction energy use	-Short-term, minor adverse impact due to construction energy use	-Short-term, minor adverse impact due to construction energy use
Infrastructure	-Long-term, moderate, adverse impact from erosion of bank by road	-Short-term, minor, adverse impact from construction work -Long-term, beneficial impact from erosion control and drainage	-Short-term, minor, adverse impact from construction work -Long-term, beneficial impact from erosion control and drainage	-Short-term, minor, adverse impact from construction work -Long-term, beneficial impact from erosion control and drainage	-Short-term, minor, adverse impact from construction work -Long-term, beneficial impact from erosion control and drainage
Visitor Use and Experience	-Long-term, minor, adverse impact from reduced visual quality of site	- Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from improvements in bank appearance	- Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from improvements in bank appearance	- Short-term, minor, adverse impact from construction activities -Long-term, moderate, adverse impact from appearance of sheet pile retaining wall	- Short-term, minor, adverse impact from construction activities -Long-term, beneficial impact from improvements in bank appearance

Resource	No Action Alternative	Preferred Alternative 1 (Turf Reinforcement Mat Protected Embankment)	Alternative 2 (Vegetated Reinforcement Embankment)	Alternative 3 (Sheet Pile Retaining Wall)	Alternative 4 (Turf Reinforcement Mat Protected Embankment with Rip Rap)
Park Operations	-Long-term, moderate, adverse impact on park staff for continuing erosion damage repairs	-Short-term, minor to moderate adverse impact during construction activities -Long-term, beneficial from a reduction in time spent repairing damage from erosion	-Short-term, minor to moderate adverse impact during construction activities -Long-term, beneficial from a reduction in time spent repairing damage from erosion	-Short-term, minor to moderate adverse impact during construction activities -Long-term, beneficial from a reduction in time spent repairing damage from erosion	-Short-term, minor to moderate adverse impact during construction activities -Long-term, beneficial from a reduction in time spent repairing damage from erosion

3.0 AFFECTED ENVIRONMENT

3.1 CHAPTER OVERVIEW

Chapter 3.0 describes the existing environmental resources of the area that would be affected if the Proposed Project were implemented. The descriptions, data, and analyses focus on the specific conditions or consequences that may result from implementing the Proposed Action as required by *NPS Director's Order #12 and Handbook*: *Conservation Planning, Environmental Impact Analysis, and Decision Making*, which sets forth the policy and procedures by which NPS will comply with NEPA (NPS 2001).

A description of existing environmental conditions provides a better understanding of planning issues and establishes a benchmark by which the magnitude of environmental effects of the Action Alternatives and the No Action Alternative can be compared. The information in Chapter 3.0 is organized by the same environmental topics used to organize the impact analysis in Chapter 4.0.

Chapter 3.0 addresses the topics that were not dismissed from further consideration as described in Chapter 1.0 for the proposed project area. The topics are organized by resource: physical resources, natural resources, cultural resources, human environment, visitor use and experience, and park operations. For this chapter, the proposed project area is defined as the area between the Cane River Lake bank and State Highway LA 494/119, beginning just north of the LA 119 bridge and ending at the Oakland Plantation's northernmost boundary, where the State Highway LA 494/119 comes in from the northwest (Figure 1-3). The proposed project area is expanded for the human environment to capture the existing conditions applicable to the site and beyond.

3.2 PHYSICAL RESOURCES

3.2.1 Air Quality

The federal Clean Air Act (CAA) requires all federal agencies to comply with existing federal, state, and local air pollution control laws and regulations. The United States Environmental Protection Agency (USEPA) sets primary National Ambient Air Quality Standards (NAAQS) required by the CAA for air pollutants that cause health threats. The CAA defines six criteria pollutants. These criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM) with size less than 10 μm^3 or 2.5 μm^3 (PM_{10} or $PM_{2.5}$), nitrogen oxides (NO_X), ozone (O_3), and lead (Pb). Volatile organic compounds (VOCs) are not criteria pollutants, but are of interest because they participate in the formation of ozone. Table 3-1 presents a summary of pollutants, their characteristics, and their health and welfare impacts.

Table 3-1. Air Pollutants and Their Characteristics

Pollutant	Characteristics
Particulates (PM_{10})	• Mixture of solid particles and liquid droplets; fine particles (less than 10 micrometers) produced by fuel combustion, power plants, and diesel buses and trucks • Can aggravate asthma, produce acute respiratory symptoms, including aggravated coughing and difficult or painful breathing, and chronic bronchitis • Impairs visibility
Sulfur Dioxide (SO_2)	• Can cause temporary breathing difficulties for people with asthma • Reacts with other chemicals to form sulfate particles that are a major cause of reduced visibility in many parts of the country • Main contributor to acid deposition
Nitrogen Oxides (NO_X)	• High temperature fuel combustion exhaust product • Can be an irritant to humans and participates in the formation of ozone • Reacts with other pollutants to form nitrate particles that are a significant contributor to visibility reduction in many parts of the country • Contributor to acid deposition
Carbon Monoxide (CO)	• Odorless, colorless gas produced by fuel combustion, particularly mobile sources • May cause chest pains and aggravate cardiovascular diseases, such as angina • May affect mental alertness and vision in healthy individuals
Volatile Organic Compounds (VOCs)	• Fuel combustion exhaust product • Consists of a wide variety of carbon-based molecules • Participates in the formation of ozone
Ozone (O_3)	• Not directly emitted by mobile, stationary, or area sources • Formed from complex reactions between NO_X and VOC emissions in the presence of sunlight • Occurs regionally due to multiplicity of sources • Can irritate the respiratory system • Can reduce lung function • Can aggravate asthma and increase susceptibility to respiratory infections • Can inflame and damage the lining of the lungs • Interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather • Damages the leaves of trees and other plants
Lead (Pb)	• Lead causes damage to the kidneys, liver, brain and nerves, and other organs and may lead to osteoporosis (brittle bone disease) and reproductive disorders • Lead exposure causes high blood pressure and increases heart disease and may lead to anemia • Lead can slow down vegetation growth and can cause reproductive damage in some aquatic life and cause blood and neurological changes in fish

The CAA requires that each of the NAAQS be revised every five years to reflect the most recently available health information. Areas of the country where air pollution levels persistently exceed the NAAQS standards are normally designated as nonattainment areas. The park is located within Natchitoches Parish. The Oakland Plantation is approximately ten miles south of the town of Natchitoches. The entire Parish of Natchitoches is in attainment for all six criteria pollutants (USEPA 2010).

3.2.2 Noise

Current noise sources in the surrounding area of the proposed project site are predominately the result of human activities. Boating and other recreational activities are popular on Cane River Lake and are the primary noise source from the lake as sound is typically amplified on flat water surfaces. Examples of noise sources include jet skis, recreational boats, and fishing boats. Another source of noise within the park includes the car traffic from State Highway LA 494/119 which runs along the Oakland Plantation, adjacent to the proposed project area. Park visitors touring the plantation are an additional source of noise. A secondary source of sound in the vicinity of the site is natural and includes calls from birds and other wildlife as well as the sound of moving water within Cane River Lake.

3.2.3 Soils

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) surveyed the soils in the vicinity of Oakland Plantation in 2010 (Figure 3-1). Three soil types, including Roxana very fine sandy loam, Moreland silt loam, and Moreland clay are found within the Oakland Plantation.

The proposed project area is comprised of Roxana very fine sandy loam soils (Figure 3-1). These deep, well drained, level (0 to 1 percent slope) soils occur on natural levees of the Red River floodplain. These soils are loamy and alkaline throughout and fertility is high. Movement of air and water through the soil is moderate and runoff is slow. These soils dry quickly after it rains and have a very high potential of productivity. Roxana very fine sandy loam soils are best suited for bottomland hardwoods. These soils also have excellent potential for cropland and pastureland. Suitable crops include cotton, soybeans, corn, grain sorghum, and truck crops. Pasture plants include bermudagrass (*Cynodon dactylon*), Pensacola bahiagrass (*Paspalum notatum*), ryegrass (*Lolium* sp.), tall fescue (*Schedonorus phoenix*), and white clover (*Trifolium repens*) (NRCS 2010).

Moreland silt loam soils are located within the northwest portion of the Oakland Plantation (Figure 3-1). These deep, somewhat poorly drained, level (0 to 1 percent slope) soils are located on the floodplain of the Red River. These soils have a loamy surface layer and a clayey subsoil with a high natural fertility. Water and air move very slowly through the subsoil resulting in a slow runoff. These soils are good for hardwood species that prefer wet clayey soils. Moreland silt loam has fair potential for cropland and pastureland. Suitable crops include soybeans and cotton and suitable pasture plants include bermudagrass, dallisgrass (*Paspalum dilatatum*), ryegrass, tall fescue, and white clover (NRCS 2010).

The northwest portion of the Oakland Plantation also contains a small amount of Moreland clay soils. These deep, somewhat poorly drained, level (0 to 1 percent) soils are located on floodplains. These soils were formed in Red River alluvium and have both a clayey surface and subsoil layer. Water and air move slowly through the subsurface layer, resulting in slow runoff. These soils are good for hardwood species that prefer wet clayey soils. Moreland clay soils have

fair potential for cropland and pastureland. Suitable crops and pasture plants are the same as those for Moreland silt loam described above (NRCS 2010).

Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied (NRCS 2010). All three soil types identified within the park and project area are considered prime farmlands (NRCS 2010).

3.2.4 Topography

A topographic survey was completed at the site during the alternatives development process. The existing edge of the lake bank sits at varying elevations ranging from approximately 104 feet North American Vertical Datum (NAVD) 1988 to 108 feet NAVD 1988. The grade of the bank in the northern half of the site near the water's edge is steep with slopes greater than 1(H):1(V). The slope is gradual from near the water's edge to the center of the lake. The sharp drop in elevation are resulted from decades of surface erosion that are caused by the wake that is generated by local boat traffic on the lake surface and surface drainage runoff along State Highway LA 494/119 (HNTB 2010).

Toward the south end of the project site, within approximately 200 feet of the abandoned steel bridge, the existing lake bank is more stable and has not experienced as severe erosion as the remainder of the project site. The existing edge of the lake bank sits at varying elevations ranging from approximately 104 feet to 108 feet. The bank then gradually slopes down toward the center of the lake to approximately elevation 78 feet. The existing slopes in this area are approximately 2.2(H):1(V) (HNTB 2010).

Figure 3-1. Soil Types Located in the Proposed Project Location

3.3 WATER RESOURCES

3.3.1 Hydrology

The east side of the project site is bounded by the water's edge of Cane River Lake. Cane River Lake is an oxbow lake that was created when what was then the main channel of the current Red River was dammed in 1916 to create a recreational waterway (HNTB 2010). The Cane River channel is about 60 miles long, from north of Natchitoches to the Red River, which is inclusive of the dammed portion (Cane River lake). The dammed portion is 34.5 miles long, with an average with of 250 feet. The depth is variable, and ranges from five to 25 feet deep toward the lower end of the river. Typically, the lower Cane River water depth is generally low. The Cane River Lake serves as a source of water for irrigation, habitat for fish, and a place for recreation.

Other open water areas in proximity to the park include Bayou Natchez, Old River, Red River, and Sibley Lake. Bayou Natchez and Old River are located approximately three to four miles, respectively, west of the park. Sibley Lake is located northwest of the park near the town of Natchitoches. An unnamed stream flows on the western wedge of the park. The Red River, a major tributary of the Mississippi River, is approximately three miles east of the park.

3.3.2 Water Quality

Water quality testing of the Cane River Lake has been inconsistent over the years. In 1995, Louisiana Department of Environmental Quality (LADEQ) evaluated the 60-mile Cane River. Water quality tests indicated that the river was in generally good condition, and was fit to support secondary and primary contact recreation, as well as fish and wildlife propagation. The degradation that occurred in the lake was due to nutrients and organic material, probably associated with urban runoff, septic tanks, and wastewater treatment plants (NPS 2000). Increased sedimentation and turbidity may be a result of the erosion of the lake bank.

The Louisiana Water Quality Inventory Report 305(b) and the 303(d) List of Impaired Water bodies is a biennial report regarding the status of the water quality in Louisiana surface water bodies. The 2008 report indicated that the Cane River Lake did not support primary contact (swimming) in all the areas tested. This was due to the presence of fecal coliform, likely a result of livestock, rural residential areas, and wildlife (other than waterfowl). The lake also did not support fish or wildlife propagation, which is attributable to low dissolved oxygen levels and high total dissolved solids levels/concentrations. Secondary contact (boating), however, was fully supported based on LADEQ water quality standards, as well as agricultural use (LADEQ 2008). Many of the problems present in 2008 were ameliorated, and the 2010 report indicated that the Cane River Lake fully supports both primary and secondary water contact. The lake still does not support fish and wildlife propagation due to the chloride levels, dissolved oxygen, and total dissolved solids. The water color is not suitable for drinking water based on its natural color (LADEQ 2010). The CRWC tests the water in Cane River Lake to make sure the water is safe for public use. In June 2010, fecal coliform levels were higher than the USEPA standard within the lake reach from the downtown area to the parkway area. Therefore swimming, waterskiing,

or any in-water activity was prohibited until levels resided. The area was marked by buoys with a notice on them.

3.3.3 Floodplains

Floodplain Management, Executive Order 11988 issued 24 May 1977, directs all Federal agencies to avoid both long- and short-term adverse effects associated with occupancy, modification, and development in the 100-year floodplain, when possible. Floodplains are defined in this order as "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a one percent greater chance of flooding in any given year." Flooding in the 100-year zone is expected to occur once every 100 years, on average. In addition, NPS Preferred Alternatives that may adversely affect floodplains must comply with Director's Order #77-2: Floodplain Management.

All agencies must avoid building within a 100-year floodplain, unless there is no other alternative. NPS policy dictates guidelines to restore and maintain natural floodplains. Guidelines also require avoidance of the environmental impacts of development within floodplains, or modification of floodplains. The guidelines also require that, where practicable alternatives exist, Class I action be avoided within a 100-year floodplain. Class I actions include the location or construction of administration, residential, warehouse, and maintenance buildings, non-excepted parking lots, or other man-made features that by their nature entice or require individuals to occupy the site.

Portions of the park are located within the floodplain, as shown in Figure 3-2. A large portion of the Oakland Plantation, including historical structures such as, the tractor shed, mule barn, wagon shed, wash shed, carpenter shop, and the square crib are within the 500-year floodplain. Approximately one-third of the plantation's structures, including the majority of the main house are outside of the floodplain. Cane River and the east bank are within the 100-year floodplain (Figure 3-2). Only the northeast corner of the proposed project area lies within the 100-year floodplain (Figure 3-2). The 100-year floodplain does not extend into the majority of the project area or Oakland Plantation due to the highly eroded west bank of the Cane River.

Figure 3-2. Floodplain Located in the Proposed Project Location

3.3.4 Wetlands

Section 404 of the Clean Water Act of 1972 (CWA) and a number of state laws and provisions regulated activities in wetlands. Executive Order 11990 – *Protection of Wetlands*, directs all federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, parks must modify actions to preserve and enhance wetland values and minimize degradation. Consistent with Executive Order 11990 and Director's Order #77-1: *Wetland Protection*, NPS adopted a goal of "no net loss of wetlands." Director's Order #77-1 states that for new actions where impacts to wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands, where possible, at a minimum acreage ratio of 1:1.

For the purpose of implementing Executive Order 11990, an area in an NPS unit that is classified as a wetland according to the USFWS "Classification of Wetlands and Deepwater Habitats of the United States" is subject to Director's Order #77-1 (with the exception of deepwater habitats, which are not subject to DO #77-1) (Cowardin 1979). The Cowardin wetland definition encompasses more aquatic habitat types than the definition and delineation manual used by the USACE for identifying wetlands subject to Section 404 of the CWA. The 1987 "USACE Wetlands Delineation Manual" requires that three parameters (hydrophytic vegetation, hydric soil, wetland hydrology) must all be present in order for an area to be considered a wetland. The Cowardin wetland definition includes such wetlands, but also adds some areas that, though lacking vegetation and/or soils due to natural physical or chemical factors such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, and rocky shores). This EA presents wetlands as defined by Cowardin et al. (1979) and consistent with DO #77-1. Under the Cowardin definition, a wetland must have one or more of the following three attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);
2. The substrate is predominantly undrained hydric soil; or
3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin wetland definition includes wetlands with one of the three criteria discussed above, but also adds some areas that, though lacking vegetation and/or soils due to natural physical or chemical factors such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, rocky shores). As stated above, deepwater habitats are not subject to DO #77-1. The wetland/ deepwater habitat boundary is described in Cowardin et al. (1979) as a depth of 2 meters (6.6 feet) at low water, or at the limits of emergent or woody vegetation extending beyond this depth. The National Wetlands Inventory (NWI) of the USFWS produces information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. The USFWS definition of wetlands is similar to the NPS definition of wetlands in that only one of three parameters (hydric soils, hydrophytic vegetation, and hydrology) is required to characterize an

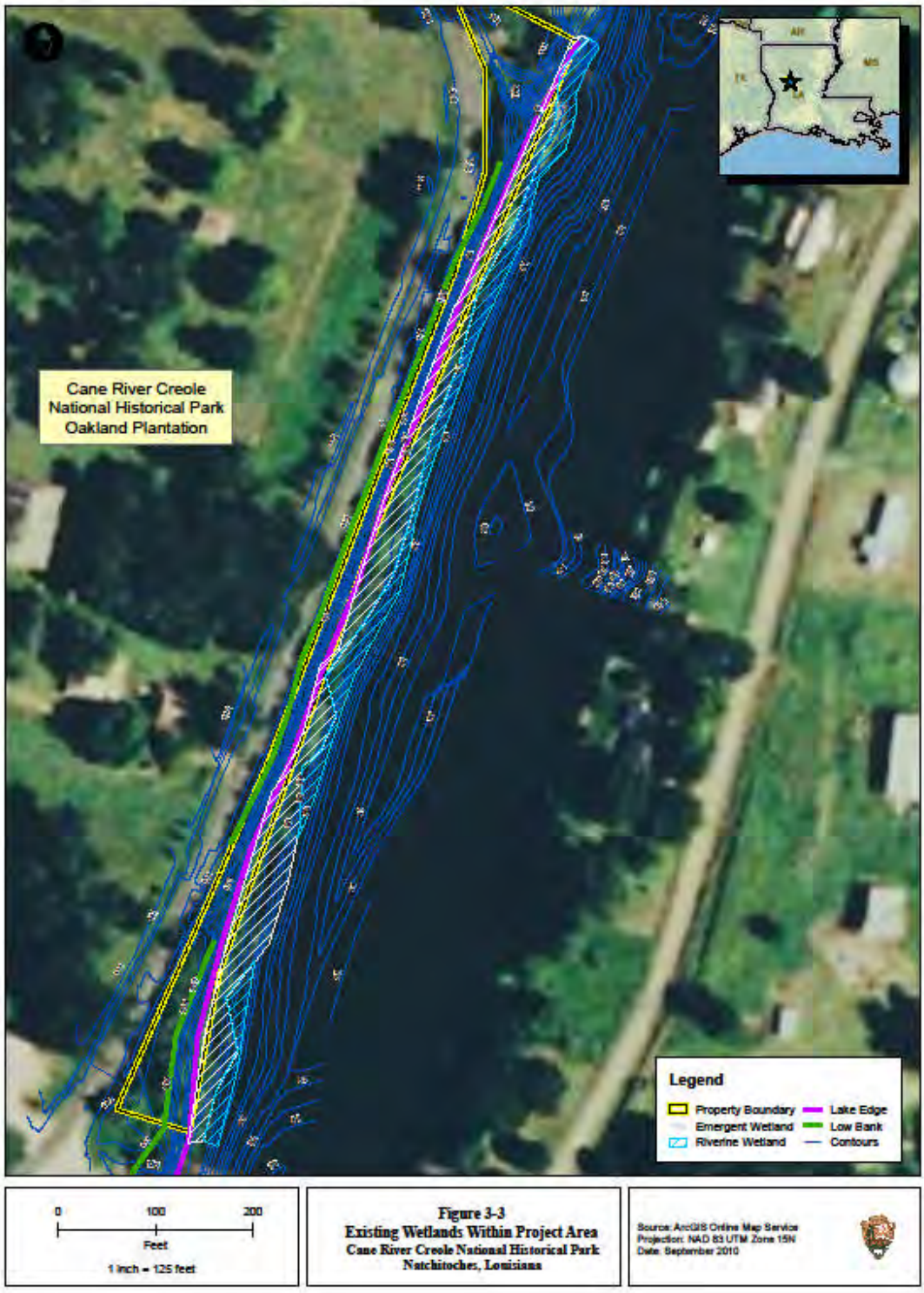
area as a wetland, based upon the Cowardin Classification of Wetlands (Cowardin et al 1979). NWI maps are prepared by the USFWS from the analysis of high altitude imagery and wetlands are identified based on vegetation, visible hydrology and geography. The wetlands depicted on NWI maps are based upon the Cowardin wetland definition and classification system (Cowardin 1979), so (subject to ground-truthing) they are considered wetlands by the NPS. Based on the NWI maps for the site (USFWS/NWI 2010), only Cane River Lake is mapped as a riverine, lower perennial, open water, permanently flooded wetland (R2OWH).

A wetland delineation of the project area was performed on 11-12 May 2010 and the NWI map of the site was ground-truthed. The eastern portion of the project area is bounded by the water's edge of Cane River Lake. As stated previously in the *Hydrology* section, Cane River Lake is an oxbow lake that was created when what was then the main channel of the current Red River was dammed in 1916 to create a recreational waterway (HNTB 2010). The water elevation at the project site was recorded during a topographic survey and varies between approximately 97.5 feet to 98.0 feet; the Mean Water Low (MLW) elevation is 94.0 feet and the Mean High Water (MHW) elevation is 100.0 feet (HNTB 2010). Within the survey area, the site topography of this narrow strip of land is extremely steep and in many areas the slope is less than 1(H):1(V) due to the continuing erosion both on the bank and near the water edge. Therefore, wetlands mapped within the survey area were located only along the water's edge on the western shoreline of Cane River Lake and until deepwater (6.6 ft) was reached. During the site visit it was determined that in addition to the riverine wetland mapped as Cane River Lake, the shoreline of Cane River Lake supports a narrow, palustrine wetland as described in detail in the paragraphs that follow.

In addition to the riverine wetland mapped by NWI, a palustrine wetland exists immediately along the western shoreline of Cane River Lake Approximately 0.64 acres of PEM1/2H wetlands are located in the vicinity of the park and approximately 0.26 acres of R2OWH wetlands (6.6 ft and less) are located in the vicinity of the park (Figure 3-3). This palustrine wetland is described as an emergent with both persistent and non-persistent vegetation that is a permanently flooded wetland (PEM1/2H). The upland/wetland boundary of the palustrine wetland was located along the water's edge due to existing steep slopes beyond the shoreline. The palustrine/riverine wetland boundary was located at the extent of the rooted vascular plants observed at the site. The riverine wetland continues from beyond the rooted vascular plant boundary until deepwater habitat is reached at approximately 2m (6.6 ft).

Because the project area is located in the State of Louisiana, which is considered the *Atlantic and Gulf Coast Plain* region by the USACE, the Regional Supplement to the 1987 USACE Delineation Manual (USACE 2008) was used to record data for the wetland delineation. The project area is also considered within Region 2 (Southeast) by USFWS for determining hydrophytic plant status. Four datasheets were recorded within the wetland area (WL2, WL6, and WL12) two upland datasheets were recorded (UPL1, UPL2), and one datasheet was recorded within a disturbed upland area at the project site (UPL3). Appendix D presents the entire SOF and includes all datasheets recorded during the wetland delineation.

Figure 3-3. Existing Wetlands Within Project Area



Within the palustrine wetland located along the western shoreline of Cane River Lake, the primary indicators of wetland hydrology included surface water, drift deposits, saturation, and aquatic fauna (red-eared slider turtles [*Trachemys scripta elegans*] were observed). Surface water covered the entire emergent wetland and submerged woody debris was observed throughout the area. Because Cane River Lake is a recreational waterway, wave action from the wakes generated by local boat traffic is an additional source of hydrology along the shoreline of the emergent wetland.

The vegetation observed within the palustrine wetland was dominated by hydrophytes (wetland vegetation). Dominant species included southern wild rice (*Zizaniopsis miliacea)* and taro (*Colocasia esculenta*) located nearest to the shoreline as well as yellow pond lily (*Nuphar lutea*) partially submerged in the water along the shoreline. Giant cutgrass is considered a persistent emergent wetland plant and characterized as an obligate (OBL) in Region 2 (occurs almost always, estimated probability 99 percent, under natural conditions in wetlands); taro is considered a non-persistent emergent wetland plant and characterized as facultative in Region 2 (usually occurs in wetlands, estimated probability 67-99 percent, but occasionally found in non-wetlands). At this site, yellow pond lily was also classified as an emergent plant and is characterized as an obligate (OBL) in Region 2. Additionally, water hyacinth (Eichhornia crassipes), one non-dominant species that is classified as a floating vascular plant, was also observed within some portions of the palustrine wetland. Also along the shoreline but non-dominant within both the palustrine and riverine wetlands, algae was observed as well as two species of submerged aquatic vegetation (SAV) that were identified as coontail (*Ceratophyllum demersum*) and waternymph (*Najas* sp.). Because emergent plants were observed as dominant at the site, this wetland was characterized as a palustrine, emergent, persistent/non-persistent, permanently flooded wetland (PEM1/2H).

The USDA NRCS characterizes the soils along the shoreline of Cane River Lake as Roxana very fine sandy loam. This soil series is defined as a hydric soil due to criterion number 4, soils that are frequently flooded for long duration or very long duration during the growing season (NRCS 2010). During the wetland delineation, the soil samples collected along the shoreline of Cane River Lake were characterized as silty clay loam with very fine sand and considered problematic hydric soils due to red parent material. This observation is confirmed because Cane River Lake is an oxbow lake that was created when the main channel of the Red River was dammed; the Red River in the vicinity of the project area is described as a land resource region (LRR P) that supports red parent material as stated in the *Interim Regional Supplement to the Corps of Engineers Manual* (USACE 2008). Because the majority of the soils at the site were submerged, the soils were collected and dried before the soil profile was described to allow redox features to become visible. In all three soils, the following hydric soil indicators were recorded: iron manganese masses and either low chroma values or redoximorphic features. At WL2, the chroma value for soil at a depth of was 5YR4/4 (at 0-2 inches) and was 5YR3/4 (at 2-12 inches) with concentrated redox features in the pore lining described as 5YR2.5/1. At WL 6, the soil from depths of 0-12 inches had a chroma value of 5YR3/2 with concentrated redox features in the pore lining described as 5YR2.5/1. At WL12, the soil at a depth of 0-12 inches had a chroma value of 5YR3/2 with concentrated redox features in the pore lining described as 5YR2.5/1. Based upon the soil samples collected, hydric soils were recorded within the palustrine wetland.

The primary functions provided by this wetland area are biotic (fish and wildlife habitat) as well as recreational. This wetland provides fisheries and benthic habitat and provides wildlife habitat for reptilian/amphibian species (most notably turtles, water snakes, and the American alligator [*Alligator mississipiensis*]) as well as aquatic avian species (commonly egrets, herons, and kingfishers). Shoreline wetland areas like the palustrine wetland at the site provide both habitat and cover for fish species that can then support recreational fishing in Cane River Lake. In summary, there are two types of wetlands that were mapped for this site: a riverine and a palustrine wetland. Cane River Lake is mapped as a riverine, lower perennial, open water, permanently flooded wetland (R2OWH) and the shoreline wetland is mapped as a palustrine, emergent, persistent/non-persistent, permanently flooded wetland (PEM1/2H).

3.4 NATURAL RESOURCES

3.4.1 Vegetation

Pecan orchards, cattle pastures, and cultivated crops of corn, soybeans, grain sorghum, and cotton are the primary vegetation types along the 60 miles of Cane River. Pastureland grasses include Bermudagrass, Pensacola bahiagrass, tall fescue, and white clover. Several of the historic plantations and residential sites along the river are landscaped with a variety of trees, shrubs, and flowers, including live oak (*Quercus virginiana*), osage orange (*Maclura pomifera*), southern magnolia (*Magnolia grandiflora*), catalpa (*Catalpa* sp.), crepe myrtle (*Lagerstroemia indica*), and jujube (*Ziziphus* sp.). Natural lowland habitats that once prevailed in the area around Cane River Lake make up only a small portion of the vegetation found along the river today. These bottomland hardwood forests generally include water oak (*Quercus nigra*), willow oak (*Quercus phellos*), hackberry (*Celtis laevigata*), pecan (*Carya illinoinensis*), and sweet gum (*Liquidambar styraciflua*) in the canopy. Some common understory plants are flowering dogwood (*Cornus florida*), wax myrtle (*Morella cerifera*), American beautyberry (*Callicarpa americana*), and poison ivy (*Toxicodendron radicans*) (NPS 2000).

Currently, Dr. Al Schotz a community ecologist and botanist with Auburn University has been performing vascular plant surveys throughout Oakland Plantation and the entire Cane River Natural Heritage Area. The vegetation community at the Oakland plantation is characterized by landscaped plantings of various native and exotic trees, shrubs, and perennials. Along the entrance drive to the main house there is a long line of live oaks, which is typically referred to as live oak allée. In addition many pecan species are found throughout the plantation, and are apparent remnants of a pecan orchard. Other vegetation includes catalpa, hackberry, Osage orange, southern magnolia, chinaberry (*Melia azedarach*), fig (*Ficus sp.*), and trifoliate orange (*Poncirus trifoliata*). Many native plum species (*Prunus* sp.) can be found on Oakland Plantation as well. There is a dense row of crape myrtles that form a hedgerow along SR 494/119 in front of the main house and cooks cabin. A fencerow of jujube parallels SR 494/119 between the plantation store and the doctor's house. The bottle garden located in front of the main house has various perennial flowers that emerge at different times throughout the year. Grassy areas are dominated mainly by Pensacola bahiagrass (CARI 2000).

During a site visit on 11-12 May 2010, general plant species were recorded within the project area. The eastern portion of the project area is bounded by the water's edge of Cane River Lake

and the western portion is bounded by a 50 feet wide right-of-way (ROW) of State Highway LA 494/119, a paved two-lane state highway. The area between the highway and the shoreline of Cane River Lake is forested and approximately 1 acre in size and 1,190 feet long; the area varies in width from approximately18 to 147 feet (HNTB 2010). The topography of this narrow strip of land is extremely steep and in many areas the slope is more than 1(H):1(V). The area immediately along the roadway is mowed/maintained grass, but beyond the mowed section, the area is an upland forest vegetated with tree, shrub, and vine plant species. Vegetation within the proposed project site consists of many non-native plant species. The dominant tree species include paper mulberry (*Broussonetia papyrifera*), black locust (*Robinia pseudoacacia*), and box elder (*Acer negundo*), as well as some sycamore (*Platanus occidentalis*) and slippery elm (*Ulmus rubra*). Other non-dominant tree species within the project area include water oak, red oak (*Quercus falcata*), pecan, and catalpa. Some tree specimens within the project area (including sycamore, oak, and black locust) are mature, established trees that are approximately 50 ft in height and 12 to 24 inches in diameter at breast height (DBH). Shrub species include elderberry, silky dogwood (*Cornus amomum*), wine berry *(Rubus phoenicolasius),* and sassafrass (*Sassafras albidum*). The understory is heavily overgrown with vines, including poison ivy, Japanese honeysuckle (*Lonicera japonica*), greenbrier (*Smilax* sp.), muscadine (*Vitis rotundifolia*), fox grape (*Vitis labrusca*), and Virginia creeper (*Parthenocissus quinquefolia*). No pine species were observed within the project area.

3.4.2 Wildlife

The Cane River Lake area provides habitat for wildlife species, both permanent residents and migratory species. White-tailed deer (*Odocoileus virginianus*), fox, bats, reptiles, and amphibian species, as well as many species of birds utilize the habitats within the park for foraging, breeding, and protection.

Many small mammals can be found on Oakland plantation, and may potentially exist in the proposed project area. Several rodent species were collected in previous studies, including the least shrew (*Cryptotis parva*), white-footed mouse (*Peromyscus leucopus*), roof rat (*Rattus rattus*), Fulvous harvest mouse (*Reithrodontmys fulvescens*), Hispid cotton mouse (*Sigmodon hispidus*), and house mouse (*Mus musculus*). Most of these rodents use areas in and around human habitation. They also use grassy or shrubby habitat, and could potentially utilize the edge habitat of the proposed project area for burrows or foraging. An archeological study done along the proposed project area indicated that rodent burrows were present (SEAC 2010). Oakland Plantation provides habitat for other mammal species including bobcat (*Lynx rufus*), fox squirrel (*Scirurus niger*), eastern grey squirrel (*Sciurus carolinensis*), red fox (*Vulpes vulpes*), nine-banded armadillo (*Dasypus novemcinctus*), and eastern cottontail rabbit (*Sylvilagus floridanus*). In addition, the proposed project area also provides potential habitat for beaver (*Castor canadensis*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), skunk (*Mephitidae* sp.), and mink (*Mustela vison*).

The park provides habitat that is crucial to both migratory and permanent resident bird species. Overall, 103 species of bird have been observed within the park, 35 of which are year-round residents. In the wetland areas of the proposed project area, some of the year round residents include the pied-billed grebe (*Podilymbus podiceps*), wood duck (*Aix sponsa*), great blue heron

(*Ardea herodias*), great egret (*Ardea alba*), cattle egret (*Bubulcus ibis*), and belted kingfisher (*Ceryle alcyon*). These year-round residents rely on the aquatic areas for foraging. Summer residents reliant on the Cane River Lake include the snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), and green heron (*Butorides virescens*). The double-crested cormorant (*Phalacrocorax auritus*) is a wading bird species that winters in the park (Ellzey 2005). White pelicans (*Pelecanus erythrorhynchos*) were also observed in the Cane River Lake in 2009 and 2010.

Many bird species use the landscaped, grassy, and hedgerow areas of the park for nesting and foraging. A few of the year-round resident species include the mourning dove (*Zenaida macroura*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), barred owl (*Strix varia*), blue jay (*Cyanocitta cristata*), eastern bluebird (*Sialia sialis*), pileated woodpecker (*Dryocopus pileatus*), and northern cardinal (*Cardinalis cardinalis*). Some of the spring residents include the Mississippi kite (*Ictinia mississippiensis*), indigo bunting (*Passerina cyanea*), white-eyed vireo (*Vireo griseus*), and northern parula (*Parula americana*). The winter resident species include the white-crowned sparrow (*Zonotrichia leucophrys*), ruby-crowned kinglet (*Regulus calendula*), and northern harrier (*Circus cyaneus*). Warbler species, such as the black-throated green warbler (*Dendroica virens*), cerulean warbler (*Dendroica cerulea*), and Tennessee warbler (*Vermivora peregrina*) are migrant species using the park habitat. American kestrels (*Falco sparverius*) have also been found in the park (Ellzey 2005).

