Environmental Assessment

Exploration and Production of Four Oil and Gas Wells from the Couba Island Field Adjacent to the Barataria Preserve of Jean Lafitte National Historical Park and Preserve

Jefferson Parish, Louisiana

April 2003

Revised November 2003

This document was prepared by C.H.Fenstermaker and Associates for the National Park Service in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) Regulations on implementing NEPA (40 Code of Federal Regulations 1500-1508)

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1.0 Introduction

C.H. Fenstermaker and Associates, under the guidance of the National Park Service, U.S. Department of the Interior (NPS), has prepared this Environmental Assessment (EA), on behalf of Aspect Energy, LLC, for the proposed exploration and production of four (4) independent oil and gas wells near the Barataria Preserve of Jean Lafitte National Historical Park and Preserve. The proposed action includes a drilling slip with associated improvements including mooring pile clusters, drilling equipment, production facilities, pipelines, and temporary living quarters. The facilities would be used for exploration and production of oil and gas from the Couba Island Field. The intent of this EA is to assess and disclose the known and potential environmental consequences, both beneficial and adverse, associated with the proposed action.

This section (*Section 1.0*) describes the proposed action and presents the purpose of and need for the proposed action. *Section 2.0* discusses the impact topics. *Section 3.0* describes the alternatives to the proposed action that were analyzed for the EA, and identifies operational and environmental criteria that were used to evaluate and compare the alternatives. *Section 4.0* discusses the potentially affected environment and potential environmental issues that are the focus of the EA, while *Section 5.0* identifies and analyzes the potential environmental consequences *Section 6.0* discusses associated mitigation measures. *Sections 7.0* through *10.0* present additional information required by the NEPA process.

1.1 Purpose of and Need for the Proposed Action

The National Environmental Policy Act (NEPA) applies to "major federal actions" and requires agencies to examine the environmental consequences of their proposed actions. Several types of federal actions trigger the requirements of NEPA, including those actions that require a federal permit, license or approval. If any action has the potential to cause environmental impact, the NEPA process must be completed before a decision is made.

The purpose of this EA is to evaluate the alternatives for the National Park Service (NPS) to determine whether or not the operation proposed by Aspect Energy, LLC to directionally drill and produce four oil and gas wells with bottom hole locations within the Barataria Preserve of Jean Lafitte National Historical Park and Preserve qualifies for an exemption under Section 9.32(e) of the NPS nonfederal oil and gas regulations as outlined in 36 CFR Part 9, Subpart B.

The National Park Service controls nonfederal oil and gas development in parks through the 36 CFR 9B regulations, which apply to all activities associated with bona fide nonfederally owned oil and gas rights within any unit of the System where “access is on, across, or through federally owned or controlled lands or waters”(36 CFR § 9.30(a)). The Service's jurisdiction under these regulations does not extend to *any activities occurring outside park*

boundaries, even if such activities are associated with a nonfederal oil and gas operation occurring inside a park.

Section 9.32(e) of the NPS nonfederal oil and gas regulations governs operators that propose to develop their nonfederal oil and gas rights in a park by directional drilling of a well from a surface location outside unit boundaries through or to a location under federally owned or controlled lands within park boundaries. It is limited in scope to those aspects of the directional drilling operation occurring *within park boundaries*. As promulgated, it does *not* provide a means for the NPS to assert regulatory authority under the 9B regulations over surface and subsurface operations occurring *outside* park boundaries. If the NPS Regional Director is able to determine from available data that the proposed drilling operation under the park poses *"no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence, fracture of geological formations with resultant fresh water acquifer [sic] contamination or natural gas escape or the like"* then operators may obtain an exemption from the 9B regulations under §9.32(e).

The regulations define operations as *"all functions, work and activities within a unit in connection with exploration for and development of oil and gas resources, the right to which is not owned by the United States..."*(36 CFR §9.31(c)). The potential impacts considered relate only to effects on park resources from downhole activities occurring within the boundary of the park, not threats to park resources associated with the operation outside park boundaries.

Granting an exemption under §9.32(e) may be triggered either by a request by an operator or by the Regional Director. If a Regional Director determines that the portion of a directional drilling operation occurring inside a park poses "no significant threat of damage to park resources," then the Regional Director must grant an exemption; it is non-discretionary.

Because the Regional Director's determination to grant a regulatory exemption is considered a federal action, the NPS must comply with the National Environmental Policy Act in the case of a §9.32(e) application submittal. Therefore, the primary focus of this NEPA document is to 1) identify and disclose to the public the potential environmental effects of the proposed downhole operations on park resources, and 2) disclose the framework that the NPS will follow in determining if the proposed operation qualifies for a regulatory exemption under §9.32(e).

When Congress established Jean Lafitte National Historical Park and Preserve on November 10, 1978 (Public Law 95-625), surface ownership within the area was acquired by the U.S. government. Private entities retained the subsurface mineral interests on these lands. Thus, the federal government does not own any of the subsurface oil and gas rights in the park, yet the NPS is required by its laws, policies and regulations to protect the park from any actions, including oil and gas operations, that may adversely impact park resources and values. Jean Lafitte National Historical Park and Preserve was created "to preserve for the education, inspiration and benefit of present and future generations significant examples of natural and

historical resources of the Mississippi Delta region …" The park's enabling legislation also enumerates certain values that are to be protected within the 20,000 acre Barataria Preserve site. Those values include a) fresh water drainage patterns, b) vegetative cover, c) integrity of biological and ecological systems and d) water and air quality.

As outlined in 36 CFR Part 9, Subpart B, C.H. Fenstermaker and Associates submitted a request for a regulatory exemption on behalf of Aspect Energy, LLC for the exploration and production of four (4) oil and gas wells in the Couba Island Field on September 4, 2003. The NPS reviewed the application materials and determined the request to be substantially complete on October 28, 2003. Aspect Energy, LLC has revised the original proposed surface operation to a location outside of the park boundary, as per the NPS recommendations. The NPS must decide whether to approve the proposal and if additional mitigation measures are needed.

1.2 Background/Scoping/Issues

This EA addresses the proposed construction and associated impacts of 4 independent oil & gas wells for exploration and production of the Couba Island Field. The Couba Island Field is located below the Northeastern banks of Lake Salvador, Couba Island, Bayou Bardeaux, the majority of the Barataria Preserve, and the southeastern banks of Lake Cataouatche. The exploration and extraction of oil and gas minerals is proposed to address the continuous demand of petroleum products by the people of United States of America.

The Couba Island Field was discovered in 1957 and has produced more than 4 million barrels of oil and 12 billion cubic feet of gas. The majority of the oil production has come from the interval between 6000-7500 feet below the surface, while nearly all the recorded gas production is from below 10,000 feet. During the mid 1970's the National Park Service acquired the surface lands covering a large portion of the Couba Island Field area. Since the inception of the Barataria Preserve, oil and gas activity has slowed to nearly a standstill. In the late 1990's interest in the field was rejuvenated and the field was identified as a suitable candidate for 3-D seismic imaging. A 3-D study was performed on the field and many new oil and gas deposits were identified.

The targets identified through the seismic and subsurface well control are all below 10,000 feet. Reaching these targets with vertical wells would be very difficult due to the sensitive nature of the area. Directional drilling is the most feasible least damaging alternative available to develop the remainder of the field.

All of the bottom hole well locations fall under delicate floatant marsh within the boundaries of the Bartaraia Preserve. . Because of their proximity to these sensitive park resources, the bottom hole locations can best be reached from drilling directionally from surface locations several thousand feet away. Consequently the surface locations were selected with these factors in mind. In particular, the proposed surface location was chosen in an open water area that did not require impact to sensitive marshes, allowed easy access, and was outside

of the park boundary. Verification of this location as the least damaging, yet feasible alternative was achieved through project scoping with the NPS, U.S. Army Corps of Engineers, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Natural Resources, the National Marine Fisheries Service and Jefferson Parish Department of Environmental Affairs.

1.3 Description of the Proposed Action

The proposed action is to drill and produce four (4) oil/gas wells and conduct related surface activities outside the boundary of the Barataria Preserve of Jean Lafitte National Historical Park and Preserve, located in Jefferson Parish, Louisiana. The well sites are located as follows:

- City of New Orleans No. 1 Well — Lat. 29°48'49.7" Long. 90°09'50.9"
- Louisiana Land & Exploration No. 1 Well, — Lat. 29°48'48.2" Long. 90°09'58.5"
- Louisiana Land & Exploration No. 2 Well — Lat. 29°48'48.9" Long. 90°09'54.7"
- Louisiana Land & Exploration No. 3 Well — Lat. 29°48'50.5" Long. 90°09'47.0"

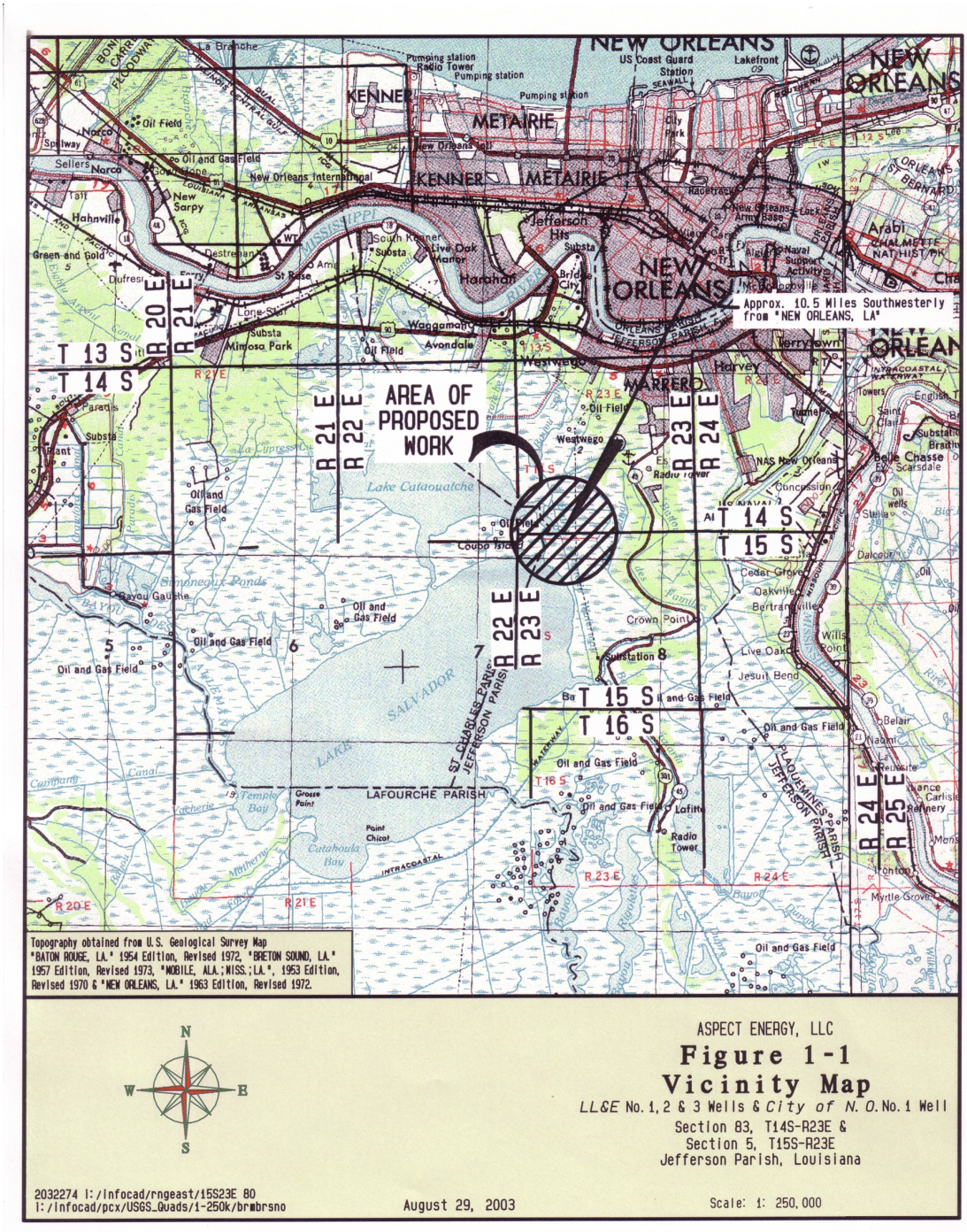
City of New Orleans No. 1 Well, LL&E No. 1, 2, and 3 Wells are to be located in Section 5 T14S-R23E, approximately 10 miles southwest of New Orleans, Jefferson Parish Louisiana. All four wells will be drilled from one 1655' x 160' slip. This slip will be created in an area that is outside of the park boundary.

The **Central Production Facility**, serving the City of New Orleans No. 1 Well, LL&E No. 1, 2, and 3 Wells, will be located within the well slip area. This facility will contain production and storage equipment.

1.4 Objectives of Taking Action

The three objectives of this project are as follows:

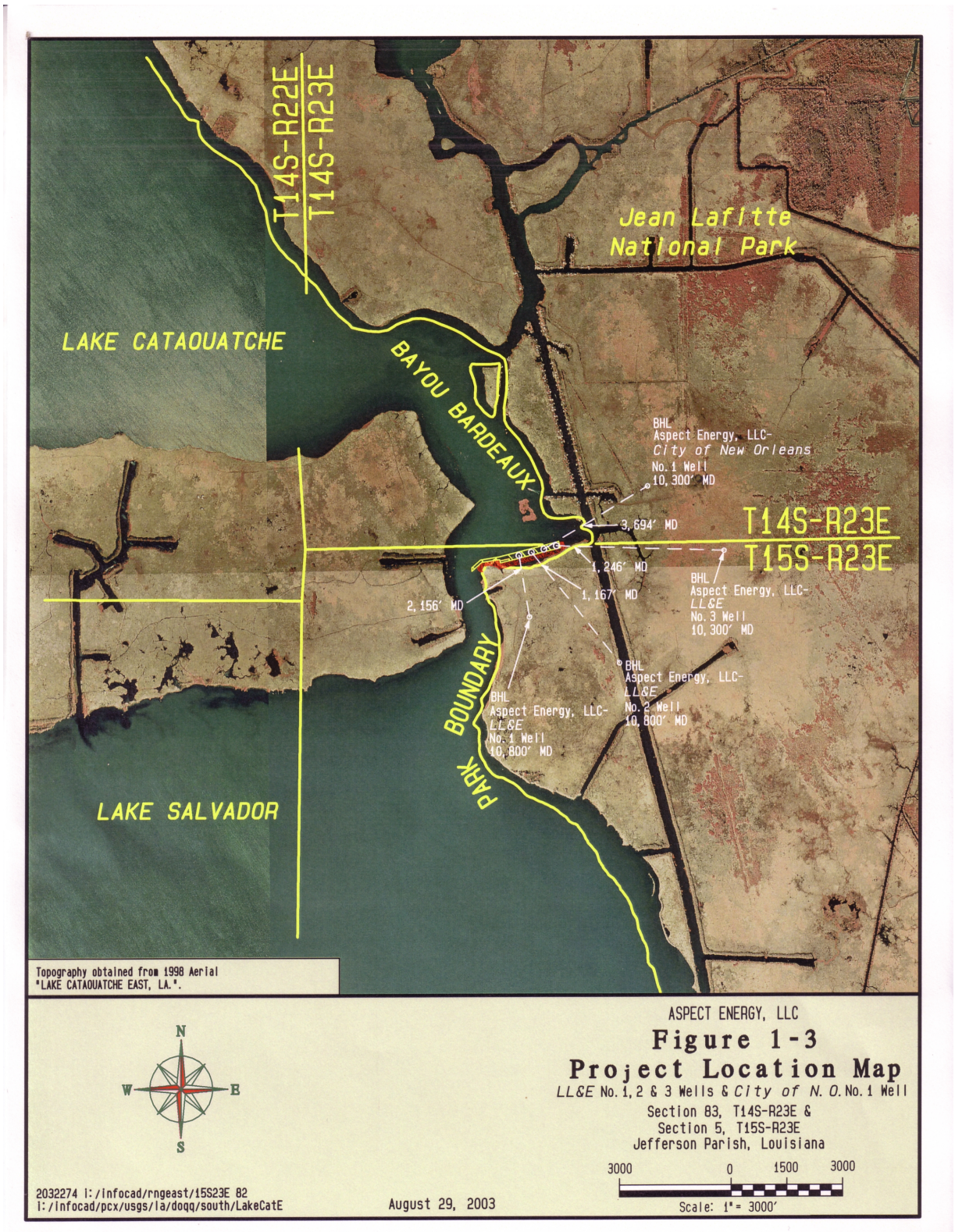
1) Provide Aspect Energy, LLC, as the holder of nonfederal oil and gas mineral interests, reasonable access for exploration and development.
2) Avoid or minimize impacts on park resources and values, visitor use and experience, and human health and safety.
3) Prevent impairment of park resources and values.


AREA OF PROPOSED WORK
NEW ORLEANS
METAIRIE
KENNER
Approx. 10.5 Miles Southwesterly from "NEW ORLEANS, LA"
T 13 S
T 14 S
T 15 S
T 16 S
R 20 E
R 21 E
R 22 E
R 23 E
R 24 E
R 25 E
Lake Cataouatche
Barataria Bay
LAFOURCHE PARISH
ST CHARLES PARISH
JEFFERSON PARISH
PLAQUEMINES PARISH
Topography obtained from U.S. Geological Survey Map "BATON ROUGE, LA." 1954 Edition, Revised 1972, "BRETON SOUND, LA." 1957 Edition, Revised 1973, "MOBILE, ALA.; MISS.; LA.", 1953 Edition, Revised 1970 & "NEW ORLEANS, LA." 1963 Edition, Revised 1972.
N
W
E
S
ASPECT ENERGY, LLC
Figure 1-1
Vicinity Map
LL&E No. 1, 2 & 3 Wells & City of N. O. No. 1 Well
Section 83, T14S-R23E &
Section 5, T15S-R23E
Jefferson Parish, Louisiana
2032274 I:/infocad/rngeast/15S23E 80
I:/infocad/pcx/USGS_Quads/1-250k/brnbrsno
August 29, 2003
Scale: 1: 250,000

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Jean Lafitte
National Park
PARK BOUNDARY
PARK BOUNDARY
LAKE CATAOUATCHE
LAKE SALVADOR
COUBA ISLAND
BARATARIA
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
Topography obtained from U.S. Geological Survey Quadrangles
"LAKE CATAOUATCHE EAST, LA." 1982 Photoinspected, 1972 & 1979 Photorevised
"BERTRANDVILLE, LA." 1966 Edition, "BARATARIA, LA." 1973 Edition &
"LAFITTE, LA." 1973 Edition.
N
W
E
S
ASPECT ENERGY, LLC
Figure 1-2
Site Map
LL&E No. 1, 2 & 3 Wells & City of N. O. No. 1 Well
Section 83, T14S-R23E &
Section 5, T15S-R23E
Jefferson Parish, Louisiana
6000 0 3000 6000
Scale: 1" = 6000'
2032274 I:/infocad/rngeast/15S23E 81
I:/infocad/pcx/usgs/la/drg/south
August 29, 2003

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T14S-R22E
T14S-R23E
Jean Lafitte
National Park
LAKE CATAOUATCHE
BAYOU BARDEAUX
BHL
Aspect Energy, LLC-
City of New Orleans
No. 1 Well
10,300' MD
3,694' MD
T14S-R23E
T15S-R23E
1,246' MD
1,167' MD
2,156' MD
BHL
Aspect Energy, LLC-
LL&E
No. 3 Well
10,300' MD
BHL
Aspect Energy, LLC-
LL&E
No. 2 Well
10,800' MD
BHL
Aspect Energy, LLC-
LL&E
No. 1 Well
10,800' MD
BOUNDARY
PARK
LAKE SALVADOR
Topography obtained from 1998 Aerial
"LAKE CATAOUATCHE EAST, LA.".
N
W
E
S
ASPECT ENERGY, LLC
Figure 1-3
Project Location Map
LL&E No. 1, 2 & 3 Wells & City of N. O. No. 1 Well
Section 83, T14S-R23E &
Section 5, T15S-R23E
Jefferson Parish, Louisiana
3000 0 1500 3000
Scale: 1" = 3000'
2032274 I:/infocad/rngeast/15S23E 82
I:/infocad/pcx/usgs/la/doqq/south/LakeCatE
August 29, 2003

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2.0 Impact Topics

The NPS met with Aspect Energy, LLC, and its contractor, C.H. Fenstermaker and Associates, early in the planning and development of this operation in order to identify resources, values and other concerns that could be potentially impacted by drilling and producing the four targeted wells. Early input from other federal, state, and local agencies was also sought. Scoping with the U.S. Fish and Wildlife Service, NOAA National Marine Fisheries Service, Louisiana Department of Natural Resources and the Jefferson Parish Department of Environmental Affairs involved contacts by telephone, meetings and field visits to the proposed project location adjacent to the Barataria Preserve. Scoping involved defining appropriate alternatives, mitigation measures and identification of major issues.

2.1 Impact Topics Identified:

Based on project scoping with other federal, state and local agencies, the following park resources, values and other concerns have been identified for evaluation in this EA:

Nonfederal oil and gas development
Geology, topography, soils and subsidence
Air quality
Noise
Water resources
Hazardous materials
Wetland vegetation
Wildlife
Threatened and endangered species
Cultural and archeological resources
Visitor use and experience

2.2 Impact Topics Eliminated from Further Analysis

The following topics have been eliminated from further analysis for the reasons described.

2.2.1 Demographics

The proposed action would result in a temporary increase of approximately 5-20 persons during the construction and drilling phases of the operation. These persons would likely not relocate their housing to Jefferson Parish as a result of the proposed work. No significant impacts to the demographics of the overall region, or to Jefferson Parish are anticipated as a result of the proposed oil and gas exploration and production.

2.2.2 Economic activity

Implementation of the proposed action would have a minor positive effect on the local economy, employment, income, and tax revenues. Project construction activities would generate additional employment, income, and sales tax revenues in the area over the short term. Over the long term, very little effect on the local economy, employment, and income will take place. Any effect would be positive. No significant adverse impacts to the local economy, employment, or income would be anticipated as a result of the implementation of the proposed action.

2.2.3 Environmental Justice

The Barataria Preserve of Jean Lafitte National Historical Park and Preserve is not located within or adjacent to any Census Block Groups that are predominately minority or low-income communities, when compared to the overall racial/ethnic composition of Jefferson Parish or Lafitte, based upon the 1990 Census information. Low-income or minority populations would not be expected to be disproportionately and adversely affected as a result of the implementation of either of the intensity-level alternatives. In addition, no disproportionate environmental health or safety risks to children would be anticipated as a result of activities generally anticipated as a result of the implementation of either of the intensity-level alternatives.

The National Park Service has not directly or indirectly used criteria, methods, or practices that discriminate on the basis of race, color, or national origin in the preparation of this document. All reference material used to describe the existing environment and to evaluate potential environmental impacts are commonly available reference sources, and do not discriminate on the basis of race, color, or national origin.

2.2.4 Utilities

Local utilities would not be used during construction and operation of the proposed oil and gas activities adjacent to the Park's Barataria Preserve. Electricity, potable water, and natural gas will be either generated or extracted on site. A local refuse contractor will dispose of non-hazardous solid waste. Drilling fluids will be contained within a closed container system and disposed of at an EPA approved disposal site by the drilling contractor. Therefore, significant direct or indirect impacts to electricity, potable water, natural gas, or solid waste disposal services are not anticipated.

2.2.5 Police and Fire Protection

In the event of a catastrophic well control problem, NPS law enforcement rangers and the local police and fire departments would act as a first response team assessing the situation and establishing the necessary perimeter. An emergency well control company would be

brought in immediately to control the situation. Thus, no effect is anticipated to police and fire resources due to implementation of the proposed action.

2.3 Cumulative Impacts

Cumulative impacts are those changes to the physical, biological, and socioeconomic environments that would result from the combination of construction, operation and associated impacts resulting from the proposed action when added to other past, present, and reasonably foreseeable actions. Past projects, or those implemented or built before 2002, can be considered to be part of the existing conditions environment baseline presented in this EA. Included within the concept of past projects are all maintenance activities, land development projects, and other actions that occurred before detailed analysis began on this EA.

The construction of the proposed locations for exploration and production of oil and gas would result in the dredge cleanout of an open water area that has not already been developed or significantly altered by man. Only submerged aquatic vegetation will be impacted by this activity. All impacts will occur outside of the park boundary. These impacts will be mitigated for by either an on-site or off-site restoration project under the guidelines of LA Coastal Management Division and USACE. The mitigation project will take place either on site or within the Corps of Engineers designated hydrologic unit. Therefore, no net loss of wetlands or wildlife habitat will occur.

Impacts to physical resources related to construction activities, such as noise, air quality, and erosion would not contribute substantially to cumulative impacts since they are typically localized and temporary.

Because the proposed work area is located in the coastal zone, the LDNR – Coastal Management Division must certify that proposed projects located in the area are consistent with the policies and regulation set forth in the LCRP. Procedurally, the operator will have to provide an information packet that describes the proposed development. The Coastal Management Division requires that the operator follow the CUP process to provide this information. Submitting an application for a CUP does not imply that a CUP will be required; application is simply one step in following the Rules and Procedures for CUPs so the coastal zone will be protected. The State of Louisiana uses the USACE ENG Form 4345 permit application form for this process. The operator will ensure that activities directly affecting or conducted in the coastal zone will be carried out in a manner that is, to the maximum extent practicable, consistent with approved LCRP programs. As such, no significant long-term impacts to the geology, topography, or soils of the area should result.

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3.0 Alternatives

Two alternatives, A and B, are described and evaluated in this EA. An alternative location for surface operations that was considered during project scoping (Alternative C) has been described, but was dismissed from further analysis. An analysis for selecting the environmentally preferred alternative is also provided.

3.1 Alternative A. No Action

The No Action Alternative is required under NEPA and establishes a baseline for comparing the present management direction and environmental consequences of the action alternative. Under the No Action alternative, the wells would not be drilled.

3.2 Alternative B. Proposed Action (Preferred Alternative)

Under Alternative B, the NPS would provide an exemption to Aspect Energy under section 9.32(e) of the nonfederal oil and gas regulations for 4 oil and gas wells to be directionally drilled and produced from a surface location outside the boundary of the Barataria Preserve within Bayou Bardeaux (See Figure 3-1). This is considered the Preferred Alternative, since it minimizes direct impacts to park resources.

The four wells would be located in Section 5, Township 14 South, Range 23 East, approximately 10 miles southwest of New Orleans. Because of the projected total depths, the directional reach and the geo-pressured nature of the wells, the rig size required to obtain these targets will be substantial. It is anticipated that a minimum of 1500 HP rotary drilling rigs with 400,000 lb. hook load capacity and 1000 HP mud pumps will be necessary to reach the desired depths. A dredged slip measuring 1655’ x 160’, as well as an 827’ x 70’ access route would be excavated in order to directionally drill and conduct production related activities for the four wells. The dredged material would be placed on the south side of the slip at an elevation conducive to marsh establishment (approximately 1.5 feet above normal water levels). Stacking of dredged material in this manner would be designed to facilitate the establishment of emergent marsh and protect the adjacent marsh shoreline.

All four wells would be drilled from a single 1655’ x 160’ slip. This slip would be created in an open water area that is outside of the park boundary. In order to achieve adequate water depth in the slip area, approximately 41,714 cubic yards of material will be dredged. Dredged material will be placed on the south side of the slip to an elevation that is 1 to 1.5 feet above normal water levels. This elevation is considered to be conducive to marsh establishment. To help promote marsh establishment and to assist in spoil bank stability several marsh plant species that are indigenous to the area will be planted. In addition to the slip area, approximately 827’ x 70’ of water bottom will be cleaned out as necessary for access.

The proposed activities would require barges and support vessels as specified on the following table:

VESSEL	PURPOSE	NUMBER	HP	LENGTH	WIDTH	DEPTH	DRAFT
Rig barge	Transport	1	N/A	200 ft	54 ft	14 ft	7 ft
Tugs	Rig service	2-3	900	63 ft	22 ft	9 ft	7 ft
Tugs	Rig moves	2-3	1200	70 ft	26 ft	8 ft	7 ft
Crew boats	Personnel	2		42 ft	15 ft	5 ft	4 ft
Shale barges	1 at location, 1 at dock	2	N/A	120 ft	30 ft	7 ft	5 ft
Deck barges	Varies with service requirements	2-3	N/A	120 ft	30 ft	7 ft	5 ft

The **Central Production Facility**, serving the four wells would be located within the well slip area. This facility would contain production and storage equipment. In response to meeting the needs of an expanding program of minerals development with minimal impact on other resources, the proposed wells and production facilities will be managed to prevent off-site movement of contaminants as per federal, state, and local regulations. Upon cessation of operations, all structures, equipment, and debris will be removed from the site.

3.3 Alternative C. Considered but Dismissed from Further Analysis

During project scoping, an alternative location was considered for siting the proposed surface operations and production facilities (See Figure 3-2). For the reasons described, this alternative was dismissed from further analysis.

This alternative consists of the cleanout of a 1000 foot x 260 foot canal area within the Barataria Preserve and the construction of associated structures to directionally explore and produce four (4) oil/gas deposits located beneath the park. Hydraulic dredging would be used in the cleanout of the slip area. Approximately 6 inches of dredged sediments and material would be hydraulically pumped and sprayed onto the adjacent marsh areas. The remainder of the dredged material would be hydraulically pumped into an abandoned oil field canal, located immediately south of the project area. Although this alternative would allow for the establishment of surface operations that could effectively reach subsurface targets within reasonable safety and engineering risks, the operation would result in significant and direct impacts to park resources and the adjacent wetlands within the boundary of the Barataria Preserve.