The amphibian and reptile populations throughout the park were surveyed from 2001 through 2003 (Conzelmann 2003). Several species of reptiles reside in the park, including in the proposed project area. Lizards such as the broadheaded skink (*Eumeces laticeps*), five lined skink (*Eumeces fasciatus*), ground skink (*Scincella laterale*), and green anole (*Anolis carolinensis*) have been found within the grassy areas of the Oakland Plantation and have the potential to occur within the proposed project area. Several species of terrestrial snakes have also been found at Oakland Plantation including the western ribbon snake (*Thamnophis proximus*), copperhead (*Agkistrodon contortrix*), eastern racer (*Coluber constrictor*), and western rat snake (*Pantherophis obsoletus*). These species have the potential to use the forested habitat within the proposed project area.

Several frog and toad species have been found on Oakland Plantation and within the proposed project area. Potential species include the Fowler's toad (*Anaxyrus fowleri*), narrowmouth toad (*Gastrophryne carolinensis*), southern leopard frog (*Lithobates sphenocephala*), American bullfrog (*Lithobates catesbeiana*) green treefrog (*Hyla cinerea*), spring peeper (*Pseudacris crucifer*) and green frog (*Lithobates clamitans*) (Conzelmann 2003). Northern cricket frogs (*Acris crepitans crepitans*) and chorus frogs (*Pseuacris triseriata feriarum*) were heard vocalizing on the bank of Cane River Lake during the site visit in May 2010.

3.4.3 Aquatic Resources

Many species of aquatic fauna inhabit the Cane River Lake region surrounding the park including turtles, water snakes, alligators, and numerous varieties of fish, which use the area for foraging, breeding, and protection.

Multiple species of turtles are found within Cane River Lake and proposed project area. Downed logs and debris throughout the lake provide a beneficial basking habitat for reptiles. Turtle species occurring or potentially occurring within the proposed project area include the red-eared slider (*Trachemys scripta elegans*), Mississippi map turtle (*Graptemys pseudogeographica kohnii*), razorback musk turtle (*Sternotherus carinatus*), and common musk turtle (*Sternotherus odoratus*). Many snake species use the Cane River lake for feeding including the yellowbelly water snake (*Nerodia erythrogaster flavigaster*), broadbanded water snake (*Nerodia fasciata confluens*), diamondback water snake (*Nerodia rhombifera*), and cottonmouth (*Agkistrodon piscivorus*). The American alligator (*Alligator mississippiensis*) is also found on the shores of Cane River Lake (Conzelmann 2003).

Some of the fish species found within the Cane River Lake near the Oakland Plantation include the largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), yellow bass (*Morone mississippiensis*), striped bass (*Morone saxatilis*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), sunfish (*Lepomis* sp.), catfish (*Ictaluridae* sp.), bowfin (*Amia calva*), gar (Lepisosteidae), carp (Cyprinidae), shad (*Alosa* sp.), and pickerel (*Esox* sp.) (NPS 2000). The lake is a popular recreational fishing area, and many of the fish species in the lake are sport fish species. The Natchitoches National Fish Hatchery raises six fish species, and aids in the conservation of other important declining wildlife in the area. The alligator snapping turtle (*Macrochelys temminckii*), striped bass, alligator gar (*Atractosteus spatula*), and paddlefish (*Polyodon spathula*) are species that are targeted for restoration by the hatchery. The pallid sturgeon (*Scaphirhynchus albus*) and Louisiana pearlshell mussel (*Margaritifera hembeli*), are species that are under a recovery program with the fishery. Lastly, the hatchery raises largemouth bass, bluegill (*Lepomis macrochirus*), and channel catfish (*Ictalurus punctatus*) for stocking for recreational fishing in the area. These species have not been documented at the Cane River Lake.

The Cane River Lake bank lines near Oakland Plantation are ideal habitat for benthic invertebrates. During low water levels at Cane River Lake in October and November 2010, park staff collected 4 species of freshwater mussels and clams. Park staff is currently working with the Natchitoches National Fishery Hatchery to identify the species collected. Two common crawfish species within Cane River Lake include the red swamp crawfish (*Procambarus clarkia*) and white river crawfish (*Procambarus zonangulus*).

3.4.4 Special Status Species

For the purposes of this EA, "special status species" are defined as those listed by either the USFWS as endangered, threatened, candidate, or special concern; by the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS) as endangered or threatened; or by the state of Louisiana as endangered, threatened, candidate, or a sensitive species. The terms "threatened" and "endangered" generally describe the official federal status of vulnerable species, as defined by the Endangered Species Act (ESA) of 1973. The term "candidate" is used officially by the USFWS when describing those species for which sufficient information on biological vulnerability and threats is available to support issuance of a proposed rule to list, but rule issuance is precluded for some reason. The federal "species of

concern" status is applied to those species for which listing may be warranted, but further biological research and field study are needed to clarify their conservation status.

Under the consistency clause (Section 7[a]) of the ESA, NPS is required to consult with USFWS and NMFS if federally protected special status species may be present in the area affected by a proposed project. NMFS and USFWS share authority over certain federally protected species and have total jurisdiction over others. The federally listed species associated with Louisiana are listed in Table 3-2, adapted from the USFWS list.

Table 3-2. Federally Listed Species Found in Louisiana

Scientific Name	Common Name	Status
Wildlife		
Acipenser oxyrinchus desotoi	Sturgeon, gulf	T
Balaenoptera physalus	Whale, finback	E
Campephilus principalis	Woodpecker, ivory-billed	E
Canis lupus	Wolf, gray	E
Caretta caretta	Sea turtle, loggerhead	T
Charadrius melodus	Plover, piping	T
Chelonia mydas	Sea turtle, green	T
Dermochelys coriacea	Sea turtle, leatherback	E
Eretmochelys imbricate	Sea turtle, hawksbill	E
Gopherus polyphemus	Tortoise, gopher	T
Graptemys oculifera	Turtle, ringed map	T
Lampsilis abrupt	Mucket, pink (pearlymussel)	E
Lepidochelys kempii	Sea turtle, Kemp's ridley	E
Margaritifera hembeli	Pearlshell, Louisiana	T
Megaptera novaeangliae	Whale, humpback	E
Nicrophorus americanus	Beetle, American burying	E
Numenius borealis	Curlew, Eskimo	E
Panthera onca	Jaguar	E
Picoides borealis	Woodpecker, red-cockaded	E
Pituophis ruthveni	Pine Snake, Louisiana	C
Potamilus inflatus	Heelsplitter, Alabama	T
Puma (=Felis) concolor coryi	Panther, Florida	E
Rana capito sevosa	Frog, Mississippi gopher	E
Scaphirhynchus albus	Sturgeon, pallid	E
Sterna antillarum	Tern, least (interior pop.)	E
Ursus americanus luteolus	Bear, Louisiana black	T
Plants		
Geocarpon minimum	(No common name)	T
Isoetes louisianensis	Quillwort, Louisiana	E

Scientific Name	Common Name	Status
Lindera melissifolia	Pondberry	E
Schwalbea americana	Chaffseed, American	E

E - Endangered
T - Threatened
C - Candidate

In 1999, consultation between the park and the USFWS indicated that there are no threatened, endangered, or candidate species present within the Cane River Creole National Historical Park (CARI 2000). A biological survey of the west bank of the Cane River Lake indicated that there were no plants listed as threatened, endangered, or candidate species present at that location (Schotz 2009). Consultation letters explaining the proposed project were sent to Louisiana DNR and the USFWS on August 3, 2010. No special status species were identified by the agencies (Appendix A).

3.5 CULTURAL RESOURCES

This section describes the cultural chronology for northwest Louisiana and the cultural resources found within the Oakland Plantation site of the park. Cultural resources include archaeological sites; historic resources, which are defined as buildings and structures that are 50 years old or older; cultural landscapes; traditional cultural properties; and Native American sacred sites.

3.5.1 Background

The land currently included within the Oakland Plantation site is located within northwestern Louisiana in the Central Gulf Coastal Plain physiographic region. Evidence of past human activity in this area is divided into seven periods: the Paleoindian Period (10,000-7000 B.C.), the Archaic Period (7000-500 B.C.), the Woodland (Early Ceramic) Period (500 B.C. - A.D. 700), the Formative Caddoan Period (A.D. 700-1000), the Caddoan Period (A.D. 1000-1700), the Historic Caddoan Period (A.D. 1700-1835) and the Historic Period (A.D. 1682-1960). There is strong evidence in the Eastern United States of prehistoric occupations predating the Paleoindian Period (14,000-10,000 B.C.). Pre-Clovis sites include Meadowcroft Rockshelter, Pennsylvania; Cactus Hill, Virginia; Saltville-2, Virginia; and Topper, South Carolina (Goodyear 2006). The natural conditions caused by the Red River, Cane River, and Cane River Lake system resulted in successive deposits of alluvium over the course of the past 10,000 years. In most cases, Paleoindian and Archaic sites are buries under several meters of alluvial overburden. No sites have been recorded within a mile of the Oakland Plantation. Additionally, American Indian artifacts have been collected during subsurface construction and archaeological monitoring activities throughout the Oakland Plantation.

Paleoindian

The Paleoindian tradition in northwestern Louisiana dates from 10,000 to 7000 B.C. and is characterized by small bands of nomadic hunters and gatherers. The artifacts most commonly associated with the this period are fluted and unfluted stone points, which at the time would have been affixed to wooden shafts to form spears for killing game. This time period is split into

early, middle, and late phases. These phases are differentiated primarily by changes in chipped stone points. Large Clovis style points and a specialized hunting and meat processing tool kit characterized the Early Paleoindian period. The Early Paleoindian tool kit was created for hunting big game. Fluted Clovis projectile points were indicative of the Middle Paleoindian as well as various unfluted projectile points (i.e. Midland, Pelican, and San Patrice). The tool kit during the Middle Paleoindian also became more generalized and less focused on big game hunting and processing. The Late Paleoindian tool kit contained the distinctive Dalton point and Dalton adz. The appearance of the Dalton adz shows that the Late Paleoindian cultures were creating and shaping wooden artifacts. Diet during this time included a wide variety of animals and plants (Bense 1994). Early and Middle Paleoindian sites are uncommon in Louisiana relative to other areas of the southeast, but Late Paleoindian sites are more common. This discrepancy is believed to represent an increase in regional population density throughout the period (Anderson and Smith 2003). Paleoindian sites have been found in northwest Louisiana, but none have been recorded within a mile of Oakland Plantation.

Archaic

The Archaic Period dates from 7000-500 B.C. The beginning of the Archaic was very similar to the Paleoindian Period. The social organization during this time consisted of egalitarian bands that hunted and gathered. The occurrence of successive side- and corner-notched and bifurcate-based points is a hallmark of this period (San Patrice, Big Sandy, Palmer, and Kirk Corner-Notched). Less well-made and more expedient tools replaced the formal toolkit that was common during the Middle Paleoindian. This change in the tools used could be related to the increased importance of foraging (Anderson and Smith 2003). Towards the middle of the Archaic we see the appearance of ceremonial shell/earthen mounds, long distance exchange networks, new tool forms, and increased evidence of conflict. This was a time of warmer temperatures and lower lake levels, which made areas around permanent water more preferred for settlements. Middle Archaic point types included Sinner, Evans, Bulverde, and Yarbrough. By the end of the Archaic mound construction, prestige-goods exchange, and warfare had expanded. Climate, vegetation, and sea level were at essentially modern levels by the Late Archaic. In northwest Louisiana, Late Archaic sites are found on terrace margins and ridges and knolls overlooking tributaries. The appearance of manos and metates indicates that plant processing was taking place (Anderson and Smith 2003). Archaic sites have been found in northwestern Louisiana near the Red River, but none are located within a mile of Oakland Plantation.

Woodland (Early Ceramic)

The Woodland Period (500 B.C-A.D. 700) is marked by the appearance of ceramics. Many areas of Louisiana have a well-defined culture chronology for the Woodland time period, but in Northwest Louisiana a distinctive pottery style did not develop (Hunter et al. 2002). Most pottery in the region at this time was undecorated (Girard 1996). When decorated ceramics are found in this region, they usually represent trade vessels from the Gulf Coast and Lower Mississippi or imitations of those styles. Because the artifact assemblage is not distinctive, the presence of mounds has helped identify Woodland sites in the region. Mound sites are found along upland ridges along the edge of the Red River floodplain. In other areas of the Southeast,

sedentism and use of domesticated cultigens were increasing, but populations near the project area might still have been relatively mobile. Overall there are a relatively small number of Woodland period village sites in Northwest Louisiana. No Woodland Period sites have been found within a mile of Oakland Plantation.

Formative Caddoan

The Formative Caddoan Period is a relatively short period of time between A.D. 700 – 1000 that refers to the late prehistoric cultures in northwestern Louisiana that preceded the Caddoan culture (Hunter et al. 2002). It was during this time that many of the Caddoan traditions crystallized. Artifact assemblages from Formative Caddoan sites contain plain, thick, grog/grit/bone tempered ceramics. Ceramic decoration consisted of punctuates and simple horizontal rim incising. It appears that this period was a time of rapid population growth in the Red River floodplain (Hunter et al. 2002). Formative Caddoan sites are located in Northwestern Louisiana, but there are none within a mile of Oakland Plantation.

Caddoan

It is during the Caddoan Period (A.D. 1000 – 1700) that we see the development of a distinct ceramic decorative tradition along the Red River. Prior to this time, ceramic decorations in the region were very similar to traditions to the south and east. By A.D. 1000 a variety of unique decorative patterns and vessel forms emerged, including fine-line engraved bottles and carinated bowls with polished surfaces (Girard 1996). During the early and middle part of the Caddoan Period we see an increased density in floodplain villages. Often there were areas within these villages that contained mounds or ceremonial structures. Large ceremonial centers used for rituals and mortuary purposes emerged during the early part of the Caddoan Period, but they appear to have been abandoned by A.D. 1400, indicating a change in social structure. By the end of the Caddoan Period, populations were more dispersed and distinct. Two sites with a Caddoan component (16NA13 and 16NA544) are located within a mile of Oakland Plantation.

Historic Caddoan

The Historic Caddoan Period (A.D. 1700-1835) starts with the initial settlement of the region by the French and ends with the removal of most of the Indians in 1835. Caddoan tribes residing in the area at this time included the Natchitoches, the Adaes, the Doustioni, and the Yatasi. By 1700 most of the Caddoan peoples had stopped building mounds and had abandoned the large ceremonial complexes. Although ceramic vessels continued to be placed in burials, goods introduced by Europeans such as glass beads, knives, and guns were also found with burials. Earlier ceramic traditions continued during this period, but lithic technologies were almost entirely abandoned with the introduction of guns and metal tools. The Caddoan population in northwest Louisiana gradually decreased because of disease, slave raiding, warfare, and mounting pressure by Europeans for agricultural land (Anderson and Smith 2003). In 1835, the remaining Caddoans were removed to Indian Territory in what is now Oklahoma (Hunter et al. 2002). Two sites with Historic Caddoan Period components (16NA13 and 16NA544) are located within a mile of Oakland Plantation.

Historic Period

In 1682, French explorer Rene-Robert Cavelier claimed Louisiana for France, but it was not until 1714 that Natchitoches, the oldest permanent settlement in Louisiana, was established. With an economy based in trading, Natchitoches became the largest European development on the Red River. The French and Indian War, or the Seven Years War, erupted in 1756 due to conflicting land claims by France and England (Hunter et al. 2002). The war ended in 1763 with France pushed out of North America. Before the war concluded, France had enticed Spain to enter the war by promising Spain the Louisiana lands west of the Mississippi. Under Spanish rule, little changed in Louisiana and commerce remained based on trading for a very long time.

In the early 18th Century, tobacco and indigo production replaced the trading economy. The plantation system worked by slave labor was adopted. In 1800, France acquired Louisiana, but sold it soon after to the United States. The plantation society continued to flourish and the development of the steamboat and cotton gin brought additional prosperity to the area. In 1789 Jean Pierre Emmanuel Prud'homme was granted a land tract south of Natchitoches where Oakland Plantation now stands. He started to plant cotton on his land, using slaves to farm it. His third son, Phanor Prud'homme I, took over the plantation in 1835. The early 1800s were a difficult time for the planters in the area. By 1835 the Red River had changed course and left Natchitoches with just a small waterway. Because of this, the city lost much of its trade importance. Additionally, poor weather and insects negatively impacted the plantation harvests (Miller and Wood 2000). Phanor Prud'homme passed his land holdings on to his two sons following his death.

Both sons joined the Confederacy when Louisiana seceded from the Union on January 26, 1861. Several battles were fought in areas near Cloutierville and Magnolia Plantation. Fighting culminated in the battle at Pleasant Hill. The Union forces retreated and the Confederates remained in control of the area through the end of the war. After the war the Prud'homme sons returned and divided the property between them, with Jacques Alphonse retaining Oakland Plantation.

Following the war, northwestern Louisiana underwent political reconstruction. Enslaved workers were freed so, sharecropping and the tenant system replaced the slave labor system. Cotton planters faced several setbacks during Reconstruction, including the decline in value of farmland, the boll weevil infestation, and the mass departure of laborers from rural areas to urban centers. Because of these hardships many plantations were not modernized and some fell to ruin. It was not until World War II that Louisiana's planting economy was reinvigorated. The armed forces need clothing and food and in response many planters started raising soybeans, poultry, and cattle. Oakland Plantation still depended on laborers into the mid 20th Century. By 1960 it had ceased being a family run plantation and was sold or leased to other farmers. The Prud'homme family sold the core of Oakland Plantation to the National Park Service in 1997 (National Park Service n.d.). Including Oakland Plantation site itself there are eight archaeological sites containing historic components within one mile of the plantation.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended (36 CFR Part 800), requires Federal agencies to consider the effects of their undertakings on historic properties and affords the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation a reasonable opportunity to comment. The purpose of the NHPA is to ensure that Federal agencies consult with state and local groups before non-renewable cultural resources are impacted or destroyed and ensures that preservation values are factored into Federal agency planning and decisions.

3.5.2 Archaeological Resources

Information regarding the sites in and around Oakland Plantation was collected from the Louisiana State Site Files in Baton Rouge. Including the Oakland Plantation site (16NA552), nine sites are located within a mile of the plantation. None of these sites intersect the proposed bank stabilization area. The Oakland Plantation Site is directly west of the proposed construction area and is discussed below.

Oakland Plantation (Site 16NA552) is a plantation complex with a French Creole style main house and numerous other associated buildings and structures. Prior to its acquisition by the NPS, Oakland Plantation was surveyed by the NPS SEAC. Numerous historic artifacts and a small number of prehistoric lithic and pottery fragments were collected. The prehistoric artifacts were identified as Choctaw and Caddoan in origin. The overwhelming majority of artifacts collected related to the historic occupation of Oakland Plantation. The intact archaeological deposits at the site provided information on the lifeways of Oakland's inhabitants and allowed archaeologists to determine the location of missing buildings. The boundary of the site follows the legal property lines of the 42-acre parcel owned by the NPS. The plantation was placed on the National Register of Historic Places in 1979 and designated a National Historic Landmark in 2001 (Fricker and Fricker 2000).

All four design alternatives for bank stabilization are proposed in the narrow strip of land north of the Cane River Bridge, between State Highway LA 494/119 and the Cane River Lake. This area was surveyed in December 2009 and January 2010 by the SEAC during relatively normal water level conditions (Wise 2010). The survey involved shovel and augur testing, bank profiling, and pedestrian survey. Subsurface excavation and examination of soil profiles did not uncover any prehistoric artifacts or definitively historic deposits. The pedestrian survey was carried out to investigate the former location of a pump house that was visible in the area on historic photographs. The survey did not find any evidence of the pump house and it was suspected that the pump house had been torn down or destroyed by bank erosion. In October and November 2010, record low water levels revealed an abundance of archaeological resources not recorded by SEAC. Artifacts collected included intact and broken bottles, shards, large ceramic sherds, bottlecaps, cans, and faunal materials. Bottles ranged in date from the late 18th century to the late 20th century. Ceramics included 19th century sherds, with the possibility of one faience sherd (NPS 2010). Two Native American sherds dating to the Caddoan period were identified during the survey. Park staff is currently conducting a follow-up survey.

3.5.3 Historic Resources

There are no historic resources within the proposed bank stabilization area, but the 42-acre Oakland Plantation is directly west of the construction area across State Highway LA 494/119. The plantation property consists of at least 34 historic buildings or structures. It is significant because it not only contains its main house, but also intact outbuildings and structures. The Oakland main house was built between 1818 and 1821 and is an excellent example of a French colonial raised cottage. The Oakland store and the entrance gate are the closest building and structure to State Highway LA 494/119 and the construction area. The store was probably built between 1868 and 1874. It contains much of its original hardware and architectural details. The entrance gate is a cast- and wrought-iron gate that stands at the entrance to the oak-lined allee leading to the bottle garden and the main house (Miller and Wood 2000).

A bridge built in the early-mid 20th Century stands directly south of the proposed stabilization area. The bridge is a steel truss bridge that potentially contributes to the historical landscape of the area (NPS 1997). It is just north of the new concrete bridge.

3.5.4 Cultural Landscape

Cultural landscapes are defined as "geographic areas, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or that exhibit other cultural or aesthetic values" (Gerdes and Messer 2007:105). The 42-acre Oakland Plantation property is considered a potentially significant landscape.

The plantation is the heart of a larger cultural landscape that extends beyond the 42-acre parcel that NPS owns. The Oakland property holds significance because it is an example of an intact plantation along the Cane River. The historic features of the plantation include not only the plantation buildings, but also the Live Oak allee, bottle garden, manmade pond, jujube tree line, and associated fenced yards. Features outside of the 42-acre NPS owned parcel also contribute to the landscape. These features include the slave cemetery, the levees west of the property near Bayou Brevelle, the historic steel trestle bridge over Cane River Lake, and the agricultural lands surrounding the plantation (NPS 1997).

3.6 HUMAN ENVIRONMENT

3.6.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires Federal agencies to make achieving environmental justice part of its mission. Specifically, each agency must identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." The intent is to prevent minority and low-income populations from being disproportionately affected by adverse human health and environmental impacts of Federal actions.

Ethnic Composition

In 2006 Natchitoches Parish had a total population of 39,500. Of residents surveyed in the county, 45.1 percent were minorities. The population of minority residents within the Natchitoches Parish was composed of 87.8 percent Black or African American, 3.9 percent Hispanic or Latino of any race, 2.1 percent American Indian or Alaska Native, 1.3 percent Asian, 0.1 percent Native Hawaiian or Other Pacific Islander, 1.9 percent of other racial backgrounds, 2.9 percent of two or more races (USCBa 2006).

The park is located in Census Tract 9909, where the total population in 2000 was 4,079 (at the time of this Report, the 2006 census data was unavailable). Approximately 45.8 percent of the population was minorities. The minority population in census tract 9909 was composed of 74.2 percent Black or African American, 4.3 percent Hispanic or Latino, 5.5 percent American Indian or Alaska Native, 0.3 percent Asian, 7.7 percent of other racial backgrounds, and 8.0 percent of two or more races (USCBa 2000).

Income distribution

According to the 2006 U.S. Census, the median household income in Natchitoches Parish was $29,112 (USCBb 2006). Poverty statistics from the 2006 U.S. Census are determined using poverty thresholds, which are based on income levels, family size, and the number of related family members under 18 years old within the household. The poverty threshold in 2006 was $10,294 for a single individual, and ranged from $13,167 to $44,865 for families, depending on the family size and the number of related children under the age of 18 (USCBc 2006). In 2006, 30.4 percent of people living in Natchitoches Parish were living under the poverty level. In Natchitoches Parish, 24.4 percent of families were living below the poverty level, and 54 percent of families with a female householder with no husband present had incomes below the poverty level (USCBb 2006).

According to the 2000 U.S. Census (2006 data unavailable), the median household income in Census Tract 9909 was $27,102 (USCBb 2000). The poverty threshold in 2000 was $ 8,794 for a single individual, and ranged from $10,409 to $ 38,322 for families, depending on the family size and the number of related children under the age of 18 (USCBc 2000). Approximately 21.5 percent of individuals in the census tract were living below poverty, and 16.9 percent of families were living below the poverty line. In 2000, 45.5 percent of families with female householder, no husband present were living below poverty in Census Tract 9909. In 2000 the number of people living below the poverty line in Census Tract 9909 was lower than those living below the poverty line in Natchitoches Parish (26.5), but higher than the United States (12.5) (USCBb 2000).

3.6.2 Aesthetics

The aesthetic nature of the park and the surrounding area is generally well preserved, and maintains a rural agricultural feel. The historic structures on the property and the surrounding landscape are also part of the aesthetic resources of the park. Across the Cane River Lake from the plantation are modern developments, but vegetative growth on the lake banks has mostly

kept them out of view. The damming of the Cane River Lake has returned water levels by the park to historically accurate heights, similar to those found when the plantation was functioning in centuries past. This has preserved the feel of the historical aesthetic of the park, as well as the river, as an aesthetic resource in the area.

3.6.3 Public Health and Safety

Safety is the park's top priority and the park has a good record regarding safety issues. Some of the safety concerns at the park are people tripping or falling, uneven ground, heat, insect stings, and poison ivy. Venomous copperhead snakes have been found on the Oakland Plantation property. Outside of the park property, vehicle accidents sometimes occur on State Highway LA 494/119, particularly on the 25 mile per hour curve just north of the proposed project site. Another safety concern includes activities associated with Cane River Lake. Some boating accidents have occurred in the last several years, which included two fatalities on the water. Park law enforcement at Jean Lafayette National Historical Park and Preserve respond to safety issues at the park. If emergencies occur, immediate response is received from the Natchitoches Sheriff Department.

3.6.4 Energy Requirements

The energy requirements of the park are minimal. Fuel is required to run mowers and maintain vegetation on the property. Additional uses of energy throughout the park include lighting for the parking lot, main house, store, and park offices, in addition to the heating and cooling of the main house and park offices. Within the park offices, additional energy is needed for computers, kitchen appliances, reproduction room, and bathrooms. Telephone, internet, and water services are also needed within the park offices.

3.6.5 Infrastructure

The proposed project area perimeter is defined by four key features: State Highway LA 494/119 to the west, two bridges to the south, the Cane River Lake to the east, and a private property to the north (Figure 1-3). Utility lines, overhead and underground, are present on both sides of State Highway LA 494/119.

Roads

State Highway LA 494/119 is a paved two-lane road, classified as a "rural-collector" by the LADOTD. It has a posted maximum speed of 55 miles per hour. The distance from the pavement edge to the top of the lake bank varies from approximately 10 to 18 feet. Within this strip of land between the road and lake bank, there are existing wooden transmission poles and an underground telephone line. A historic Oakland Plantation Coke sign is present on the lake bank side of the road adjacent to the plantation post office and store building.

Initially a dirt road, State Highway LA 494/119 was later paved with asphalt as it stands today. No reconstruction has occurred in the area since, and as a result the existing roadside drainage system most likely does not meet current LADOTD standards (LADOTD 1987).

Bridges

Two existing bridges are located at the south end of the proposed project area. An abandoned, historic, steel truss frame bridge owned by the Natchitoches Parish Police Jury is no longer in operation. To prevent access to the bridge, it has been fenced off. The second bridge, constructed from pre-stressed, precast concrete, is operated and maintained by the LADOTD and spans the Cane River Lake for approximately 380 feet. The newer, concrete bridge is two-lanes and connects State Highway LA 494 to State Highway LA 119.

Utilities

Infrastructure for utilities including electric, water, and telephone are present at the proposed project area along State Highway LA 494/119: Valley Electric Membership Corporation owns and operates a transmission line, and four associated utility poles that run along the eastern length of the proposed project area boundary; Water Works District 2 owns water lines on the western side of State Highway LA 494/119; and AT&T owns and operates an underground telephone line, present on the eastern side of State Highway LA 494/119 within the proposed project area.

3.7 VISITOR USE AND EXPERIENCE

The Cane River Creole National Historical Park at Oakland Plantation includes 44 acres of publicly accessed land, in addition to 144 acres of private land included in the legislative boundary of Oakland Plantation. The park is open from 8:00 am until 4:00 pm daily. It is closed on Thanksgiving Day, Christmas Day, and New Years Day. There are no fees to visit Oakland Plantation.

Oakland Plantation is the most complete Creole plantation in the South. The property has a main house, plantation store, and 27 other historical outbuildings. In the whole park there are more than 67 cultural resources, 42 of which are historic vernacular buildings. There is an extensive collection of farming tools, family and household items, historic furniture, and historic records in the park's collection. The Prud'homme Store, a building of great historical significance, serves as the visitor center for Oakland Plantation. This visitor center has picnic tables, accessible restrooms, and self-guided maps available. Visitors have the opportunity to do self guided tours throughout the Oakland Plantation. The buildings are left open for visitors to enter during self-guided tours. A ranger-led guided tour of the plantation is available daily at 1:00 pm. A formal tour of the Magnolia Plantation is offered by rangers on Saturdays and Sundays at 11:00 am and 3:00 pm.

The park has year-round activities available for visitors. During the fall, the Oakland Plantation is featured in the Fall Tour of the Homes. The Association for the Preservation of Historic Natchitoches (APHN) began the Fall Tour of Homes in 1954 to raise money for its preservation projects. The tour includes visits to eight historic homes and three plantations within the Natchitoches area and now includes musical performances. In addition, those people who grew up living in the homes are also present and give visitors a more complete view of plantation life

in the 20th century. During the spring of 2010, the park hosted its first annual Cane River Music Festival. This event, which is free to visitors, presented a wide spectrum of musical styles that have made Louisiana famous, including jazz, zydeco, blues, Creole, and Cajun music. Throughout the year, musicians, storytellers, and craftspeople can also be found at various locations throughout the park. The plantation is available for use by groups, and many people hold family reunions at the park, including those who have lived in the main house in the past. The Natchitoches Art Guild holds free painting workshops for park visitors throughout the year. Additional events that occur at the park include clean-up days, where volunteers join park rangers and the Natchitoches Parish Sheriff Office Community Service Division to clean up the Oakland Plantation. On Earth Day, visitors can assist park rangers with the planting of the demonstration garden, which represents the vegetables and cash crop that were historically found at the Oakwood Plantation.

In the Cane River Lake adjacent to the park, fishing, boating, water-skiing, and jet-skiing are popular, as well as swimming, kayaking, canoeing, and barging. Several fishing tournaments are held annually on the Cane River Lake. Boat users must have a permit or license to operate a vessel on the Cane River Lake. Licenses are also required for fishing. A parking lot and boat ramp at Shell Beach was constructed three years ago for access to the lake.

In 2009, the estimated number of visitors to the park was 27,411. The busiest months were December, May, and October, with the highest monthly visitation for 2009 being 4,310 in December (NPS 2009). A yearly visitor survey is conducted at the park in compliance with the Government Performance and Results Act. The survey was created as a measure of visitor satisfaction, appreciation, and understanding. It includes questions about the facilities, activities, and recreational opportunities at the park. The percentage of visitors who were satisfied in these categories in 2009 was 93 percent for the visitor center, 97 percent for the exhibits, and 91 percent for the facilities combined. For visitor services, the satisfaction rate was 99 percent for ranger assistance and 97 percent for combined visitor services. The combined recreational opportunities satisfaction rate was 96 percent. The overall satisfaction rate with the park by visitors was 98 percent (PSU 2009).

3.8 PARK OPERATIONS

The park currently has 14 full-time staff. This includes facility management and maintenance staff, interpretive staff, a Cane River Lake heritage ranger, museum technicians, an administration officer, and a park superintendant. The Facility Management and Maintenance staff is responsible for the up keep of the plantation grounds through gardening and maintaining lawns and fields, and maintaining the historic structures and cultural landscape. The Interpretive staff develops programs for the visitors at the plantation, in schools, and public venues such as libraries. The staff also provides technical assistance to the National Heritage Area, maintains the park website, leads tours of both plantations, and works in the park store. The museum technician maintains cultural and natural resource collections at the park. The park offers paid positions to students between the ages of 15 and 18 through the Youth Conservation Corps program. The focus of this program is education and students have the opportunity to visit the other sites within the Natural Heritage Area.

Volunteers provide crucial assistance to the park staff. There are roughly 30 volunteers in the park for the summer months, including members of the Prud'homme family. Volunteers contribute 10,000 volunteer hours leading tours, working with the park's collections, and maintaining the park grounds.

4.0 IMPACT ANALYSIS

4.1 CHAPTER OVERVIEW

NEPA requires the disclosure of environmental impacts associated with the alternatives including the No Action Alternative. This section presents the environmental impacts of the Preferred Alternative and the No Action Alternative on physical resources, natural resources, cultural resources, human environment, visitor use and experience, and park operations. These analyses provide the basis for comparing the effects of the alternatives. NEPA requires consideration of context, intensity and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate for impacts. NPS policy also requires that "impairment" of resources be evaluated in all environmental documents.

Chapter 4 describes and analyzes potential environmental effects on the physical resources, natural resources, cultural resources, human environment, visitor use and experience, and park operations associated with the Action Alternative and the No Action Alternative. In addition, cumulative impacts, as defined in regulations developed by the CEQ (Code of Federal Regulations, Title 40, Section 1508.7) are discussed throughout this chapter for each resource. A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.1.1 Statutory Requirements

Primary laws and guidance documents that guided the development of this EA are:

- National Park Service Organic Act of 1916 (16U.S.C. 1-4, et seq.) – Created the National Park Service to promote and regulate the use of national parks, monuments, and reservations, by such means and measures as to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the land in such manner as will leave them unimpaired for the enjoyment of future generations.

- The National Historic Preservation Act of 1966 as amended (16 U.S.C. 470) – To protect and preserve historic districts, sites and structures, and archeological, architectural and cultural resources. Section 106 and Section 110 (36 CFR 800) respectively require consultation with the State Historic Preservation Office and that NPS nominate all eligible resources under its jurisdiction to the National Register of Historic Places.

- The National Environmental Policy Act of 1969 – Public Law 91-190 established a broad national policy to improve the relationship between humans and their environment and sets out policies and goals to ensure that environmental considerations are given careful attention and appropriate weight in all decisions of the federal government. This legislation requires and guides the preparation of this EA.

- National Park Service Regulations and Policies – Actions proposed in this document are subject to the NPS Director's Order #28 (Cultural Resource Management), Director's Order #2 (Park Planning), Director's Order #12 (Conservation Planning, Environmental Impact Analysis, and Decision-making), and Director's Order #77 (Natural Resource Protection). Actions are also subject to the service-wide policy document, Management Policies (NPS 2006b).

4.1.2 Methods for Evaluating Environmental Effects

The method of analysis of potential effects is based on the *Director's Order* #12 Handbook [sec 5.4(f)]. Four categories of effects are considered: direct effects, indirect effects, cumulative effects and impairment. The context, duration, and intensity of the impacts must also be defined. Intensity of effects and thresholds of significance are defined for both beneficial and adverse effects. These are further defined in Section 4.1.2.2.

Where quantitative data were not available, best professional judgment was used to determine impacts. In general, the thresholds used come from existing literature, consultation with subject experts, and appropriate agencies.

To analyze impacts, methods were selected to predict the potential change in park resources that would occur with the implementation of the alternatives. Evaluation factors were established for each impact topic to assess the changes in resource conditions of the alternative. The study area was defined as the area between the Cane River Lake bank and State Highway LA 494/119, beginning just north of the State Highway LA 119 bridge and ending at the Oakland Plantation's northernmost boundary, where State Highway LA 494/119 begins to head northwest (Figure 1-3)

4.1.2.1 Impact Categories

Three impact categories are used in this analysis and defined below.

Direct Effects – Direct effects are impacts that are caused by the alternative at the same time and in the same place as the action.

Indirect Effects – Indirect effects are impacts caused by the alternatives that occur later in time or farther in distance than the action.

Impairment - In addition to determining the environmental consequences of implementing the preferred and other alternatives, NPS Management Policies 2006 (section 1.4) requires analysis of potential effects to determine whether or not proposed actions would impair a park's resources and values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do

give the NPS the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of the park. That discretion is limited by the statutory requirement that the NPS must leave resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (NPS 2006). Whether an impact meets this definition depends on the particular resources that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated. Impairment may result from visitor activities; NPS administrative activities; or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park.

A determination of impairment is made for each of the resource impact topics carried forward and analyzed in the EA. Impairment findings are not necessary for the human environment, visitor use and experience, and park operations. These impact areas are not generally considered to be park resources or values according to the Organic Act, and cannot be impaired the same way that an action can impair park resources and values.

Cumulative Impacts – A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The following list of past, present, and planned projects within the park or areas in close proximity to the park are considered in the cumulative impact discussion:

- **Seawall Construction** – Landowners along the Cane River Lake have recently constructed seawalls to protect their property from erosion. The creation of the seawalls creates more wave action on the opposite bank of the lake.

- **Shell Beach** – A parking lot and boat ramp were built at Shell Beach in 2007. Shell Beach is located on the east bank of the Cane River Lake near the Old Bermuda Bridge.
- **Road Maintenance** – The LADOTD maintains the roadways and repairs ditches along State Highway LA 494/119.
- **Historic Shell Beach Bridge –** The historic Shell Beach Bridge is owned and operated by the Cane River Waterway Commission. The bridge is currently closed, but may need repairs in the future.

4.1.2.2 Impact Definitions

Each potential impact is described in terms of its context (site-specific, local, or regional), duration (short-term or long-term), and intensity (negligible, minor, moderate, or major). For the purposes of analysis, the following definitions, unless stated otherwise, are used for all impact topics:

Duration

Short-term impacts: Impacts that might occur during the site preparation and construction phases of the bank stabilization or in the short term (1 to 6 months) after implementation of the bank stabilization.

Long-term impacts: Those impacts occurring from implementation of the bank stabilization through the next 10 years.

Intensity

Negligible: Impacts would have no measurable or perceptible changes to the resource.

Beneficial: Resource improvements would occur and would have a perceptible change to the resource within the park.

Adverse:

Minor: Impacts would be measurable or perceptible but would be localized within a relatively small area. The overall viability of the resource would not be affected and, if left alone, would recover.

Moderate: Impacts would cause a change in the resource; however, the impact would remain localized.

Major: Impacts to the resource would be substantial, highly noticeable, and permanent.

4.2 PHYSICAL RESOURCES

4.2.1 Air Quality

Common to All Action Alternatives – The construction phase of the proposed project would have short-term, minor, adverse impacts on air quality. The removal of the vegetation prior to the installation of the bank stabilization may cause an increase in dust and particulate matter. The operation of construction equipment to re-grade the drainage ditches, install culvert crossings and outfalls, and install the bank stabilization material would generate some criteria pollutant emissions, including carbon monoxide, nitrogen oxides, and particulate matter. A barge would be transported to and from the project site to be used as a staging area. Short-term, fugitive gas emissions would be generated from the operation of the barge. Overall, air emissions would be minimal since the proposed construction activities are temporary. These impacts would be short-term in nature, lasting only the duration of the construction activities, which is estimated at approximately four to six months. Additionally, the park is located in Natchitoches Parish, Louisiana, which is currently in attainment with USEPA air quality criteria for all six criteria pollutants.

There would be no impacts to air quality following the construction period.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no increase in air quality pollutants. Natchitoches Parish would continue to be in attainment with the USEPA air quality criteria.

Cumulative Impacts – Short-term, minor, adverse impacts to air quality would result from land owners constructing seawalls along the Cane River Lake and the addition of the boat ramp and parking lot at Shell Beach. During the construction phase of these projects, it is anticipated that some criteria air pollutants were emitted. If road or bridge repairs occur, air emissions would also be generated from the LADOTD vehicles and any construction equipment used during the repairs. When the short-term, minor, adverse impacts to air quality associated with the bank stabilization project at the park are added to the impacts of these other past, present, and future projects, cumulative impacts to air quality in the long-term would be negligible. Impacts would be negligible due to the short duration time of the impacts.

Conclusion – The implementation of the proposed Action Alternatives would result in short-term, minor, adverse impacts to air quality due to the proposed lake bank stabilization and associated construction activities. Once the construction period is over, there would be no impacts to air quality. No impact to air quality would result from the No Action Alternative. Cumulative impacts to air quality would be negligible. Although some impacts to air quality would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.2.2 Noise

Common to All Action Alternatives – The construction phase of the project is expected to create short-term, minor, adverse noise levels at the park. Noise is expected to be generated from the operation of the construction equipment needed for the drainage improvements, clearing of vegetation, and installation of the bank stabilization material. Additional noise would be generated from the construction vehicles entering and leaving the site and the hauling of materials to and from the site. Because construction is located along water, the Action Alternatives could create noise disturbance, since sound can be heard at greater distances over water rather than land. These impacts would last only for the duration of construction activities, estimated to be four to six months. Noise impacts would be localized in the vicinity of the construction site and would possibly disrupt visitors at the park and landowners in close proximity to the project area. Construction noise is expected to temporarily impact avian and other wildlife in close proximity to the construction site, but these impacts would cease after the proposed construction is completed. To minimize noise impacts, construction activities would be restricted to daylight hours.

There would be no change in noise following the construction period.

No Action Alternative –Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no impact to noise levels, as the current conditions at the site would remain unchanged.

Cumulative Impacts – Short-term, minor, adverse impacts to noise levels would likely occur from the construction of seawalls along Cane River Lake, the parking lot and boat ramp at Shell Beach, historic Shell Beach bridge repairs, and the LADOTD road repairs. The impacts to noise would affect the local land owners and wildlife within the project areas, but would only last the duration of the construction period. When the short-term, minor, adverse impacts to noise associated with the bank stabilization project at the park are added to the impacts of these other past, present, and future projects, cumulative impacts to noise would be short-term, minor, and adverse. Impacts would be minor since the noise levels would be localized and temporary.

Conclusion – The implementation of the proposed Action Alternatives would result in short-term, minor, adverse impacts to noise as a result of construction equipment and activities in the proposed action area, which would subside to no impact upon completion of the proposed construction. Current noise sources within the park would remain unchanged under the No Action Alternative. Cumulative impacts to noise are anticipated to be short-term minor, and adverse. Although some impacts to noise would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.2.3 Soils

Common to All Action Alternatives – The Action Alternatives would have a short-term, minor, adverse impact to soils during the construction phase. Soil disturbance occurs through the physical movement of the soil. During the construction process, soil is highly vulnerable to erosion by wind and water. Soils would be disturbed during the proposed drainage improvements, which include the installation of the culvert crossings, culvert outfall into the lake, and drainage outfall chute. Additional soil disturbance would occur during the removal of vegetation and the installation of the bank stabilization material. To minimize impacts, measures would be used to prevent or reduce soils from erosion and to prevent eroded soils from entering Cane River Lake. Sediment and erosion controls would be required by applicable local agencies.

In addition, the construction equipment that would be used has the potential to compact soils in the staging and construction area. Soil compaction has the potential to kill vegetation and create subsurface barriers for water, nutrients, and microorganisms that result in changes to vegetation integrity. It is not anticipated that soil compaction would result in the loss of soil function, since the impacts would be temporary only lasting the duration of the construction period. Disturbed staging areas would be re-stabilized after construction is complete.

After the bank stabilization material is installed, the project area would be re-vegetated with native trees, shrubs, and grasses. It is estimated that full vegetative cover would be reestablished within two years. Erosion of soils from surface drainage runoff and wave action would be greatly reduced. The new drainage chutes would mitigate erosion of soils by directing sheet flow that may otherwise impact the area adversely during potential washout events. Therefore, long-term, beneficial impacts to soils would occur.

The three soil types identified within the park boundary, including the proposed project area are considered prime farmlands. The proposed bank stabilization would have no impact to prime farmlands. The proposed project would not irretrievably disturb or convert the prime farmland soils to the point that the soils could not be used for farming in the future. In addition, although the land holds characteristics suitable for farming, the project area is a narrow strip of land that would unlikely be used for farming, due to the small size of the site. The proposed project area would continue to serve as a vegetated buffer between Cane River Lake and State Highway LA 494/119.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The erosion along the lake bank would continue unabated, and could result in damage to the adjacent State Highway LA 494/119, in addition to existing utilities along the State Highway. A long-term, moderate, adverse impact to soils and lake-bank erosion would occur as a result of the No Action Alternative.

Cumulative Impacts – Beneficial impacts to soils would likely occur due to landowners constructing seawalls along Cane River Lake and from the LADOTD repairing the adjacent roadways to the park as necessary. Impacts would be beneficial because these actions would

reduce erosion of soils in these areas. When the overall long-term, beneficial impacts to soils from the bank stabilization are combined with the impacts from the projects listed above; cumulative impacts would be beneficial.

Conclusion – Impacts to soils would be short-term, minor, and adverse during the construction phase of the Action Alternatives, resulting from the disturbance and compaction of soils caused by construction activities. To minimize impacts to soils during construction, sediment and erosion controls would be implemented. Long-term, beneficial impacts to soils would result after construction is complete and the bank slope is re-vegetated. The stabilization material would reduce further erosion of the banks. There would be no impact to prime farmlands. The No Action Alternative would not involve construction activity, but would not address the eroding lake bank, resulting in long-term, moderate, adverse effects to the soils and lake-bank erosion in the project area. Cumulative impacts to soils would be beneficial. Although some impacts to soils would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the Alternatives would cause impairment to park resources.

4.2.4 Topography

Common to All Action Alternatives - Long-term, beneficial impacts to the topography of the project site are expected under all the Action Alternatives. The grading and excavation of the land would restore the steep eroded banks to a more natural, gradual slope. The lake bank would also be protected with material which would be more stable and erosion resistant, to prevent changes in the topography of the lake bank in the future.

No Action Alternative –Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. Impacts to topography would be long-term, moderate, and adverse. The lake banks would continue to erode and change the topography of the area.

Cumulative Impacts: The impacts associated with the construction of the seawalls, parking lot, and boat ramp would have negligible impacts to the topography of the Cane River Lake area. When the beneficial impacts to topography from the bank stabilization project are combined with the negligible impacts associated with the other projects in the area, long-term, beneficial cumulative impacts to topography are expected under the Action Alternatives. The stabilization would prevent the threat of future erosion. Under the No Action Alternative, cumulative impacts to topography would be long-term, minor, and adverse.

Conclusion: Long-term, beneficial impacts to the topography of the site would occur from the stabilization and prevention of future bank erosion. Long-term, moderate, adverse impacts to topography would occur under the No Action Alternative. Cumulative impacts would be long-term and beneficial under the Action Alternatives and long-term, minor, and adverse under the No Action Alternative. Although some impacts to topography would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future

generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.3 WATER RESOURCES

4.3.1 Hydrology

Common to All Action Alternatives – During the construction phase of the project, short-term, negligible impacts to hydrology are expected. A barge would be needed as a staging area on the lake. The barge has the potential to slightly alter the water flow. Following construction, the barge would be removed and natural flow would resume. Additional long-term, negligible impacts to hydrology would occur from the alteration of the elevation and width of the lake bank. Since the bank would be extended 5 to 14 feet, the area for water to flow would be slightly reduced, altering the water flow. The width of the river would be reduced by 1.5 to 4.5 percent.

Common to Alternative 1 and Alternative 2: Under Alternatives 1 and 2, the park would construct the new embankment below the normal water elevation at the lake; therefore, a temporary inflatable dam and dewatering system would be installed until the base of the existing lake bank can be built above the existing water surface. During the construction phase of the project short-term, minor adverse impacts to the hydrology of Cane River Lake would occur. Due to the temporary inflatable dam, the existing channel width would be reduced 1.5 to 4.5 percent, which may slightly alter the natural flow by forcing the water through a narrow area. Once the construction period ends, the inflatable dam would be removed and the impacts would be minimized.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no impact to the hydrology of the lake.

Cumulative Impacts –Impacts to hydrology would occur from the seawall construction and improvements at Shell Beach; however these impacts are expected to be negligible. When the short-term, negligible impacts from the bank stabilization project are combined with impacts from other projects in the area, negligible cumulative impacts to hydrology would occur. The activities occurring along the lake bank has the potential to slightly alter the water flow.

Conclusion – Alternatives 1 and 2 would create short-term, minor, adverse impacts to hydrology due to the use of an inflatable dam and dewatering system. Long-term, negligible impacts would occur from the adjustment of the elevation and width of the bank under all Action Alternatives. The No Action Alternative would not impact the lake hydrology at all, as no construction would take place under this alternative. Cumulative impacts to hydrology are anticipated to be negligible. Although some impacts to hydrology would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.3.2 Water Quality

Common to All Action Alternatives – Short-term, minor, adverse impacts to water quality may occur during the construction phase of the project. Soil disturbance would occur during the construction of the new drainage systems, removal of vegetation, and installation of the bank stabilization material. If soil migration occurs, the eroded soils would reduce the water quality of Cane River Lake within the immediate area. In particular, turbidity levels and sedimentation are expected to increase. To minimize impacts to water quality, the park would comply with state and local regulations by implementing sediment and erosion controls. In addition, to further minimize the risk of sedimentation and erosion, the compacted clay fill material would be lined with a TRM to contain the fill material. There is also a potential for contaminants from construction equipment to enter into the lake, which may include heavy metals, hydrocarbons, or other toxic substances. To minimize water quality impacts construction equipment would be inspected for leaks or other faults that may cause pollution to the water. Section 401 of the Clean Water Act requires the certification of all federal licenses and permits in which there is a "discharge of fill material into navigable waters". The certification is used to determine whether an activity, as described in the federal license or permit, would impact established site specific water quality standards. A water quality certification from the LADEQ would be required for this project.

After the bank stabilization material is installed and the project area is re-vegetated, impacts to water quality would be long-term and beneficial. Erosion of the lake bank is expected to be reduced greatly, which would reduce the amount of sediment entering Cane River Lake. Overall, less erosion and sedimentation would improve water quality.

Common to Alternatives 3 and 4 – Under Action Alternatives 3 and 4, additional short-term, minor, adverse impacts to water quality may occur. The placement of the sheet pile wall (Alternative 3) and riprap (Alternative 4) in the water may cause an increase in turbidity in the local area. In order to minimize impacts, a turbidity curtain would be used to contain the loose soils. After the installation of these materials is complete, the turbidity curtain would be removed.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The current status of the eroding lake bank would perpetuate and the potential for further sedimentation and turbidity in the Cane River Lake adjacent to Oakland Plantation would result in long-term, moderate, adverse impact.

Cumulative Impacts – Temporary impacts to water quality would occur during the construction of seawalls along Cane River Lake and the construction of the parking lot and boat ramp at Shell Beach. Increases in turbidity are expected to occur. However, long-term impacts are expected to be beneficial from the construction of seawalls along the lake bank. Seawalls reduce the risk of further erosion and sedimentation of the bank which it is protecting; however seawalls can increase wave action and create offsite erosion on opposite banks. When the overall long-term,

beneficial impacts to water quality from the bank stabilization are combined with the impacts from the projects listed above; cumulative impacts would be negligible.

Conclusion – The Action Alternatives would result in short-term, minor, adverse impacts to water quality during the construction phase of the proposed action due to sedimentation, turbidity, and construction activities. In the long-term, beneficial impacts to water quality would occur from the reduction of erosion and sediment entering the lake. Additional short-term, minor, adverse impacts to water quality are expected under Alternatives 3 and 4 due to the placement of sheet pile and riprap in the water. Under the No Action Alternative, long-term, moderate, adverse impacts to water quality would continue due to bank erosion and sedimentation. Cumulative impacts to water quality would be negligible due to the bank stabilization projects. Although some impacts to water quality would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.3.3 Floodplains

Common to All Action Alternatives – Currently, a large portion of the Oakland Plantation, including many of the historic structures, lies within the 500-year floodplain. The proposed bank stabilization project would have no impact to the 500-year floodplain, since all construction activities would be outside of this area.

Common to Action Alternatives 1, 2, and 4 –A small portion of the northeast corner of the proposed project site lies within the 100-year floodplain. Since the banks within the project area are currently steep, the majority of the project area lies outside of the 100-year floodplain. The proposed project under Alternatives 1, 2, and 4 includes stabilizing the bank by extending the bank further into the lake and decreasing the steepness of the slope from the water's edge to the top of the bank. The gradual slope of the bank would reduce the water surface elevation and allow more volume of water into the lake. There is a potential that the floodplain would widen and extend into the proposed project location. Long-term, beneficial impacts to the floodplain would result since the floodplain would function more naturally since the floodplain would no longer be restricted by the existing steep banks.

Alternative 3 – Under Alternative 3, the lake bank would be stabilized by placing a sheet pile wall approximately five feet from the existing toe of the bank. The bank behind the wall would be filled and regraded. The placement of the sheet pile within the floodplain would create long-term, moderate, adverse impacts since the sheet pile wall would reduce the area of the floodplain by a minor amount.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. Therefore, no actions would occur within the 100-year or 500-year floodplain. There would be no impacts to floodplains.

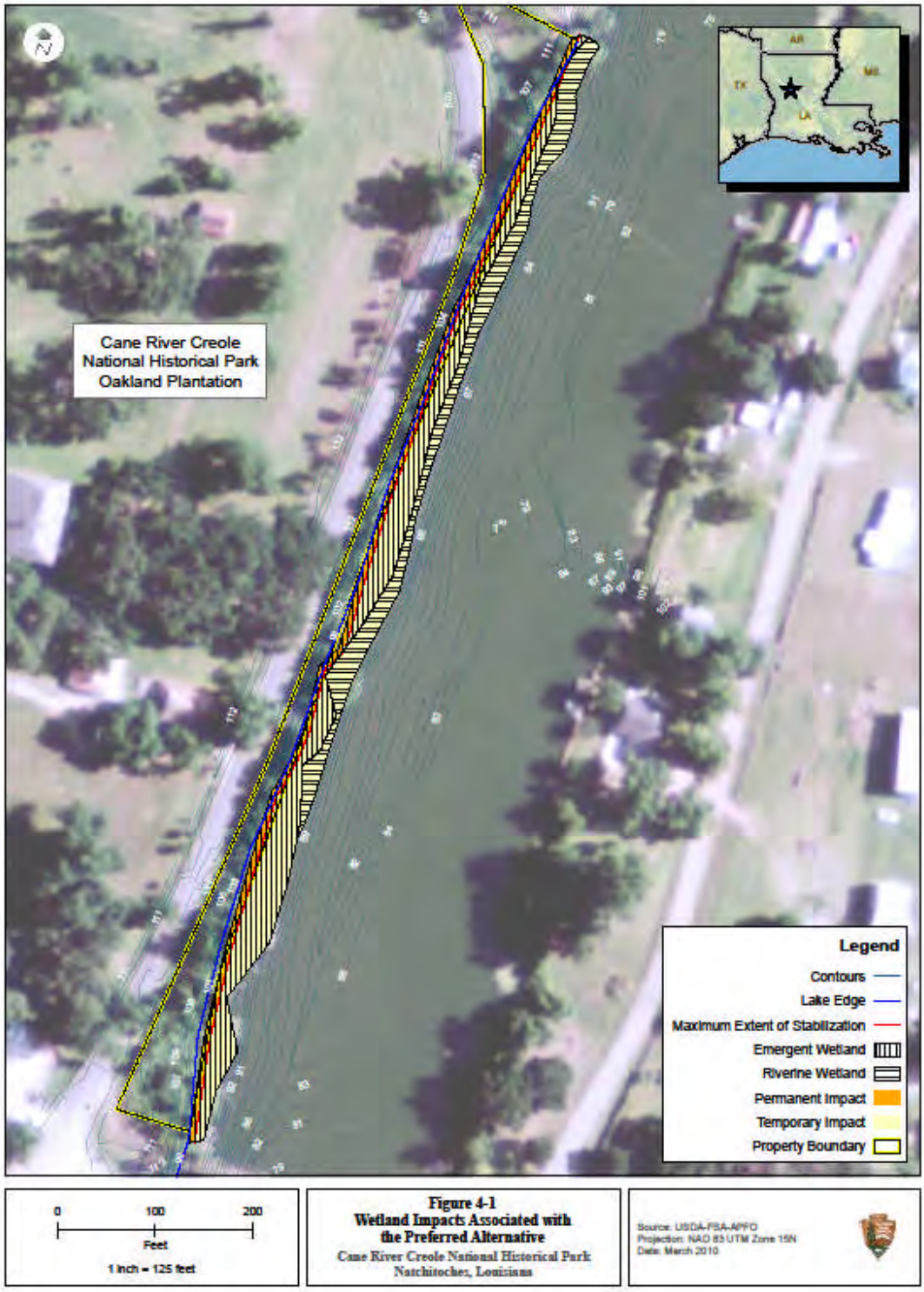
Cumulative Impacts – The construction of the seawalls, boat ramp, and parking lot would occur within the 100-year floodplain on the east bank of Cane River Lake. The 100-year floodplain along this bank extends approximately 250-feet from the lake edge. Impacts to the floodplain would be long-term, moderate, and adverse from these actions. The long-term, beneficial impacts to the floodplain from Alternatives 1, 2, and 4 should reduce some of the impacts from these projects resulting in long-term, minor, adverse cumulative impacts to the floodplain. However, Alternative 3 results in long-term, moderate, adverse impacts and when combined with the moderate, adverse impacts from the seawalls, boat ramp, and parking lot, cumulative impacts would be long-term, moderate, and adverse under this alternative.

Conclusion There would be no impact to the 500-year floodplain, which includes a large portion of the Oakland Plantation. Impacts to the 100-year floodplain under Alternatives 1, 2, and 4 would be long-term and beneficial since the floodplain would be more likely to naturally function. Under Alternative 3, long-term, moderate, adverse impacts to the floodplain would occur due to the placement of the sheet pile wall, which reduce the area of the floodplain. There would be no impacts to the floodplain under the No Action Alternative. Cumulative impacts to the floodplain would be long-term, minor, and, adverse under Alternatives 1, 2, and 4 and long-term, moderate, and adverse under Alternative 3. Although some impacts to the floodplain would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.3.4 Wetlands

Common to All Action Alternatives – Long-term, minor, adverse, impacts to wetlands are anticipated as a result of the emergency bank stabilization along Cane River Lake. The addition of fill to the current bank would affect both palustrine and riverine wetlands along the shoreline of the Lake, but detailed impacts are associated with the extent of the embankment footprint into the lake, which varies by Alternative and is described in the paragraphs that follow. Also along the shoreline but non-dominant within the palustrine and riverine wetlands, two species of SAV that were identified as coontail and waternymph exist in portions of the site. Because emergent plants were observed as dominant at the site, this wetland was characterized as a PEM1/2H. Any impacts to the PEM1/2H wetland as described below will also affect SAV species for all action alternatives.

Figure 4-1. Wetland Impacts Associated with the Preferred Alternative



Common to Alternatives 1 and 3 – Long-term, minor, adverse, impacts to wetlands are anticipated as a result of Alternatives 1 and 3 due to the extent of the embankment footprint into the lake. Although Alternative 1 includes an extent of the embankment footprint 5.6 ft into the Lake and Alternative 3 includes an extent of the embankment footprint only 5 ft into the Lake, the impact acreage is the same. As a result of Alternatives 1 and 3, it is estimated that approximately 0.17 acres of fill material along the bank classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) would be required and would permanently impact this wetland and 0.001 acres along the bank classified as riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would be permanently impacted. The PEM1/2H wetland beyond the extent of bank stabilization would be temporarily and adversely affected during the construction period. As a result, a maximum of approximately 0.47 acres beyond the bank stabilization classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) and 0.26 acres of riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would temporarily impact these wetland areas during barge activities while the stabilization is being constructed and placed along the shoreline. Therefore, a total of approximately 0.171 acres of PEM1/2H and R2OWH wetlands will be permanently affected by Alternatives 1 and 3 along the bank of the Cane River Lake at the plantation.

The yellow pond lily is the dominant plant species that will be temporarily impacted beyond the bank stabilization because it is the only emergent rooted vascular plant at the site at depths beyond 5 ft. Yellow pond-lily is an aquatic perennial plant with spongy rhizomes that anchor the plant into the muddy bottom of a waterbody (USDA/NRCS 2004). Although this plant is not considered invasive, it is very difficult to eradicate when not grown in containers because any section of rhizome left behind may sprout new growth; this plant may become weedy in some regions or habitats and may displace desirable vegetation if not properly managed (USDA/NRCS 2004). Due to the hardiness and resilience of yellow pond lily rhizomes, it is expected that this plant species will recover in many areas from temporary construction that occur beyond the areas of bank stabilization following the completion of water-based construction activities. Although long-term, minor, adverse impacts to wetlands would occur as a result of Alternatives 1 and 3, beneficial impacts are associated with stabilizing the bank and replanting with wetland vegetation to reduce future erosion and the ultimate loss of land would offset the adverse impacts to wetlands. In addition to the impact along the bank of Cane River Lake, proposed drainage improvements will also occur in the vicinity of a disturbed area investigated during the wetland delineation in the northeast corner of the site. Specifically, a drainage outfall chute into Cane River Lake at the north end of the project site is proposed that will also be naturally re-vegetated following construction activities. The drainage chute design details include a smooth transition to the existing Cane River Lake bank slope. Therefore, Alternatives 1 and 3 should reduce the secondary or offsite effects that currently occur at the site, including drainage and flooding that have exacerbated the bank erosion and have affected the existing wetlands along the shoreline of the site.

As a result of wetland impacts, a SOF describing wetlands and impacts according to the NPS definition is included in Appendix D. This SOF also includes a wetland mitigation plan to offset the effects of the Action Alternatives. In addition to an SOF, a Section 10 Rivers and Harbors

Appropriation Act of 1899 Permit and a Section 404 Permit may be required for the discharge of material into wetland areas, which would be completed and submitted to the USACE-Vicksburg District. Because the project area is outside of Louisiana's coastal zone, Louisiana DNR does not review the Joint Application Permit. The exact acreage of wetlands affected and a mitigation plan for the loss of wetlands would be included in the permit application as a requirement of the Section 404 Permit. The NPS uses a more conservative estimate of wetlands, which includes requiring only one of the three criteria that the USACE requires for the characterization of a wetland.

Alternative 2 – Long-term, minor, adverse, impacts to wetlands are anticipated as a result of Alternative 2 due to the extent of the embankment footprint 14 ft into the lake. As a result of Alternative 2, it is estimated that approximately 0.37 acres of fill material along the bank classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) would be required and would permanently impact this wetland and 0.02 acres along the bank classified as riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would be permanently impacted. The PEM1/2H wetland beyond the extent of bank stabilization would be temporarily and adversely affected during the construction period. As a result, a maximum of approximately 0.27 acres beyond the bank stabilization classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) and 0.24 acres of riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would temporarily impact these wetland areas during barge activities while the stabilization is being constructed and placed along the shoreline. Therefore, a total of approximately 0.39 acres of PEM1/2H and R2OWH wetlands will be permanently affected by Alternative 2 along the Cane River Lake at the plantation.

Alternative 4 – Long-term, minor, adverse, impacts to wetlands are anticipated as a result of Alternative 4 due to the extent of the embankment footprint 8.5 ft into the lake. As a result of Alternative 4, it is estimated that approximately 0.23 acres of fill material along the bank classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) would be required and would permanently impact this wetland and 0.004 acres along the bank classified as riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would be permanently impacted. The PEM1/2H wetland beyond the extent of bank stabilization would be temporarily and adversely affected during the construction period. As a result, a maximum of approximately 0.41 acres beyond the bank stabilization classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) and 0.26 acres of riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would temporarily impact these wetland areas during barge activities while the stabilization is being constructed and placed along the shoreline. Therefore, a total of approximately 0.234 acres of PEM1/2H and R2OWH wetlands will be permanently affected by Alternative 4 along the Cane River Lake at the plantation.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no change to the emergent wetlands along the bank, although, long-term, moderate, adverse impacts could occur with the continued erosion causing loss of wetlands as a result of the No Action Alternative.

Cumulative Impacts – The construction of the seawalls along Cane River Lake and the addition of the boat ramp and parking lot at Shell Beach have the potential to create long-term, minor to moderate, adverse impacts to wetlands. Cane River Lake is a riverine wetland itself and there are many other areas of palustrine, emergent wetlands located along the shoreline of the lake. The bank stabilization project would create impacts to wetlands; however a mitigation plan would be carried forward to offset impacts and ultimately resulting in beneficial impacts to wetlands. Therefore, when combined with other projects in the area, cumulative impacts to wetlands would be long-term, minor, and adverse. The benefits from the bank stabilization would reduce some of the impacts from seawalls along Cane River Lake, the boat ramp, and parking lot.

Conclusion – The Action Alternatives would cause a long-term, minor, adverse impact to emergent wetlands along the bank of the Cane River Lake. The loss of wetlands under the Action Alternatives would be mitigated through re-vegetation of the site with appropriate native, wetland plant species. In the long-term, impacts to wetlands would be beneficial due to the stabilization of the bank and re-vegetating with wetland vegetation. The No Action Alternative may cause long-term, minor, adverse impacts to wetlands from continued erosion. Cumulative impacts to wetlands would long-term, minor, and adverse. Although some impacts to wetlands would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.4 NATURAL RESOURCES

4.4.1 Vegetation

Common to All Action Alternatives – The Proposed Action would have short-term, minor, impacts on vegetation. Under all Action Alternatives, vegetation along the bank of the Cane River Lake would need to be removed at the site. The land within the proposed project area on the bank of the Cane River Lake consists of many introduced, non-native tree, shrub, and vine species. Tree species along the bank that would be removed include paper mulberry, black locust, sycamore, oak species, and box elder. Shrubs that would be removed include elderberry, silky dogwood, wine berry, and sassafras. The understory is heavily overgrown with vines, which would be removed and include poison ivy, Japanese honeysuckle, greenbrier, muscadine, fox grape, and Virginia creeper. No pine species are located within the project area. Impacts to the vegetation would be short-term, as disturbed areas would be re-planted with native species at the end of the construction period. It is expected that the area will be completely re-vegetated in 2 years.

Long-term, negligible impacts to vegetation would occur from the removal of a few mature, established tree species located along the river Mature trees to be removed include two sycamore trees (14" DBH), one red oak (12" DBH), and one water oak (12" DBH). Since there would only four mature trees would be sacrificed, impacts would be negligible.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The vegetation community would remain in its current state, including a mix of native and non-native species. Continued erosion of the bank could cause eventual damage to the vegetation community creating long-term, moderate, adverse impacts.

Cumulative Impacts – There is a potential for vegetation removal during the construction of the seawalls, parking lot, boat ramp, and road maintenance creating long-term, minor to moderate, adverse impacts to vegetation. When combined with the projects mentioned above, the proposed bank stabilization project would create negligible to long-term, minor, adverse cumulative impacts to vegetation. The impacts to vegetation within the project area would be temporary which should reduce some of the impacts from the sea walls, parking lot, boat ramp, and road maintenance.

Conclusion – Impacts to vegetation are expected to be short-term, minor and adverse. Impacts would be localized to the project area; however, impacts would be minimized by re-vegetating disturbed areas with native species at the end of the construction period. Long-term, negligible impacts to vegetation would occur from the take of four mature tree species. There would be long-term, moderate, adverse impacts to vegetation under with the No Action Alternative. Cumulative impacts to vegetation would be negligible to long-term, minor, and adverse. Although some impacts to vegetation would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.4.2 Wildlife

Common to All Action Alternatives – The Action Alternatives would create short to long-term, minor, adverse impacts to wildlife in the area. Wildlife species that forage and nest in the proposed project area and its vicinity might be temporarily disrupted during the construction period. Unavoidable noise and human activity may cause avian and other wildlife species to avoid areas in close proximity to the construction site. The removal of vegetation would cause additional adverse impacts to wildlife in the area that use the trees and shrubs for foraging and nesting. Although, the area would be re-vegetated, it is expected to take at last 2 years for the vegetation to become completely established. However, impacts would be minimal since similar wildlife habitat is located in adjacent areas along Cane Rive Lake.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no impact to terrestrial wildlife. The habitat provided by the bank of the Oakland plantation along the Cane River Lake would remain the same. However, continued erosion could cause future damage to burrows located on the bank.

Cumulative Impacts – Impacts to wildlife due to the installation of the seawall, parking lot, boat ramp, and roadway repairs would be short- to long-term, minor, and adverse. Wildlife within the immediate area of these projects would be temporarily disturbed due to noise and construction

activities. However, there would be a loss of habitat from the construction of the parking lot. Overall, when the short-to- long-term, minor, adverse impacts to wildlife from the bank stabilization project are combined with the impacts associated with the other projects in the area, it is expected that long-term, minor, adverse cumulative impacts would occur. Cumulative impacts would be minor since the affected area is only a small portion of available wildlife habitat along Cane River Lake.