3.4 Environmentally Preferred Alternative

Section 101 of NEPA states that "…it is the continuing responsibility of the Federal Government to…(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest

range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources" [42 U.S.C. Section 4321 et seq. Section 101 (b)].

The environmentally preferred alternative for drilling and producing the four wells from the Couba Island Field is based on these national environmental policy goals. Under Alternative A, No Action, the wells would not be drilled. Since there would be no oil and gas operations or subsequent impacts, Alternative A would provide the greatest protection of the area and the adjacent park resources and values. Alternative A meets all six of the criteria and is the environmentally preferred alternative.

Aspect Energy's proposal, Alternative B, would have greater effects on the environment because of the drilling and production operations. Although mitigating measures would reduce effects to park resources and values, there would still be effects, and therefore this alternative would not meet the nation's environmental policy goals as consistently as the No Action Alternative.

However, because the enabling legislation of Jean Lafitte National Historical Park and Preserve honors existing nonfederal oil and gas rights, the environmentally preferred alternative was not selected as the proposed action.

3.5 Analysis Summary

Table 3-1
Alternatives Analysis Results

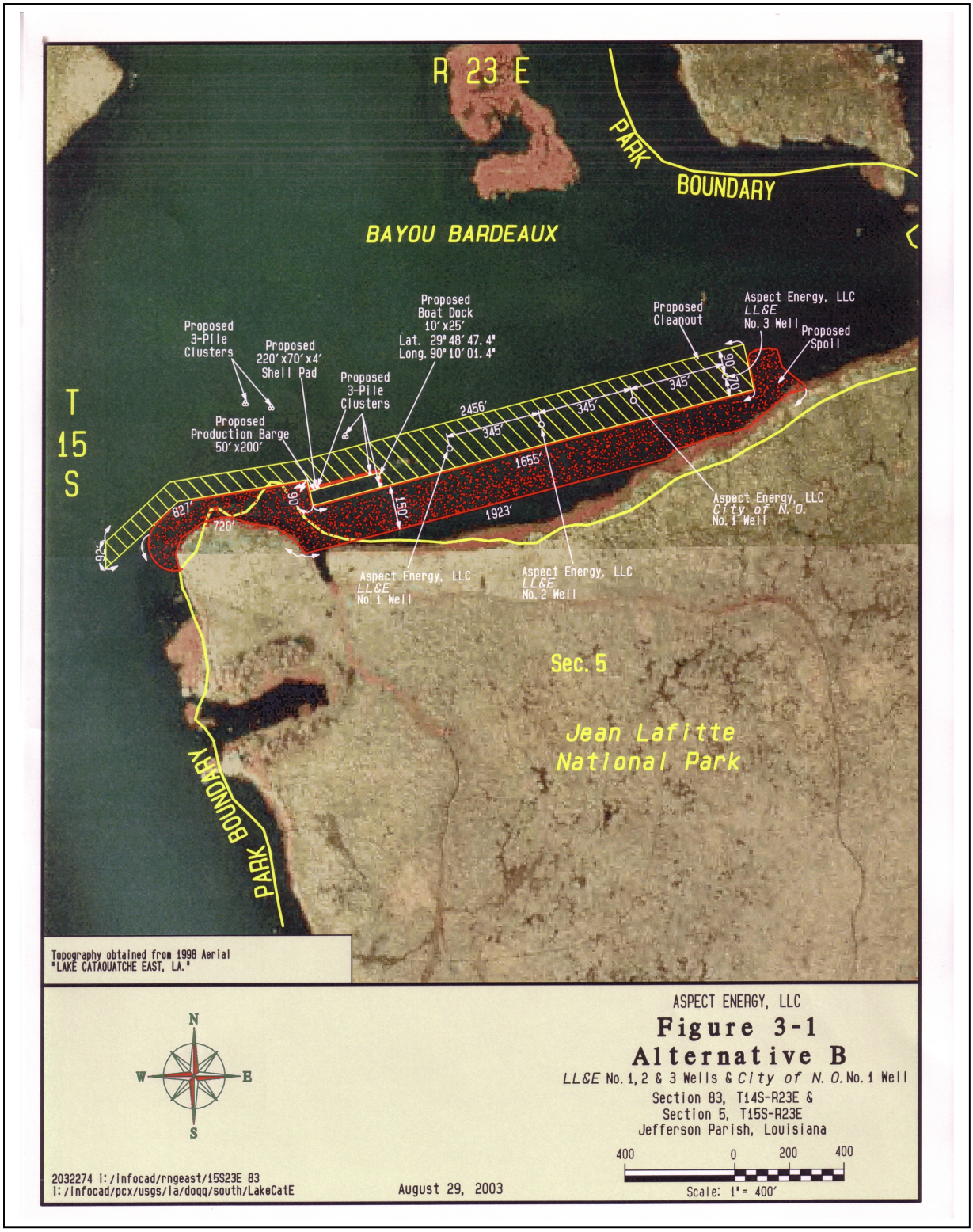
Objectives	Does Alternative A, No Action, Meet Objective?	Does Alternative B, Proposed Action, Meet Objective?
Provide Aspect Energy, LLC, as the holder of nonfederal oil and gas mineral interests, reasonable access for exploration and development	No The wells would not be permitted to be drilled, precluding Aspect Energy reasonable access to develop its nonfederal oil and gas mineral interests	YES The wells would be drilled and produced with the application of mitigation measures to meet other objectives
Avoid or minimize impacts on park resources and values, visitor use and experience, and human health and safety.	YES Without drilling the wells, there would be no impacts	YES Mitigation measures would avoid and minimize impacts
Prevent adverse impacts of park resources and values	YES Without drilling the wells, there would be no potential for park resources and values to be adversely impacted	YES Mitigation measures would prevent adverse impacts on park resources and values

Table 3-2
Comparative Summary of Impacts

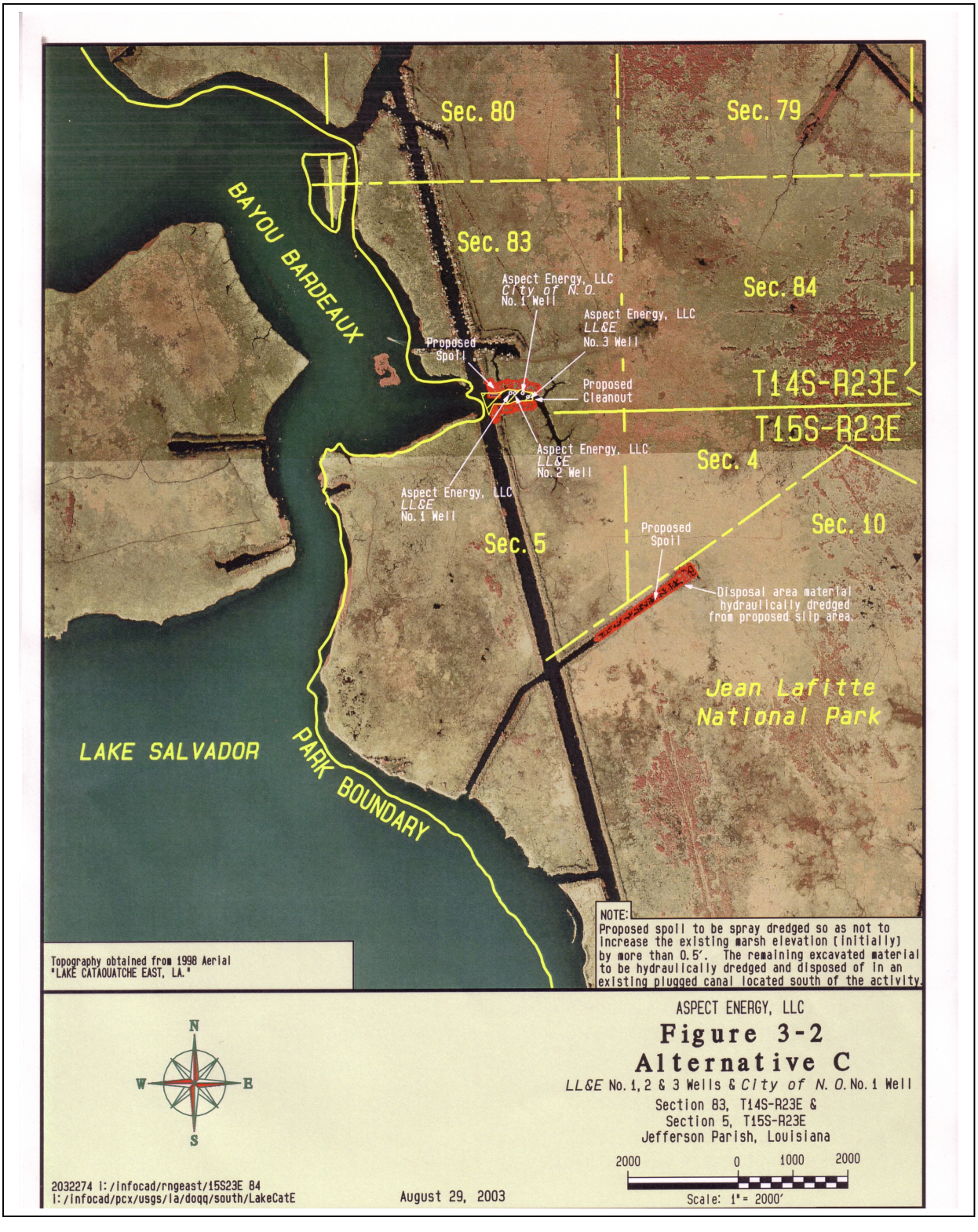
Impact Topic	Alternative A: No Action	Alternative B: Proposed Operation
Nonfederal oil and gas development	The Couba Island Field wells would not be drilled or developed, resulting in a negligible adverse impact on domestic energy supplies, and a moderate impact on Aspect Energy due to uncertainty about future exploration and development	The Couba Island Field wells would be drilled and if they produce hydrocarbons, could result in a negligible beneficial impact on domestic energy supplies
Geology, topography, soils and subsidence	The Couba Island Field wells would not be drilled. The proposed project area will not be disturbed; no new impacts on geology, topography and soils would occur.	Cumulative impacts on geology, topography, soils and subsidence throughout the park would be short to long term and remain minor in localized areas surrounding existing canals and park development. No impairment to this resource would result from implementation of this alternative.
Air quality	The Couba Island Field wells would not be drilled. The proposed project area will not be disturbed; no new impacts to air quality would occur.	Any increase in point source air emissions will be permitted and regulated as stipulated in State and Federal law. No significant impact on regional air quality would be anticipated.
Noise	The Couba Island Field wells would not be drilled. The proposed project area will not be disturbed; no new impacts due to noise would occur.	Long-term noise impacts to the general areas due to production activities would be slight (less than one dB) based on information contained in highway planning studies. Activities would generally produce noise levels from the low-50 to the mid-80 dB level, depending on the time of day and activities ongoing at the time. No significant impacts due to noise are anticipated.
Water resources	The Couba Island Field wells would not be drilled. The proposed project area will not be disturbed; no new impacts on water resources would occur.	A temporary increase in suspended sediments and turbidity would be experienced during the construction phase of the proposed project.
Hazardous materials	The Couba Island Field wells would not be drilled. The proposed project area will not be disturbed; no new impacts on geology, topography and soils would occur.	Through the appropriate use of equipment, good safety practices and the proper handling of extracted oil and gas the construction of the locations for oil and gas exploration and production are not expected to result in significant impacts

Comparative Summary of Impacts

Impact Topic	Alternative A: No Action	Alternative B: Proposed Operation
Wetland Vegetation	The Couba Island Field wells would not be drilled. Therefore no temporary or permanent impacts to submerged aquatic vegetation would be anticipated from existing conditions.	Submerged Aquatic Vegetation at the sites of the proposed drilling locations will be disturbed during excavation. The no longer needed portions of the slip area will be allowed to re-vegetate naturally. In the event that exploration was not successful, the entire project area will be allowed to re-vegetate naturally. These activities would not result in a significant loss of habitat or species diversity for the area.
Wildlife	The Couba Island Field wells would not be drilled. Therefore no temporary or permanent impacts to wildlife or wildlife habitat would be anticipated from existing conditions.	Wildlife would be expected to relocate to similar habitats in the area.
Threatened and endangered species	The Couba Island Field wells would not be drilled. Therefore no temporary or permanent impacts to threatened or endangered species, or candidate species would be anticipated from the existing conditions.	The USFWS have concurred that no threatened or endangered species, or candidate species, is known to exist near, or likely to be found near, the proposed project area.
Cultural and archeological resources	The Couba Island Field wells would not be drilled. Therefore no temporary or permanent impacts to archeological sites or historic properties would be anticipated from the existing conditions.	Coordination with the Louisiana Division of Archeology produced no known archeological sites or historic properties that will be affected by this undertaking.
Visitor use and experience	The Couba Island Field wells would not be drilled. Therefore no temporary or permanent impacts to visitor use and experience would be anticipated from existing conditions.	The site of the proposed activities is primarily open water areas. The construction site is very localized. Land use in and around the Park consists of three general categories: improved/other grounds, semi-improved grounds, and unimproved grounds. Hunting and fishing is allowed on the unimproved areas of the Park. During the approximately 120 days of drilling operations noise and physical activity from the operation may push game species away from the immediate area. Once the wells are on production, there will be very little disturbance around the locations. Drilling activities will occur in shallow water near the shoreline of Bayou Badeaux where very little boat traffic normally occurs. Although normal boating traffic may be slightly altered by oil and gas operations, it is not anticipated that a significant impact will occur.


R 23 E
PARK BOUNDARY
BAYOU BARDEAUX
T 15 S
Proposed 3-Pile Clusters
Proposed 220' x70' x4' Shell Pad
Proposed Boat Dock 10' x25' Lat. 29° 48' 47.4" Long. 90° 10' 01.4"
Proposed 3-Pile Clusters
Proposed Production Barge 50' x200'
Proposed Cleanout
Aspect Energy, LLC LL&E No. 3 Well
Proposed Spoil
2456'
345'
345'
345'
1655'
1923'
827'
720'
925'
Aspect Energy, LLC City of N.O. No. 1 Well
Aspect Energy, LLC LL&E No. 1 Well
Aspect Energy, LLC LL&E No. 2 Well
Sec. 5
Jean Lafitte National Park
PARK BOUNDARY
Topography obtained from 1998 Aerial "LAKE CATAOUATCHE EAST, LA."
N
W
E
S
ASPECT ENERGY, LLC
Figure 3-1
Alternative B
LL&E No. 1, 2 & 3 Wells & City of N. O. No. 1 Well
Section 83, T14S-R23E &
Section 5, T15S-R23E
Jefferson Parish, Louisiana
400 0 200 400
Scale: 1" = 400'
2032274 I:/infocad/rngeast/15S23E 83
I:/infocad/pcx/usgs/la/doqq/south/LakeCatE
August 29, 2003

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Sec. 80
Sec. 79
Sec. 83
Sec. 84
BAYOU BARDEAUX
Aspect Energy, LLC
City of N. O.
No. 1 Well
Aspect Energy, LLC
LL&E
No. 3 Well
Proposed
Spoil
Proposed
Cleanout
T14S-R23E
T15S-R23E
Aspect Energy, LLC
LL&E
No. 2 Well
Sec. 4
Aspect Energy, LLC
LL&E
No. 1 Well
Sec. 5
Proposed
Spoil
Sec. 10
Disposal area material
hydraulically dredged
from proposed slip area.
Jean Lafitte
National Park
LAKE SALVADOR
PARK BOUNDARY
NOTE:
Proposed spoil to be spray dredged so as not to increase the existing marsh elevation (initially) by more than 0.5'. The remaining excavated material to be hydraulically dredged and disposed of in an existing plugged canal located south of the activity.
Topography obtained from 1998 Aerial "LAKE CATAOUATCHE EAST, LA."
N
W
E
S
ASPECT ENERGY, LLC
Figure 3-2
Alternative C
LL&E No. 1, 2 & 3 Wells & City of N. O. No. 1 Well
Section 83, T14S-R23E &
Section 5, T15S-R23E
Jefferson Parish, Louisiana
2000 0 1000 2000
Scale: 1" = 2000'
2032274 I:/infocad/rngeast/15S23E 84
I:/infocad/pcx/usgs/la/doqq/south/LakeCatE
August 29, 2003

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4.0 Affected Environment

This section contains a description of the existing environment within the project area adjacent to the Barataria Preserve. It provides information to serve as a baseline from which to identify and evaluate environmental consequences resulting from the proposed action. Resources evaluated are presented in three major categories, which represent major environmental components of the area: physical, biological, and socioeconomic.