Conclusion – Impacts to wildlife are expected to be short-to long-term, minor, and adverse during the construction activities. Although, habitat would be cleared for the bank stabilization, the area would be re-vegetated with native species and would be established within two years. The No Action Alternative would have no impact to wildlife. Cumulative impacts to wildlife would be long-term, minor, and adverse. Although some impacts to wildlife would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.4.3 Aquatic Resources

Common to All Action Alternatives – Short-term, minor, adverse effects to aquatic species would occur during the construction period. During construction activities, it is possible that eroded soils may enter the waterway, creating temporary impacts to aquatic resources such as fish and benthic invertebrates. Eroded soil endangers water resources by reducing water quality and causing siltation of aquatic habitat. Fish would be expected to avoid or leave the areas of disturbance during the construction period. Those species that are immobile, including benthic invertebrates, may be sacrificed during the construction activities. The operation of the barge within the lake may cause additional short-term impacts to aquatic resources due to noise and reduced water quality. Fish are anticipated to return to the site upon completion of construction and benthic invertebrates are expected to re-colonize. To reduce impacts to aquatic resources, erosion and sediment controls would be implemented. In the long-term, the bank stabilization would reduce erosion, which would create beneficial impacts to aquatic resources by reducing the amount of sediment entering the system and improving water quality.

Common to Action Alternatives 1 and 2 - Under Alternatives 1 and 2, the park would construct the new embankment below the normal water elevation at the lake; therefore, a temporary inflatable dam and dewatering system would be installed until the base of the existing lake bank can be built above the existing water surface. Reducing the amount of underwater habitat would create short-term, minor, adverse impacts for some aquatic species. Fish and other mobile aquatic species would be displaced from this area during the construction period. Following construction, the inflatable dam would be removed and the underwater habitat would be available for use by these species. Those species that are immobile and depend on water flow, including many benthic invertebrates, could be potentially sacrificed from the dewatering of a portion of the lake. These species also become more vulnerable to prey when exposed. Impacts to these species would be long-term, minor, and adverse, since the area affected is small and would impact a small population of benthic invertebrates. In addition, impacts would be minor

since the overall reproductive success of the species would not be affected and the species would not be permanently lost.

Common to Action Alternatives 3 and 4 – Alternative 3 and 4 includes the placement of sheet pile (Alternative 3) and riprap (Alternative 4) in the lake bottom which has the potential to increase turbidity in the small, localized area. Increases in turbidity would have short-term, minor, adverse, impacts to aquatic resources during the construction phase. Increases in suspended matter may clog the gills of fish and shellfish and also affect a fish's ability to find food. To minimize impacts, a turbidity curtain would be used during the construction process. Impacts would be temporary and last only the duration of the construction activities, which is estimated to last four to six months.

Alternative 3: Alternative 3 includes the installation of a sheet pile retaining wall along the bank of the proposed project area. Many aquatic species use the habitat adjacent to the bank for feeding, breeding and for protection from predators. The sheet pile retaining wall has the potential to act as a barricade between the edge of the bank and the water. Some aquatic species may not be able to access this desired habitat along the lake's edge. In addition, benthic invertebrates may be sacrificed during the installation of the sheet pile since some species are immobile. Impacts to aquatic species would be long-term, moderate, and adverse.

Long-term, beneficial impacts to benthic invertebrates would occur after the sheet pile retaining wall has been installed. The sheet pile wall would create new habitat for the colonization of benthic invertebrates.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake, the site would remain in its current state, and the aquatic species would remain unchanged. Therefore there would be no impact to the aquatic species at the site.

Cumulative Impacts – Short-term, minor, adverse impacts to aquatic resources would likely occur due to the seawall, parking lot, and boat ramp construction. Impacts would be temporary and localized. Overall when the impacts associated with the bank stabilization project under Alternatives 1 and 2 are combined with the impacts from the other projects above, cumulative impacts are expected to be negligible. Impacts would be short-term and last only the duration of the construction activities. Cumulative impacts under Alternatives 3 and 4 would be short-term, minor, and adverse. Impacts would be minimal since additional aquatic resource habitat is available throughout Cane River Lake.

Conclusion – Impacts to aquatic wildlife species include short-term, minor, adverse effects to aquatic species during the construction period. The species that will potentially be impacted are expected to leave or avoid the disturbed area, and return upon completion of the project. Long-term, beneficial impacts are expected from the reduction of erosion, which would improve water quality. Additional short-term, minor, adverse impacts would occur under Alternatives 1 and 2 from the use of the temporary dam. The installation of the sheet pile and riprap under Alternatives 3 and 4 may increase turbidity and create additional short-term, minor, adverse impacts to aquatic resources. Lastly, long-term, minor, adverse impacts may occur under

Alternative 3 from the sheet pile wall acting as a barrier along the water's edge. Long-term, beneficial impacts to benthic invertebrates would occur from the additional habitat of the sheet pile wall. The No Action Alternative will not impact aquatic species. Cumulative impacts to aquatic resources would be negligible under Alternatives 1 and 2 and short-term, minor, and adverse under Alternatives 3 and 4. Although some impacts to aquatic resources would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.4.4 Species of Special Status

The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

No effect*:* When a proposed action would not affect a listed species or designated critical habitat.

May affect/not likely to adversely affect: Adverse effects on special status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial.

May affect/likely to adversely affect*:* When an adverse effect to a listed species may occur as a direct or indirect result of proposed actions and the effect is either not discountable or completely beneficial.

Is likely to jeopardize proposed species/adversely modify proposed critical habitat (impairment): The appropriate conclusion when NPS or USFWS identifies situations in which the proposal could jeopardize the continued existence of a proposed species or adversely modify critical habitat to a species within or outside park boundaries.

Common to All Action Alternatives – In accordance with the federal and state requirements for special status species, consultation letters were mailed to local and federal agencies on August 3, 2010, including the USFWS Lafayette Ecological Services Field Office in Lafayette, the Cane River Waterway Commission (CRWC), and the Louisiana DNR. Information about the proposed project was included in the consultation letters. A response was received from the USFWS stating that the proposed project would have no effect to special status species. In addition a response was received from the Louisiana DNR that did not indicate any listed species in the project area (Appendix A). More details and correspondence between NPS and agencies consulted are supplied in Chapter 7 and Appendix A. A copy of this EA will be submitted to the USFWS, CRWC, and Louisiana DNR for their review.

The Alabama Natural Heritage Program conducted a botanical survey on July 29, 2009 for plants of conservation importance along the west bank of the Cane River Lake falling within the jurisdictional boundary of the Oakland Plantation. No plants of special importance were identified on the property during the survey (Appendix A).

Based on consultation with the aforementioned agencies and field investigations, it was determined that the proposed bank stabilization project would have no effect on special status species or critical habitats. None of the listed species presented in Chapter 3 currently occur within the proposed project area. In addition, the proposed project area does not support the habitat for any listed species.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no impact to special status species.

Cumulative Impacts – It is likely that the construction of the seawall, boat ramp, parking lot, bridge repairs, and the road improvements would have no effect to special status species because it is likely that these areas do not support the habitat for the listed species in Louisiana. Overall, there would be no cumulative impacts to special status species, since the projects including the bank stabilization project would have no effect to the species or critical habitat.

Conclusion –There would be no effect to special status species under any of the Action Alternatives. The proposed project location does not support the habitat for any of the listed species in Louisiana. In addition, there would be no effect to the listed species under the No Action Alternative. No cumulative impacts would occur for species of special status. Since there would be no impacts to special status species, the alternatives would cause no impairment to park resources.

4.5 CULTURAL RESOURCES

4.5.1 Archaeological Sites

Common to All Action Alternatives – All four bank stabilization alternatives fall in the narrow strip of land between the Cane River Lake and State Highway LA 494/119. This area has received a comprehensive archaeological survey. Historic aerial photographs show a pump house at the southern end of the project area. Shovel and auger testing did not uncover any remains of the pump house, but there is a chance parts of the building are buried in the area (Wise 2010). Archaeological resources including bottles, shards, and American Indian sherds were found at three sites within the project area during the October and November 2010 cultural resource survey.

All four alternatives result in some ground disturbance within the project area from installation of new culverts, grading, or vegetation removal. Removal of earth along the Cane River Lake has the potential to uncover older cultural deposits. Wise (2010) does recommend monitoring of any construction or earth disturbance in the immediate area (within 100 feet) of the suspected location of the pump house. The monitoring will ensure that the pump house, if extant, is not disturbed. Park staff would be present to inspect the three identified areas where archaeological resources were recently collected during construction activities. In addition, Louisiana SHPO stated that the bank stabilization project area is immediately adjacent to archaeological site 16NA552; therefore, it is recommended that a professional archaeologist monitor all ground

disturbing activities (Appendix A). No adverse effects on archaeological sites are anticipated since qualified individuals would be on site during ground disturbing activities.

A staging area for the alternatives will be placed within park property. The park has been systematically surveyed in the past and therefore, the location of archaeological deposits is known (Miller and Wood 2000). To avoid adverse effects to archaeological resources within the plantation boundary, the staging area would be situated in an area where archaeological deposits have not been detected.

By preventing continued erosion of the lake bank, all four alternatives will have a long-term, beneficial impact on archaeological resources in the area.

No Action Alternative – Under the No Action Alternative, there is the potential for long-term, indirect, minor, adverse, impacts on archaeological sites in the vicinity. The continued erosion of the project site could threaten State Highway LA 494/119 causing it to be rerouted through areas that might contain archaeological resources.

Cumulative Impacts – It is probable that past construction at Shell Beach, bridge repairs, and road repairs by Louisiana DOT had no adverse impacts to archaeological resources in the area. If future roadwork is limited to the current right-of-way then no adverse impacts are anticipated. Construction of seawalls along the Cane River Lake could have adverse impacts on archaeological resources if sites exist where the seawall is constructed and the ground is disturbed during construction. Because wave action is increased by seawalls, wave action can have a minor adverse impact on archaeological sites near unprotected areas of the lake bank. There would be a beneficial impact on sites inland of newly constructed seawalls because the walls hinder lake bank erosion. When the long-term beneficial impact of the current bank stabilization project is added to the impacts of these other past, present, and future projects, the overall cumulative impacts are beneficial.

Conclusion – All Action Alternatives will have a long-term beneficial impact on inland archaeological resources by preventing continued erosion of the lake bank. The No Action Alternative could result in long-term, indirect, minor, adverse impact on archaeological resources because erosion of the lake bank could threaten State Highway LA 494/119 causing it to be rerouted through areas that might contain sites. Additionally, continued erosion could eventually threaten archaeological resources along the eastern edge of the plantation boundary. Cumulative impacts to archeological sites would be beneficial. None of the alternatives would cause impairment to park resources.

4.5.2. Historic Resources

Common to All Action Alternatives – All four alternatives involve vegetation removal and some earth moving. A staging area is also necessary for the bank stabilization alternatives. The vegetation removal and construction would result in a short-term, minor adverse impact on the viewshed for Oakland Plantation and the historic steel truss bridge just south of the project area. The staging area is proposed to be placed in the southeast corner of the parking lot adjacent to

the Doctor's House (park headquarters), which would also have a short-term, minor, adverse impact on the viewshed for portions of the Oakland Plantation property.

Re-vegetation of the lake bank will include planting of native species in the area, which would have a long-term beneficial impact on the historic resources in the area. The action alternatives would have a long-term beneficial impact on the historic resources of the area by preventing continued erosion of the bank, which could threaten the stability of the steel truss bridge and State Highway LA 494/119.

No Action Alternative – Under the No Action Alternative, there is the potential for long-term, indirect, minor, adverse effects on Oakland Plantation and the historic steel truss bridge. The continued erosion of the project site could threaten the stability of the bridge. Additionally, the erosion could impact State Highway LA 494/119 which is the main road leading to Oakland. If the stability of the highway is compromised it could be rerouted through areas containing historic resources related and unrelated to Oakland Plantation.

Cumulative Impacts – It is likely that construction at Shell Beach, creation of seawalls, bridge repairs, and road repairs by Louisiana DOT would create short-term, minor, adverse impacts to the viewshed of historic resource in the area while they were being constructed. If future roadwork is limited to the current right-of-way then no long-term, minor, adverse impacts are anticipated to historic resources close to the road. There is a chance that construction of seawalls along the Cane River Lake could have long-term adverse impacts on the viewsheds of surrounding historic resources if they are not built with historic resources in mind. Additionally, because they increase wave action seawalls can have a long-term, minor, adverse impact on historic resources near unprotected areas of the lake bank. There will be a minor beneficial impact on historic resources inland of newly constructed seawalls because the walls hinder lake bank erosion. When the long-term, beneficial impact of the current bank stabilization project is added to the impacts of these other past, present, and future projects, the overall cumulative impacts are beneficial.

Conclusion – All four bank stabilization alternatives will result in a short-term, minor, adverse impact on the view sheds of historic resources in the area, but once construction has ceased and re-vegetation of the area has been completed there will be long-term beneficial impacts on the historic resources. The No Action Alternative could result in long-term, indirect, minor, adverse effects on historic resources in the area. Continued erosion could destabilize the historic steel truss bridge and compromise State Highway LA 494/119 causing it to be rerouted to areas where it could impact historic resources. Cumulative impacts to historical sites are anticipated to be beneficial. Although some impacts to historic resources would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.5.3 Cultural Landscapes

Common to Alternatives 1, 2, and 4 – All three alternatives involve vegetation removal and some earth moving as well as set up and use of a construction staging area. The vegetation removal, construction, and staging area would result in a short-term, minor adverse impact on the viewshed for the Oakland Plantation cultural landscape.

Re-vegetation of the lake bank would include planting of native species in the area, which will have a long-term beneficial impact on the cultural landscape.

Alternative 3 – Like the other alternatives, Alternative 3 involves vegetation removal and some earth moving as well as set up and use of a construction staging area. The vegetation removal, construction, and staging area would result in a short-term, minor adverse impact on the viewshed for the Oakland Plantation cultural landscape. Re-vegetation of the lake bank would include planting of native species in the area, which would have a long-term beneficial impact on the cultural landscape.

Alternative 3 also involves construction of a sheet pile retaining wall. Portions of the wall would always be visible above the water line. The retaining wall would have a long-term, minor, adverse impact on the viewshed for the Oakland Plantation cultural landscape.

No Action Alternative – Under the No Action Alternative, there is the potential for long-term indirect, moderate, adverse effects on the Oakland Plantation cultural landscape. The continued erosion of the project site could threaten State Highway LA 494/119. If the stability of the highway is compromised it could be rerouted through an area where it could have a moderate, long-term impact on the cultural landscape.

Cumulative Impacts – Construction at Shell Beach, creation of seawalls, bridge repairs, and past road repairs by Louisiana DOT likely had short-term, minor, adverse impacts to the viewshed of the cultural landscape while they were being constructed. If future roadwork does not drastically alter the landscape then no long-term adverse impacts are anticipated to the Oakland Plantation cultural landscape. The shell beach has a minor long-term adverse impact on the viewshed of the landscape. There is also a chance that some new seawalls along the Cane River Lake could have long-term, minor, adverse impact on the viewshed of the cultural landscape if seawalls are not designed in a historically appropriate way. Additionally, because seawalls increase wave action, a minor adverse impact on the cultural landscape near unprotected areas of the lake bank would occur. There is a beneficial impact on the landscape in the area of newly constructed seawalls because the walls prevent lake bank erosion.

When the long-term beneficial impact of bank stabilization alternatives 1, 2, and 4 are added to the impacts of these other past, present, and future projects, the overall cumulative impacts are beneficial. Although minor, the long-term adverse impact to the viewshed caused by Alternative 3 could have a more adverse impact on the cultural landscape when added to the impacts of other construction projects in the area.

Conclusion –Alternatives 1, 2, and 4 would result in a short-term, minor, adverse impact on the Oakland Plantation cultural landscape, but once construction has ceased and re-vegetation of the area has been completed there would be long-term beneficial impacts landscape. Alternative 3 would prevent erosion that could compromise the highway, but it would have a long-term, minor, adverse impact on the viewshed for Oakland Plantation cultural landscape because the sheet pile retaining wall would be visible above the water line. The No Action Alternative could result in long-term indirect adverse effects on the cultural landscape in the area. Continued erosion could compromise State Highway LA 494/119 causing it to be rerouted to areas where it could have a long-term, moderate, adverse impact on the cultural landscape. Cumulative impacts to the cultural landscape would be beneficial for most alternatives, but may be more adverse for Alternative 3. Although some impacts to the cultural landscape would occur, the impacts would not affect the resource to the point that the park's purposes could not be fulfilled, goals of the park's General Management Plan would not be met, and enjoyment of the park by future generations would be precluded. Therefore, none of the alternatives would cause impairment to park resources.

4.6 HUMAN ENVIRONMENT

4.6.1 Environmental Justice

Common to All Action Alternatives – *Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires Federal agencies to make achieving environmental justice part of its mission. Specifically, each agency must identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." The intent is to prevent minority and low-income populations from being disproportionately affected by adverse human health and environmental impacts of Federal actions.

Approximately 45 percent of the Natchitoches Parish population are considered minorities and 30 percent of people live below the poverty level. The proposed bank stabilization project is expected to not cause adverse impacts to the minority or low income population. All Action Alternatives could have a short-term, beneficial impact on the minority or low income populations by providing temporary jobs for the duration of the construction period.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The No Action Alternative would have no impact on environmental justice, as there would no impacts to low-income or minority communities.

Cumulative Impacts – No adverse impacts to minority or low income populations are expected from the construction of seawalls, parking lot, boat ramp, bridge repairs, or roadway improvements. Overall, when the beneficial impacts associated with the bank stabilization project are combined with the impacts from past, present, and future projects in the area, short-term, beneficial cumulative impacts would occur. Cumulative impacts would be the result of the creation of temporary construction jobs available.

Conclusion – The Action Alternatives would provide a short-term, beneficial impact to low-income and minority communities by the creation of jobs during the construction period. The No Action Alternative would have no impact on these communities. Cumulative impacts to environmental justice would be short-term and beneficial.

4.6.2 Aesthetics

Common to All Action Alternatives – Short-term, minor, adverse impacts to the aesthetics of the area would occur during the construction period. The removal of vegetation and the presence of the construction equipment would be visible by park visitors at the plantation, river users, and passengers in vehicles along State Highway LA 494/119. An additional adverse impact to aesthetics would include the staging areas on the park property and within the water. The natural landscape of the park and Cane River Lake would be altered for approximately four to six months.

Common to Action Alternatives 1, 2, and 4 – Under Action Alternatives 1, 2 and 4, the materials used for the bank stabilization would be placed underground and covered with native vegetation. The Action Alternatives would provide an overall, long-term, beneficial impact by improving the appearance the lake bank. The lake bank would no longer be severely eroded and overgrown with non-native vegetation. The gentle slope of the stabilized bank and planted trees, shrubs, and grasses would be more aesthetically and culturally pleasing.

Alternative 3 – Under Alternative 3, a cantilevered sheet pile retaining wall would be placed at the toe of the bank. Long-term, moderate, adverse impacts to the aesthetics of the area would occur from this alternative. The sheet pile retaining wall would be visible from both land and the water after the construction period. The addition of the sheet pile is against the park's objective of preserving the visual characteristic of the proposed project area.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The No Action Alternative would result in long-term, moderate, adverse impacts to the park and Cane River Lake through the continued erosion of the bank over time. This erosion would lessen the aesthetic appeal of the area because visual appearance of the site would not be improved.

Cumulative Impacts – Short-term, minor, adverse impacts to the aesthetics of the surrounding area would be impacted during the construction of seawalls, boat ramp, parking lot, bridge repairs, and road improvements to State Highway LA 494/119. When the overall beneficial impacts associated with the bank stabilization project under Alternatives 1, 2, 4 are combined with the impacts from other projects in the area, beneficial impacts are expected to occur. In general, the projects would improve damaged areas and would prevent further deterioration from occurring.

Conclusion – The construction activities would create short-term, minor, adverse impacts to aesthetic appearance of the site due to the removal of vegetation and presence of construction equipment. Alternatives 1, 2, 4 would create long-term, beneficial impacts following

construction by a reduction of erosion and re-vegetation of the area with native plant species. Alternative 3 would have long-term, moderate, adverse impacts to the aesthetics of the area due to the installation of a sheet pile retaining wall. The No Action Alternative would result in long-term, moderate, adverse impacts to the aesthetic appearance of the site from erosion of the bank over time. The visual appearance and historical landscape would not be improved under the No Action Alternative. Cumulative impacts to aesthetics would be beneficial under the action alternatives.

4.6.3 Public Health and Safety

Common to All Action Alternatives – Short-term, minor, adverse impacts to public health and safety would occur during the four to six month construction period. Drivers along State Highway LA 494/119 would need to use caution while driving pass the construction area as workers and equipment would be located along the edge of the road. In addition, one lane of traffic would be closed during a portion of the construction period; therefore traffic control would be needed. Park visitors would be discouraged from crossing the highway and entering the project site. To minimize the risk of injuries the project site would be blocked off from park visitors. Construction zone signs and a reduced speed limit would be placed on the highway north and south of the project area. Boaters and fishermen on Cane River Lake would also be discouraged from driving boats along the west bank of the site.

Alternative 3 – Long-term, minor, adverse impacts to public health and safety have the potential to occur under Alternative 3. A sheet pile retaining wall would be placed along the lake bank. The retaining wall may pose additional safety hazards to boaters and other users on Cane River Lake. If a boat or jet ski would crash into the retaining wall, it is likely that injuries would be more severe when compared to a natural vegetated bank.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. There would be no impact to public health and safety under the No Action Alternative, because the safety of the site would remain unchanged.

Cumulative Impacts – Short-term, minor, adverse impacts to public health and safety is expected to occur during the construction of the seawalls, boat ramp, parking lot, bridge repairs, and road improvements. The risk of injury could occur during these activities. When the short-term, minor, adverse impacts to public health and safety associated with the bank stabilization project are added to the impacts identified for other projects in the area, cumulative impacts are expected to be short-term, minor, and adverse for Alternatives 1, 2 and 4. Long-term, minor, adverse cumulative impacts would occur under Alternative 3 from the installation of the permanent sheet pile retaining wall.

Conclusion –All of the proposed Action Alternatives would have a short-term, minor, adverse impact on the public health and safety along the proposed action area adjacent to the Cane River Lake as a result of construction activities underway in the area during the proposed action. Additional long-term, minor, adverse impacts to public health and safety would occur under Alternative 3 from the installation of the sheet pile retaining wall. Public health and safety

would not be impacted under the No Action Alternative. Cumulative impacts to public health and safety would be short-term, minor, and adverse for Alternatives 1, 2, and 4 and long-term, minor, and adverse for Alternative 3.

4.6.4 Energy Requirements

Common to All Action Alternatives – Short-term, minor, adverse impacts to energy use would occur during the construction period. The removal of vegetation and installation of the bank stabilization material would require the use of many different types of construction equipment that would require energy to operate. In addition, the use of a generator may be needed. The additional energy requirement would last for approximately four to six months.

In the long-term, no additional energy requirements would be needed following the construction period.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. The site would remain in its current state under No Action Alternative, and no changes in the energy requirements would occur.

Cumulative Impacts –Short-term, minor, adverse impacts to energy use would occur during the construction of the seawalls, parking lot, boat ramp, bridge repairs, and road improvements. It is likely that these construction projects would require the additional use of energy to operate machinery and equipment. When the short-term, minor, adverse impacts to energy requirements associated with the bank stabilization project are added to the impacts identified for other projects in the area, cumulative impacts are expected to be short-term, minor, an adverse. No long-term impacts are expected.

Conclusion – All of the proposed Action Alternatives would have short-term, minor, adverse impacts on energy requirements during the construction period due to the use of construction equipment. There would be no impact to energy use under the No Action Alternative. Cumulative impacts to energy requirements would be short-term, minor, and adverse.

4.6.5 Infrastructure

Common to All Action Alternatives – The proposed Action Alternatives would create short-term, minor, adverse impacts to the infrastructure (roadways and utilities) within the proposed project area. Impacts to traffic along State Highway LA 494/119 would result from the closure of the northbound lane during construction. Traffic would be frequently stopped in the southbound lane to allow oncoming traffic to continue north. Traffic delays in this area are expected to occur for one to six weeks. Impacts to traffic may be minimized if a barricade or barrier is used to block the project site without fully closing the northbound lane. Following the construction period, the northbound lane would reopen resulting in no long-term impacts to the roadways.

During the construction period, the existing utilities, including power and telephone service would need to be temporarily relocated in order to perform the extensive earthwork required for the bank stabilization resulting in short-term, minor, adverse impacts to customers using power and telephone services if temporary service is needed. Short-term, minor, adverse impacts to the utility companies would also occur during the construction period due to the relocation of utility lines. Following the construction phase, the utility lines would be returned to the original location in the project area.

The completion of the bank stabilization project would create long-term, beneficial impacts to the roadways and utilities within the project area. The stabilization of the bank would prevent further erosion from occurring, which has been a threat to the existing road and utility lines. The new stormwater system would features designs to keep the road clear of water during heavy rain events and prevent the soils from washing into the lake. The reduction of erosion would also no longer threaten the electrical and telephone lines which would increase the reliability of the service.

An agency consultation letter was sent to the LADOTD on 3 August 2010. A response was received on 25 August 2010 requesting that the NPS apply for a project permit to perform the bank stabilization work within the LADOTD right-of-way (Appendix A). The NPS would submit a permit application which would include details of the proposed work including traffic control.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. As a result, the lake bank along State Highway LA 494/119 would continue to erode causing the potential for the slow deterioration of the nearby highway. The roadside swales and drainage ditches along LA 494/119 would also continue to erode, creating the potential for long-term, moderate, adverse impacts to the roads during major rain events. The utilities following the State Highway along the Cane River Lake bank would also potentially impacted in a similar fashion if the lake bank was left to erode unabated.

Cumulative Impacts –Long-term, beneficial impacts to infrastructure would result from the construction of the seawalls, boat ramp, parking lot, bridge repairs, and road improvements. Beneficial cumulative impacts would be expected when the beneficial impacts from the bank stabilization project are added to the impacts from other projects within the area. Cumulatively, the projects would improve the local roadways and prevent further erosion from occurring which could be damaging to the local infrastructure.

Conclusion – The Action Alternatives would have a short-term, minor, adverse impact on the roadways along the proposed project area during construction as a result of lane closure. The utilities would be impacted from the proposed action during construction, since they would have to be moved so excavation could take place resulting in short-term, minor, adverse impacts. Impacts would affect both customers and the utility companies. After the area is stabilized, long-term, beneficial impacts to the roadways, utilities, and customers would occur since erosion would no longer threaten the reliability of the services. Long-term, moderate, adverse impacts to the local infrastructure would continue under the No Action Alternative. Erosion of the area

would continue to threaten the stability of the roadway and utilities. Cumulative impacts to infrastructure would be beneficial.

4.7 VISITOR USE AND EXPERIENCE

Common to All Action Alternatives – Short-term, minor, adverse impacts to the visitor use and experience would occur during the construction period. Construction equipment would be visible to visitors at the plantation and may adversely impact the park experience since it would take away from the cultural landscape. Visitors may also be disturbed from the noise associated with the construction activities. Additionally, since the northbound lane of State Highway LA 494/119 would be closed, access to the parking area may be difficult and may dissuade visitors from coming to the park. The staging area located on park property would also take away from the cultural landscape and natural aesthetics of the park.

Those using Cane River Lake for boating, fishing, or other water activities would also be impacted adversely. Construction activities along the water's edge would not be aesthetically pleasing. Noise associated with the construction activities would also create short-term, minor, adverse impacts to those on the water. Fisherman would likely move upstream or downstream of the project area, since it is likely that most fish would relocate away from the site. A barge would be used as a staging area in Cane River Lake. Transporting the barge to and from the site and the use of the barge at the site for four to six months may also impact those individuals recreating on the river. Many boaters and fisherman may avoid this area of the lake.

Common to Action Alternatives 1, 2, and 4 – Once the project area has been stabilized, long-term, beneficial impacts to the visitor use and experience would likely occur. Currently the site is highly eroded, overgrown with non-native vegetation, and not aesthetically pleasing. In addition, Cane River Lake is not visible from the plantation because of the eroded banks and overgrown vegetation. The stabilized bank would be graded so that there would be a gentle slope and the area would be re-vegetated with native species. Views of the lake would be visible and more aesthetically pleasing. Long-term, beneficial impacts to those participating in water activities would also occur. The re-vegetated area would also be more aesthetically pleasing from the water.

Alternative 3 – Long-term, moderate, adverse impacts to visitor use and experience would occur under Alternative 3. This alternative includes the installation of a sheet pile retaining wall along the base of the existing bank. The sheet pile wall would be noticeable from both parkland and the water. The retaining wall would alter the natural aesthetics and cultural landscape of the area.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. As a result the banks would continue to erode and the views from the lake would continue to be aesthetically displeasing, therefore, long-term, minor, adverse impacts to visitor use and experience would occur.

Cumulative Impacts –Short-term, negligible impacts to visitor use and experience would occur from the construction of the seawalls, boat ramp, parking lot, bridge repairs, and road improvements. Impacts would be negligible since these projects would be in close proximity and may indirectly impact park visitors. In the long-term, the improvements to the area would create beneficial impacts to the visitor use and experience. When the overall beneficial impacts associated with the bank stabilization project under Alternatives 1, 2, and 4 are combined with the impacts from the other projects, long-term, beneficial cumulative impacts to the visitor use and experience would occur. Overall the projects mentioned above would improve the visual quality of the area as a whole and may offer visitors more recreational activities. Cumulative impacts under Alternative 3 would be long-term, minor, and adverse since the sheet pile wall would adversely impact the visual quality of the area. Cumulative impacts would also be long-term, minor, and adverse under the No Action Alternative due to the continued erosion of the lake bank.

Conclusion – While underway, the proposed Action Alternatives would have a short-term, minor, adverse impact on visitor use and experience as a result of the construction occurring at the project area. Long-term, beneficial impacts to visitor use and experience would occur under Alternatives 1, 2, and 4 due to the gradual sloping and re-vegetation of the project area. Long-term, moderate, adverse impacts to visitor use and experience would occur under Alternative 3 due to the installation of the sheet pile retaining wall, which would alter the natural and cultural landscape. Under the No Action Alternative, long-term, minor, adverse impacts to visitor use and experience would occur. Cumulative impacts to visitor experience would be beneficial for Alternatives 1, 2, and 4, and long-term, minor, and adverse for Alternative 3 and the No Action Alternative.

4.8 PARK OPERATIONS

Common to All Action Alternatives – During the construction phase of the proposed bank stabilization, impacts to park operations are expected to be short-term, minor to moderate, and adverse. Currently the park has a relatively small staff with each staff member having specific responsibilities. Park staff would be onsite to monitor construction activities, specifically within the three recently found sites containing archaeological resources. This monitoring period could last four to six months and would take away from the typical daily responsibilities of the staff.

After the construction period is complete, impacts to park operations are expected to be long-term and beneficial. In the past during major storm events, park staff was responsible for performing emergency repairs to the bank. Once the bank has fully re-vegetated, which is estimated to take approximately two years, the new drainage patterns would reduce the amount of erosion occurring. Therefore, park staff would no longer spend time repairing eroded areas.

No Action Alternative – Under the No Action Alternative, no bank stabilization measures would be undertaken on the proposed project area along the Cane River Lake. Severe erosion of the banks would continue. Park staff would continue to monitor the erosion and make emergency repairs to problem areas. Impacts to park staff would be long-term, moderate, and adverse.

Cumulative Impacts –There would be no impacts to park operations associated with the construction of the seawalls, boat ramp, parking lot, bridge repairs, and road improvements. These activities would not occur on park land and park staff would not be needed in assisting with these projects. Cumulative impacts to park staff would be beneficial under the action alternatives and long-term, moderate and adverse under the No Action Alternative.

Conclusion – Short-term, minor to moderate, adverse impacts to park staff would occur during the construction period, since staff would be needed to monitor construction activities. Long-term, beneficial impacts to park staff would occur after the bank has been stabilized. Staff would no longer monitor the erosion or make necessary repairs to the bank. Under the No Action Alternative, long-term, moderate, adverse impacts to park staff would occur, since erosion would continue and the staff would be responsible for maintaining the land. Cumulative impacts to park operations would be beneficial under the action alternatives and long-term, moderate, and adverse under the No Action Alternative.

5.0 MITIGATION MEASURES

This chapter provides a summary of the mitigation measures for the Preferred Alternative by each applicable resource category. General categories of mitigation measures include:

- Avoiding certain impacts altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying impacts by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action; and/or
- Compensating for impacts by replacing or providing substitute resources or environments.

To the extent possible, potential impacts associated with the proposed project were avoided and the park has determined that the proposed project has been mitigated to the best attempt possible to offer the least amount of impact to the human and natural environment. The following mitigation measures by resource category have been developed to minimize the degree and/or severity of adverse effects, and would be implemented during construction of the Preferred Alternative, as needed.

5.1 NOISE

Construction activities would produce noise at the project site. Noise levels may impact visitors to the park and landowners adjacent to the project site. Impacts to adjacent landowners would be mitigated by restricting construction activities to daylight hours.

5.2 SOILS

Soils within the project site would be disturbed during the drainage improvements, removal of existing vegetation, and the installation of the bank stabilization material. To minimize impacts, measures would be used to prevent or reduce soils from erosion and to avert eroded soils from entering Cane River Lake. Sediment and erosion control plans would be required by applicable local agencies.

5.3 WATER QUALITY

Because disturbed sediments are susceptible to erosion and can impact water quality, best management practices and sediment and erosion control measures would be used during the installation of the bank stabilization material. If soil migration occurs during the construction period, impacts to water quality, including an increase in turbidity levels would occur. To minimize impacts to water quality, the park would comply with state and local regulations by implementing sediment and erosion control plans. To contain the clay fill material within the bank, a TRM would be installed to prevent additional erosion and sedimentation. There is also a potential for contaminants from construction equipment to enter into the lake, which may include heavy metals, hydrocarbons, or other toxic substances. To minimize water quality impacts,

construction equipment would be inspected for leaks or other faults that may cause pollution to the water.

5.4 WETLANDS

For the purposes of implementing Executive Order 11990, the NPS has determined that any area classified as wetland habitat according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* is subject to *Director's Order #77-1: Wetland Protection* and the implementation procedures outlined in the *Procedural Manual #77-1: Wetland Protection*. Director's Order #77-1 states that for new actions where impacts to wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands where possible at a minimum acreage ratio of 1 to 1. A wetlands mitigation plan and a wetlands permit would be required for wetlands affected by the bank stabilization project.

Impacts to wetlands are anticipated as a result of the placement of the fill material within the bank and the removal of the existing vegetation. A wetland mitigation plan has been completed and submitted with the Wetlands and Floodplains SOF (Appendix D). To summarize, it is estimated that approximately 0.17 acres of fill material along the bank classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) would be required and would permanently impact this wetland and 0.001 acres along the bank classified as riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would be permanently impacted. The PEM1/2H wetland beyond the 5.6 feet of bank stabilization would be temporarily and adversely affected during the construction period. As a result, a maximum of approximately 0.47 acres beyond the bank stabilization classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) and 0.26 acres of riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would temporarily impact these wetland areas during barge activities while the stabilization is being constructed and placed along the shoreline. Therefore, a total of approximately 0.171 acres of PEM1/2H and R2OWH wetlands will be permanently affected by the proposed project along the bank of the Cane River Lake at the plantation. To mitigate for wetland impacts, the portion of the fill included in the bank stabilization immediately along Cane River Lake will be re-vegetated with appropriate native, wetland vegetation following stabilization. Although minor, adverse impacts to wetlands would occur as a result of the Preferred Alternative, the long-term, minor, beneficial impacts associated with stabilizing the bank and replanting with wetland vegetation to reduce future erosion and ultimate loss of land would offset the adverse impacts to wetlands.

5.5 VEGETATION

Short-term, minor, adverse impacts to vegetation would occur from the removal of the existing vegetation, including invasive species from the project area. To minimize the impacts to vegetation, following the installation of the bank stabilization material, the project area would be re-vegetated with native trees, shrubs, and grasses. It is expected that the area would become completely re-vegetated within two years.

5.6 AQUATIC RESOURCES

Short-term, minor, adverse impacts to aquatic resources may occur if soils eroded or migrate into the water, reducing the water quality within the localized area. To minimize the impacts to aquatic resources, sediment and erosion control plans would be implemented. In addition, the clay fill material would be lined with a TRM to prevent the escape of the material into the water.

5.7 ARCHAEOLOGICAL RESOURCES

The bank stabilization project is located immediately adjacent to archaeological site 16NA552. In addition, during a cultural survey in October and November 2010, numerous artifacts were collected within the project site. To minimize impacts to archaeological resources both park staff and a professional archaeologist would be present at the site to monitor for potential resources during the ground disturbing activities.

5.8 PUBLIC HEALTH AND SAFETY

During the construction period, there would be an increases risk of injuries to occur from park visitors, park staff, construction workers, and motorists along the State Highway LA 494/119. To reduce the risk of injuries, the project area would be blocked off or barricaded from public access. In addition, construction zone signs would be placed on the highway both north and south of the project area.

5.9 INFRASTRUCTURE

During the construction period, the northbound lane on State Highway LA 494/119 would be potentially shut down in the vicinity of the project area. To minimize impacts to traffic delays, barricades could be placed around the active construction site, which would allow traffic to use both the north and south bound lanes.

6.0 ENVIRONMENTAL COMMITMENTS

6.1 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are impacts that cannot be fully mitigated or avoided. The following unavoidable adverse effects would occur from the implementation of the proposed project under all the Action Alternatives:

- Short-term, minor adverse impacts to physical resources, including air quality, noise levels, and soils due to the operation of the construction equipment and disturbance to soils.
- Short-term, minor adverse impacts to vegetation and wildlife due to the removal of existing vegetation within the project area.
- Short-term, minor adverse impacts to the historic viewshed, cultural landscape, and aesthetics during the construction period due to the alteration of the visual appearance of the project site
- Short-term, minor adverse impacts to the human environment including public health and safety, energy requirements, and infrastructure due to the operation of the construction equipment and the closure of the northbound lane on State Highway LA 494/119.
- Short-term, minor, adverse impacts to visitor use and experience would occur due to the presence and use of the construction equipment on both land and on the lake.

Alternatives 1 and 2 include the use of an inflatable dam and dewatering system during the construction period. Unavoidable, short-term, minor, adverse impacts to hydrology and aquatic resources would occur during this period. The natural hydrology of the lake would be altered and fewer habitats for fish and other aquatic species would be available.

Alternative 3 and 4 include the placement of a sheet pile retaining wall (Alternative 3) and riprap (Alternative 4) on the bottom of the lake. Unavoidable, short-term, minor, adverse impacts to soils, water quality, and aquatic resources would occur during the construction period. The placement of the materials on the lake bottom would disturb sediments which would increase the turbidity levels within the project area.

The impacts discussed above would result from the construction period and would be temporary lasting approximately four to six months. During construction, long-term, minor, adverse impacts to palustrine and riverine wetlands would occur from the placement of fill material along the lake's edge. No unavoidable, long-term, adverse impacts to resources are expected after the completion of the bank stabilization project.

6.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section discusses irreversible and irretrievable commitments of resources. A resource commitment is considered irreversible when primary or secondary impacts from its use limit future options. Irreversible commitment applies primarily to nonrenewable resources, such as minerals or cultural resources, and to those resources that are only renewable over long time spans, such as soil productivity. A resource commitment is considered irretrievable when the use

or consumption of the resource is neither renewable nor recoverable for use by future generations.

Irreversible
Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. Irreversible environmental changes to natural resources associated with the Action Alternatives would include the commitment of energy as a result of the construction of the bank stabilization project.

Irretrievable
An irretrievable commitment of resources refers to effects on resources that, once gone, cannot be replaced. The Action Alternatives are not expected to cause irretrievable commitments of resources at the park. However, the No Action Alternative could cause the permanent and irretrievable loss of portions of the Oakland Plantation property along the Cane River Lake bank.

6.3 SUMMARY OF ENVIRONMENTAL COMMITMENTS

As a result of construction activities for the Action Alternatives, several unavoidable adverse effects would occur to noise levels, water quality, air quality, aquatic resources, a temporary reduction in the quality of water-based recreational opportunities in the immediate area, and aesthetics due to construction equipment. Minor, unavoidable impacts to wetlands are expected, but mitigation measures are expected to offset these impacts.

7.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

7.1 PUBLIC SCOPING

Scoping is an effort to involve agencies and the general public in determining the scope of issues to be addressed in the environmental document. Scoping includes consultation with any interested agency, or any agency with jurisdiction by law or expertise to obtain early input. Among other tasks, scoping determines important issues and eliminates issues determined to be unimportant; allocates assignments among the project team members and/or participating agents; identifies related projects and associated documents; identifies other permits, surveys, consultations, etc. required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. Scoping includes both internal and external scoping activities.

Internal scoping refers to the process used to define issues, alternatives, and data needs. In September 2009 a site assessment was performed by engineers which evaluated the project area and determined the cause of the severe erosion. After the site assessment, the project engineers developed multiple alternatives to stop the erosion from progressing. In May 2010, a site visit and project meeting occurred between the park staff and biologists. During this visit, a wetland delineation was performed and potential impacts to the area were identified. The project team conducted a Value Analysis and Choosing by Advantages workshop in June 2010. During this workshop the final alternatives to be carried forward through analysis and the Preferred Alternative were selected.

External Scoping is the process used to gather public input. For this project, a scoping newsletter was mailed to 54 individuals, organizations, stakeholders, and agencies in order to notify the public that an environmental assessment is being completed for this project. The newsletter provided the project history, current conditions at the site, a project description, a description of the NEPA process, and a description of the public scoping period. The public had the opportunity to comment on the proposed project for a total of 32 days (June 12, 2010 through July 14, 2010) using the NPS Planning, Environment, and Public Comment (PEPC) website. No comments were received on the newsletter. The newsletter and distribution list are included in Appendix B.

This EA will be distributed to agencies for public and agency review and comment for a period of at least 30 days; comments received will be addressed in an errata sheet to be attached to the Finding of No Significant Impact (FONSI), assuming there are no issues that may lead to significant impacts from the Preferred Alternative. Following the completion of the EA and response to comments, the FONSI will be signed and dated by the NPS Regional Director.

7.2 AGENCY AND STAKEHOLDER CONSULTATION

A consultation letter was mailed to local and federal agencies on August 3, 2010 requesting consultation and comments regarding the proposed project at the park. A list of agencies and stakeholders that received the consultation letter and a copy of the consultation letter can be found in Appendix A. Responses were received from the USFWS, Louisiana DNR, and LADOTD. Copies of the agency responses are included in Appendix A.

7.2.1 Endangered Species Act (ESA) Section 7 Consultation

In accordance with the federal and state requirements for special status species, a consultation letter was mailed to the USFWS Lafayette Ecological Services Field Office in Lafayette, and the Louisiana DNR. Information about the proposed project was included in the consultation letter. A response was received from the USFWS indicating that the proposed project would have no effect on special status species. The Louisiana DNR response did not indicate the presence of the listed species within the project site. Consultation and responses can be found in Appendix A.

In addition, the Alabama Natural Heritage Program conducted a botanical survey on July 29, 2009 for plants of conservation importance along the west bank of the Cane River Lake falling within the jurisdictional boundary of the Oakland Plantation. No plants of special importance were identified on the property during the survey (Appendix A).

7.2.2 Section 106 of the National Historic Preservation Act Consultation

Agency consultation was conducted with the State Historic Preservation Office (SHPO) to comply with Section 106 of the NHPA. Section 106 of the NHPA (36 CFR, Part 800) requires federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. If the Preferred Alternative meets the criteria for an "undertaking" or has the potential to cause effects to historic properties, consultation with the Louisiana SHPO is required. The SHPO stated that the bank stabilization project is immediately adjacent to archaeological site 16NA552, Oakland Plantation, which is listed on the NRHP. Due to the project's location, the SHPO recommends that a professional archaeologist monitor all ground disturbing activities associated with the project (Appendix A).

8.0 LIST OF PREPARERS

U.S. Department of the Interior, National Park Service

Steven Wright, NPS Southeast Regional Office, Project Manager
Laura Gates, Superintendent of Cane River Creole National Historical Park
Eric Ford, Facility Manager of Cane River Creole National Historical Park
Dustin Fuqua – Cultural Resource Specialist of Cane River Creole National Historical Park

EA Engineering, Science, and Technology

Suzanne Boltz, Project Manager
Kathryn Cerny-Chipman, Environmental Scientist
Sarah Koser, Environmental Scientist
Adam Kumm, Environmental Scientist
Jeannette Matkowski, Environmental Scientist

New South Associates

Joe Joseph, Ph.D, RPA, Principal Investigator
Diana Valk, Principal Investigator

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APPENDIX A

Agency Consultation

Consultation Letter

IN REPLY REFER TO:

United States Department of the Interior

National Park Service
Cane River Creole
National Historical Park
400 Rapides Drive
Natchitoches, Louisiana 71457

August 3, 2010

Ms. Brandi Bradford
U.S. Army Corps of Engineers
Red River Louisiana Field Office
106 Tauzin Island Road
Natchitoches, LA 71457

Dear Ms. Bradford:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality NEPA regulations (40 Code of Federal Regulations 1500 to 1508), and the National Park Service (NPS) NEPA compliance guidelines (Director's Order-12), the NPS is preparing an Environmental Assessment (EA) for the proposed emergency stabilization and erosion control of Cane River Lake at Cane River Creole National Historical Park (NHP), Natchitoches Parish, Louisiana.

The Cane River Creole NHP is located in northwestern Louisiana, approximately 150 miles northwest of Baton Rouge and 70 miles southeast of Shreveport within the Natchitoches Parish, Louisiana (Figure 1). The park consists of two units, the Oakland Plantation and the Magnolia Plantation, totaling 63 acres. The Oakland Plantation is approximately 44 acres and is located on Cane River Lake ten miles south of Natchitoches (Figure 1). The Magnolia Plantation is approximately 19 acres and is located 10 miles south of the Oakland Plantation (Figure 1). The plantations provide a center for the interpretation of both the story of plantation life and the history of the Cane River region.

In October 2007, two severe storms, producing approximately 17 inches of rain within 36 hours, resulted in a major washout and several other smaller washouts along the Cane River Lake bank and roadside swale. The eroded bank runs parallel with a thin strip of land owned by the Cane River Creole NHP (Figure 2). Located between State Highway 494/119 and the Cane River Lake, the land is east of the Oakland Plantation Main House. Despite some remedial maintenance effort by park staff, the erosion still persists. If the erosion continues without treatment, it will threaten existing utilities, trees, vegetation, and the adjacent State Highway.

The NPS is proposing to reconstruct and stabilize the eroded shoreline. A site assessment of the affected area was performed in September 2009. A total of four conceptual design alternatives are being proposed for the stabilization of the shoreline and will be analyzed in an EA. The design alternatives proposed would stop the erosion from progressing beyond its current state; would stabilize the remaining lake side bank and toe; and would restore the natural visual characteristics of the existing lake bank and preserve the cultural landscape. Each alternative involves the removal of vegetation currently existing along the lake bank (most of which is non-native), restoration of the bank slope, and installation of a stabilization material along the toe of the bank. All of the alternatives

construction of a drainage outfall chute. A construction staging area would be located on the Oakland Plantation. Following construction, the NPS would restore the natural look and native vegetation of the area by replanting with native shrubs, grasses, and small trees.

Please identify any resources within your purview that may experience potential impacts from the proposed project. Please provide any comments or information within 30 days of receipt of this letter. Send responses to:

Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Sincerely,

Laura Gates
Superintendent
Cane River Creole National Historical Park

Enclosures:
Enclosure 1. Agency Distribution List
Figure 1. Location Map of Park
Figure 2. Location of Project Area

Agency Consultation Distribution List

Louisiana Department of Transportation & Development
Nick Verret
3300 S. MacArthur Dr.
Alexandria, LA 71301-2955

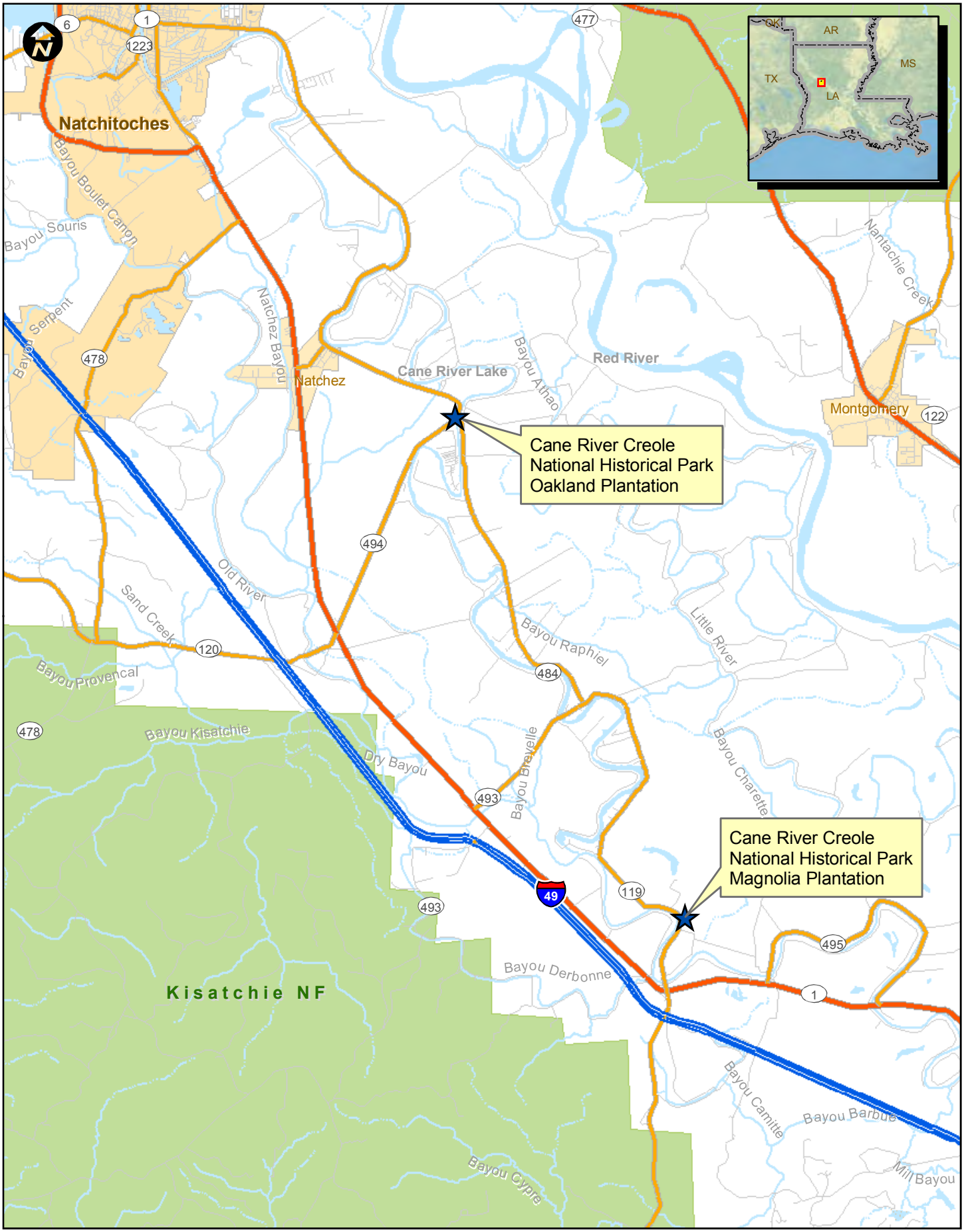
Cane River Waterway Commission
Betty Fuller
244 Cedar Bend Road
Cane River (Bermuda), LA 71469

Louisiana Department of Natural Resources
Gary Snellgrove
617 N. 3rd St.
Baton Rouge, LA 70804

Louisiana Division of Archeology/Louisiana Office of Historic Preservation
Department of Culture, Recreation, and Tourism
Phil Boggan
P.O. Box 44247
Baton Rouge, LA 70804

U.S. Army Corps of Engineers
Red River LA Field Office
Brandi Bradford
106 Tauzin Island Road
Natchitoches, LA 71457

U.S. Fish and Wildlife Service
Lafayette Ecological Services Field Office
Jim Boggs
646 Cajundome Boulevard Suite 400
Lafayette, LA 70506



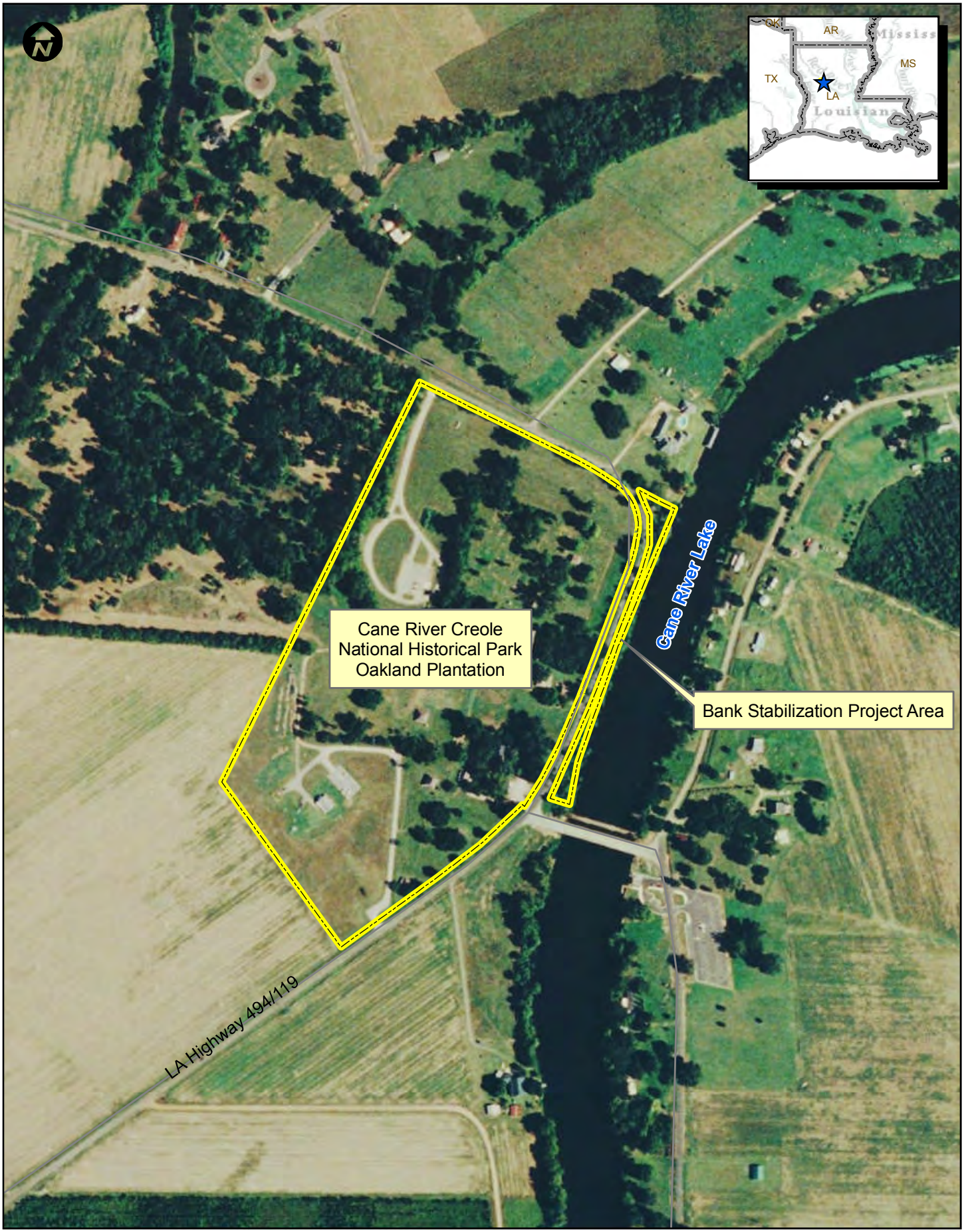
0 2 4

Miles

1 inch = 2 miles

Figure 1
General Location of
Cane River Creole National Historical Park
Natchitoches, Louisiana

Source: ArcGIS Online Map Service
Projection: NAD 83 UTM Zone 15N
Date: July 21, 2010



0 500 1,000

Feet

1 inch = 0.09 miles

Figure 2
Location of Bank Stabilization Project

Natchitoches, Louisiana

Source: ArcGIS Online Map Service
Projection: NAD 83 UTM Zone 15N
Date: July 21, 2010

Agency Responses

ALABAMA NATURAL HERITAGE PROGRAM

1090 South Donahue Drive, Auburn University, AL 36849
TEL: 334 844-5019, FAX: 334 844-4462, E-MAIL: ars0002@auburn.edu

August 7, 2009

Dear Laura,

At the request of the National Park Service I conducted a botanical survey on July 29, 2009, for plants of conservation importance along the west bank of Cane River Lake falling within the jurisdictional boundary of the Oakland Plantation. No plants of conservation importance, in accordance with the United States Fish and Wildlife Service and the Louisiana Natural Heritage Program, were found on this section of the property during the survey.

If you have any questions, please feel free to contact me at your earliest convenience.

Best wishes,
Al Schotz

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P.O. Box 94245
Baton Rouge, Louisiana 70804-9245
www.dotd.la.gov
Phone (318) 561-5101 Fax (318) 561-5114

BOBBY JINDAL
GOVERNOR

SHERRI H. LEBAS, P.E.
SECRETARY

August 23, 2010

Ms. Laura Gates
Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Subject: Proposed Cane River Lake Bank Stabilization

Dear Ms. Gates:

I received your August 3 letter relative to the proposal bank stabilization work to be undertaken by the National Park Service, and am referring this matter to Mr. Jonathan Lachney, Area Engineer, for his review and comments. You should hear back from him within the next several days.

Thank you for allowing us the opportunity to review your proposal.

Sincerely,

Nicholas F. Verret, Jr., P.E.
District Engineer Administrator

Cc: Mr. Jonathan Lachney

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P.O. Box 5945
Alexandria, Louisiana 71307
www.dotd.la.gov
(318) 561-5109

BOBBY JINDAL
GOVERNOR

SHERRI H. LEBAS, P.E.
SECRETARY

August 25, 2010

RECEIVED
AUG 26 2010

Ms. Laura Gates
Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

RE: Environmental Assessment Study for Project at Oakland Plantation

Dear Ms. Gates,

Your letter of inquiry regarding potential impacts to LADOTD as a result of the proposed bank stabilization project at Oakland Plantation has been forwarded to me for review. It is understood that it may be necessary to enter LADOTD right-of-way along LA 119 to perform work associated with the stabilization project. Within the LADOTD right-of-way is located a two-lane asphalt surfaced state highway (LA 119) with drainage facilities that include roadside ditches and cross drain culverts. There are also permitted public utilities within the right-of-way of which you will need to verify ownership.

As discussed in previous meetings, it is requested by LADOTD that a project permit be applied for to perform any work within LADOTD right-of-way. Details of the proposed work including traffic control will need to be attached to the permit. For assistance with the permit application process you may contact Mr. Rick Cozby at (318) 561-5129. You may deal directly with utility owners within LADOTD right-of-way.

Thank you for the courtesy and consideration you have shown to LADOTD throughout this process. If you need any further assistance or would like a primary contact, you may reach me at the above address or phone number.

Sincerely,

Jonathan L. Lachney
Area Engineer

CC:
Mr. Nicholas Verret
Mr. Robert Mays
Mr. Rick Cozby
Mr. Paul Hammond

United States Department of the Interior

National Park Service
Cane River Creole
National Historical Park
400 Rapides Drive
Natchitoches, Louisiana 71457

August 3, 2010

Mr. Jim Boggs
U.S. Fish and Wildlife Service
Lafayette Ecological Services Field Office
646 Cajundome Boulevard Suite 400
Lafayette, LA 70506

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
X Will have no effect on those resources
( ) Is not likely to adversely affect those resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

Debra A. Hulla Ag 30 2010
Acting Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service
Date

Dear Mr. Boggs:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality NEPA regulations (40 Code of Federal Regulations 1500 to 1508), and the National Park Service (NPS) NEPA compliance guidelines (Director's Order-12), the NPS is preparing an Environmental Assessment (EA) for the proposed emergency stabilization and erosion control of Cane River Lake at Cane River Creole National Historical Park (NHP), Natchitoches Parish, Louisiana.

The Cane River Creole NHP is located in northwestern Louisiana, approximately 150 miles northwest of Baton Rouge and 70 miles southeast of Shreveport within the Natchitoches Parish, Louisiana (Figure 1). The park consists of two units, the Oakland Plantation and the Magnolia Plantation, totaling 63 acres. The Oakland Plantation is approximately 44 acres and is located on Cane River Lake ten miles south of Natchitoches (Figure 1). The Magnolia Plantation is approximately 19 acres and is located 10 miles south of the Oakland Plantation (Figure 1). The plantations provide a center for the interpretation of both the story of plantation life and the history of the Cane River region.

In October 2007, two severe storms, producing approximately 17 inches of rain within 36 hours, resulted in a major washout and several other smaller washouts along the Cane River Lake bank and roadside swale. The eroded bank runs parallel with a thin strip of land owned by the Cane River Creole NHP (Figure 2). Located between State Highway 494/119 and the Cane River Lake, the land is east of the Oakland Plantation Main House. Despite some remedial maintenance effort by park staff, the erosion still persists. If the erosion continues without treatment, it will threaten existing utilities, trees, vegetation, and the adjacent State Highway.

The NPS is proposing to reconstruct and stabilize the eroded shoreline. A site assessment of the affected area was performed in September 2009. A total of four conceptual design alternatives are being proposed for the stabilization of the shoreline and will be analyzed in an EA. The design alternatives proposed would stop the erosion from progressing beyond its current state; would stabilize the remaining lake side bank and toe; and would restore the natural visual characteristics of the existing lake bank and preserve the cultural landscape. Each alternative involves the removal of vegetation currently existing along the lake bank (most of which is non-native), restoration of the bank slope, and installation of a stabilization material along the toe of the bank. All of the alternatives

construction of a drainage outfall chute. A construction staging area would be located on the Oakland Plantation. Following construction, the NPS would restore the natural look and native vegetation of the area by replanting with native shrubs, grasses, and small trees.

Please identify any resources within your purview that may experience potential impacts from the proposed project. Please provide any comments or information within 30 days of receipt of this letter. Send responses to:

Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Sincerely,

Laura Gates

Laura Gates
Superintendent
Cane River Creole National Historical Park

Enclosures:
Enclosure 1. Agency Distribution List
Figure 1. Location Map of Park
Figure 2. Location of Project Area

BOBBY JINDAL
GOVERNOR

State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CONSERVATION

ROBERT D. HARPER
SECRETARY
JAMES H. WELSH
COMMISSIONER OF CONSERVATION

September 1, 2010

TO: Ms. Laura Gates, Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, Louisiana 71457

RE: Solicitation of Views
U. S. Department of the Interior
National Park Service (NPS)
Environmental Assessment (EA)
Proposed Emergency Stabilization and Erosion Control of
Cane River Lake at Cane River Creole National Historical Park (NHP)
Natchitoches Parish, Louisiana

Dear Ms. Gates:

In response to your letter dated August 3, 2010, concerning the referenced matter, please be advised that the Office of Conservation collects and maintains many types of information regarding oil and gas exploration, production, distribution, and other data relative to the petroleum industry as well as related and non-related injection well information, surface mining and ground water information and other natural resource related data. Most information concerning oil, gas and injection wells for any given area of the state, including the subject area of your letter can be obtained through records search via the SONRIS data access application available at:

http://www.dnr.state.la.us/CONS/Conserv.ssi

A review of our computer records for the referenced project area indicates no oil, gas or injection wells located within or adjacent to the project area. Additionally, the LADOTD database indicates that there are no registered water wells in the immediate vicinity of the project area. Please note that unregistered water wells may be located in the area.

The Office of Conservation maintains records of all activities within its jurisdiction in paper, microfilm or electronic format. These records may be accessed during normal business hours, Monday through Friday, except on State holidays or emergencies that require the Office to be closed. Please call 225-342-5540 for specific contact information or for directions to the Office of Conservation, located in the LaSalle Building, 617 North Third Street, Baton Rouge, Louisiana. For pipelines and other underground hazards, please contact Louisiana One Call at 1-800-272-3020 prior to commencing operations. Should you need to direct your inquiry to any of our Divisions, you may use the following contact information:

Division	Contact	Phone No.	E-mail Address
Engineering	Jeff Wells	225-342-5638	jeff.wells@la.gov
Pipeline	Steven Giambrone	225-342-2989	steven.giambrone@la.gov
Injection & Mining	Laurence Bland	225-342-5515	laurence.bland@la.gov
Geological	Mike Kline	225-342-3335	mike.kline@la.gov
Environmental	Tony Duplechin	225-342-5528	tony.duplechin@la.gov

If you have difficulty in accessing the data via the referenced website because of computer related issues, you may obtain assistance from our technical support section by selecting Help on the SONRIS tool bar and submitting an email describing your problems and including a telephone number where you may be reached.

Sincerely,

James H. Welsh
Commissioner of Conservation

JHW:MBK

SCOTT A. ANGELLE
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

PAM BREAUX
SECRETARY

September 14, 2010

Ms. Laura Gates
Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Re: Proposed Emergency Stabilization and Erosion Control
Cane River Lake at Cane River Creole NHP
Natchitoches Parish, Louisiana

Dear Ms. Gates:

This is in response to your letter received in our office on August 17, 2010, regarding the above-referenced project. Our office has reviewed the project information and has the following comments to offer. The bank stabilization project area is immediately adjacent to archaeological site 16NA552, Oakland Plantation, which is listed on the National Register of Historic Places. Due to the project's location, our office would recommend that a professional archaeologist monitor all ground disturbing activities.

If you have any questions concerning these comments, please contact Rachel Watson in the Division of Archaeology at (225) 342-8165.

Sincerely,

Phil Boggan
Deputy State Historic Preservation Officer

PB:RW:kf

APPENDIX B

Public Involvement

Public Distribution List

Cane River National Heritage Area Commission
Director Cynthia Sutton
P.O. Box 1201
Natchitoches, LA 71458

Natchitoches Historic Foundation
550 Second Street
Natchitoches, LA 71457

Betty Fuller
1679 LA Highway 493
Natchitoches, LA 71457

City of Natchitoches
Mayor Wayne McCullen
P.O. Box 37
Natchitoches, LA 71458

Louisiana Creole Heritage Center
Northwestern State University of Louisiana
School of Social Sciences
Natchitoches, LA 71497

LA Department of Transportation & Development
Nick Verret
P.O. Box 3300
Alexandria, LA 71307-5945

LA Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

LA Department of Environmental Quality
402 Rainbow Drive
Alexandria, LA 71360

LA Department of Natural Resources
P.O. Box 94396
Baton Rouge, LA 70804-9396

LA Division of Archaeology
Department of Culture, Recreation, & Tourism
Dr. Charles Chip McGimsey, LA State Archaeologist
P.O. Box 44247
Baton Rouge, LA 70804

Association for Preservation of Historic Natchitoches
310 Jefferson Street
Natchitoches, LA 71457

Cane River Waterway Commission
244 Cedar Bend Road
Cane River (Bermuda), LA 71469

Natchitoches Parish Police Jury
Corrine Jones
Administration/Planning/Economic Development
200 Church Street
Natchitoches, LA 71457

St. Augustine Historical Society
c/o St. Augustine Catholic Church
2262 LA Highway 484
Natchez, LA 71456

Twin Valley Resources Conservation & Development NRCS
Bennie Dobson
428 Dixie Plaza
Natchitoches, LA 71457

LA Department of Transportation & Development
Jonathan Lachney
P.O. Box 3300
Alexandria, LA 71307-5945

LA Department of Environmental Quality
Office of Environmental Compliance
P.O. Box 4312
Baton Rouge, LA 70821-4312

LA DEQ Northwest Regional Office
Regional Manager Otis Randle
1525 Fairfield Room 520
Shreveport, LA 71101-4388

LA Office of Historic Preservation
Scott Hutchinson, State Historic Preservation Officer
Capitol Annex Building
1051 North Third Street
Baton Rouge, LA 70802

LA Northwest Regional Archaeology Program
Dr. Jeff Girard, Northwest LA Region Archaeologist
Northwestern State University of LA
Natchitoches, LA 71497

Northwestern State University of Louisiana
Office of the President
President Randall Webb
102 A.A. Fredericks Annex
Natchitoches, LA 71497

Northwestern State University of Louisiana
Williamson Museum
Dr. Pete Gregory
Natchitoches, LA 71497

Northwestern State University of Louisiana
Heritage Resources Program
Dr. Julie Ernstein
Natchitoches, LA 71497

Mr. & Mrs. Ted Duggan
4463 LA Highway 494
Natchez (Bermuda), LA 71456

Mr. Kenneth Prud'homme
646 Fish Hatchery Road
Natchitoches, LA 71457

Denise Poleman 1543
Salter Lane
Natchitoches, LA 71457

Dr. & Mrs. Michael Vienne
1843 Bermuda Road
Natchez (Bermuda), LA 71469

Mary Metoyer
14799 LA Highway 1
Cloutierville, LA 71416

Tim Brown
118 Rose Hill Plantation Road
Natchez, LA 71456

HNTB Federal
Bobby Aboesono
9100 Bluebonnet Centre Boulevard Suite 301
Baton Rouge, LA 70809

Northwestern State University of Louisiana
Cultural Resource Office
School of Social Sciences
Dr. Tommy Hailey
Natchitoches, LA 71497

Northwestern State University of Louisiana
Heritage Resources Program
Dr. ElizaBeth Guin
Natchitoches, LA 71497

Northwestern State University of Louisiana
Heritage Resources Program
Dr. Dean Sinclair
Natchitoches, LA 71497

Mr. & Mrs. Greg Duggan
188 Cedar Bend Road
Cane River (Bermuda), LA 71469

Mr. & Mrs. Mayo Prud'homme
9728 Peach Orchard Road
Bastrop, LA 71220

Mrs. Doris Brett Vincent
1015 Chandelle Lake Drive
Pensacola, FL 32507

Point Place Marina
Robert Walker
1209 Patrick Road
Natchitoches, LA 71457

Mr.James Helaire
c/o General Delivery
Natchez, LA 71456

Auburn University
Dr. Alfred Schotz
1090 Donahue Drive
Auburn, AL 36849-543 1

Nowlin & Associates, Inc.
740 Front Street
Natchitoches, LA 71457

Jean Lafitte National Historical Park & Preserve
Superintendent Carol Clark
419 Rue Decatur
New Orleans, LA 70130

US Army Corps of Engineers
Red River LA Field Office
Brandi Bradford
106 Tauzin Island Road
Natchitoches, LA 71457

US Fish & Wildlife Service
Lafayette Ecological Services Field Office
646 Cajundome Boulevard Suite 400
Lafayette, LA 70506

NPS Southeast Archaeological Center
Director Dr. David Morgan
2035 East Paul Dirac Drive
Johnson Building Suite 120
Tallahassee, FL 32310

US Senator Mary Landrieu
Capital One Tower
One Lakeshore Drive Suite 1260
Lake Charles, LA 70629

US Representative John Fleming
6425 Youree Drive Suite 350
Shreveport, LA 71105

LA Senator Gerald Long
P.O. Box 151
Winnfield, LA 71483

Natchitoches National Fish Hatchery
Karen Kilpatrick
615 South Drive
Natchitoches, LA 71457

US Fish & Wildlife Service
George Chandler, North Louisiana Refuges Manager
11372 Highway 143
Farmerville, LA 71241

US Forest Service
Kisatchie National Forest
District Ranger Mike Dawson
229 Dogwood Park Road
Provencal, LA 71468

National Center for Preservation Training & Technology
Director Kirk Cordell
645 University Parkway
Natchitoches, LA 71457

US Senator David Vitter
Northwest Louisiana
920 Pierremont Suite 113
Shreveport, LA 71106

LA Representative Rick Nowlin
816 University Parkway Suite C
Natchitoches, LA 71457

LA Governor Bobby Jindal
P.O. Box 94004
Baton Rouge, LA 70804-9004

Public Newsletter

Cane River Creole National Historical Park
Natchitoches Parish, Louisiana
Newsletter 1
June 2010

National Park Service
U.S. Department of the Interior

Scoping Newsletter

Environmental Assessment for the Proposed Emergency Stabilization/ Erosion Control of Cane River Lake at Oakland Plantation

History and Background

Cane River Creole National Historical Park (NHP) was established in November 1994 to commemorate the long and complex history of the early European exploration and settlement of the Red River Valley in northwestern Louisiana during the early 18th century. It was also established to recognize the interactions among the French, Spanish, African, and Indian peoples and the subsequent development and evolution of Creole culture and plantation life along Cane River up to the mid 20th century.