4.1 Physical Environment

New Orleans is located in southeastern Louisiana, approximately 178 miles (286 km) south of Jackson, Mississippi; 144 miles (232 km) west of Mobile, Alabama; and 356 miles (573 km) northeast of Houston, Texas. The city is situated between the Mississippi River and Lake Pontchartrain; and lies 93 river miles (150 km) above the point where the river empties into the Gulf of Mexico.*(Figure1-1).* The Barataria Preserve lies approximately 10.5 miles (16.9 km) southwest of the New Orleans central business district on approximately 20,000 acres (8,094 ha) near Crown Point, Louisiana, in Jefferson Parish *(Figure1-1)*

4.1.1 Earth Resources

4.1.1.1 Climate

New Orleans is located in a temperate region characterized by mild winters and hot, humid summers. The normal average daily temperature is 67.9 degrees Fahrenheit (F) (19.9 degrees Celsius [C]). The average annual rainfall in New Orleans is 61.9 inches (157.2 centimeters [cm]), with the winter months generally bringing wetter weather (Southern Regional Climate Center [SRCC], 1999).

4.1.1.2 Topography

The New Orleans area is flat, with a variance in elevation of 25 ft (8 m), from approximately 20 feet (6 m) above mean sea level (msl) to 5 feet (1.5 m) below msl. The terrain in and around the Barataria Preserve is flat, with an elevation differential ranging from approximately 3.0 feet (0.9 m) above msl to 2.0 feet (0.6 m) below msl (U.S. Navy, 1989b; reconfirmed 2001). The existing areas proposed for the new development are located in areas with an elevation range from 0.0 feet (0.0 m) to approximately 3.0 ft (0.91 m) (USGS, 1992a and 1966/Revised 1994).

4.1.1.3 Geology and Soils

The proposed activity is located near the outer margin of the Gulf Coastal Plain that dips seaward toward the Gulf of Mexico at three to six degrees. The dominant structural feature

within the Gulf Coastal Plain is the Mississippi Embayment. This broad area of subsidence has more or less coincided with the Mississippi drainage system since at least the Jurassic Period. Sedimentation along the gulf coast as result of this large drainage system and the resultant downwarping due to sediment loading has resulted in an abnormally thick sedimentary section here. Sedimentary thickness may approach 50,000 to 100,000 feet in the project area. This zone of thickening runs parallel to the continental shoreline and is known as the Gulf Coast Geosynclines (Murray, 1961). This extraordinary accumulation of sediments, including abundant reservoir quality sands, in conjunction with dynamic structural deformation accounts for south Louisiana being one of the largest oil and natural gas provinces in the nation.

The present deltaic plain of the proposed oil and gas exploration and production was fairly recently reworked during the Pleistocene and Holocene epochs of the Quaternary Period by fluvial action of the Mississippi River and by sporadic incursions of marine sedimentary influences. A primary factor in the development of the survey area' s geology and topography has been the ongoing process of diversion of the Mississippi River. River diversion occurs when overbank flows breach the natural levee system and create a major new crevasse splay of sediment and distributary channels. At least six of these geologically recent events are recognized as specific Mississippi River deltaic lobes. Of these, the St. Bernard and Lafourche ancestral deltas had the greatest impact upon the survey area's distributary pattern (Baumann and Adams, 1981).

These distributary channels arid sporadic marine incursions were primary factors in the formation of the soil types presently found within this general area. Soil formation and type are determined by a combination of parent material, topography, climate, soil organisms, vegetation and time. As defined and depicted by the U.S. Department's soil survey of Jefferson and St. Charles parishes, the preponderant soil in this large general area, including the Preserve, is the Kenner muck, a unit of the Kenner series. This is level, very poorly drained, semi fluid, organic soil common to freshwater marshes. It is flooded or ponded most of the time. The Kenner series of soils are rapidly to very rapidly permeable and formed from herbaceous plant material in freshwater marshes. The extreme northeastern portion of the current Preserve area lies along the edge of rising higher land to the north. The eastern margin of the Preserve is also represented by higher forested swampland. Here the soils present, along with the (Kenner muck, include the Allemand muck and the Barbary muck. The Allemand muck is level, very poorly drained semi fluid organic soil common to marshland. The Allemand series of soils are very slowly permeable and formed from moderately thick accumulations of decomposed herbaceous material and the underlying clayey alluvium. The Barbary muck is level, very poorly drained, semi fluid mineral soil common to swamps and commonly parallels natural levees. The Barbary series of soils formed from clayey alluvium and are very slowly permeable. Both are flooded or ponded most of the time. As land elevation rises just to the north of and along the east edge of the Preserve, other soils present Include the Commerce silty clay loam, Commerce silt loam, and Sharkey clay. These level, elongated, poorly to somewhat poorly drained, firm mineral soils occur in low to intermediate positions along natural levees. The Commerce series of

soils are moderately slow permeable and formed from loamy alluvium while the Sharkey series are very slowly permeable and formed from clayey alluvium. All soil series and associations in this area are hydric soils and therefore possess redoximorphic features common to this parameter of wetlands (U.S. Department of Agriculture, 1983 and 1987).

The pedogenic process within the proposed project area has been altered due to man-made flood control initiated in the early part of this century. This included the placement of levees along the present Mississippi River. Soil forming sediments from the fluvial action of overbank discharges have been replaced by pedogenic attributes of decomposing vegetation, especially in the interior freshwater marshes. Beneath the floating mat of vegetation, a zone of colloidal suspension comprised of decomposing plant debris exists which varies from 3 to 10 feet deep. The greater depths of this colloidal suspension are typically found in the freshwater marsh's interior.

4.1.2 Air Resources

The Environmental Protection Agency (EPA) has established primary and secondary standards known as the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), lead, particulate matter 10 micrometers or less in diameter (PM10), and sulfur dioxide (SO2). The NAAQS provide the framework for O3, CO, and particulate matter attainment provisions in Title I of the 1990 Clean Air Act Amendments. Under Title I, each state continues to have primary responsibility for assuring attainment of air quality standards through the State Implementation Plan (SIP). The Louisiana Department of Environmental Quality (LDEQ) was granted authority to administer this program in Louisiana, and has adopted the standards presented in Table 4-1 for the air quality program.

Table 4-1
National Ambient Air Quality Standards (NAAQS)
for Criteria Pollutants

Pollutant	Time Frame	Value (ppm*)	Standard Value ($\mu g/m^3$**)	Type
Carbon Monoxide (CO)	8-Hour Average	9	10	Primary
	1-Hour Average	35	40	Primary
Nitrogen Dioxide (No_2)	Annual Arithmetic Mean	0.053	100	Primary and Secondary
Ozone	1-Hour Average	0.12	235	Primary and Secondary
Lead	Quarterly Average		1.5	Primary and Secondary
Particulate < 10 Micrometers (PM-10)	Annual Arithmetic Mean		50	Primary and Secondary
	24-Hour Average		150	Primary and Secondary
Sulfur Dioxide	Annual Arithmetic Mean	0.03	80	Primary
	24-Hour Average	0.14	365	Primary
	3-Hour Average	0.50	1300	Secondary

* parts per million
** micrograms per cubic meter

Source: LDEQ, 1999a.

The 1990 Clean Air Act (CAA) Amendments define how the EPA and states designate regions as attainment, nonattainment, maintenance, or unclassifiable with respect to NAAQS. The Amendments allow a redesignation if justified by air quality measurements, but require the state to submit an approved maintenance plan showing that the NAAQS will be maintained for at least 10 years. SIPs must address pollution control for clean air areas (to maintain air quality), and for areas that are in violation of the NAAQS (to assure that ambient standards are attained in the future). Inventories are required for all pollutants that are precursors to the pollutants regulated under the NAAQS. A broad category of chemicals called volatile organic compounds (VOCs) contributes to ozone nonattainment. Nitrogen oxide (NOx) emissions can also contribute to ozone concentrations through complex interactions with VOCs. Both of these pollutants therefore contribute to ozone nonattainment and would be listed in an ozone non-attainment inventory.

Jefferson Parish is currently designated as an attainment area for the criteria pollutants CO, NO2, SO2, O3; and unclassifiable-attainment for lead (Pb) and PM10 (LDEQ, 2001a). The new federal standard for ozone has been established at a level equivalent to 85 parts per billion (ppb), averaged over any 8-hour period (40 Code of Federal Regulations [CFR] 50). A community will meet the eight-hour standard when the three-year average of the annual fourth-highest daily maximum eight-hour concentration measured at each monitoring site is less than 85 ppb. The closest air monitoring station is New Orleans City Park, where the fourth highest 8-hour average for 1997 was 89 ppb. The EPA has evaluated the ozone readings for 1997 through 1999 in the year 2000, and determined that Jefferson Parish is in attainment of the new standard (LDEQ, 2001a).

In the case of oil and gas operations, typical sources of criteria pollutants requiring permitting are from gas flaring due to well testing and those associated with production/processing facilities. Facility operations resulting in emissions may include the various sources of fuel combustion, glycol dehydration, fugitive emissions, flash gas losses, waste gas disposal, standing/working losses from tanks, and loading losses.

LDEQ refers to any and all origins of air contaminants as Point Source Emissions and each Point Source Emission is required to be permitted. An Emission Inventory is required for each one. This is a tabulation of data detailing the types, amounts, quantities, and sources of the emissions. An Emission Inventory is submitted with an air permit application.

4.1.3 Water Resources

During modern time, both natural and anthropogenic changes have altered the hydrology and chemistry of the Barataria Basin. Elimination of overbank flooding, levee construction, canal construction, and agriculture have combined to alter the basin from a flow-through estuary to an estuary where hydrology and chemistry are largely determined by precipitation and tides. Elimination of overbank flooding by levees along the Mississippi River has reduced the sedimentary input to the detrital-based food chain of these coastal freshwater

marshes. Canal construction has increased flow through rather than across the freshwater marsh and circumvented the natural assimilative capacity of these marshes. Spoil banks associated with dredged canals further exacerbate the lack of natural sheet flow over the marshes additionally reducing assimilative capacity. These hydrological alterations are subsequently passed on through the trophic levels of the existing food chain. Presently, re-suspended bay bottom sediments and decomposing vegetation are the major sources of detrital input to these marshes. The abnormally low amounts of rainfall the past few years, including the year 2000, within producing organisms and oxygen consuming organisms and is one of the most important parameters affecting a freshwater aquatic ecosystem. Sufficient concentrations of dissolved oxygen are necessary to sustain a healthy and diverse assemblage of invertebrates and fish. The Environmental Protection Agency criteria for dissolved oxygen is 5 parts per million for most warm water organisms. Below this level impairment in reproduction and life stages occur. Concentrations below 4 parts per million can cause acute mortality in many freshwater aquatic organisms (United States Environmental Protection Agency, 1986).

Average dissolved oxygen concentrations for the two sites along the Kenta Canal were 5.3 and 5.2 parts per million respectively. One of these sites fell below this threshold level for acute mortality to fish and macro-invertebrates on four occasions during July and August of 1981 and February of 1982. The other location also dropped below this minimum level from July through September of 1981. Sampling along the Segnette Canal possessed higher dissolved oxygen concentrations averaging 7.5 and 7.9 parts per million annually; however, both fell, below or equaled this threshold limit causing acute mortality to fish and macro-invertebrates from July to September of 1981.

Other physiochemical constituents of the water column here were in acceptable ranges according to the standards set by the United States Environmental Protection Agency (1986). These water quality parameters include turbidity, pH, biochemical oxygen demand and nitrates. Phosphorus, however, was above the limits prescribed by the United States Environmental Protection Agency (1986).

Average annual phosphorus concentrations for the two locations along the Kenta Canal were 0.79 and 1.22 parts per million and 0.63 and 2.2 parts per million along the Segnette Canal. The Environmental Protection Agency standards for total phosphates as phosphorus should not exceed 0.05 parts per million in any stream at the point where it enters a lake or reservoir (United States Environmental Protection Agency, 1986). Elevated levels of phosphorous can stimulate excessive or nuisance growth of algae and lead to accelerated eutrophication. Phosphorus concentrations above 0.001 parts per million have been reported as lethal levels for important marine and estuarine species and also may result in significant bioaccumulation (United States Environmental Protection Agency, 1976).

Phytoplankton numbers were relatively low at all sites ranging from 1.8 cells/Liter to 1,700 cells/Liter in the Segnette Canal. By comparison approximately 1,000,000 cells/Liter constitutes an algal bloom. Overall community diversity for phytoplankton was low at all

three sites, and all sites were dominated by a small number of genera. These included Cyclotella sp., Agmenellum sp., Anacystis sp., Oscilitoria sp., Scenedesmus sp., Melosira sp., and Lyngbya sp., which are moderately pollution tolerant organisms (United States Environmental Protection Agency, 1973).

Benthic macro-invertebrates are organisms that live at least part of their life attached or resting on available substrates in an aquatic environment. Like phytoplankton, species of the benthic community have been used as indicators of water quality. Sampling locations in the Kenta and Segnette Canals were dominated by Bezzia sp., Probezzia sp., Chaoborus sp., Garnmarus sp., Chironomus sp., and Gleodichonomus sp. that may tolerate somewhat degraded environments. This does not unequivocally mean the canals and open water areas are excessively polluted; however, it is notable that the obligate aquatic organisms present here are those near the base of the food web, which are able to tolerate adverse conditions.