The first European settlement in the region occurred in 1713-1714, when St. Denis, a French explorer, established Fort St. Jean Baptiste in what is now the city of Natchitoches, making it the oldest permanent European settlement in Louisiana. The area flourished. Commercial agriculture centered around indigo and some tobacco production replaced the early frontier trading economy. It was during this time that farmers adopted the plantation system, relying heavily on slavery as a means for expansion and growth. Gradually transitioning into a cotton economy, the plantations prospered throughout the 18th and 19th centuries and well into the 20th century.

Oakland Plantation is one of two plantations within the National Park. It provides a center for the interpretation of both its own story and the history of the Cane River region. Oakland Plantation was owned and operated by the French Creole Prud'homme family for nine generations. The park property includes the core of a French Creole plantation started by Jean Pierre Emanuel Prud'homme and his family. The vernacular structures, most of which were built by enslaved workers, include the main house (1818-1821), an overseer's house, quarters occupied by enslaved workers and later sharecroppers and tenant farmers, and outbuildings including barns and grain storage buildings, a cotton seed house, chicken houses, a plantation store, wash house and a wagon shed. Many of these Creole buildings have roots in African and medieval French building traditions that have been adapted to climate, and locally available building materials and technologies.


The Main House at Oakland Plantation was home to the Prud'homme family for over two centuries.

Oakland Plantation, originally known as Bermuda Plantation, was a large-scale cotton plantation, and like similar sizeable plantations it garnered wealth through an agricultural system based on slavery. By 1840 nearly 150 enslaved workers lived their lives on the plantation as did the families of the owner and overseers. All were affected by the Civil War when both Union and Confederate forces ravaged the Cane River countryside during the Red River Campaign. Life changed for all of Oakland's residents following the war when the value of cotton dwindled and a freed labor force changed the way in which plantations operated.

Despite these changes, the plantation continued to evolve both as an agricultural operation and a community. By 1874, the plantation store became the center of plantation social and economic life. By agreement, sharecroppers and tenant farmers working Oakland Plantation land were required to do business with the plantation store, which extended them credit, bought their crops, and sold them seed, agricultural implements and other needed supplies. The plantation community persisted through low cotton prices, boll weevil infestations, and even the Great Depression. However, the increasing application of mechanized farming brought an end to the plantation after nearly two centuries.

Project Background

In October 2007, two severe storms, producing upwards of seventeen inches of rain in thirty-six hours, resulted in a major washout and several other smaller washouts along the Cane River Lake bank and roadside swale. The eroded bank runs parallel with a thin strip of land owned by the Cane River Creole NHP. Located between State Highway LA 494/119 and the Cane River Lake, the land is east of the Oakland Plantation Main House. Despite some remedial maintenance effort by park staff, the erosion still persists. If the erosion continues without treatment, it will threaten existing utilities, trees, vegetation, and the adjacent State Highway.

Damage caused by the storms in 2007.

Old Bermuda bridge crossing Cane River Lake.

Erosion along the affected area.

Proposed Action

The NPS is proposing to reconstruct and stabilize the eroded shoreline. A site assessment of the affected area was performed in September 2009. A total of four conceptual design alternatives are being proposed for the stabilization of the shoreline and will be analyzed in an Environmental Assessment. The design alternatives proposed would stop the erosion from progressing beyond its current state; would stabilize the remaining lake side bank and toe; and would restore the natural visual characteristics of the existing lake bank and preserve the cultural landscape. Each alternative involves the removal of vegetation currently existing along the lake bank (most of which is non-native), restoration of the bank slope, and installation of a stabilization material along the toe of the bank. All of the alternatives would require some minor earthwork activities within the State Highway LA 494/119 right-of-way and construction of a drainage outfall chute. A construction staging area would be located on the Oakland Plantation. Following construction, the NPS would restore the natural look and native vegetation of the area by replanting with native shrubs, grasses, and small trees.

As a means of erosion control and prevention, vegetation would be removed from the affected area, stabilization material installed, and the river bank replanted with native species.

Metoyer family members on the gallerie of the overseer's house.

Catch of the day.

Historic photographs from Oakland Plantation courtesy of the Prud'homme and Metoyer families.

Prud'homme's store, Oakland Plantation

A man sits on a diving board overhanging the Cane River Lake.

A skiff floating along the banks of Cane River Lake.

Cleaning fish after a day of fishing.

NEPA Process

The NPS must follow the National Environmental Policy Act (NEPA) of 1969 to ensure consideration of important environmental issues. The construction of an emergency stabilization and erosion control mechanism along the bank of the Cane River Lake adjacent to the Cane River Creole NHP will be analyzed during the NEPA process.

The environmental effects resulting from the proposed shoreline stabilization will be evaluated in an Environmental Assessment. The analysis will consider impacts to topics such as wildlife habitat, vegetation, special status species, water resources, air quality, socioeconomics, cultural resources, soils, park visitor use and experience, and public health and safety.

The document will analyze both short-term and long-term, as well as, cumulative effects of the proposed shoreline stabilization (action alternatives), along with the "no action alternative." By comparing the proposed action alternatives with the no action alternative, and identifying mitigation measures that would minimize adverse effects, the Environmental Assessment will assist stakeholders in the decision-making process.

National Park Service
U.S. Department of the Interior

Cane River Creole National Historical Park preserves the resources and cultural landscapes of the Cane River region and enhances the understanding of its peoples and traditions.

Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Phone
Park Headquarters
318-352-0383

Visitor Information
318-356-8441

Email
cari_information@nps.gov

Website
www.nps.gov/cari

The National Park Service cares for special places saved by the American People so that all may experience our heritage.

Public Scoping Period

As part of the NEPA process, the proposed project will be evaluated in an Environmental Assessment, which will analyze the potential environmental effects of the proposed alternatives. At this time, the Superintendent is announcing a 30-day public scoping period to solicit public comments on the proposed shoreline stabilization project. During this period, the public is invited to identify any issues or concerns they might have with the proposed project so that the NPS can appropriately consider them in the Environmental Assessment. You may submit your comments electronically at the NPS's Planning, Environment, and Public Comment website (http://parkplanning.nps.gov). If you are unable to access this website, please submit written comments to:

Superintendent
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Please submit comments by July 14, 2010. Once the Environmental Assessment is developed, it will be made available for public review for a 30-day period. If you wish to be added to the park's mailing list, please be sure to indicate that in your response.

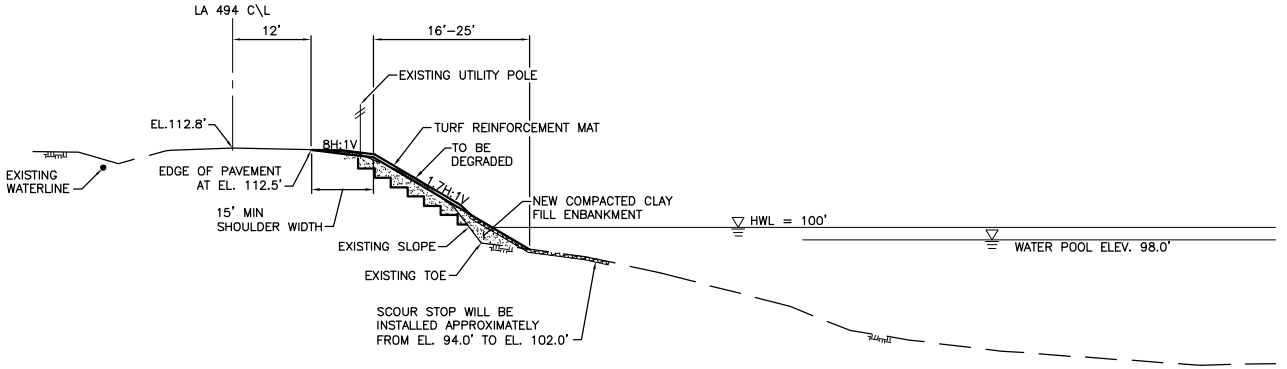
It is NPS practice to make all comments, including names and addresses of respondents who provide that information, available for public review. Individuals may request that the NPS withhold their name and/or address from public disclosure. If you wish to do this, correspondents using the website can make such a request by checking the box "keep my contact information private". If submitting written comments please state this request at the beginning of your comment. The NPS will honor such requests to the extent allowable by law.

United States Department of the Interior
National Park Service
Cane River Creole National Historical Park
400 Rapides Drive
Natchitoches, LA 71457

Fall fog on Oakland Plantation.

APPENDIX C

Cross Sectional Profiles



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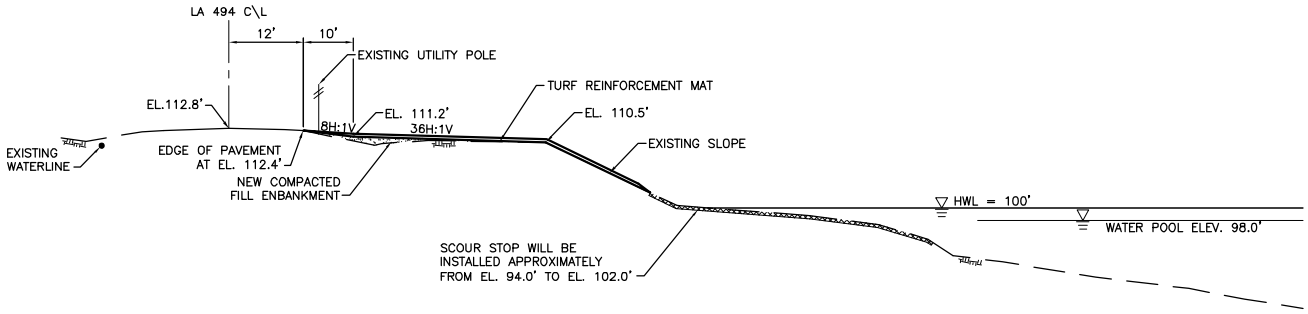
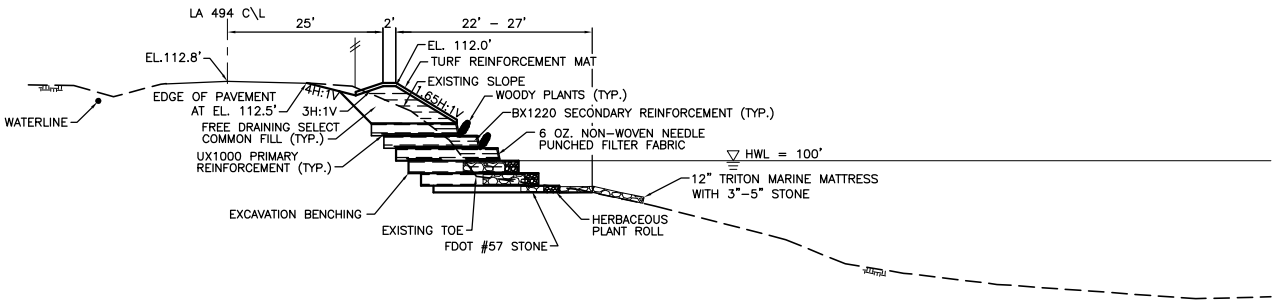


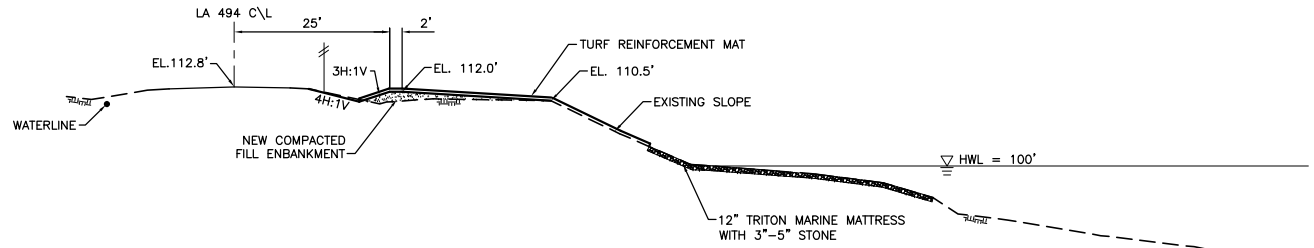
TYPICAL SECTION 2
STA. 27+60 TO STA. 29+50

ALTERNATIVE 1

DESIGNED: B.S.D. / CADD: A.J. LOVE / TECH. REVIEW: B.A. / DATE: 07/02/2010	SUB SHEET NO. C13	TITLE OF SHEET: TYPICAL SECTIONS ALTERNATIVE 1 — CANE RIVER CREOLE N.H.P. NATCHITOCHES, LOUISIANA	DRAWING NO. ——— / PMIS/PKG NO. 154979 / SHEET ____ OF ____



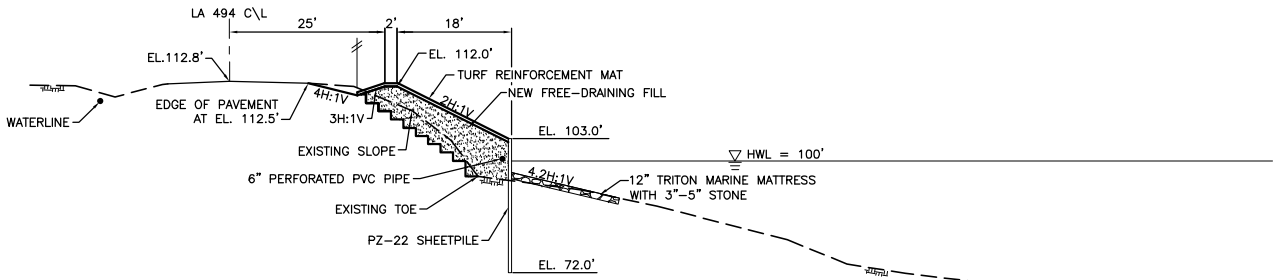
TYPICAL SECTION 1
STA. 18+50 TO STA. 27+60



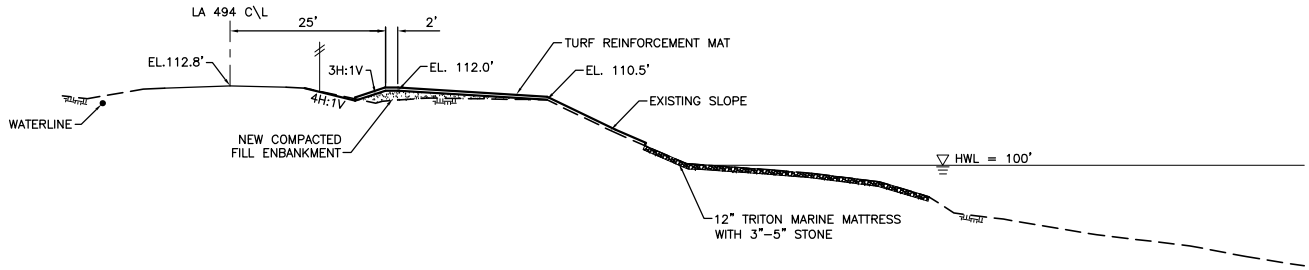
TYPICAL SECTION 2
STA. 27+60 TO STA. 29+50

ALTERNATIVE 2

DESIGNED: GMED A.J. LOVE TECH. REVIEW: DATE:	SUB SHEET NO. C10	TITLE OF SHEET TYPICAL SECTIONS ALTERNATIVE 2 CANE RIVER LAKE N.H.P. NATCHITOCHES PARISH, LOUISIANA	DRAWING NO. PMIS/PKG NO. 154979 SHEET ___ OF ___



TYPICAL SECTION 1
STA. 18+50 TO STA. 27+60



TYPICAL SECTION 2
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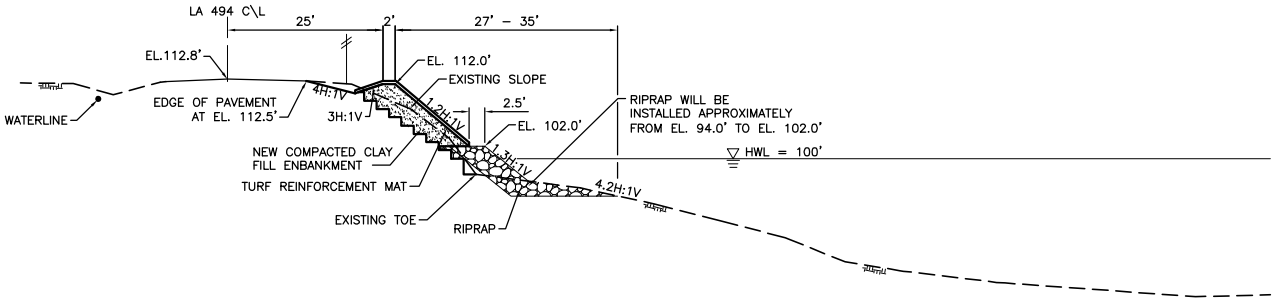
ALTERNATIVE 3

DESIGNED: A.J. LOVE TECH. REVIEW: DATE:	SUB SHEET NO. C11	TITLE OF SHEET TYPICAL SECTIONS ALTERNATIVE 3 CANE RIVER LAKE N.H.P. NATCHITOCHES PARISH, LOUISIANA	DRAWING NO. PMIS/PKG NO. 154979 SHEET ___ OF ___



TYPICAL SECTION 1
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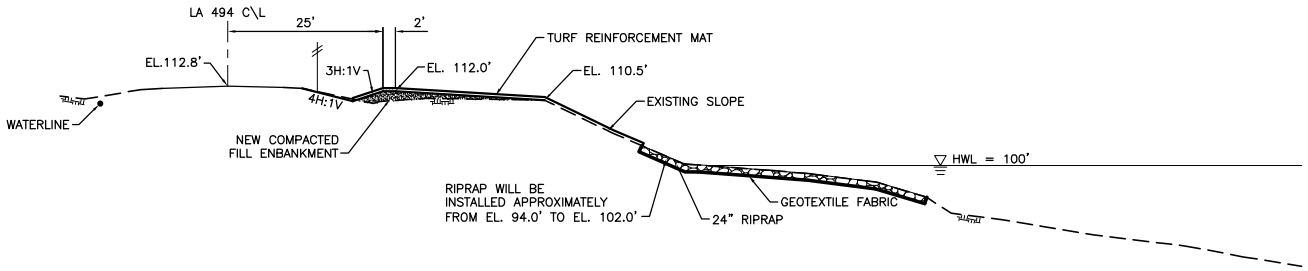

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ALTERNATIVE 4

DESIGNED: A.J. LOVE TECH. REVIEW: DATE:	SUB SHEET NO. C12	TITLE OF SHEET TYPICAL SECTIONS ALTERNATIVE 4 CANE RIVER LAKE N.H.P. NATCHITOCHES PARISH, LOUISIANA	DRAWING NO. PMIS/PKG NO. 154979 SHEET ___ OF ___

APPENDIX D

Statement of Findings: Wetlands and Floodplains

STATEMENT OF FINDINGS

FOR

EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

AND

EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT)

Cane River Creole National Historical Park
Emergency Stabilization / Erosion Control on the Bank of Cane River Lake

Oakland Plantation
Natchitoches Parish, Louisiana

Recommended: _____ _____
Superintendent, Date

Certification of
Technical Adequacy
and Servicewide Consistency: _____ _____
Chief, Water Resources Division Date

Approved: _____ _____
Regional Director Date

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STATEMENT OF FINDINGS
FOR
EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS) AND
EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT)

Cane River Creole National Historical Park
Emergency Stabilization / Erosion Control on the Bank of Cane River Lake

Oakland Plantation
Natchitoches Parish, Louisiana

1. INTRODUCTION

1.1 Wetlands

Executive Order 11990: *Protection of Wetlands*, issued 24 May 1977, directs all federal agencies to avoid to the maximum extent possible the long- and short-term adverse impacts associated with the occupancy, destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, parks must modify actions to preserve and enhance wetland values and minimize degradation.

To comply with E.O. 11990 within the context of the agency's mission, the National Park Service (NPS) has developed a set of policies and procedures found in *Director's Order #77-1: Wetland Protection* and *Procedural Manual #77-1: Wetland Protection*. These policies and procedures emphasize: 1) exploring all practical alternatives to building on, or otherwise adversely affecting, wetlands; 2) reducing impacts to wetlands whenever possible; and 3) providing direct compensation for any unavoidable wetland impacts by restoring degraded or destroyed wetlands on other NPS properties. If a Preferred Alternative will have adverse impacts on wetlands, a Statement of Findings (SOF) must be prepared that documents the above steps and presents the rationale for choosing an alternative that will have adverse impacts on wetlands.

1.2 Floodplains

Pursuant to Executive Order 11988 (Floodplain Management), and the NPS Director's Order #77-2: Floodplain Management, the NPS has evaluated flooding hazards related to a proposed banks stabilization project along the shoreline of the Cane Rive Lake along the Oakland Plantation (the "plantation") at Cane River Creole National Historical Park (the "park"). This SOF describes the Preferred Alternative, project site, floodplain determination, use of floodplain, investigation of alternatives, flood risks, and mitigation for the continued use of facilities within the floodplain.

2. PREFERRED ALTERNATIVE

The Preferred Alternative is described as bank stabilization of the bank of Cane River Lake along the plantation property. In addition to bank stabilization, proposed drainage improvements under the Preferred Alternative would include re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site. In order to maintain the natural aesthetic look of the project site and to provide adequate stabilization of the lake bank, a Turf Reinforcement Mat (TRM) system would be installed along the lake bank and along the channel of the chute. The TRM structure consists of three layers of polypropylene and a layer of coconut fibers. The mats along with the root reinforcement of seeded or planted vegetation, resist damage from wave energy and high velocity surface flows. The compacted clay fill would be placed at a slope of 1.7(H):1(V) on the face of the existing embankment. The embankment footprint would be extended approximately 5.6 feet into the lake. The face of the compacted clay fill would be lined with a TRM to prevent erosion of the fill material. The roadway shoulder would be sloped at 8(H):1(V) and the area between it and the top of the new lake bank would be graded to gradually slope down into the lake to allow for natural water flow into the lake. This would allow for natural drainage, rather than drainage through a lakeside ditch. The TRM can withstand high scour from water flow, and would therefore prevent erosion of the bank. A geosynthetic scour mat would be placed at the toe of the embankment to prevent erosion at the toe.

The site would need to be cleared of vegetation in preparation for the fill and installment of TRM. After the installation is complete, the area would be re-vegetated with appropriate native plant species. The proposed re-vegetation plan would include two planting techniques: hydro-seeding and container planting. Hydro-seeding would be utilized on the steep slopes. The first seed mix would be a slope stabilizing native grass mix sown into 12 inches of topsoil and below a turf reinforcement mat. Species that would be used include switch grass (*Panicum virgatum*), Indian grass (*Sorpghastrum nutans*). The second seed mix would include a wetland edge mix below the scour stop to the edge of the lake. Potential species include river cane (*Arundinaria gigantea*) and giant cutgrass (*Zizaniopsis miliacea*). Container plants would include three gallon shrubs on 12 inches of top soil, above the wetland edge mix. Potential species include common buttonbush (*Cephalanthus occidentalis*), swamp dogwood (*Cornus amomum*), American black elderberry (*Sambucus nigra spp. canadensis*.), and spicebush (*Lindera* sp.). Proper establishment of the native plants is essential to help anchor the soil and stabilize the lake bank. It is estimated that full vegetative cover can be reestablished in two years.

3. PROJECT SITE

The plantation includes 44 acres of land owned by NPS with an additional 144 acres within the park boundary under private ownership. The plantation borders the Cane River Lake, and is about 10 miles to the south of the Natchitoches Parish. The plantation is part of the Cane River Creole National Historical Park. The project area is a small strip of land along the bank of Cane River Lake on the property. The area of concern is approximately 1.01 (upland) acres, 1,190 feet long and varies in width (18 to 147 feet). It is bordered to the east by the Cane River Lake and to the west by a 50 feet wide right-of-way (ROW) of State Highway LA-494. LA-494 is a paved two-

lane state highway and is classified as a rural-collector. The posted speed limit along this roadway is 55 MPH. The south end of the project area is bordered by two bridges. The vegetation along the project area is mostly shrubs, bushes, and trees. Figure 1 shows the project area.

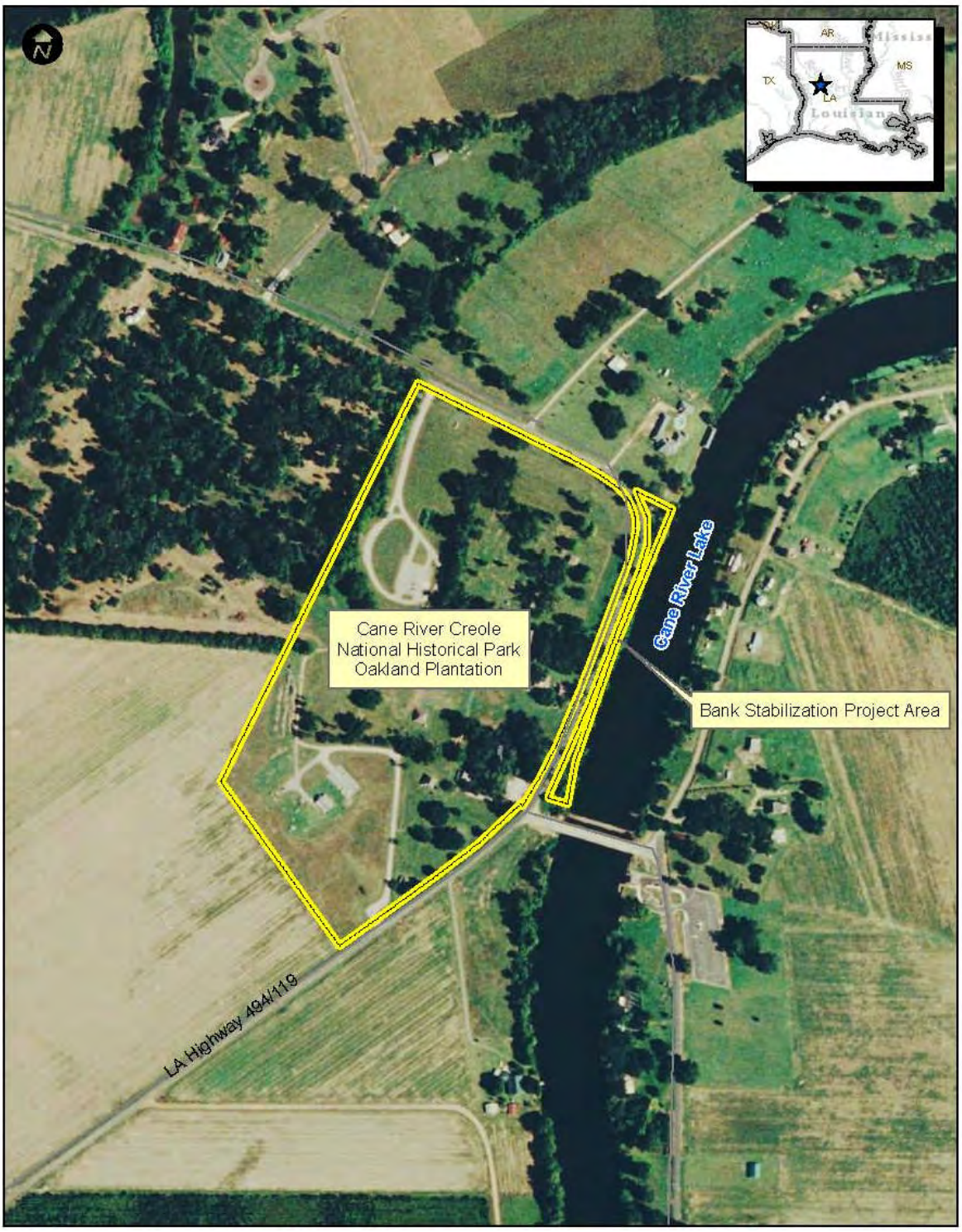


Figure 1. Cane River Lake Project Area

4. DESCRIPTION OF WETLANDS AND FLOODPLAINS WITHIN PROJECT AREA

4.1 Wetlands

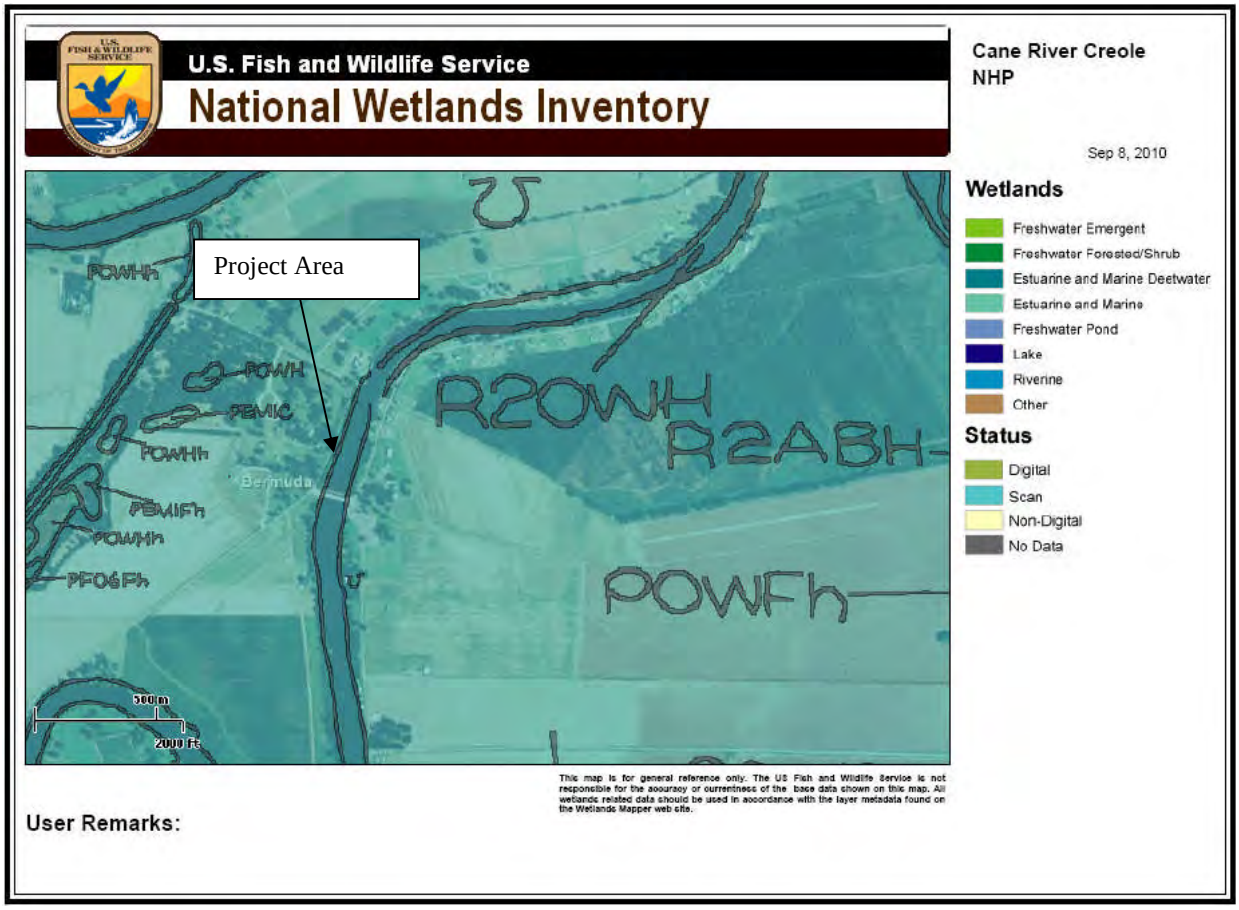
For the NPS, any area that is classified as a *wetland* according to the U.S. Fish and Wildlife Service's (USFWS) "Classification of Wetlands and Deepwater Habitats of the United States" (Report FWS/OBS-79/31); (Cowardin et al. 1979) is subject to NPS DO #77-1: *Wetland Protection*. (*Deepwater habitats* are not subject to DO #77-1.) Under the Cowardin definition, a wetland must have one or more of the following three attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation);
2. The substrate is predominantly undrained hydric soil; or
3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The Cowardin wetland definition encompasses more aquatic habitat types than the definition and delineation manual used by the Corps of Engineers for identifying wetlands subject to Section 404 of the Clean Water Act. The 1987 "Corps of Engineers Wetlands Delineation Manual" requires that *all three* of the parameters listed above (hydrophytic vegetation, hydric soil, wetland hydrology) be present in order for an area to be considered a wetland. The Cowardin wetland definition includes such wetlands, but also adds some areas that, though lacking vegetation and/or soils *due to natural physical or chemical factors* such as wave action or high salinity, are still saturated or shallow inundated environments that support aquatic life (e.g., unvegetated stream shallows, mudflats, rocky shores).

The National Wetlands Inventory (NWI) of the USFWS produces information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. The wetlands on the maps are based upon the Cowardin wetland definition and classification system (Cowardin 1979), so (subject to ground-truthing) they are considered wetlands by the NPS. Based on the NWI maps for the site, only Cane River Lake is mapped as a riverine, lower perennial, open water, permanently flooded wetland (R2OWH). Figure 2 presents a map of wetlands and deepwater habitats as mapped by NWI. The NWI map of the project area was ground-truthed during a wetland delineation conducted from 11-12 May 2010 by a wetland delineator (Sarah T. Koser) who has received a certificate of training from a recognized wetland delineation training provider and has over eight years of experience in wetland delineation. The wetland delineation of the site was performed via boat (due to deep waters beyond the shoreline of the site) and by foot; Ms. Betty Fuller of the Cane River Waterway Commission acted as captain of the boat. During the wetland delineation, it was determined that the in addition to the riverine wetland mapped at Cane River Lake, the shoreline of Cane River Lake supports a narrow, palustrine wetland. The palustrine wetland is described as an emergent with both persistent and non-persistent vegetation that is permanently flooded wetland (PEM1/2H). The upland/wetland boundary of the palustrine wetland was located along the water's edge due to existing steep slopes beyond the shoreline. The palustrine/riverine wetland boundary was located at the extent of the rooted vascular plants observed at the site. The riverine wetland continues from the rooted vascular plant boundary until deepwater habitat is reached at approximately 2m (6.6 ft). In summary, there are two types of

wetlands that were mapped for this site: a riverine and a palustrine wetland. Appendix A presents the photographic log of the wetland delineation.



Source: USFWS/NWI 2010.

Figure 2. National Wetland Inventory Wetlands at the Park

Because the project area is located in the State of Louisiana, which is considered the *Atlantic and Gulf Coast Plain* region by the USACE, the Regional Supplement to the 1987 USACE Delineation Manual (USACE 2008) was used to record data for the wetland delineation. The project area is also considered within Region 2 (Southeast) by USFWS for determining hydrophytic plant status. Four datasheets were recorded within the wetland area (WL2, WL6, and WL12) two upland datasheets were recorded (UPL1, UPL2), and one datasheet was recorded within a disturbed upland area at the project site (UPL3). Appendix B presents the datasheets recorded during the wetland delineation.

Within the palustrine wetland located along the western shoreline of Cane River Lake, the primary indicators of wetland hydrology included surface water, drift deposits, saturation, and aquatic fauna (red-eared slider turtles [*Trachemys scripta elegans*] were observed). Surface water covered the entire emergent wetland and submerged woody debris was observed throughout the area.

Because Cane River Lake is a recreational waterway, wave action from the wakes generated by local boat traffic is an additional source of hydrology along the shoreline of the emergent wetland.

The vegetation observed within the palustrine wetland was dominated by hydrophytes (wetland vegetation). Dominant species included southern wild rice (*Zizaniopsis miliacea)* and taro (*Colocasia esculenta*) located nearest to the shoreline as well as yellow pond lily (*Nuphar lutea*) partially submerged in the water along the shoreline. Giant cutgrass is considered a persistent emergent wetland plant and characterized as an obligate (OBL) in Region 2 (occurs almost always, estimated probability 99%, under natural conditions in wetlands); taro is considered a non-persistent emergent wetland plant and characterized as obligate in Region 2 (usually occurs in wetlands, estimated probability of being found in wetlands under natural conditions is 99%). At this site, yellow pond lily was also classified as an emergent plant and is characterized as an obligate (OBL) in Region 2. Additionally, water hyacinth (*Eichhornia crassipes*), one non-dominant species that is classified as a floating vascular plant, was also observed within some portions of the palustrine wetland. Also along the shoreline but non-dominant within both the palustrine and riverine wetlands, algae was observed as well as two species of submerged aquatic vegetation (SAV) that were identified as coontail (*Ceratophyllum demersum*) and waternymph (*Najas* sp.). Because emergent plants were observed as dominant at the site, this wetland was characterized as a palustrine, emergent, persistent/non-persistent, permanently flooded wetland (PEM1/2H).

The USDA NRCS characterizes the soils along the shoreline of Cane River Lake as Roxana very fine sandy loam. This soil series is defined as a hydric soil due to criterion number 4, soils that are frequently flooded for long duration or very long duration during the growing season (NRCS 2010). During the wetland delineation, the soil samples collected along the shoreline of Cane River Lake were characterized as silty clay loam with very fine sand and considered problematic hydric soils due to red parent material. This observation is confirmed because Cane River Lake is an oxbow lake that was created when the main channel of the Red River was dammed; the Red River in the vicinity of the project area is described as a land resource region (LRR P) that supports red parent material as stated in the *Interim Regional Supplement to the Corps of Engineers Manual* (USACE 2008). Because the majority of the soils at the site were submerged, the soils were collected and dried before the soil profile was described to allow redox features to become visible. In all three soils, the following hydric soil indicators were recorded: iron manganese masses and either low chroma values or redoximorphic features. At WL2, the chroma value for soil at a depth of was 5YR4/4 (at 0-2 inches) and was 5YR3/4 (at 2-12 inches) with concentrated redox features in the pore lining described as 5YR2.5/1. At WL 6, the soil from depths of 0-12 inches had a chroma value of 5YR3/2 with concentrated redox features in the pore lining described as 5YR2.5/1. At WL12, the soil at a depth of 0-12 inches had a chroma value of 5YR3/2 with concentrated redox features in the pore lining described as 5YR2.5/1. Based upon the soil samples collected, hydric soils were recorded within the palustrine wetland.

Also a small area approximately 0.07 acres in size in the northeast corner of the site and inland from the shoreline was investigated during the wetland delineation downstream of a grassed swale. This area is a drainage depression fed by stormwater through a scoured channel that overflows to Cane River Lake. Debris (large trees and shrubs) have been dumped in area and channel is headcutting and moving upstream to culvert. Therefore, this area was considered disturbed and a

datasheet was recorded (UPL3-DST) to determine if the area qualified as a wetland. It was determined that although some hydrophytic plant species were observed, there were not greater than 50 percent and the vegetation as well as the soil was considered very borderline for a wetland area. Because no hydrology was observed at the site, the area only gets wet during storm events from overland/surface runoff from the culvert/swale, and because hydrophytic vegetation was not greater than 50 percent, this area was not considered a wetland.

Following the field activities, the wetland data points collected in the field via boat and by foot were mapped on an aerial photograph. Approximately 0.64 acres of PEM1/2H wetlands are located in the vicinity of the park and approximately 0.26 acres of R2OWH wetlands (6.6 ft and less) are located in the vicinity of the park. For a graphical depiction of the existing wetland site features at the park, see Figures 3 and 4.

Wetland Functions and Values

Wetlands serve a wide range of ecological functions. They are valuable as holding areas for rising floodwaters. Wetland vegetation reduces floodwater velocity and depletes its destructive energy, thereby protecting mainland and upland areas. Wetland vegetation also forms buffers against erosion by absorbing current and storm energy, stabilizing substrates, and trapping sediments. Filtration of sediments, nutrients, pollutants, and toxic substances has the added advantage of improving water quality.

The wetland area at the project site is associated with bank of the Cane River Lake along the plantation property, in-between the right-of-way for state highway LA-494 and the Cane River Lake. This wetland area is characterized as a ***palustrine, emergent, persistent/non-persistent, permanently flooded wetland (PEM1/2H).*** The primary functions provided by this wetland area are biotic (fish and wildlife habitat) as well as providing economic values through recreational fishing and tourism. This wetland provides fisheries and benthic habitat and provides wildlife habitat for reptilian/amphibian species (most notably turtles, water snakes, and the American alligator [*Alligator mississipiensis*]) as well as aquatic avian species (commonly egrets, herons, and kingfishers). Shoreline wetland areas like the palustrine wetland at the site provide both habitat and cover for fish species that can then support recreational fishing in Cane River Lake. Secondary values provided by the wetland include cultural values such as aesthetics because the shoreline wetland is vegetated and located within a historical park. In summary, there are two types of wetlands that were mapped for this site: a riverine and a palustrine wetland. Cane River Lake is mapped as a riverine, lower perennial, open water, permanently flooded wetland (R2OWH) and the shoreline wetland is mapped as a palustrine, emergent, persistent/non-persistent, permanently flooded wetland (PEM1/2H). The wetlands identified within the project area do not support habitat for any special status species.

The entire Cane River Lake is mapped as a R2OWH, therefore, this habitat is located outside of the project area. The dammed portion of Cane River Lake is approximately 34.5 miles in length; therefore, the habitat associated with the riverine wetland is similar throughout this stretch of the river. Cane River Lake supports a variety of finfish species including largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), yellow bass (*Morone mississippiensis*), striped bass (*Morone saxatilis*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis*

nigromaculatus), sunfish (*Lepomis* sp.), catfish (*Ictaluridae* sp.), bowfin (*Amia calva*), gar (Lepisosteidae), carp (Cyprinidae), shad (*Alosa* sp.), and pickerel (*Esox* sp.) (NPS 2000). Fish species use the riverine portion of Cane River Lake for breeding and foraging. Aquatic bird species including the pied-billed grebe (*Podilymbus podiceps*), wood duck (*Aix sponsa*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), double-crested cormorant (*Phalacrocorax auritus*), and white pelicans (*Pelecanus erythrorhynchos*) rely on this habitat for feeding. During construction, these fish and bird species may disperse to the similar riverine habitat adjacent to the project area.

The palustrine emergent wetland located along the shoreline is not considered a unique, rare, or unusual habitat within the immediate project area. Palustrine wetlands are common along the shorelines of the 34.5-mile Cane River Lake. Associated vegetation includes southern wild rice, taro, yellow pond lily, giant cutgrass, and water hyacinth. Many of the bird species mentioned above may use the emergent wetland for feeding. There is potential that some avian species may use the wetland areas or vegetation for nesting sites. Impacts to bird species from the bank stabilization would be minimal since it is likely that the birds would use the similar habitat adjacent to the project area and along the Cane River Lake for feeding and nesting. Other wildlife that are associated with the palustrine wetlands include amphibian and reptiles, including the southern leopard frog (*Lithobates sphenocephala*), American bullfrog (*Lithobates catesbeiana*) red-eared slider (*Trachemys scripta elegans*), Mississippi map turtle (*Graptemys pseudogeographica kohnii*), razorback musk turtle (*Sternotherus carinatus*), yellowbelly water snake (*Nerodia erythrogaster flavigaster*), broadbanded water snake (*Nerodia fasciata confluens*), cottonmouth (*Agkistrodon piscivorus*), and the American alligator (*Alligator mississippiensis*). In addition, mussels, clams, and crustaceans including crawfish are also commonly found within the palustrine wetland areas. Like the other fish and birds discussed above, it is likely that most of the reptile, amphibian, and crustaceans would disperse to other similar areas during construction activities.

4.2 Floodplains

The 100-year floodplain mapped on the boundary of Cane River Lake is Zone A, which means that no Base Flood Elevation (BFE) which is the height of the base flood, in feet, in relation to the National Geodetic Vertical Datum of 1929 has been determined for the area (Figure 5) (FEMA 1998). A large portion of the plantation is located within the 500-year floodplain. Approximately one-third of the plantation's structures, including the majority of the main house are outside of the floodplain. Cane River itself is within the 100-year floodplain (Figure 5). However, only the northeast corner of the proposed project area lies within the 100-year floodplain and this area is estimated to be less than 0.1 acres within the floodplain.

All agencies must avoid building within a 100-year floodplain, unless there is no other alternative. NPS policy dictates guidelines to restore and maintain natural floodplains. Guidelines also require avoidance of the environmental impacts of development within floodplains, or modification of floodplains. The guidelines also require that, where practicable alternatives exist, Class I action be avoided within a 100-year floodplain. Class I actions include the location or construction of

administration, residential, warehouse, and maintenance buildings, non-excepted parking lots, or other man-made features that by their nature entice or require individuals to occupy the site.

Figure 3. Existing Conditions along West Bank of Cane River Lake at Proposed Bank Stabilization

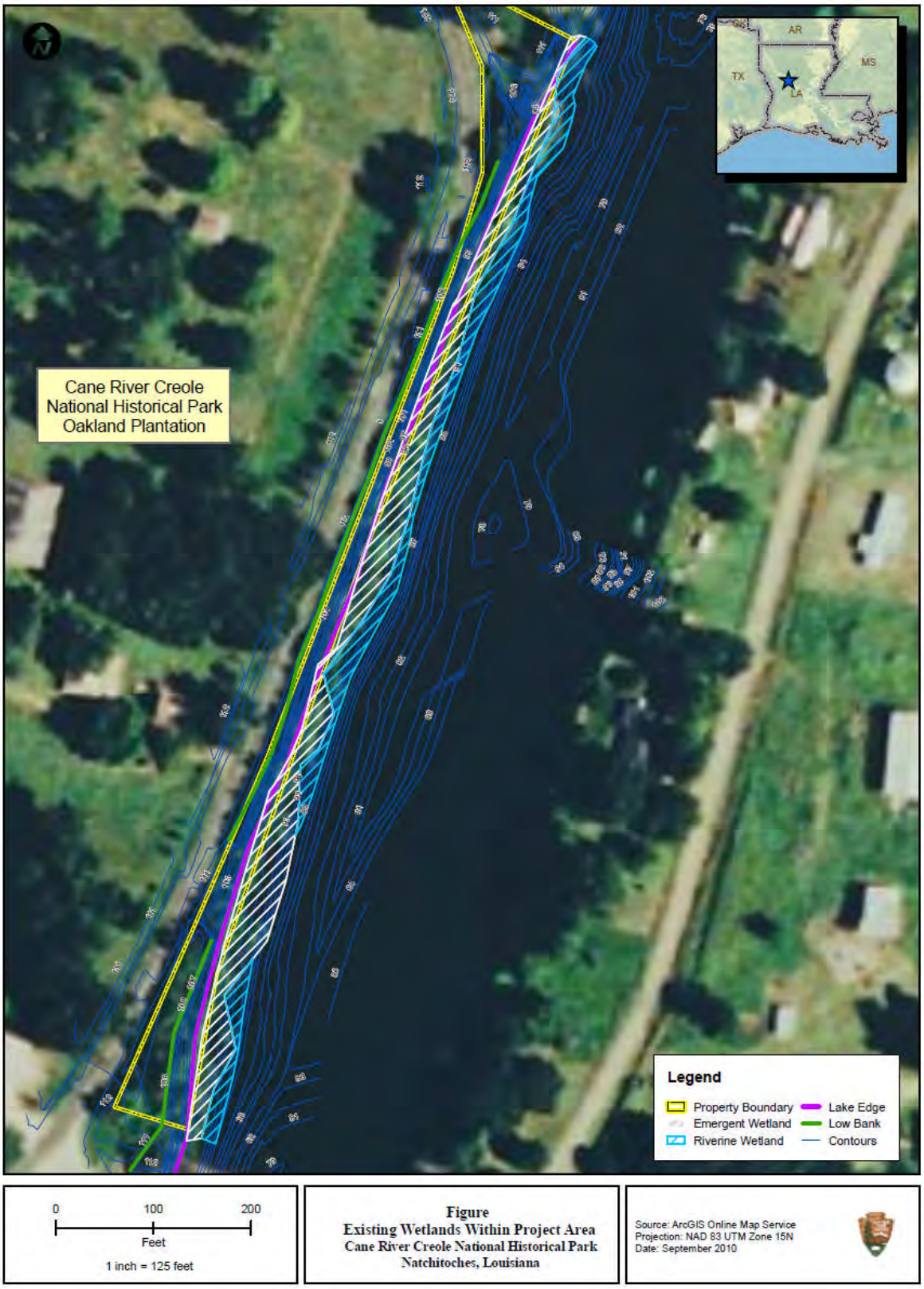


Figure 4. Existing Wetlands along the West Bank of Cane River Lake

Figure 5. Mapped 100-Year and 500 year Floodplain at the Plantation

5. USE OF THE WETLANDS AND FLOODPLAINS

5.1 Historical Use of the Park

Originally, Oakland Plantation was over 3400 acres, most of which was devoted to growing cotton. This large cotton plantation was home to a vast workforce of enslaved workers. In 1840, there were nearly 150 enslaved workers sharing the plantation with the owner's families, and the families of the overseers. The Civil War brought changes to the Cane River area. The isolation of cotton markets by the Union forces cut off the connection of these plantations to their markets. In response, Southern Confederate troops burned the cotton in order to prevent its seizure by the Union troops. When the Union troops arrived in Cane River, they took grain stores and slaves. As they retreated, they burned many of the plantations. Many of the plantation's former workers and their descendants returned to Oakland as sharecroppers, often remaining the same houses as their ancestors. Although the Oakland plantation survived the war, pests and low cotton prices kept things meager at the plantation, and eventually mechanical equipment replaced human labor. In 1994, the park was designated by Congress.

The route of the Red River was altered by after the removal of huge log jams to allow navigation. This change was upstream of the Natchitoches, and altered the flow of the water to the east. The abandoned canal was then called Cane River. Because of lowering water elevation, the channels were dammed to maintain higher water levels for agricultural and recreational use. This also returned the appearance of the Cane River to what it was before Red River changed course. The dammed portion is referred to as the Cane River Lake. Today Cane River is enjoyed as a recreation site for boating, fishing, and swimming, as well as jet skiing, water skiing, and recreational barging. The narrowness of the river means that boat wakes have caused serious erosion damage. This erosion was exacerbated by two severe storms that occurred in late October, 2007. These two heavy storms occurred within 36 hours of each other, with rainfall reaching 17 inches between the two storms. This resulted in a major washout of this thin strip of land in the park. This strip of land is about 1 acre, 1,190 feet long, with width varying along the side from 18 to 147 feet.

5.2 Proposed Use of the Park

NPS is proposing to provide bank stabilization along the Cane River Lake on the plantation, thereby preserving the property and State Highway LA-494. The need for the Preferred Alternative includes reduction of bank erosion that threatens State Highway LA-494 and the plantation property. Erosion conditions are currently exacerbated during storm events, when runoff becomes stronger and by wave action from passing boats in the Cane River Lake.

There are two principle issues affecting the proposed project area: erosion of the bank from runoff and from wave action from boats. The highly eroded areas are located at or near the existing storm water discharge points to the Cane River Lake. At the north end of the project site, severe erosion due to the high velocity of storm water discharge exiting the cross drain pipes caused a large portion of the lake bank to washout. Similarly, a small washout occurred south of the plantation store near a discharge area of an existing cross drain pipe. The erosion of the bank

along Cane River Lake has reduced the top of the bank to as narrow as approximately 10 feet from the edge of the roadway pavement. In addition to the erosion caused by the storm water runoff, erosion problems are occurring near the top and side of the bank. Although the lake does not have a substantial current flow, local boat traffic that travels along the lake creates wake that contributes to the erosion of the toe of the lake bank. Wave action is also created from the newly constructed seawalls along portions of the Cane River Lake which has contributed to the erosion of the bank.

With the implementation of the Preferred Alternative, the use of the park would remain the same; however, a small portion of the 100-year floodplain is located within the project area and within wetlands as confirmed during the 2010 site visit. The proposed use of the park and the visitation are both expected to stay the same. Re-grading to create a more naturally functioning floodplain and planting of the site with native vegetation would provide a more aesthetically pleasing and historical landscape along the bank of the Cane River Lake.

6. INVESTIGATION OF ALTERNATIVES

For this project, a Preferred Alternative, a No Action Alternative, and three other alternatives were considered and investigated. Under the Preferred Alternative, stabilization of the bank of the lake and toe in as well as drainage improvements within the project area would occur and would include re-grading the drainage ditches on both sides of the roadway, installing culvert crossings, installing a new culvert outfall into the lake, and constructing a drainage outfall chute into the lake at the north end of the project site would be undertaken. In order to maintain the natural aesthetic look of the project site and to provide adequate stabilization of the lake bank, a Turf Reinforcement Mat (TRM) system would be installed along the lake bank and along the channel of the chute. The TRM structure consists of three layers of polypropylene and a layer of coconut fibers. The mats along with the root reinforcement of seeded or planted vegetation, resist damage from wave energy and high velocity surface flows. The compacted clay fill would be placed at a slope of 1.7(H):1(V) on the face of the existing embankment. The embankment footprint would be extended approximately 5.6 feet into the lake. Beneath the water surface elevation level, the scour stop would be installed approximately from elevation 94.0 ft to 102 ft. The face of the compacted clay fill would be lined with a TRM to prevent erosion of the fill material. The roadway shoulder would be sloped at 8(H):1(V) and the area between it and the top of the new lake bank would be graded to gradually slope down into the lake to allow for natural water flow into the lake. This would allow for natural drainage, rather than drainage through a lakeside ditch. The TRM can withstand high scour from water flow, and would therefore prevent erosion of the bank. A geosynthetic scour mat would be placed at the toe of the embankment to prevent erosion at the toe.

Alternative 2 would restore the lake bank with a geogrid reinforced embankment system and protect the new ground surface with a TRM system. The geogrid reinforced retaining wall system would be composed of geogrid, geotextile, and wire form baskets. The geogrid protects the new lake bank from internal stability failure and erosion, while the wire form baskets give permanent facial stability in fill placement and compaction. The toe of the new lake bank would be protected with a Marine Mattress system. The Marine Mattress system would consist of 12 inches of 3-5 inch stones encapsulated in geogrid and geotextile layers. The marine mattress would protect the lower bank from erosion caused by water movement down the lake bank and drainage outfall

chutes, as well as from wave impacts of boat wakes. The existing bank slope would be returned to a 1.65(H):1(V) and the toe of the embankment footprint would be extended approximately 14 feet into the lake. The backfill would consist of free draining common fill (stone) and granular fill. A drainage ditch would also be located at the top of the embankment with a 4(H): 1(V) slope near the edge of the existing roadway and a 3(H):1(V) slope near the edge of the existing embankment.

Alternative 3 would restore the lake bank by installing a cantilevered sheet pile wall and constructing an embankment slope of 2(H):1(V) behind the sheet pile wall that would be lined with a TRM to prevent erosion of the embankment material. A 12-inch thick marine mattress would be placed on the lake side of the sheet pile wall to prevent erosion. The sheet pile would be placed approximately 5 feet from the existing toe of the lake. The backfill would consist of free draining fill material. Drainage behind the sheet pile wall would be provided by a perforated pipe that would be covered with geotextile fabric, preventing free draining backfill or other debris from entering and clogging the pipe.

Alternative 4 would restore the existing and eroded lake bank with compacted clay fill embankment above a riprap/stone base and protecting it with a TRM system. This alternative consists of excavating the existing slope and placing riprap at a slope of 1.6(H):1(V). The toe of the embankment footprint would extend approximately 8.5 feet into the lake. A longitudinal stone dike would be constructed along the lake bank toe and compacted clay fill would be placed on top of the riprap or stone base. The embankment would be lined with a TRM system to prevent erosion. A geotextile would be used as a separator at the clay/stone interface. A drainage ditch would also be located at the top of the embankment with a 4(H): 1(V) slope near the edge of the existing roadway and a 3(H):1(V) slope near the edge of the existing embankment.

Because the location of the bank along the Cane River Lake has emergent wetlands, alternative locations that entirely avoid wetlands and waters of the U.S., including floodplains as defined by the NPS, are not possible. The *Environmental Assessment: Cane River Creole National Historical Park Emergency Stabilization / Erosion Control on the Bank of Cane River Lake,* Oakland Plantation, Natchitoches Parish, Louisiana considers the No Action alternative along with the Preferred Alternative and three other alternatives, all of which involve projects within the wetlands and floodplains. For a graphical presentation of the Preferred Alternative, see Figures 6 and 7. Along with the No Action Alternative, the Preferred Alternative, and three other alternatives, additional alternatives were considered but dismissed in the EA. These additional alternatives were identified during the internal scoping process. These alternatives were dismissed from further analysis due to technical feasibility, potential for major environmental impacts to the park, and conflicts with the purpose and need of the project. Table 1 includes a description of the dismissed alternatives and justification for dismissal.

Table 1. Alternatives Considered But Dismissed

Alternative	Description	Reasons for Dismissal
Alternative A	Turf reinforcement mat protected embankment (with stone toe)	-May not meet USACE long term stability criteria -Exceeds Cane River Lake Waterway Commission (CRWC) criteria -Impact of shoreline changed -No medium/large tree growth
Alternative B	Turf reinforcement mat protected embankment (with scour stop toe)	-May not meet USACE long term stability criteria -Soil stabilization issues -Exceeds CRWC criteria -No medium/large tree growth
Alternative C	Vegetated reinforcement embankment (with stone toe)	-May not meet USACE long term stability criteria -Exceeds CRWC criteria -Concerns about boat damage from stone toe -Erosion issues not fully solved, may be future problems
Alternative D	Vegetated reinforcement embankment (with scour stop toe)	-May not meet USACE long term stability criteria -Exceeds CRWC criteria -Impact of shoreline changed -Erosion issues not fully solved, may be future problems
Alternative E	Sheet pile retaining wall	-Cost of the alternative -Alternative causes concern over boater safety -Extent and appearance of the steel sheet pile
Alternative F	Turf reinforcement mat protected embankment (with riprap base)	-May not meet USACE long term stability criteria -Exceeds CRWC criteria -Visual impact of shoreline changed -Constructability issues (steepest solution) -Concerns over boat strike and safety of riprap
Alternative G	Use wood seawall / trees for protected embankment	-May not meet USACE long term stability criteria -Visual impact of shoreline changed -Erosion issues not fully solved, may be future problems -Concerns from CRWC
Alternative H	Use articulated concrete mat or gunnite surface stabilization	-Visual impact of shoreline changed -Erosion issues not fully solved, may be future problems -Slope too steep to install gunnite (need 1:1, have 1:4 slope)
Alternative I	Drop stone on embankment at washout areas (USCOE idea)	-Concerns from CRWC -Impact of shoreline changed -Erosion issues not fully solved, may be future problems -Riprap area cannot be re-vegetated

Alternative	Description	Reasons for Dismissal
Alternative J	Use wood or composite retaining wall with fill behind (similar to Alt 3)	-Extent and appearance of the steel sheet pile -Poses many concerns over boater safety -Wood or composite retaining walls will require multiple replacements before useful life of project is met
Alternative K	Use turf reinforcement mat protected embankment with wood or composite wall to reduce riprap	-Constructability issues (steepest solution) -Wood or composite retaining walls will require multiple replacements before useful life of project is met -Visual impacts of shoreline changed -Exceeds CRWC criteria
Alternative L	Use soldier pile retaining wall with fill behind (similar to Alt 3)	-Poses maintenance issues along weak spots of retaining wall -Extent and appearance of retaining wall -Concerns over boater safety -Concerns over boat damage from stone toe
Alternative M	Use stone columns along the edge of the road	-Existing areas not fully solved, may be future problems and added maintenance -Impact of shoreline changed -Cost of alternative -Concerns over boater safety
Alternative N	Use micropiles or jet grouting to reinforce embankment	-Constructability issues due to steepness -Cost of alternative -Concerns over boater safety -Existing areas not fully solved, may be future soil stabilization problems
Alternative O	Use sheet pile closer to road with no additional fill to restore the lake bank or removal of existing vegetation required & underground drainage system	-Existing areas not fully solved, may be future problems -Cost of alternative -Risk of future loss of additional historic landscape -Concerns from CRWC
Alternative P	Move the road to a new location	-Existing areas not fully solved, may be future problems -Cost and schedule requirements of alternative -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition

Alternative	Description	Reasons for Dismissal
Alternative Q	Give the land between the road and lake to the Natchitoches Police Jury and let them solve the problem	-Doesn't address purpose and need of project -Won't solve erosion and instability issues in timely manner -Parish's objective in resolving issue disregards the Park's mission to restore area to natural condition
Alternative R	Close the road and allow the erosion to naturally continue	-Doesn't address purpose and need of project -Will stop traffic flow on road, causing major disruptions -Probably will not be approved by LADOTD -Concerns from CRWC
Alternative S	Sell the land between the road and lake to concessionaire and let them develop it for their use	-Doesn't address purpose and need of project -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition -Concerns from LADOTD, NPS, and CRWC
Alternative T	Give the land between the road and lake to the Louisiana Department of Transportation and let them solve the problem	-Doesn't address purpose and need of the project -Won't solve erosion and instability issues in timely manner -State's objective in resolving issue disregards the Park's mission to restore area to natural condition -Concerns from LADOTD, NPS, and CRWC
Alternative U	Do partial sheet pile and solve road drainage areas	-Doesn't address purpose and need of the project -Impact of shoreline changed -Concerns from NPS and CRWC
Alternative V	Create earth retention system at road shoulder and re-grade at road shoulder only	-Cost of alternative -Impact of shoreline changed -Existing eroded lake bank is not mitigated -Concerns from NPS and CRWC

No Action Alternative. The No Action Alternative is required for the Park process to review and compare all feasible alternatives to the existing baseline conditions. Under the No Action Alternative, the bank of the Cane River Lake would continue to be susceptible to erosion from stormwater runoff and wave action from boating activities. This lack of action would continue to lead to erosion of the bank, and erosion could eventually threaten State Highway LA-494 by the continued deterioration of the bank.

Figure 6 Proposed Design Layout for Bank Stabilization at Cane River Lake

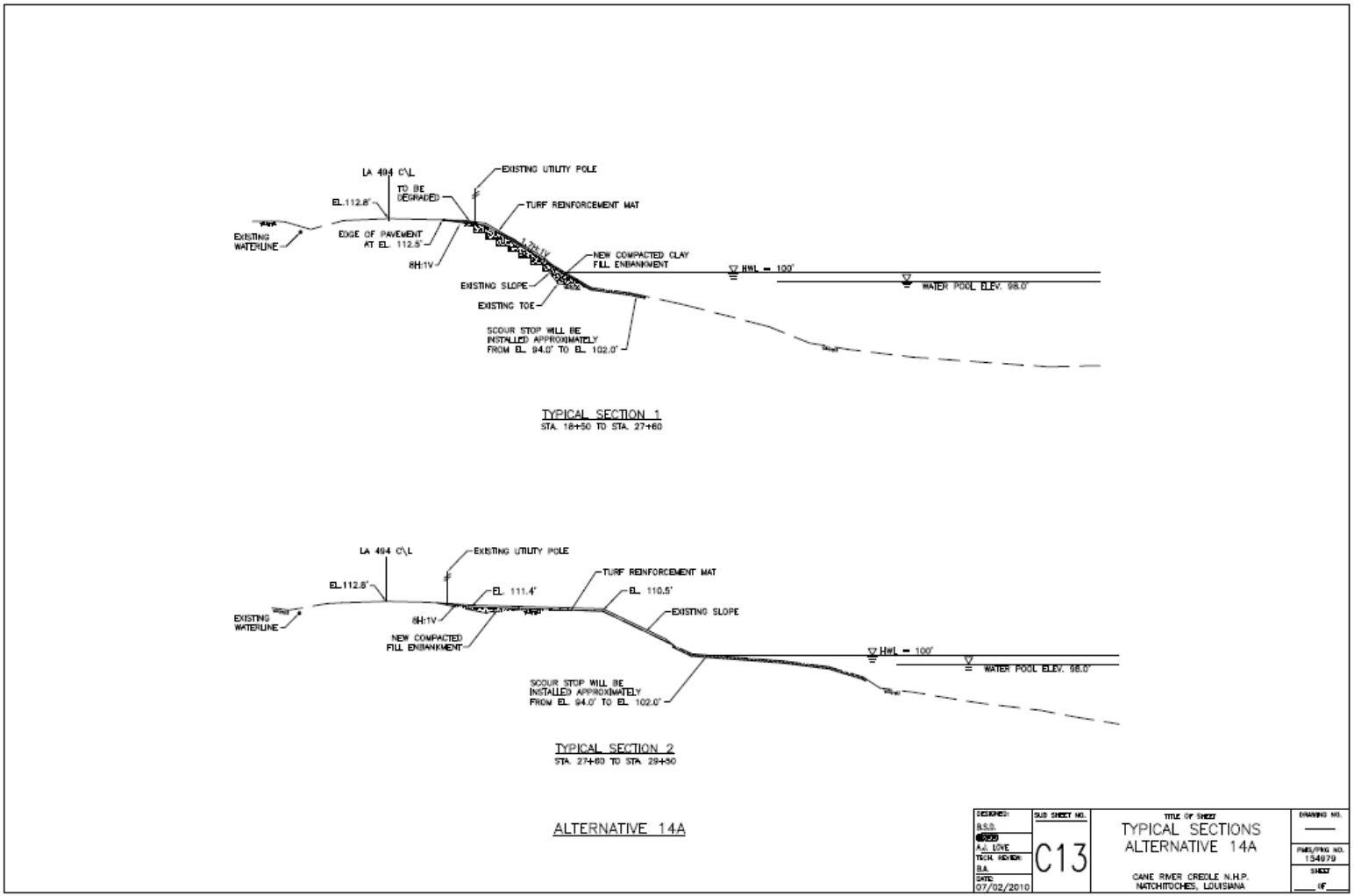


Figure 7. Details of Typical Cross-Sections for Proposed Bank Stabilization

7. WHY THE PREFERRED ACTION WAS CHOSEN

To select the Preferred Alternative, a Value Analysis Workshop was conducted on June 22 and 23, 2010. A Value Analysis is an organized, creative process, which focuses attention on the requirements of a project for the purposes of achieving essential functions and attendant benefits at the lowest, total costs for materials, equipment, staffing, energy usage, facilities, maintenance, etc. During the Value Analysis the team reviewed the design alternatives, considered cost estimates, and prepared a function-logic diagram. A function-logic diagram describes the essential functions of the project that would enhance the park's mission. Certain value analysis analytical tools and methods were used during the two day workshop to focus the team on the issues, problems, and opportunities presented by the proposed project.