4.1.4 Hazardous Materials Issues

Several existing pipelines, regional oil production and hazardous materials transport activities all pose a potential risk to the Barataria Preserve. The Gulf Intracoastal Waterway along the southern boundary of the Preserve, as well as two state highways that border and enter the Park all serve as pathways for commercial hazardous waste carriers. Louisiana Department of Environmental Quality has identified a 3.3 acre residental property along state highway 301 as an area of interest for hazardous wastes. This area is currently being mitigated and is expected to attain site closure status by the end of November 2003. The Park is also required to maintain a hazardous materials inventory for small quantities of products utilized for routine maintenance operations at each site.

Although the proposed operation will be exempt for hazardous materials on the sites by RCRA Regulations, the drilling location and facilities are covered by The Emergency Planning and Community Right to Know Act (EPCRA) and must submit an emergency and hazardous chemical inventory form to the LEPC, the SERC and the local fire department annually. Facilities provide either a Tier I or Tier II form. Louisiana requires the Tier II form. Tier II forms require basic facility identification information, employee contact information for both emergencies and non-emergencies, and information about chemicals stored or used at the facility. The following information is required for each chemical:

- The chemical name or the common name as indicated on the MSDS;
- An estimate of the maximum amount of the chemical present at any time during the preceding calendar year and the average daily amount;
- A brief description of the manner of storage of the chemical;
- The location of the chemical at the facility; and
- An indication of whether the owner of the facility elects to withhold location information from disclosure to the public.

The Environmental Protection Agency (EPA) regulates spill prevention, countermeasure, and control practices for offshore Oil & Gas Production and Storage Facilities. All offshore facilities are required by EPA to at a minimum, have one of the following oil spill prevention systems in place or its equivalent:

- Curbing or drip pans; or
- Sumps and collection systems

These methods prevent and control small oil discharges around pumps, glands, valves, flanges, expansion joints, hoses, drain lines, separators, treaters, tank, and associated equipment. All discharged material collected should be routed to a sump system to prevent discharge from the facility. Where sump systems are not practical, collected oil must be removed as often as necessary to prevent overflows from the collection system. EPA also requires that all storage tanks have high level sensing devices, which shut in all production and sounds an alarm when triggered. Tanks are also required to have adequate cathodic protection to prevent corrosion. The regulations require all flowlines to be wrapped in a protective coating, cathodically protected, or painted and have functioning pressure safety sensors to prevent over-pressuring of the line.

This facility is considered an offshore facility and therefore requires a Facility Response Plan. The Facility Response Plan contains written procedures for inspecting and testing pollution prevention equipment at the facility as well as exercises for spill control and countermeasure. All inspections and exercises must be recorded and maintained within the Plan for a minimum of five years. The Response plan also contains information that personnel are to use in response to a spill event of any magnitude including events that require an evacuation.

Facilities that barge oil offsite fall under the jurisdiction of the United States Coast Guard (USCG). These facilities are required to prepare and implement an Operations of Transfer Manuel before being allowed to transfer by USCG.

USCG requires facilities to implement various safety practices to prevent oil spill during transfer operations. Safety measures for transfer operations include: properly labeling and pressure testing transfer piping and hoses, placing locks and chains on transfer valves, utilizing intrinsically safe radios, having adequately sized drip pans to catch discharges, 1000’ of containment boom within 1 hour of the facility in case of discharges, and maintaining adequate lighting for night time transfers. USCG also requires that terminal ends of transfer piping be capped or blank flanged when not in use.

4.2 Biological Environment

4.2.1 Vegetation

Three hundred thirty-five species of herbaceous and woody plants are known to exist within the Barataria Preserve of Jean Lafitte National Historical Park and Preserve; however, a small number of species account for the majority of the vegetative cover (White, 1988). *(Appendix B)* lists the most common species encountered in the survey's predominant environment, which is represented by freshwater marsh, canals and canal spoil banks.

Within the Barataria Preserve area there are four primary vegetative land cover classifications. These and their approximate proportional percentage are bulltongue/spike-rush is the predominant freshwater marshes (70%), wax myrtle in the scrub-shrub wetlands (20%), and forested transitional overstory along natural levees, spoil banks and particularly along the east side of the Preserve (less than 10%).

The dominant community near the proposed project area is freshwater marsh subtended by a floating mat. Primary species of the marsh community include bulltongue and maidencane with interspersed assemblages of wax myrtle. Other small, isolated assemblages include cattail and possibly some saltmeadow cordgrass. The herbaceous species listed in *(Appendix B)* cover over 80 percent of the surface area within the Park's freshwater marshes.

Open waters of canals possess floating aquatic vegetation such as water hyacinth, duckweed and mosquito fern. Dominant submerged aquatic plants include coontail, eurasian milfoil, tape grass, and carolina fanwort. Interior open water areas within the freshwater marsh occasionally contain white water lily.

The majority of the overstory vegetation in the area occurs just north of the Preserve. A portion of this higher forested area to the north and east extends into the northern edge of and along the eastern margin of the Preserve. Palustrine, forested, permanently flooded areas commonly contain bald cypress, water tupelo and red maple in the overstory with dwarf palmetto locally in the understory. Linear-aligned overstory communities are common along natural levees and spoil banks of canals within the proposed project area. Species here include red maple, boxelder, black willow, water oak, live oak, water tupelo, and bald cypress. A pure stand of Chinese tallow tree exists along the northern half of Bayou Segnette as well as being widespread throughout the park.

Submerged aquatic vegetation on the site of the proposed locations consists of primarily Eurasian milfoil, coontail, and tape grass.

4.2.2 Wildlife

The wildlife found in southeastern Louisiana is a diverse assemblage. The species of animals and their abundance found in a specific area are determined by the availability of habitat that meets the species' requirements. Some species are habitat generalists, and may be found commonly in several habitat types. Some species are habitat specialists, and are found only in one habitat type. Other species often are limited to areas that have been altered by human activity and are not found in areas having native habitat. Lists of mammals, birds, reptiles, amphibians, and fish typically found within southeastern Louisiana, and that are known or expected to inhabit the Barataria Preserve, are presented in *Appendix B*.

4.2.2.1 Fisheries

The Jean Lafitte National Historical Park and Preserve's database provides documentation of those ichthyofaunal species that have been found within the park; however, documentation relative to habitat for these obligate aquatic species remain unknown. The list of species that possibly occur in the Barataria Preserve is extensive. *Appendix B*, included in the back of this report, contains a list fish species of known or probable occurrence within the Preserve. It was provided by the National Park Service's Park Species database on March 13, 2001. The assemblage of fish species here may be limited in part to those possessing the ability to withstand reduced or low oxygen concentrations, especially during the summer and early fall. Other species such as killifish may also inhabit these areas at any time due to their ability to obtain oxygen from the air-water interface (i.e. meniscus).

4.2.2.2 Amphibians and Reptiles

Seventy-four species of amphibians and reptiles are known to inhabit or have ranges encompassing the park. Thirty-two of these species (43%) may be found in freshwater marsh or canal habitats. The complete list of herpetofauna and their habitats are in *Appendix B-3*.

Herpetofaunal species, like mammals, are more abundant along spoil banks and levees rather than in the marsh proper. These higher areas provide needed dry ground for adults and are the preferred sites for basking and hibernation (Conner and Day, 1987).

4.2.2.3 Birds

The park is clearly dominated by its inherent avifauna. Three hundred twenty-six species are known to inhabit or have geographic ranges encompassing the park *Appendix B-4*. Sixty-nine species (21%) may commonly inhabit the freshwater marshes and canals of the park. This 21% is chiefly comprised of native and migratory waterfowl and wading birds. The residuum associated with freshwater marshes and canals are considered to be rare migrants or uncommon residents (Daily field list for the birds of the Barataria Preserve, Jean Lafitte National Historical Park).

Waterfowl begin arriving in the Barataria Basin about mid-August with the appearance of blue-winged teal, but the majority of the waterfowl do not begin arriving until October with numbers continuing to increase until mid-winter. The mottled duck, which is common in freshwater marshes and the wood duck that prefers wooded streams or swamps, are the only species of waterfowl nesting in the Barataria Basin (Conner and Day, 1987).

Because the mottled duck is commonly found in freshwater marshes, its nesting and food habits will be discussed briefly. Ducklings most commonly feed on scuds (Amphipods) and midge larvae (Chrionomids) for the first two weeks of life. At three to nine weeks of age the diet consists primarily of seed material from bulrush, widgeon grass (Ruppia sp.), southern water nymph, and spike rush. Late summer food for mottled ducks of all ages is composed primarily of rice. Fall and winter food sources vary greatly, and changes quickly in response to sudden changes of habitat with most feeding occurring in recently inundated marshes or prairies after significant rain events (Stutzenbaker, 1988).

Mottled ducks nest in a variety of habitats but most often choose well-drained sites where large, grassy areas of saltmeadow cordgrass and rough cordgrass (Spartina spartinae) are dominant. The peak nesting period for mottled ducks occurs between March and May but may extend as late as October or coinciding with the occurrence of the first frost. Mottled ducks are determined nesters and utilize their lengthy breeding season to compensate for earlier nesting failures. Mottled duck females have been known to renest as many as four times during one breeding season (Stutzenbaker, 1988).

The Barataria Preserve of the Jean Lafitte National Historical Park and Preserve supports limited numbers of mottled ducks, and the inherent vegetation is not a primary food source. Therefore, disturbance of nesting ducks or feeding habitat within the project area will be minimal.

The migratory or over-wintering puddle ducks (e.g. mallards and green-winged and blue-winged teal) within the basin are most common in shallow, fresh and intermediate marsh ponds surrounding Lake Salvador, Lake Boeuf and Lac des Allemands (Conner and Day, 1987). The project area within Jean Lafitte National Historical Park and Preserve is preponderantly comprised of freshwater marsh subtended by a floating mat. Open water of the interior is typically less than one-tenth of acre in size, thereby limiting the habitat available for use by these puddle ducks.

Common diving duck species of the area (i.e. redhead, ring-necked duck, canvasback, and lesser scaup) feed in a variety of habitats including the shallow freshwater marshes where molluscs and insects are the main dietary component. However, the preponderant diet of these species comprises leaves and stems of aquatic plants found in deeper, open waters (Kortright, 1967).

Wading birds are found in a variety of habitats throughout the year, but their nesting habits are quite specific. Great egrets and great blue herons nest in mature cypress trees and water tupelo. Smaller egrets, herons and ibis prefer to nest in smaller trees and shrub near ponds and swamps (Portnoy 1977). Avian species that are secretive and nest in deep freshwater marsh areas are likely to be more disturbed by the proposed seismic survey than those more arboreal nesting species. These species include the red-winged blackbird, king rail, and American bittern. Disruption of nesting, loss of eggs or fledgling mortality is not likely to occur due to nearby drilling operations. If these nesting disruptions occur, there would be no significant effects to local populations or their long-term numbers due to re-nesting potential.

4.2.2.4 Mammals

Fifty-nine species of mammals *Appendix B-5* are known to inhabit or have ranges that encompass the Barataria Preserve of Jean Lafitte National Historical Park and Preserve. Twelve species (21% of the total species) may be found in or near freshwater marshes and/or canals, and six of the thirteen species (10% of the total species) have been documented in freshwater marsh habitats within the park (Rossman and Demastes, LSU Museum of Natural History).

Small mammals are found throughout Barataria Basin and are most common along ecotones (Conner and Day, 1987). Most dens and nest sites are found on the higher ground of levees and the spoil banks of canals, which should not be impacted by the proposed activity.

4.2.3 Threatened and Endangered Species

There are no currently listed federal threatened or endangered species known to reside in the Barataria Preserve, and the Preserve is not critical habitat for any endangered species. Non-resident threatened Brown Pelicans visit the Preserve throughout the non-breeding season. The threatened Bald Eagle nests within one mile of the Preserve boundary, and forages infrequently along the Lake Salvador shoreline. Migrant Least Terns, possibly of the endangered Interior population, visit the Preserve in spring and fall.

No threatened or endangered species are known to be present on the immediate area of the proposed project, and no known unique or critical habitats have been identified (Fleming, 1997; U.S. Fish and Wildlife Service [USFWS], April 2002). Coordination with federal and state wildlife agencies was performed for the proposed project. The USFWS have concurred that no threatened or endangered species, or candidate species, is known to exist near, or likely to be found near, the proposed project area.

4.3 Socioeconomic Environment

4.3.1 Recreation

The Barataria Preserve of Jean Lafitte National Park contains nine miles of boardwalk or hard-surfaced trails and over 20 miles of waterways for exploration. The visitor center exhibits highlight the natural history and lifeways of the area.

Hunting, fishing and trapping activities are regulated by policies set forth by the LDWF and the National Park Service. Hunting policies include open seasons in designated zones, a state hunting license and an NPS permit. Deer and small game may be harvested by archery or shotgun during the designated season.

Commercial and recreational fishing is also allowed within the many waterways of the park. Some areas of the park are restricted to bank fishing and non motorized boat fishing.

4.3.2 Cultural Resources

Since the Barataria Preserve is rich in cultural history many archeological investigations have been documented. At least 16 reports, surveys, assessments or analyses have been conducted within or adjacent to the Barataria Preserve. Although many archeological sites have been found throughout, it is believed that the proposed project will not affect any known archeological sites or historic properties. The Louisiana State Historic Preservation Officer has confirmed this statement in the attached letter dated June 17, 2003.

Archeological investigations have been fairly well documented within the proposed project area due to federal projects associated with developments of the U.S. Army, Corps of Engineers or surveys by personnel associated with the Jean Lafitte National Historical Park and Preserve. Beginning with Giardina (1969), at least 16 reports, surveys, assessments or analyses have been conducted within or adjacent to the Barataria Preserve of the Jean Lafltte National Historical Park and Preserve including Beavers, 1977, 1982, 1982a; Franks, 1988; Gagliano, 1978; Gendel, 1984; Giardino, 1969, 1984; Goodwin, 1985; Holmes, 1986; Neuman, 1975, 1975a; Goodwin and Associates, 1985; Speaker, 1986; Swanson, 1988; and Young, 1985.

The archeological sequence in Louisiana is not precisely defined; however, a general scheme has been established.

Paleo-Indian Era 10000 B.C. - 6000 B.C.
The earliest people probably reached Louisiana after 10,000 BC from artifacts found in association with the remains of Pleistocene mammals at the Trappey Mastodon site, cordage of cane at the Avery Island site and a Clovis point at the John Pearce site. Fluted and unfluted lanceolate points of the Clovis, Folsom, Scottsbluff, Plainview and Meserve types

are the only confirmed evidence of this period. Later in this era, Dalton and San Patrice type points replaced the Clovis prototypes with bifacial fluting replacing the single flake fluting.

During the early Paleo-Indian era, native American populations were wide ranging, following herds of Pleistocene megafauna and leaving few traces of their campsites. As this era began to wane, the traditional nomadic pattern began to shift as man exploited local floral and faunal resources. The ensuing population stabilization and localization resulted in the development of diverse regional cultural patterns.

Meso-Indian Era 6000 B.C. - 2000 B.C.

During the early portion of this era, the settlement pattern continued to localize and native Americans began to exploit a greater diversity of natural resources. Additions of mortars, pestles, mealing stones and pipes provide evidence that the people were knowledgeable of plants as food. Also, shell, copper and other raw materials were widely used and traded during this era, and human interments began.

Although the close of the Meso-Indian Era is often considered to mark the first appearance of horticulture, the transition is not clear, and the subsistence base of many groups did not shift at this time. Generally, the appearance of pottery and the shift from dart points to arrow points is considered evidence of the termination of this era. For example, the bow and arrow replaced the atlatl that presumably appeared in this era. However, the appearance of pottery and arrow points was not simultaneous and in many cases, dart points persist well into the Neo-Indian Era. Stone projectile points diagnostic of this era include Morrow Mountain, Marshall, Frio, Tortugas, Ensor, Wells, Macon, Gary, Marcos, Morhiss, Trinity, Carrollton and Kirk.

Neo-Indian Era 2000 B.C. - 1600 A.D.

The Neo-Indian Era may be divided into several foci depending upon the classification scheme. This report follows Neuman (1984) denoting seven distinct cultures that developed during this time frame. These cultures include the Poverty Point, Tchefuncte, Marksville, Troyville-Coles Creek, Caddo, Plaquemine and Mississippian.

The Poverty Point culture from 2000 B.C. to 800 B.C. developed along coastal areas on natural levees and associated stream terraces. Characteristics of their occupation were small sites circumscribing large regional centers. The regional centers possessed large earthen constructions and an extensive trade network of finished materials. These objects included lapidary work, fiber tempered pottery, stone tools, baked clay objects and steatite bowls. The Linsley site uncovered during the construction of the Mississippi River Gulf outlet dates from this cultural period from approximately 1740 B.C. Therefore, confirmed human occupation near the proposed project area dates to this cultural period.

The Tchefuncte Culture that existed from approximately 500 B.C. to 400 A.D. is probably one of the earliest cultures known to produce ceramic pottery that occupied locations within the Jean Lafitte National Historical Park and Preserve. Other small villages were located on

natural levees, in backwater areas and dome formations near the survey area. The Big Oak Island, Little Woods and Little Oak Island sites are all associated with this culture and located near the proposed project area in the vicinity of Lake Pontchartrain. Due to the proximity of productive marshes, clams (rangia cuneata) were the principal component of the midden mounds. Other species such as white-tailed deer, ducks, raccoons, beaver, muskrat, otter, bear, gray fox, catfish and alligator gar have also been found within these mounds. Other analogous locations such as the Copell site occupy approximately the same latitude in southern Louisiana. Although the Tchefuncte culture was later in the Neo-Indian era, the earthen mound building was not as impressive nor did this culture have an elaborate trade network as the previous Poverty Point culture. The Tchefuncte culture did, however, produce a greater quantity of ceramic pottery than the previous Poverty Point culture.

The Marksville Culture constructed conical mounds located primarily within the Red River Valley of Louisiana and southeastward to the Gulf Shores area of Alabama between 1 A.D. and 500 A.D. This culture possessed a large trade network due to the diverse artifacts found within their funerary mounds. These artifacts included copper panpipes, mica, galena, earspools, bracelets, beads, mica figurines, ceramic figures and green stone celts. These artifacts suggest a regional manifestation of the vast Hopewellian complex from the Illinois River Valley; however, the Marksville culture's subsistence base that included chipped-stone points, knives, scrapers, ground-stone atlatl weights and plummets are analogous to the preceding Tchefuncte culture. Coastal sites are associated with natural levees and cheniers upon shell middens where ceramic pottery was prevalent. Pottery designs with animal motifs were common. These sites extended from the Sabine River to the Chandeleur Islands and included the Jean Lafitte National Historical Park and Preserve.

The Troyville/Coles Creek Culture between 400 A.D. and 1200 A.D. built flat topped, pyramidal shaped tumuli used as substructures for religious and ceremonial buildings rather than funeraries of the earlier Marksville Culture. Pottery of this culture is generally larger than the previous Marksvile culture, decorated in checkered stamping, confined generally to the upper half of the object and typically lacking animal motifs. In the inland portions of Louisiana, the socioreligious structures surrounded open plazas, while along coastal areas, diverse shell middens were associated with these mounds as found within the Jean Lafitte National Historical Park and Preserve.

The larger midden mounds were used by previous and successive cultures that either placed cane (Arundinaria), clay or other associated building materials above the base layer to form culturally related structural features. Although there is a stratifying effect, it belies the pits, trenches and other excavations of successive cultures for funerary, pottery production or other occupational features. In both structure and form, these socioreligious architectural monuments emulate those of Meso-America but not as expansive.

The Meso-American influence may also have emanated in the use of cultigens such as squash and bottle gourds in the middle of this era circa 325 B.C., while corn first appeared in Louisiana artifacts about 400 A.D. and beans about 1000 AD. Plant horticulture further

assisted sedentism of the cultures by providing food for a larger population in a specific area and later grown in combination would provide better soil conditions for a greater length of time in a specific area. However, the abundant natural resources associated with the coastal environments throughout the year may have precluded the use of horticulture as a significant source of food.

The Caddo Culture was principally located in Northwest Louisiana, Oklahoma and Texas; however, coexistence occurred briefly and near the western and northwestern extension of the Troyville-Coles Creek culture. Other principle developments attributed to the Caddo Culture are the bow and arrow, cultigens (e.g. corn, beans and squash) and cranial deformation. Northeast within the Mississippi Alluvial Valley, the Plaquemine Culture also coexisted with the Caddo Culture.

The Plaquemine Culture occupied a triangular region with a base covering the Louisiana coastal zone, including the Jean Lafitte National Park and Preserve, and forming an apex near Greenville, Mississippi. At this northern estimated terminus, the Plaquemine Culture also coexisted with the Mississipian Culture. Archaeological manifestations of the Plaquemine culture indicate a protohistoric development of the Troyville-Coles Creek Culture from 1000 A.D. to 1600 A.D. Pottery design, small stone projectile points, clay ear ornaments and ground stone celts link the Plequemine and Troyville-Coles Creek cultures as well as mass burial funerary practices. The Plaquemine Culture constructed circular and rectangular, multistaged mounds that are the classic development of temple mound construction in the lower Mississippi Alluvial Valley. These circular, stepped mounds typically possessed plazas between them with smaller round or rectangular domiciles indicate a class-structured society.

Characteristic Plaquemine ceramics include striated vessel exteriors from pre-fired rubbing of the clay possibly with vegetation, shell tempered clays, projecting handles on vessel rims, and the absence of stamped designs.

The Plaquemine and Mississipian Cultures, if they are separable, coalesced into some of the largest ceremonial-residential centers existing in the prehistoric period. The Cahokia site along the Mississippi River in Illinois occupies a rectangular area of 6.5 square miles. The ceremonial complex of these mound builders is a notable characteristic of this culture. Mississippian vessels were diverse from short to tall, globular with straight, recurved or everted rims; plain and compound long-necked bottles; straight rimmed plates; deep and shallow bowls; gourd forms; footed vessels; and vessels with strap and loop handles. These ceramics were manufactured by shell tempering from pulverized particles incorporated into the unfired clay. Decorative motifs were also applied to the ceramics in addition to positive and negative painting. Effigy vessels often depicted fish, reptiles, amphibians, birds, mammals and humans. Mississippian prehistoric remains have also been found within the Jean Lafitte National Park and Preserve.

Prior to the historic period, the ceremonial complex declined due in part to the warring factions of the purported chiefdoms that controlled the agrarian based culture. In Louisiana,

the Taensas, Ouachas, Tchaouachas and Chitimachan groups were historic heirs of this Mississipian Culture. Recent evidence supports the theory that the Tchaouachas and Ouachas resided in the area until at least the 1850's (Swanson, et.al., 1991).

Historical

European explorations along the Louisiana coast and the Mississippi River initially included Spanish expeditions by Alonso Alvarez Pineda, Alvar Nunez Cabeza de Vaca, and Hernando De Soto. Later French exploration efforts were made by Marquette and Joliet. In 1682, de La Salle claimed the territory for France and named the land for Louis XIV. In 1718, New Orleans was founded, and French plantations were the dominant agrarian base. In 1762 with the First Peace of Paris, Louisiana was ceded to Spain, and Spanish rule ensued until the Treaty of San Ildefonso in 1800 where Louisiana again became a French colony. In 1803, the United States, during President Thomas Jefferson's régime, bought the Louisiana territory for 15 million dollars from Napoleon. In 1812, Louisiana became the 18th state. Since that time the Barataria basin has supplied New Orleans and Louisiana with seafood products of shrimp, crabs and fish. Since the 1930's, this area has been one of the larger suppliers of natural gas and oil.

Known Prehistoric and Historic Sites

The National Register of Historic Places lists 17 locations in Jefferson and St. Charles parishes *Table 4-2.* The Barataria Preserve of the Jean Lafitte National Historical Park and Preserve was lofted on October 15, 1966. The Barataria Preserve was established in 1978 by Public Law 95-625 of 16 USC 230, Section 901, *et sequentia.* This unit was established to "preserve for the education, inspiration, and benefit of present and future generation significant examples of natural and historical resources of the Mississippi Delta region and to provide for their interpretation in such manner as to portray the development of cultural diversity in the region."

Table 4-2
Site List of the National Register of Historic Places in Jefferson and St. Charles Parishes, Louisiana

Historic Site	Parish
Destrehan Plantation	St. Charles
Dorvin House	St. Charles
Homeplace Plantation House	St. Charles
Kenner and Kugler Cemeteries Archeological District	St. Charles
LaBranche Plantation Dependency	St. Charles
Ormond Plantation House	St. Charles
Barataria Preserve of Jean Lafitte Historical Park Historic District	Jefferson
Camp Parapet Powder Magazine	Jefferson
Crockett, David, Fire Hall and Pumper	Jefferson
Felix-Block Building	Jefferson
Fort Livingston	Jefferson
Gretna Historic District	Jefferson
Harahan Elementary School	Jefferson
Kenner Town Hall	Jefferson
Magnolia Lane Plantation House	Jefferson
Old Jefferson Parish Courthouse	Jefferson
St. Joseph Church-Convent of the Most Holy Sacrament Complex	Jefferson

5.0 Environmental Consequences

This section discusses the anticipated environmental impacts that may result from the implementation of the proposed action and the No Action Alternative. The potential direct and indirect impacts on the local physical, biological, and socioeconomic environment are discussed. The duration of impacts are described as short term, ranging from weeks to several years in duration, or long term, extending 20 years or longer. An attempt was made to describe the intensity and type of impact as negligible, minor, moderate, or major, and as beneficial or adverse. Most impact analyses are qualitative.

The intensity of impacts has been defined as follows:

negligible = at lower levels of detection
minor = detectable, but slight
moderate = readily apparent effects with potential to become major
major = severely adverse or exceptionally beneficial

5.1 Physical Environment

5.1.1 Nonfederal Oil and Gas Development

Impacts of Alternative B. Proposed Action
Under Alternative B, Proposed Action, the Couba Island Field wells would be drilled and if they successfully produce hydrocarbons, could result in a negligible beneficial impact on domestic energy supplies. Costs and time that Aspect Energy has invested to contract the preparation of this environmental assessment, NPS application are minor contributors to overall project costs. This investment coupled with the costs associated with obtaining other regulatory permits and the cost of implementing the proposed project would result in minor adverse impacts to Aspect Energy.

Cumulative Impacts:
Should the 4 proposed wells in the Couba Island Field be developed, production of oil and gas resources underlying the Barataria Preserve of Jean Lafitte National Historical Park and Preserve would increase available products to the domestic energy supplies resulting in a minor beneficial impact.

Conclusion:
Under the Proposed Action, the Couba Island Field wells would be drilled and developed, resulting in a potential cumulative minor beneficial impact on the nation's domestic energy supplies. The costs and time to prepare a formal NPS application and environmental assessment would result in a minor adverse impact on Aspect Energy.

Impacts of Alternative A: No Action
The Couba Island Field wells would not be drilled or developed, resulting in a negligible adverse impact on domestic energy supplies, and a moderate adverse impact to Aspect Energy due to uncertainty about future exploration and development and lost revenues.

5.1.1 Earth Resources/Topography/Geology/Soils

5.1.1.1 Impacts of Alternative B: Proposed Action

The proposed project area is located within the designated Louisiana coastal zone. In Louisiana, the Louisiana Department of Natural Resources (LDNR) – Coastal Management Division must certify that proposed projects located in the coastal zone are consistent to the maximum extent practicable with the policies and regulations set forth in the Louisiana Coastal Resources Program (LCRP). The Coastal Management Division requires that the Coastal Use Permit (CUP) process be followed to provide information on the project particulars. Submitting an application for a CUP does not imply that a CUP will be required; application is simply one step in following the Rules and Procedures for CUPs so the coastal zone will be protected. The State of Louisiana uses the U.S. Army Corps of Engineers (USACE) ENG Form 4345 permit application form for this process. The operator will ensure that proposed activities directly affecting or conducted in the coastal zone will be carried out in a manner that is, to the maximum extent practicable, consistent with approved LCRP programs.

Topography

The construction-related activities to be conducted for the proposed project near the Barataria Preserve would involve the excavation and cleanout of a slip location and the construction of supporting infrastructure. Local site topography would be moderately altered during these cleanout and construction activities. Botom materials excavated during slip construction would be placed immediately adjacent and connected to existing marshes of the Barataria Preserve. This material would be placed and contoured to an elevation similar to the adjacent marshes in order to create additional emergent marshland and provide some level of erosion protection for the existing shoreline. Once the drilling of the proposed oil and gas wells are complete, the excavated slip area would be allowed to fill-in naturally.

Soils, Geology, and Subsidence

Recently, there have been many concerns about coastal loss occurring due to mineral extraction subsidence. Studies indicate that reservoir production from very shallow wells play a part in surface land subsidence in isolated areas. However, it is important to note that natural subsidence, erosion, and man made surface disturbing activities are considered to be the greatest causes for coastal loss.

An examination of the Couba Island Field underscores reasons for believing surface subsidence would not be influenced by hydrocarbon reservoir production rates. Log inspection of producing wells in the Couba Island Field indicate the potentially productive formations (at least as far as Azimuth Energy, LLC can predict) are all water drive energy reservoirs, or "Hydrofers." A Hydrofer is a hydropressure formation that is under active water drive (Stuart 1970). Hydropressures are pore-space fluid pressures that are equal to the effective weight of the overlying waters plus the backpressure created by any out flowing water.

The key to that analysis is the influence on formation pressure by the "active water drive" energy. Hydropressures are preserved at the hydropressure gradient by the effective weight of the overlying waters. In hydrofer sands, the water from the aquifer replaces hydrocarbon water production about as fast as it is removed (Stuart 1970).

All of the potentially productive zones in the field are around 9,500' deep, or deeper, and below a massive shale section (900' thick). There is no plan by Azimuth Energy to drill to geopressured zones (where a geologic seal traps fluid pressure which in turn upholds part of the overburden weight). Subsidence and compaction for the last 65,000,000 years has forced the sediment deposits to support the overburden by virtue of compaction and grain-to-grain contact within the multiple layers of sediment.