The Value Analysis workshop focused on the following:

- Develop the Preferred Alternative for the proposed project by using Choosing by Advantages.
- Review options to maximize the projects useful life (50-100 years)
- Create options within the project budget.
- Identify opportunities to improve the value of the project.

The Preferred Alternative was selected by using the Choosing by Advantages process. In this process, decisions are based on the importance of the advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and the weighing of the importance of each advantage. The factors used to evaluate the proposed alternatives for the bank stabilization project included the following:

- Protect cultural and natural resources.
- Improve efficiency of park operations.
- Provide cost-effective, environmentally responsible, and otherwise beneficial development for the park.

Alternative 1, which includes drainage system improvements, the installation of compacted clay fill lined with a TRM system, the installation of a geosynthetic scour mat at to the tow of the bank, and the re-vegetation of the bank was selected as the Preferred Alternative. Alternative 1 was selected because this alternative would be better at preventing erosion from the local boat traffic and would meet the long-term needs of the project. Additionally, Alternative 1 would require the least amount of maintenance from park staff and it would best preserve the cultural landscape of the area.

8. PROPOSED IMPACTS TO WETLANDS, FLOODPLAIN AND FLOOD RISK OF THE PROPOSED PROJECT AREA

8.1 Impacts to Wetlands

Figure 8 and the following table describes the permanent impacts to wetlands for the No Action Alternative and the Preferred Alternative:

Alternative	Impact (Acreage)	Wetland Type
No Action Alternative	0.0 acres	N/A
Preferred Alternative	0.17 acres	PEM1/2H
Preferred Alternative	0.001 acres	R2OWH

No Action Alternative

Under the No Action Alternative, the proposed stabilization project would not be constructed and erosion of the bank of Cane River Lake would continue. Therefore, long-term, minor, adverse impacts associated with wetland loss from further erosion would occur as a result of the No Action Alternative.

Preferred Alternative

As stated previously, the Cane River Lake western bank along the plantation and portions of the immediately surrounding area is characterized as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H), and beyond this wetland to a maximum of 6.6 ft in depth as riverine, lower perennial, open water, permanently flooded wetland (R2OWH) under the Cowardin classification system. These wetland areas are therefore regulated as wetland under DO #77-1. Portions of the site are also regulated as a wetland (vegetated portions) or a "water of the United States" (unvegetated portions) under Section 404 of the Clean Water Act. As a result of the Preferred Alternative, long-term, minor, adverse impacts to these wetlands are anticipated as a result of the addition of fill to the current bank. The Preferred Alternative consists of extending the embankment footprint approximately 5.6 feet into the lake (at water pool elevation of 98 feet) within the PEM1/2H wetland. A barge would be transported to and from the project site to be used as a staging area for four to six months during construction for bank stabilization. Therefore, ***approximately 0.17 acres of fill material along the bank classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) would be required and would permanently impact this wetland and 0.001 acres along the bank classified as*** riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would be permanently impacted**.** The PEM1/2H wetland beyond the 5.6 feet of bank stabilization would be temporarily and adversely affected during the construction period. As a result, a maximum of ***approximately 0.47 acres beyond the bank stabilization classified as palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H) and 0.26 acres of riverine, lower perennial, open water, permanently flooded wetland (R2OWH) would temporarily impacted*** during barge activities while the stabilization is being constructed and placed along the shoreline.

The yellow pond lily is the dominant plant species that will be temporarily impacted beyond the 5.6 ft of bank stabilization because it is the only emergent rooted vascular plant at the site at depths beyond 5.6 ft. Yellow pond-lily is an aquatic perennial plant with spongy rhizomes that anchor the plant into the muddy bottom of a waterbody (USDA/NRCS 2004). Although this plant is not considered invasive, it is very difficult to eradicate when not grown in containers because any section of rhizome left behind may sprout new growth; this plant may become weedy in some regions or habitats and may displace desirable vegetation if not properly managed (USDA/NRCS 2004). Due to the hardiness and resilience of yellow pond lily rhizomes, it is expected that this plant species will recover in many areas from temporary construction that occur beyond the areas of bank stabilization following the completion of water-based construction activities. Although long-term, minor, adverse impacts to wetlands would occur as a result of the Preferred Alternative, beneficial impacts are associated with stabilizing the bank and replanting with wetland vegetation to reduce future erosion and the ultimate loss of land would offset the adverse impacts to wetlands. Though wetlands would be impacted, the end result would be a gain and protection of the stream side wetlands. In addition to impact along the bank of Cane River Lake, proposed drainage improvements will also occur in the vicinity of the disturbed area investigated during the wetland delineation in the northeast corner of the site. Specifically, a drainage outfall chute into Cane River Lake at the north end of the project site is proposed that will also be naturally re-vegetated following construction activities. The drainage chute design details include a smooth transition to the existing Cane River Lake bank slope. Therefore, the Preferred Alternative should reduce the secondary or offsite effects that currently occur at the site, including drainage and flooding that have exacerbated the bank erosion and have affected the existing wetlands along the shoreline of the site.

Other impacts associated with the Preferred Alternative are described in detail in Chapter 4 of the EA and include long-term impacts from the project and temporary impacts from bank stabilization construction activities. Figures 6 and 7 show current design details of the Preferred Alternative and Figure 8 shows wetland impacts associated with the Preferred Alternative; note that from the water's edge on bank of the Cane River Lake to the extent of the emergent, rooted vascular plants is classified as a palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H), with a riverine, lower perennial, open water, permanently flooded wetland (R2OWH) from the boundary of the rooted vascular plants to deepwater habitat The bank stabilization of the western bank of Cane River Lake on the plantation would provide a long-term, beneficial impact to cultural landscape resources and infrastructure by improving the aesthetics of the area, and preventing further erosion that could threaten State Highway LA-494. Long-term, beneficial impacts to soils, water quality, archeological resources, the floodplain, and aesthetics are also anticipated as a result of the Preferred Alternative. Adverse impacts to wetlands will result from the Preferred Alternative, but mitigation proposed and the long-term benefits of protecting resources through the bank stabilization are expected to outweigh the adverse affects. The bank stabilization period would cause short-term, minor adverse impacts to noise quality, water quality, air quality, soils, vegetation, wildlife, aquatic resources, historic resources, the cultural landscape, health and safety, energy requirements, a reduction in the quality of water-based recreational opportunities in the immediate area, and aesthetics due to construction equipment. These impacts would be temporary in nature and would only occur during the bank stabilization period of the project.

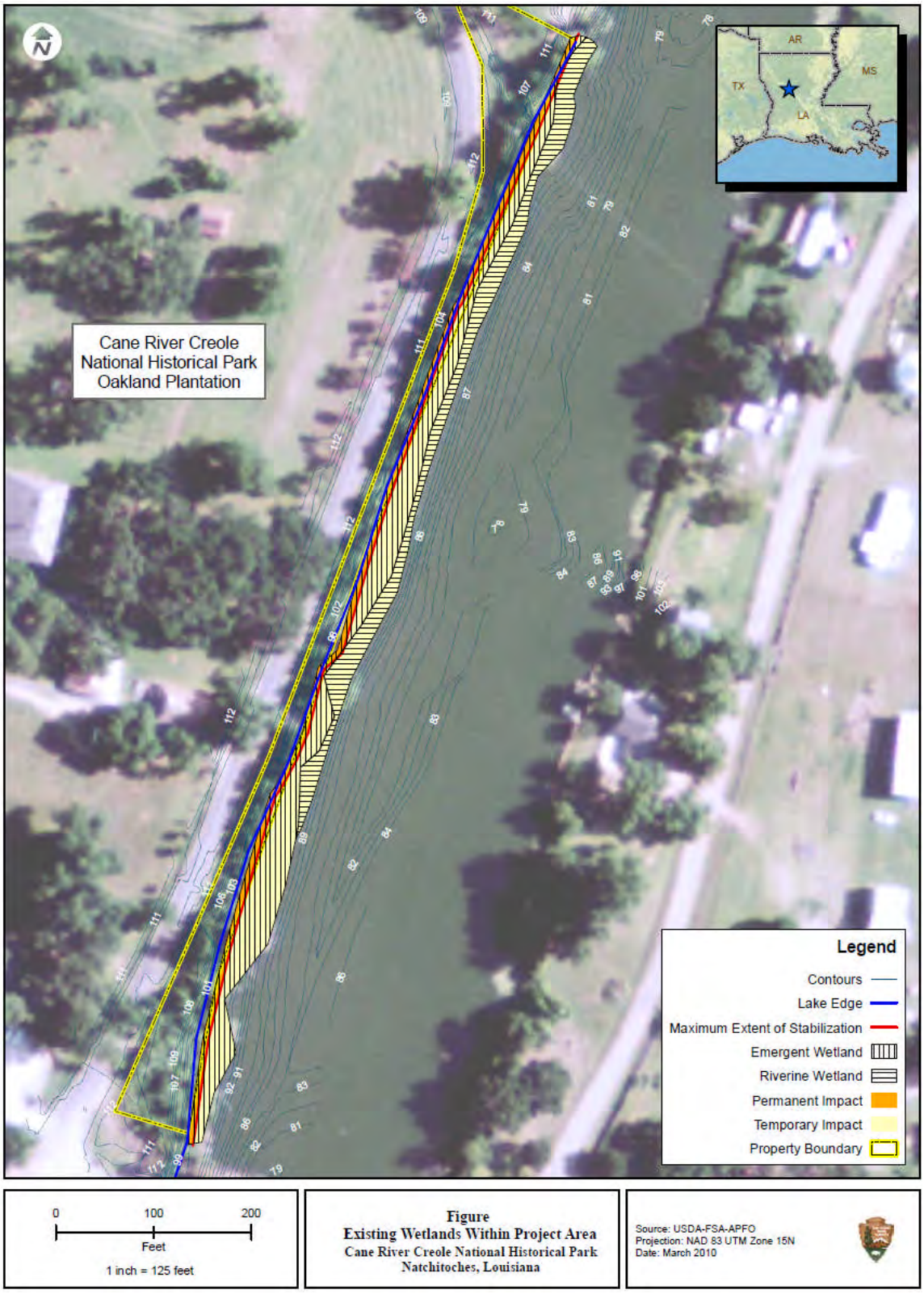


Figure 8. Wetland Impacts Associated with Preferred Alternative

Total Wetland Impacts

As stated above, a total of approximately 0.171 acres of PEM1/2H and R2OWH wetlands will be permanently affected by the proposed project along the bank of the Cane River Lake at the plantation. The dimensions of the Preferred Alternative as discussed in previous sections are approximate and may change during the more detailed design phase of this project. The wetland impacts discussed in this section represent the most current approximations at this time; however, this acreage may increase/decrease after final design. The wetland impacts are located within a ***palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H)*** on the bank of Cane River Lake along the plantation property and within a ***riverine, lower perennial, open water, permanently flooded wetland (R2OWH)***. According to NPS DO #77-1, if impacts to wetlands cannot be avoided, compensation for wetland degradation or loss would be required at a minimum 1:1 ratio in a comparable alternate location, which is discussed in greater detail in Section 9.1.

As a result of the wetlands affected by the Action Alternatives, a Section 10 Rivers and Harbors Appropriation Act of 1899 Permit and a Section 404 Permit may be required for the discharge of material into wetland areas, which would be completed and submitted to the USACE-Vicksburg District. Because the project area is outside of Louisiana's coastal zone, LADNR does not review the Joint Application Permit. The exact acreage of wetlands affected and a mitigation plan for the loss of wetlands would be included in the permit application as a requirement of the Section 404 Permit. The NPS uses a more conservative estimate of wetlands, which includes requiring only one of the three criteria that the USACE requires for the characterization of a wetland.

8.2 Flood Risk of the Proposed Project Area

Floodplain zones, as mapped by FEMA, are located within the site boundary. NPS has adopted guidelines pursuant to Executive Order 11998 stating that it is NPS policy to restore and preserve natural floodplain values and avoid environmental impacts associated with the occupation and modification of floodplains. As stated previously, a large portion of the Oakland Plantation lies within the 500-year floodplain. The 100-year floodplain includes the Cane River Lake, the lake banks, and a small portion of the northeast corner of the proposed project area. Since the banks within the project area are currently steep, the majority of the project area lies outside of the 100-year floodplain. The proposed project under the Preferred Alternative includes stabilizing the bank by extending the bank further into the lake and decreasing the steepness of the slope from the water's edge to the top of the bank. Reducing the slope of the bank would likely extend the floodplain into the proposed project area, which would be similar to the historic floodplain of the area.

The Preferred Alternative would cause minor alterations to less than 0.1 acres within the floodplain by providing bank stabilization along the bank of the plantation on Cane River Lake. A small portion of the northeast corner of the proposed project site lies within the 100-year floodplain. Since the banks within the project area are currently steep, the majority of the project area lies outside of the 100-year floodplain. The Preferred Alternative includes stabilizing the bank by extending the bank further into the lake and decreasing the steepness of the slope from the water's edge to the top of the bank. The gradual slope of the bank would reduce the water surface

elevation and allow more volume of water into the lake. There is a potential that the floodplain would widen and extend into the proposed project location. Long-term, beneficial impacts to the floodplain would result from the Preferred Alternative since the floodplain would function more naturally. As stated previously, a TRM system would be placed along the lake bank and along the channel of the drainage chute, and a geosynthetic scour mat would be placed at the toe of the embankment to prevent erosion at the toe. The addition of fill and placement of mats along with the root reinforcement of seeded or planted vegetation, would reduce damage from wave energy and high velocity surface flows. Further erosion of the bank would halt. Stopping this erosion would result in long-term, beneficial impacts to the floodplain from the Preferred Alternative, because lessening the steepness of the slope would allow for the restoration of natural floodplain function. In order to protect the bank, material revetment and fill material is required.

9. MITIGATION MEASURES

Implementation of the Preferred Alternative would involve impacting minimal areas of wetlands and the floodplain on the bank of the Cane River Lake. The majority of the bank stabilization activity would occur in the water and along the shoreline of the bank. During the entire bank stabilization process for the Preferred Alternative, best management practices would be employed to minimize impacts to hydrology, water quality, threatened and endangered species, and cultural resources as described in detail in Chapter 5 of the EA to comply with both *Procedural Manual #77-1: Wetland Protection* and *Procedural Manual #77-2: Floodplain Management*. If required, a sediment and erosion control plan would be prepared prior to construction and submitted to appropriate local and state agencies. Whenever possible, construction activities, including heavy equipment use and stockpiling of materials, would be conducted outside of wetland areas and a barge would be transported to and from the project site to be used as a staging area for four to six months during construction for bank stabilization.

9.1 Wetland Mitigation

For the purposes of implementing Executive Order 11990, the NPS has determined that any area classified as wetland habitat according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* is subject to *Director's Order #77-1: Wetland Protection* and the implementation procedures outlined in the *Procedural Manual #77-1: Wetland Protection*. Director's Order #77-1 states that for new actions where impacts to wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands at a minimum acreage ratio of 1 to 1. For this project, the estimated impact to the riverine and palustrine wetlands is estimated at 0.171 acres. Wetland mitigation will be accomplished by re-vegetating the area with plant species native to the area, region 2. The plant species used will include only FAC, FAC+, FACW, and OBL wetland species native to the area. Obligate wetland (OBL) species that will be used include giant cutgrass (*Zizaniopsis miliacea*) and common buttonbush (*Cephalanthus occidentalis*). Facultative wetland (FACW) species that will be used are river cane (*Arundinaria gigantea*) and northern spicebush (*Lindera benzoin*). Facultative wetland - (FACW-) used will be swamp dogwood (*Cornus foemina*), American black elderberry (*Sambucus nigra ssp. canadensis*), and switch grass (*Panicum virgatum*), which is a facultative (FAC+) species.

The wetland impacts discussed in this section represent the most current approximations at this time; however, this impact and compensation acreage may increase/decrease after final design. It is expected that once project construction is completed and the area has become full re-vegetated that the site will once again function as an emergent palustrine wetland. Additional benefits include returning the site back to an accurate cultural landscape as well as creating a more contiguous wetland area at the park. Mitigation efforts would restore these wetland areas after construction has concluded. The current wetland at the shoreline is characterized as Palustrine, emergent, persistent/non-persistent permanently flooded wetland (PEM1/2H), while the wetland from the emergent rooted vascular plants to the deepwater habitat is riverine, lower perennial, open water, permanently flooded wetland (R2OWH). These palustrine wetlands would be restored through the re-vegetation efforts, so the functions gained through wetland mitigation would be similar to the functions lost from the implementation of the project.

Currently, the wetlands at the proposed project area provide biotic benefits through the creation of habitat for fish and wildlife, including several reptile and amphibian species. The wetlands also provide habitat for aquatic avian species, such as herons and egrets. Portions of this function will be temporarily lost during construction, but will be restored after mitigation efforts have been completed. The wetland mitigation work will be completed at the conclusion of the construction for bank stabilization. The anticipated time-frame for the full functioning of the restored wetland (from a soil stabilization function and shorebird/reptile/benthic habitat function) is estimated at approximately one year.

Monitoring of the restored wetland would be consistent with 33 CFR Part 332 (Compensatory Mitigation for Losses of Aquatic Resources), paragraph 6 (Monitoring). Therefore, a monitoring goal and period is required to demonstrate that the mitigation project has met performance standards; normally a monitoring period of five years is sufficient. The first year following planting in the fall, spring and summer monitoring would occur. Monitoring would then occur annually for the four subsequent years. If goals are not met, maintenance would occur through an adaptive management perspective. The funding source for the wetland restoration as part of the mitigation is not currently known, but the NPS is committed to following *Procedural Manual* #77-1 and preserving natural resources. Therefore, NPS commitment for funding of the compensatory restoration will meet the requirements and restrictions of Section 5.2.3, paragraph 6 of *Procedural Manual* #77-1. A wetland mitigation plan and a wetlands permit may be required for wetlands impacted on the bank of the proposed study area and would be prepared when design and survey efforts are completed. Both the wetlands mitigation plan and wetlands permit application would be completed after design of the preferred action is completed and available for use in preparing these documents.

9.2 Floodplain Mitigation

The design of structures within the floodplain would incorporate methods for minimizing flood damage, as contained in the National Flood Insurance Program "*Floodplain Management Criteria for Flood-Prone Areas"* (CFR 44, 60.3) and in accordance with any state or county requirements for flood-prone areas.

Floodplain infiltration and conveyance would be beneficially impacted by the Preferred Alternative due to the fact that steepness of the bank would be reduced, returning the natural function of the floodplain. The prevention of further erosion would further benefit the floodplain. The majority of the construction activity associated with the Preferred Alternative would occur in the water and along shoreline areas within the floodplain. Because the Preferred Alternative is water-dependent, the project cannot completely avoid being situated in a floodplain due to its function relying on a close proximity to water. Impacts to the floodplain have been minimized to the greatest extent practicable. Short-term, minor impacts to floodplains would occur due to construction activities but long-term benefits would occur when the area is re-vegetated. Re-vegetation of the shoreline areas following construction would assist in improving biotic values through planting native plant vegetation.

10. SUMMARY

The bank stabilization of the Cane River Lake shoreline would protect infrastructure and improve the cultural landscape and aesthetics as well as prevent future erosion along the shorelines of bank on the plantation property. Long-term, beneficial impacts to soils, water quality, the floodplain, archeological sites, infrastructure, the cultural landscape, and aesthetics are anticipated as a result of the prevention of further erosion under the Preferred Alternative. The Preferred Alternative would occur within the Cane River Lake, within a ***palustrine, emergent, persistent/non-persistent permanently flooded*** wetland (PEM1/2H), and ***riverine, lower perennial, open water, permanently flooded*** wetland (R2OWH), and within the 100-year floodplain. Approximately 0.17 total acres of palustrine wetlands, 0.001 acres of riverine wetlands, and 0.1 acres of the 100-year floodplain will be permanently affected by this project. As stated previously, the dimensions of the Preferred Alternative as discussed in this document and the EA are approximate and may change during the more detailed design phase of this project. The wetland impacts discussed in this document represent the most current approximations at this time, and the re-vegetation of the area with appropriate native, wetland plant species would meet NPS requirements for wetland compensation. In the broader sense of the Cane River Lake, the undertakings proposed in this document would not significantly alter wetland systems but make improvements to the shoreline, would beneficially alter floodplain attributes, and decrease potential flooding risks to human safety or property damage. The overall hydrology of the river and its banks is not expected to change as a result of the Preferred Alternative, and the natural function of the floodplain is expected to be partially restored. The Preferred Alternative would, therefore, constitute a beneficial impact to the floodplain. The NPS finds the Preferred Alternative to be acceptable under Executive Order 11988 for the protection of floodplains.

The mitigation proposed in exchange for the wetland impacts would assure no net loss of wetlands. The specific locations for compensation, the schedule for project completion, the funding sources, and other details relating to wetlands compensation will be determined at a later stage and in consultation with the NPS and appropriate resource agencies. The Preferred Alternative would, therefore, constitute a minor impact to wetlands that would be compensated for by re-vegetating the site with appropriate, native wetland plant species. The NPS therefore finds that the Preferred Alternative, as stipulated, is consistent with Executive Order 11990 and the policies and procedures found in Director's Order #77-1 and Procedural Manual #77-1.

11. REFERENCES

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APPENDIX A: PHOTOGRAPHIC RECORD

PHOTOGRAPHIC RECORD

Cane River Creole National Historical Park
May 11-12, 2009

Photo 1 – Old Bridge

Photo 2 – Old bridge shoreline

Photo 3 – View from Bridge

Photo 4 – Erosion scour hole

Photo 5 – Oakwood plantation

Photo 6 – NPS property boundary

Photo 7 – Swale area

Photo 8 – Swale along road

Photo 9 – Old bridge looking North

Photo 10 – Shoreline near bridge

Photo 23 – EM 8: Yellow pond lily, taro, giant cutgrass

Photo 24 – EM 9: Yellow pond lily, taro, giant cutgrass

Photo 25 – EM 9: Yellow pond lily, taro, giant cutgrass

Photo 26 – EM 9: Yellow pond lily, taro, giant cutgrass

Photo 27 – EM 10: Yellow pond lily and red eared slider turtle

Photo 28 – Yellow pond lily, taro, giant cutgrass

Photo 47 - Taro along shoreline

Photo 48 – Barn swallow nests (under bridge)

Photo 51 - Recording data during wetland delineation

Photo 52 - Recording data during wetland delineation

Photo 53 - looking down at shoreline from high bank

Photo 54 - looking down at shoreline from high bank

APPENDIX B: DATASHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010

Applicant/Owner: NPS State: LA Sampling Point: WL2

Investigator(s): SK, JM Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR or MLRA): Lat: Long:

Soil Map Unit Name: Roxana very fine sandy loam NWI classification: PEM1/2H; River = R2OWH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes**	
Hydric Soil Present?	**Yes**	
Wetland Hydrology Present?	**Yes**	**Is the sampling area within a wetland? YES**

Remarks:

Thin emergent wetland along closed bridge. Photos #44 and #45

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)
		Surface Soil Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	X Aquatic Fauna (B13) **Red-eared slider**	Drainage Patterns (B10)
X Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
X Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**Yes**	Depth (inches): 0
Water Table Present?	**Yes**	Depth (inches): 0
Saturation Present? (includes capillary fringe)	**Yes**	Depth (inches): 0

Wetland Hydrology Present? Yes

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WL2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
	= Total Cover		
Sapling Stratum (Plot size:)			
1.			
4.			
5.			
	= Total Cover		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Colocasia esculenta*	70	Y	OBL
2. *Zizaniopsis miliacea*	10	Y	OBL
3. *Eichhornia crassipes*	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

Prevalence Index

___ is ≤3.0[1]

Problematic Hydrophytic Vegetation[1]

___ (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks: (If observed, list morphological adaptations below)

Also algae and coontail SAV dispersed in some areas along shoreline; submerged woody debris in water along shoreline 5' and out.

SOIL

Sampling Point: WL2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
~~2-12~~	~~7.5YR 3/2~~	~~100~~					~~silt loam~~	~~submerged w/organic debris w/ fine sand~~
Let soil dry out and re-examined:								
0-2	5YR 4/4	90	5YR 2.5/1	10	C	PL	Silty loam w/ very fine sand	
2-12	5YR 3/4	90	5YR 2.5/1	10	C	PL	Silty loam w/ very fine sand	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- **X** Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- **X** Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Low chroma soils with brighter redox features.

Region LRRP; red parent material originates from Red river/cane river

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010
Applicant/Owner: NPS State: LA Sampling Point: WL6, photo #47
Investigator(s): SK, JM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR or MLRA): Lat: Long:
Soil Map Unit Name: Roxana very fine sandy loam NWI classification: PEM1/2H; River = R2OWH
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes**	
Hydric Soil Present?	**Yes**	
Wetland Hydrology Present?	**Yes**	**Is the sampling area within a wetland? YES**

Remarks:

Thin emergent wetland along shoreline. Some overhanging trees rooted further inland of shoreline, but an emergent wetland. Photos #47, 48, 49

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)
		Surface Soil Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
X High Water Table (A2)	X Aquatic Fauna (B13) **Red-eared sliders**	Drainage Patterns (B10)
X Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
X Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**Yes**	Depth (inches): 0
Water Table Present?	**Yes**	Depth (inches): 0
Saturation Present? (includes capillary fringe)	**Yes**	Depth (inches): 0

Wetland Hydrology Present? Yes

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Also coontail and Najas species dispersed in some areas near shoreline

VEGETATION – Use scientific names of plants.

Sampling Point: WL6

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Robinia pseudo-acacia*	1	N	UPL
2.			
3.			
	= Total Cover		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. *Colocasia esculenta*	15	Y	OBL
2. *Zizaniopsis miliacea*	5	Y	OBL
3. *Nuphar lutea*	10	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

Prevalence Index

___ is ≤3.0[1]

Problematic Hydrophytic Vegetation[1]

___ (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WL6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
Let soil sample dry:								
0-12	5YR 3/2	90	5YR 2.5/1	10	C	PL		

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- **X** Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- **X** Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: **Bright reddish soil but completely submerged and supportive of emergent veg; red parent material originates from Red river/cane river**

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010
Applicant/Owner: NPS State: LA Sampling Point: WL12
Investigator(s): SK, JM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR or MLRA): Lat: Long:
Soil Map Unit Name: Roxana very fine sandy loam NWI classification: PEM1/2H; River = R2OWH
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes**	
Hydric Soil Present?	**Yes**	
Wetland Hydrology Present?	**Yes**	**Is the sampling area within a wetland? Yes**

Remarks:

Photos # 50, 51, 52. Shoreline with wave action

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)
		Surface Soil Cracks (B6)
X Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
X High Water Table (A2)	X Aquatic Fauna (B13)	Drainage Patterns (B10)
X Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
X Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**Yes**	Depth (inches): 0
Water Table Present?	**Yes**	Depth (inches): 0
Saturation Present? (includes capillary fringe)	**Yes**	Depth (inches): 0

Wetland Hydrology Present? Yes

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Aquatic fauna included: red-eared sliders and dragonflies

VEGETATION – Use scientific names of plants.

Sampling Point: WL12

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
Herb Stratum (Plot size: 30 ft radius)			
1. *Zizaniopsis miliacea*	10	Y	OBL
2. *Colocasia esculenta*	15	Y	OBL
3. *Eichhornia crassipes*	3	N	OBL
4. *Nuphar lutea*	40	Y	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
Prevalence Index
___ is ≤3.0[1]
Problematic Hydrophytic Vegetation[1]
___ (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: WL12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
Let soil dry out:								
0 – 12	5YR 3/2	90	5YR 2.5/1	10	C	PL	silty clay loam with very fine sand	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- **X** Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- **X** Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Photo #53 wetland along shore; low chroma soils with brighter redox features; Region LRRP; red parent material originates from Red river/cane river

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010
Applicant/Owner: NPS State: LA Sampling Point: UPL1
Investigator(s): SK, JM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR or MLRA): Lat: Long:
Soil Map Unit Name: Roxana very fine sandy loam NWI classification: None -upland area
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**No**	
Hydric Soil Present?	**No**	
Wetland Hydrology Present?	**No**	**Is the sampling area within a wetland? No**

Remarks:

Upland pt. by WL6

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)

Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**No**	Depth (inches):
Water Table Present?	**No**	Depth (inches):
Saturation Present? (includes capillary fringe)	**No**	Depth (inches):

Wetland Hydrology Present? No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: UPL1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Broussonetia papyrifera*	5	Y	NI
2. *Robinia pseudo-acacia*	2	N	UPL
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Shrub Stratum (Plot size:)			
1. *Rubus spp.*	5	N	NA
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Toxicodendron radicans*	20	Y	FAC
2. *Vitis rotundifolia*	5	N	NA
3. *Lonicera japonica*	50	Y	FAC-
4. *Vitis labrusca*	5	N	NA
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

Prevalence Index

___ is ≤3.0[1]

Problematic Hydrophytic Vegetation[1]

___ (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ____ **No X**

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UPL1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 12	7.5YR 5/6	100					silty-dry (very orange)	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** **X**

Remarks:.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010
Applicant/Owner: NPS State: LA Sampling Point: UPL2
Investigator(s): SK, JM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR or MLRA): Lat: Long:
Soil Map Unit Name: Roxana very fine sandy loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**No**	
Hydric Soil Present?	**No**	
Wetland Hydrology Present?	**No**	**Is the sampling area within a wetland? No**

Remarks:

Upland pt. by WL6

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)

Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	**No**	Depth (inches):
Water Table Present?	**No**	Depth (inches):
Saturation Present? (includes capillary fringe)	**No**	Depth (inches):

Wetland Hydrology Present? No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Dry terrestrial area b/n mowed grass and emergent wetland. Very steep topography, discarded debris

VEGETATION – Use scientific names of plants. Sampling Point: UPL2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Broussonetia papyrifera*	5	Y	NI (UPL)
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			
Sapling Stratum (Plot size:)			
1. *Sambucus canadensis*	2	Y	FACW-
2. *Cornus* sp.	2	N	
3.			
4.			
5.			
6.			
7.			
= Total Cover			
Shrub Stratum (Plot size:)			
1. *Toxicodendron radicans*	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
= Total Cover			
Herb Stratum (Plot size:)			
1. *Elymus virginicus*	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size:)			
1. *Toxicodendron radicans*	10	Y	FAC
2. *Vitis rotundifolia*	2	N	NA
3. *Lonicera japonica*	5	Y	FAC-
4. *Vitis labrusca*	2	N	NA
5.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 2	x 2 = 4
FAC species 35	x 3 = 105
FACU species 0	x 4 = 0
UPL species 5	x 5 = 25
Column Totals: 42 (A)	134 (B)

Prevalence Index = B/A = 3.19

Hydrophytic Vegetation Indicators:

__ X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: UPL2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 12	7.5YR 4/6	100					silty loam- dry and orange	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Cane River Creole NHP City/County: Natchitoches Parish Sampling Date: 5/11/2010
Applicant/Owner: NPS State: LA Sampling Point: UPL3 =DST area
Investigator(s): SK, JM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR or MLRA): Lat: Long:
Soil Map Unit Name: Roxana very fine sandy loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
Are Vegetation **Yes**, Soil **Yes**, or Hydrology **YES** significantly disturbed? Are "Normal Circumstances" present? Yes No X
Are Vegetation , Soil , or Hydrology naturally problematic?(If needed, explain any answers in Remarks) *stormwater drainage area

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**No**	
Hydric Soil Present?	**No**	
Wetland Hydrology Present?	**No**	**Is the sampling area within a wetland? No**

Remarks:

This area is downstream of the grassed swale. It is a drainage depression fed by stormwater through a scoured channel with vegetation that overflows to Cane River Lake. Debris (large trees and shrubs) have been dumped in area and channel is headcutting and moving upstream to culvert.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

Surface Water (A1)	Water-Stained Leaves (B9)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2)	Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)	Marl Deposits (B15) **(LRR U)**	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Geomorphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

Secondary Indicators (minimum of two required)
Surface Soil Cracks (B6)

Field Observations:

Surface Water Present?	**No**	Depth (inches):
Water Table Present?	**No**	Depth (inches):
Saturation Present? (includes capillary fringe)	**No**	Depth (inches):

Wetland Hydrology Present? No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Photo # 60: soil photo
61: overview of area
62/63: looking from DST to Cane River Lake

VEGETATION – Use scientific names of plants.

Sampling Point: UPL3=DST

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Broussonetia papyrifera*	5	Y	NI (UPL)
2. *Catalpa speciosa*	5	Y	FACU
3.			
4.			
5.			
6.			
= Total Cover			
Sapling Stratum (Plot size:)			
1. *Robinia pseudo-acacia*	10	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			
Shrub Stratum (Plot size:)			
1. *Rubus phoenicolasius*	5	Y	NI (UPL)
2.			
3.			
4.			
5.			
6.			
= Total Cover			
Herb Stratum (Plot size: 30 ft radius)			
1. *Verbena hastata*	1	Y	FAC
2. *Leersia sp.*	2	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover			
Woody Vine Stratum (Plot size:)			
1. *Toxicodendron radicans*	5	Y	FAC
2. *Vitis labrusca*	5	Y	FAC+
3.			
4.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

Prevalence Index ___ is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes_____ No X_____**

Remarks: (If observed, list morphological adaptations below)

Large change in topography. Could this disturbed area be a location for mitigation?

SOIL

Sampling Point: UPL3=DST

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 – 12	7.5YR 5/6	90	7.5YR/ 5/8	5	RM	PL	Silty loam	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Organic Bodies (A6) **(LRR P, T, U)**
- 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- Muck Presence (A8) **(LRR U)**
- 1 cm Muck (A9) **(LRR P, T)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Coast Prairie Redox (A16) **(MLRA 150A)**
- Sandy Mucky Mineral (S1) **(LRR O, S)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) **(LRR P, S, T, U)**
- Polyvalue Below Surface (S8) **(LRR S, T, U)**
- Thin Dark Surface (S9) **(LRR S, T, U)**
- Loamy Mucky Mineral (F1) **(LRR O)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Marl (F10) **(LRR U)**
- Depleted Ochric (F11) **(MLRA 151)**
- Iron-Manganese Masses (F12) **(LRR O, P, T)**
- Umbric Surface (F13) **(LRR P, T, U)**
- Delta Ochric (F17) **(MLRA 151)**
- Reduced Vertic (F18) **(MLRA 150A, 150B)**
- Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF1 2) **(LRR T, U)**
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ **No X** ____

Remarks:

Some oxidation has occurred and some concretions observed, but little change b/w colors

Area only gets wet during storms from overland/surface runoff from culverts/swales

Not a wetland area, but both soil and vegetation are very borderline and area supports some hydrophytic plant species due to the runoff that occurs during storm events. This portion of the site is disturbed and debris has been discarded within this area.