To summarize, reservoir pressure should exhibit very little decrease with hydrocarbon production in the Couba Island Field. Aquifer re-pressurization should maintain original formation pressure within the rock pore space. Sediments buried at the depth of the expected producing formations in the Couba Island Field are compacted enough to support the weight of the overburden, without benefit of pore-space pressure.

Cumulative Impacts:
Under Alternative B, Proposed Action, cumulative impacts to topography would be greater than those described under the No Action Alternative, but are expected to be minor and localized within the project area. Construction activities would not affect soil characteristics, but may cause the top layers to mix during excavation. Dredge material would only be taken from water bottoms in the immediate project area.

Conclusion:
No major adverse impacts to the overall topography, geology and/or soil resources are expected from the construction, operation, and maintenance of the proposed oil and gas well locations and supporting structures. No change in subsidence rates within the Barataria Preserve due to hydrocarbon/water production from the proposed oil and gas operations are expected. No impairment of earth resources are expected from implementation of this alternative.

5.1.1.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. The proposed project area would remain undisturbed and there would be no additional impacts on earth resources.

Cumulative Impacts:
Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas adjacent to the Park. Site topography, geology and soil resources would not be altered and overall surface elevations and bathymetry in the area would remain unchanged.

Conclusion:
There would be no additional impacts to the existing topography, geology, or soils at the Barataria Preserve. No impairment of earth resources would result from implementation of this alternative.

5.1.2 Air Resources

5.1.2.1 Impacts of Alternative B. Proposed Action

The potential air emission sources during construction could include dragline dredge, tug boats, work vessels, and other predominately diesel-powered construction equipment. Temporary increases in dust emissions in the immediate vicinity of construction sites are not likely to occur.

The pollutants emitted to the ambient air directly or indirectly from the proposed construction activities would not significantly impact the ambient air quality of the region, and would not jeopardize compliance with state and federal ambient air quality standards. The EPA has published final rules on general conformity that apply to federal actions in areas designated *nonattainment* for any of the criteria pollutants under the CAA. The rules do not apply to this action, since the area is in *attainment* for the criteria pollutants CO, NO_2, SO_2, O_3; and unclassifiable-attainable for lead (Pb) and PM_{10} (EPA, 2001b).

Operation of tug boats and work boats is expected to be the primary mode of transportation to and from the well site. While vessels associated with the operation would generate emissions such as CO and NO_x, they are anticipated to have no significant impact on regional air quality since these vehicles are already part of the existing traffic mix in the region.

In the case of oil and gas operations, typical sources of criteria pollutants are from gas flaring due to well testing and those associated with production/processing facilities. Facility operations resulting in emissions may include the various sources of fuel

combustion, glycol dehydration, fugitive emissions, flash gas losses, waste gas disposal, standing/working losses from tanks, and loading losses. LDEQ refers to any and all origins of air contaminants as Point Source Emissions and each Point Source Emission is required to be permitted. An Emission Inventory is required for each one. This is a tabulation of data detailing the types, amounts, quantities, and sources of the emissions. An Emission Inventory is submitted with an air permit application. Thus, implementation of the proposed action would not jeopardize compliance with state and federal ambient air quality standards.

Cumulative Impacts:
Impacts to air quality during construction of the proposed facilities adjacent to the Barataria Preserve are expected to be localized, short-term and restricted to point-source locations. Construction machinery exhaust emissions are estimated to be of relatively short duration and of moderate intensity, but still within state and federal standards. Future oil and gas operations could contribute to air quality impacts, however, no additional operations are proposed at this time.

Conclusion:
Since construction equipment and activities are required to meet LDEQ standards for exhaust emissions, and since these exhaust emissions are expected to be of relatively small quantities, no significant long-term deterioration of air quality is expected. Implementation of the proposed action would not jeopardize compliance with state and federal ambient air quality standards. Therefore, no impairment to air quality would result from implementation of this alternative.

5.1.2.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. The proposed project area would remain undisturbed and there would be no additional impacts on air quality.

Cumulative Impacts:
Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas. Continuation of recreational uses of the Park, particularly boating, would contribute to cumulative impacts on air quality.

Conclusion:
There would be no long-term change to the existing air emissions at the Barataria Preserve under the No Action Alternative. No impairment to air quality would result from implementation of this alternative.

5.1.3 Noise

5.1.3.1 Impacts of Alternative B. Proposed Action

Construction-related equipment noise levels generally range from 76 dB for hoist operations and 85 dB for dredge operations, to a maximum of 101 dB for pile-driver operations. Noise levels related to the proposed construction activities at a given receptor would vary widely, depending on the phase of construction, excavations, and the specific tasks undertaken. Noise levels related to drilling operations vary depending on the specific rig that will be located on each location. It is anticipated that noise levels on the drilling operation will range from 75 dB to 108 dB and not to exceed 115 dB. No increased noise levels would be anticipated to be perceptible to the nearest residential neighborhoods or visitor use areas that are located within or adjacent to the Barataria Preserve during the construction and drilling period. No significant impacts related to construction noise and drilling operation noise would be anticipated as a result of the implementation of the proposed drilling operation.

Specifications of production equipment cannot be determined until completion of the wells. Although production equipment may register near 85 dB immediately next to the equipment, it is expected that the noise generated by the production operations will not exceed a daily weighted average of 75 dB over the general area.

Cumulative Impacts:
Short-term impacts on the immediate adjacent unpopulated areas due to noise levels during construction and drilling activities would include noise from construction equipment, construction vessels/delivery vessels traveling to and from the construction site, drilling rig operations. Long-term impacts on the immediate adjacent unpopulated areas due to noise levels from production equipment would primarily be noise from compressors and generators. No long-term impacts due to increased noise levels during production would be anticipated to be perceptible to the nearest residential neighborhoods or visitor use areas that are located within or adjacent to the Barataria Preserve. .

Conclusion:
Traffic noise impacts resulting from vessels used to service the wells and production equipment would be minimal. No significant impacts related to production noise would be anticipated as a result of the implementation of the proposed oil and gas activities. No impairment to the natural soundscape is expected.

5.1.3.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. Continuation of visitor use throughout the waterways of the Preserve would result in a localized and intermittent increase in noise levels. The proposed project area would remain undisturbed and there would be no additional impacts related to noise or natural soundscapes.

Cumulative Impacts:
Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas.

Conclusion:
Under Alternative A, No Action, there would be no change to the existing noise levels at the Barataria Preserve. Cumulative impacts would be short to long-term and localized around the visitor use areas.

5.1.4 Water Resources

5.1.4.1 Impacts of Alternative B. Proposed Action

In order to minimize the increase in turbidity, construction activities will incorporate erosion and sediment controls, including interim and permanent stabilization practices. Recommended methods of turbidity and erosion control include the use of silt fences, coco matting, check dams, and temporary vegetation or straw cover.

Cumulative Impacts:
A temporary increase in suspended sediments and turbidity would be experienced during the construction phase of the proposed project. Emergent spoil material would be planted with a suitable marsh plants to reduce erosion and sedimentation problems as soon as possible following construction activities. Accumulation of water, due to rainfall, within the drilling rig and production facility will be pumped to an adjacent waterway. All discharged rainwater will be free of contaminants. Cumulative impacts on water resources would be short to long term, and minor around the proposed site. No impairment to water resources is expected from this alternative.

Conclusion:
Under Alternative B, Proposed Action, construction and maintenance of the drilling slip and production barge would result in localized, short to long term, minor adverse impacts in localized areas adjacent to the development site. No impairment to water resources would result from this alternative.

5.1.4.2 Impacts of Alternative A: No Action

Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas. The proposed project area would remain undisturbed and there would be no new impacts to water resources.

Cumulative Impacts:
Under Alternative A, No Action, there would be no contribution towards cumulative impacts on water resources. Existing impacts are the result of anthropogenic changes to the

ecosystem including canal and levee construction, water diversion projects and point-source pollutants.

Conclusion:
Under Alternative A, No Action, the wells would not be drilled and the project area would remain undisturbed. There would be no new impacts to the water resources of the Barataria Preserve. Cumulative impacts would be short to long-term and the result of existing perturbations to the system. No impairment of water resources would result from this alternative.

5.1.5 Hazardous Materials Issues

5.1.5.1 Impacts of Alternative B. Proposed Action

On March 22, 1993, EPA provided clarification on the scope of the Exploration and Production waste (E&P) exemption with respect to wastes generated by crude oil reclamation operations, service companies, crude oil pipelines, gas plants and feeder pipelines, and natural gas storage fields *(Federal Register,* volume *58,* number 53, pages 15284-15287). Under this guidance E & P waste on the proposed locations would not be considered hazardous. Although this is true, the proposed drill sites and facilities are covered by the Emergency Planning and Community Right to Know Act (EPCRA) and must submit an emergency and hazardous chemical inventory form to the LEPC, the SERC and the local fire department annually. The state of Louisiana requires that facilities provide a Tier II form.

Development of the site of the proposed action would not be expected to generate hazardous wastes. Drilling fluids and cuttings will be contained in a closed container system and disposed of at an offsite EPA approved disposal site. The operations of the production facilities would result in the use and production of non-hazardous wastes and materials. These materials would include the use and disposal of petroleum, oil, grease, etc. These materials would be used and disposed of in accordance with applicable federal and state regulations. The construction of secondary containment during the drilling phase and the production phase will help insure containment of petroleum products in the case of a catastrophic event.

Cumulative Impacts:
Under Alternative B, Proposed Action, no cumulative impacts are expected from the use of any hazardous materials and or waste products.

Conclusion:
Through the appropriate use of equipment, good safety practices and the proper handling of extracted oil and gas, the construction of the locations for oil and gas exploration and production are not expected to result in significant impacts.

5.1.5.2 Impacts of Alternative A: No Action

Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas. The proposed project area would remain undisturbed and there would be no new impacts due to any new chemical substance.

Cumulative Impacts:
Under Alternative A, No Action, there would be no cumulative impacts from hazardous chemicals or waste products expected from current conditions.

Conclusion:
Implementation of the No Action Alternative would result in no impacts due to hazardous wastes at the Barataria Preserve.

5.2 Biological Environment

5.2.1 Vegetation

5.2.1.1 Impacts of Alternative B. Proposed Action

Since the proposed project would take place in the shallow, open water area of Bayou Bardeaux, submerged aquatics are the only vegetation that would be directly impacted. Dominant submerged aquatic plants include coontail, Eurasian milfoil, tape grass, and Carolina fanwort. Dredging activity would remove approximately 7.4 acres of submerged aquatic vegetation in the immediate area of the project. Upon completion of the drilling phase, submerged aquatic vegetation is expected to re-colonize the disturbed area naturally. Indirect impacts to adjacent vegetation communities could result from accidental leaks or spills of associated substances used during the operation.

Cumulative Impacts:
Under Alternative B, Proposed Action, cumulative impacts on vegetation would be localized, short to long term, minor adverse impacts limited to the area around the site of development. Since the spoil area created with dredge material will be planted with native marsh plants, it is anticipated that there will be a net gain in emergent marsh as a result of this project.

Conclusion:
The Proposed Action would result in localized short to long-term minor adverse impacts to submerged aquatic vegetation around the development site. Cumulative impacts to surrounding emergent vegetation would also be short to long term, but beneficial with the creation of a small new area of emergent marsh and increased shoreline protection. No impairment to vegetation would result from this alternative.

5.2.1.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. The proposed project area would remain undisturbed and there would be no new impacts to vegetation.

Cumulative Impacts:
The No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas. Existing impacts are mainly the result of anthropogenic changes to the ecosystem including canal and levee construction, water diversion projects, saltwater intrusion and the introduction and spread of exotic species.

Conclusion:
The wells would not be drilled under the No Action Alternative. The proposed project area would remain undisturbed and no new impacts to vegetation would occur. Cumulative impacts on park vegetation would be short to long term, minor adverse impacts due to existing conditions. No impairment to vegetation would result from the implementation of this alternative.

5.2.2 Wildlife

5.2.2.1 Impacts of Alternative B. Proposed Action

Wildlife habitat surrounding the proposed drill sites at the Barataria Preserve has not been formally measured for species-specific habitat parameters. However, visual wildlife observations and NPS databases confirm that the Barataria Preserve supports white-tailed deer, alligators, several small mammals, many different bird species, and several fish species. The park manages for habitat improvements, modifications, and recreational opportunities, but does not maintain wildlife management plans with species-specific management goals. Because of abundant habitat type, impacts to wildlife populations are not expected be significant. No federally listed endangered or threatened species or their habitat would be jeopardized. Drillsite construction would displace small mammals, reptiles, amphibians, neotropical birds and fish. These animals are motile and would relocate to similar habitats found immediately adjacent to the project area or would adjust home ranges to reflect the changes in available habitat. Such dispersal would create minor spatial distribution changes in local wildlife populations with negligible long-term effect.

Cumulative Impacts:
Under Alternative B, Proposed Action, cumulative impactes on wildlife would result in short to long term minor adverse impacts, within a localized area around the drilling operation.

Conclusion:
Under Alternative B, the proposed operation, which involves dredging an access slip for drilling and production, would result in short to long term minor adverse impacts, within a localized area around the drilling operation.

5.2.2.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. The proposed project area would remain undisturbed and there would be no impacts to wildlife resources.

Cumulative Impacts:
The No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas. No cumulative impacts to wildlife are expected under current conditions.

Conclusion:
Implementation of the No Action Alternative would result in no impact to wildlife species at the Barataria Preserve.

5.2.3 Threatened and Endangered Species

5.2.3.1 Impacts of Alternative B. Proposed Action

There are no currently listed federal threatened or endangered species known to reside in the Barataria Preserve, and the Preserve is not critical habitat for any endangered species. No impacts to the casual brown pelicans, bald eagles and migrant least terns are expecetd from the proposed action.

Cumulative Impacts:
No cumulative impacts to any federally listed threatened or endangered species, or associated critical habitats are expected.

Conclusion:
There would be no impacts to these species from implementation of the proposed action.

5.2.3.2 Impacts of Alternative A: No Action

There are no currently listed federal threatened or endangered species known to reside in the Barataria Preserve, and the Preserve is not critical habitat for any endangered species. No change in the occurrence of any threatened or endangered species is expected under current conditions.

Cumulative Impacts:
No cumulative impacts to any federally listed threatened or endangered species, or associated critical habitats are expected.

Conclusion:
There would be no impacts to these species from the implementation of the No Action Alternative.

5.3 Cultural and archeological resources

Impacts of Alternative B. Proposed Action
Since the Barataria Preserve is rich in cultural history many archeological investigations have been documented. Although many archeological sites have been found throughout the Park, the proposed project will not affect any known archeological sites or historic properties. The Louisiana State Historic Preservation Officer has confirmed this statement in the attached letter dated June 17, 2003.

Conclusion:
There would be no impacts to any know cultural or archeological resource from the implementation of Alternative B, Proposed Action.

Impacts of Alternative A: No Action
Implementation of the No Action Alternative would result in no construction of the locations for exploration and production of oil and gas. Consequently, there would be no direct, indirect or cumulative impacts to any known cultural or archeological resources within the Barataria Preserve.

5.4 Socioeconomic Environment

5.4.1 Visitor Use and Experience

5.4.1.1 Impacts of Alternative B. Proposed Action

The site of the proposed oil and gas locations at the Barataria Preserve are primarily open water areas. The construction footprint of the proposed drill sites is very localized. Land use in and around the Park would continue to consist of three general categories: improved/other grounds, semi-improved grounds, and unimproved grounds.

The Barataria Preserve allows recreational hunting and fishing within desgnated areas throughout the Park.. Drilling operations would last for approximately 120 days. During this time, noise and physical activity from the operation may push game species, primatily white-tailed deer, away from the immediate area. Once the wells are on production, very little disturbance will be present around the locations. Normal hunting activities do not pose a significant danger to the wells or supporting equipment.

Drilling activities would occur in shallow water near the shoreline of Bayou Badeaux where very little boat traffic normally occurs. Although oil and gas operations may slightly alter

the paths of normal boating traffic, it is not anticipated that a significant impact will occur. All structures will be lighted in accordance with US Coast Guard regulations.

Cumulative Impacts:
The total amount of unimproved land that will be changed by the project would be less than 1%. The proposed oil and gas activity would result in cumulative impacts on the natural scenery of the Preserve, however, this operation is not expected to have a significant impact on recreational hunting and fishing in the unimproved areas of the Park.

Conclusion:
Although no significant impacts to land use, recreational hunting or fishing are expected as a result of the implementation of the proposed action, the construction of the slip and the drilling and production of the wells would result in localized, long term, minor to moderate adverse impacts on visitor use and experience.

5.4.1.2 Impacts of Alternative A: No Action

Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. The proposed project area would remain undisturbed and there would be no new impacts to visitor use and recreational activities.

Cumulative Impacts:
Implementation of the No Action Alternative would result in no construction of locations and supporting structures for exploration and extraction of oil and gas.

Conclusion:
Under Alternative A, No Action, the 4 oil and gas wells would not be drilled from the Couba Island Field. Visitor use would continue and there would be no impacts. Cumulative short to long-term minor adverse impacts would be localized around existing and future developments throughout the site.

6.0 Compliance With Various Land Use Policies And Controls

This EA has been prepared in accordance with the following regulations:

> The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations (P.L. 91-190; 42 USC 4321 *et seq*; 40 CFR 1500-1508).
>
> DO-12 Handbook to Director's Order 12 – Conservation Planning, Environmental Impact Analysis and Decision-making

A summary of the various laws and coordination requirements and the extent to which the proposed action complies or conflicts with each of these laws and requirements are presented in this section.

6.1 National Environmental Policy Act

The National Environmental Policy Act of 1969, as amended, contains policy and guidance to ensure that potential impacts from proposed federal actions are assessed using a systematic and interdisciplinary approach. This EA has been prepared in accordance with *Section 102(2)(c)* of NEPA, CEQ regulations on implementing NEPA procedures (40 CFR 1500-1508), and the U.S. Department of the Interior - National Park Service regulations on implementing NEPA procedures (32 CFR 775).

6.2 Clean Water Act

The Clean Water Act, as amended, regulates discharges to the waters of the United States. Compliance with applicable provisions of the Clean Water Act will be accomplished by coordination with the appropriate resource agencies, submittal of permit applications, if required, and response to agency review. *Section 404* of the Act regulates the discharge of dredged or fill material. Any point sources of pollution associated with the proposed action will comply with NPDES permit requirements. This Act would also include stormwater discharges associated with industrial activity, and those discharges originating from large and medium municipal separate storm sewer systems. Releases of stormwater runoff to area streams would adhere to state and local water quality requirements and permit conditions.

6.3 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable water of the United States unless the Secretary of the Army has authorized the work by permit. No impacts to any navigable water of the United States are anticipated as part of the implementation of the proposed project.

6.4 Clean Air Act

The Clean Air Act, as amended, provides for protection and enhancement of the nation's air resources. Particulate matter and other air pollutants resulting from construction activities would have a short-term air quality impact on the immediate vicinity, but no permanent or long-term impacts to regional air quality related to the construction, operation, or maintenance of the proposed activity that would occur. Equipment associated with construction, exploration, and production of the oil and gas wells would generate emissions, such as CO and NO_x; however, they are anticipated to have no measurable impact on regional air quality. The EPA has published final rules on general conformity that apply to federal actions in areas designated *nonattainment* for any of the criteria pollutants under the CAA. The rules do not apply to this action, since the area is in *attainment* for all criteria pollutants. Any point source emission that exceeds federal or state standards will be permitted accordingly.

6.5 Fish and Wildlife Coordination Act

Section 10 of the Fish and Wildlife Coordination Act directs federal agencies to consult with USFWS, National Marine Fisheries Services, and state agencies before authorizing alterations to water bodies. The purpose of this Act is to ensure that wildlife conservation receives equal consideration, and that it be coordinated with other features of water resource programs.

6.6 Endangered Species Act

The Endangered Species Act requires that any action authorized by a federal agency is not likely to jeopardize the continued existence of an endangered or threatened species or results in the destruction or adverse modification of habitat of such species, which is determined to be critical. As discussed in *Section 4.2.3*, no threatened or endangered species, or known habitat, occur at the Barataria Preserve of Jean Lafitte National Historical Parkand Preserve.. Due to the absence of these species, or suitable habitat, the proposed project would not affect the continued existence or remove or alter any habitat known to be critical to these species.

6.7 National Historic Preservation Act

In compliance with applicable federal laws, regulations, and procedures regarding historic preservation, potential impacts to cultural resources have been evaluated for the proposed project. As discussed in *Section 4.3.6*, none of the proposed facilities would impact historic resources. Also, there would be no impacts to archeological resources in the area proposed for the construction of the proposed drill sites and associated structures.

6.8 Coastal Zone Management

The Coastal Zone Management (CZM) Act of 1972, as amended, provides for the effective management, beneficial use, protection, and development of the resources of the nation's coastal zone. NAS JRB New Orleans is located within the designated Louisiana coastal zone. In Louisiana, the LDNR – Coastal Management Division must certify that proposed projects located in the coastal zone are consistent to the maximum extent practicable with the policies and regulations set forth in the LCRP. Procedurally, the operating company will have to provide an information packet that describes the proposed development. The Coastal Management Division requires that the Coastal Unit Permit (CUP) process be followed to provide this information. Submitting an application for a CUP does not imply that a CUP will be required; application is simply one step in following the Rules and Procedures for CUPs so the coastal zone will be protected. The State of Louisiana uses the USACE ENG Form 4345 permit application form for this process. The operating company will ensure that the activities directly affecting or conducted in the coastal zone will be carried out in a manner that is, to the maximum extent practicable, consistent with approved LCRP programs.

6.9 Wetlands

Executive Order 11990, "Protection of Wetlands," directs agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands on federal property. Because the Barataria Preserve is located within the Louisiana coastal zone, wetland permitting is initiated through the LDNR - Coastal Management Division using the CUP process. The State of Louisiana uses the USACE ENG Form 4345 permit application form for the CUP process, and provides a copy of the CUP to the USACE for processing (LDNR, 1999).

The LDNR indicates that if wetland impacts cannot be avoided, mitigation to compensate for the destruction, loss, or degradation of any wetlands must be provided. No net loss of this resource would be allowed in the coastal zone (LDNR, 1999).

Mitigation for impacts will be addressed under the guidelines of LA Coastal Management Division and USACOE.

6.10 Prime and Unique Farmland Soils

The purpose of the Farmland Protection Policy Act is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. Although some soils located at the Barataria Preserve are listed as prime farmland, none of these soils are in agricultural production on-station and land uses in the area are committed to urban uses. The NRCS indicates that the Farmland Protection Policy Act does not apply if the land in question is zoned to exclude agricultural uses, or if it is already in or committed to urban uses.

6.11 Coastal Barrier Resources

The Coastal Barrier Resources Act of 1982 requires that no new expenditures or financial assistance be made available for various construction projects within the boundaries of the Coastal Barrier Resources System. The USFWS designates coastal barrier resources. The Barataria Preserve is not located within a coastal barrier zone.

6.12 Administration of Environmental Policy (Environmental Justice)

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. These executive orders mandate that federal agencies identify disproportionately high and adverse human health or environmental effects on minority and low-income populations and children. As discussed in *Section 4.3.5*, no disproportionate adverse impact to minority or low-income persons living in the area surrounding the Barataria Preserve would be anticipated as a result of the implementation of the proposed project. Additionally, no disproportionate environmental health or safety risks to children are anticipated as a result of the implementation of the proposed project.

6.13 Resource Conservation and Recovery Act (RCRA)

RCRA and subsequent amendments established a cradle-to-grave system for the tracking, management, generation, transportation, treatment, storage, disposal, and recycling of waste materials. On July 6, 1988, EPA made a regulatory determination that oil and gas exploration and production (E&P) wastes did not warrant regulation as hazardous wastes under Subtitle C of RCRA *(Federal Register,* volume 53, number 129, pages *25446-25459).* Although the proposed operation will be exempt for hazardous materials on the sites by RCRA Regulations, the drilling locations and facilities are covered by The Emergency Planning and Community Right to Know Act (EPCRA) and must submit an emergency and hazardous chemical inventory form to the LEPC, the SERC and the local fire department annually. Facilities provide either a Tier I or Tier II form. Louisiana requires the Tier II form. Development of the site of the proposed action would be expected to generate some hazardous wastes, due to the use and disposal of petroleum, oil, grease, etc. These hazardous wastes would be disposed of in accordance with applicable federal and state regulations.

Short-term impacts from construction of the proposed oil and gas wells and associated structures would include the following: soil disturbance and erosion, increased air emissions, and noise. Long-term impacts include loss of vegetation and wildlife habitat, and increased boat traffic. These unavoidable impacts, and any related mitigation or funding solutions, are discussed in the previous sections of this EA, and are not anticipated to be significant.

7.0 Mitigation Measures

7.1 Wetlands

Direct impacts to park natural resources, most notably the globally unique floating wetlands that characterize the Barataria Preserve, have been avoided by relocating the proposed operation to an open water site outside of the Park boundary. (See Alternative C, Considered but dismissed)

The location of surface operations (as proposed) was selected in order to minimize both visual and logistical impacts to the fishing camps located along the Bayou Segnette Waterway.

Bottom materials excavated during slip construction would be placed immediately adjacent and connected to existing marshes of the Barataria Preserve. This material would be placed and contoured to an elevation similar to the adjacent marshes and planted with native wetland vegetation to create additional emergent marshland and provide some level of protection for the existing shoreline.

The construction contractor(s) will implement soil erosion control measures, such as the use of coco matting and silt fences, to minimize soil erosion during any possible construction activities as part of implementation of the proposed activities.

Current Federal regulations require compensatory wetland mitigation for most projects impacting greater than one-tenth (1/10th) of an acre of jurisdictional wetlands. Compensatory mitigation is defined as off-site acquisition, creation, restoration, enhancement and maintenance of wetlands at sites approved by COE for the express purpose of compensating for unavoidable wetland losses associated with development actions. Mitigation options include on-site restoration/ preservation, off-site restoration, and payment of an in-lieu fee or the purchase of mitigation credits from an approved mitigation bank. A mitigation plan will be coordinated under the guidelines of the LA Coastal Management Division and the USACE.

7.3 Spill Prevention and Control

The construction contractor(s) will implement a spill contingency plan, prior to any construction activity, to reduce or eliminate the potential for contamination of water or soils from accidental spills and releases.

Aspect Energy, LLC will construct and file a U.S. Coast Guard approved Spill Prevention Control and Cleanup Plan. The plan will be submitted to the National Park Service and will be maintained in the Couba Island Field from the onset of Aspect Energy, LLC activity. All personnel working in the field and those personnel with office oversight and surveillance will have copies of the plan and will be familiar with its contents and the listed

requirements. All stated methods and procedures for spill prevention, containment and cleanup equipment will be adhered to and all required equipment will be available or on-site, as the requirements will specify.

Aspect Energy, LLC will select a contract spill control and cleanup vendor who will be called to the sight for a "PRE-INCIDENT" audit and assessment. This vendor will have the primary control and cleanup responsibilities for the Couba Island Field and will be charged with maintaining on-site equipment at the ready. He will also commit to having instant availability to mobilize and man additionally required material.

WELL DRILLING AND COMPLETION MODE

- Mud weight sufficient to overpower formation pressure
- Blowout preventers
- Pollution plan below flowline
- Rig containment boom in water, ready for deployment
- Rig cleanup equipment and absorbant pads
- Rig inspected drilling fluid tanks and lines
- Internal drill pipe blowout preventers
- Rig telephone communication
- Rig sewer treatment facility
- Round-the-clock surveillance on location
- Rig fire fighting equipment and crews
- Copy of Aspect Energy, LLC Spill Prevention, Control & Cleanup Plan
- Standby crew boat
- A water-based drilling mud will be utilized for drilling the well.
- A closed loop "zero discharge system" would be utilized for drilling the well.

PRODUCTION MODE

- Inspected API approved and certified vessels, tanks and lines
- Vessel and tank automatic acting liquid level controls and dump valves
- Tanks and vessels equipped with high level, low level, high pressure and low pressure (where appropriate) alarms with automatic shut down system (activates all well shut-in).
- Remote Emergency Shut In system controls (activates all well shut-in)
- High/Low pressure pipeline shut in controls
- Regularly scheduled ESI system tests
- Contained vessel skids that drain to barge sump
- Containment boom in water, ready for deployment
- Closed containment boom around oil loading facility
- Absorbant pads and cleanup rags stored on production barge
- Copy of Aspect Energy LLC Spill Prevention, Control & Cleanup Plan
- Fire fighting equipment
- Telephone communication
- Daily pollution and leak inspection by trained personnel

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8.0 Environmental Commitments

In accordance with Federal, State, and local laws the following permits or approvals will be aquired prior to commencement of activity.

State of Louisiana Department of Natural Resources Coastal Use Permit
US Army Corps of Engineers Section 404/10 permit
State of Louisiana Department of Environmental Quality LPDES Permit
State of Louisiana Department of Environmental Quality Water Quality Certification
State of Louisiana Department of Natural Resources Conservation Permit (drilling permit)
Jefferson Parish Letter of No Objection
NPS Nonfederal Oil and Gas Regulations (exemption)

All activity will be conducted in accordance with conditions stated within these permits and under the guidelines of EPA, USCG, and NPS regulations.

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10.0 Coordination

Federal, state, and local governments and agencies were consulted prior to and during the preparation of this Environmental Assessment. Most agencies were either contacted in writing, by telephone, by Internet, or visited during the course of the study. The agencies contacted are listed below.

10.1 Federal Agencies

U.S. Army Corps of Engineers
U.S. Bureau of the Census
U.S. Department of Commerce
U.S. Environmental Protection Agency, Region 6
U.S. Fish and Wildlife Service
Natural Resources Conservation Service
National Park Service

10.2 State Agencies

Louisiana Department of Culture, Recreation, and Tourism
Louisiana Department of Economic Development
Louisiana Department of Environmental Quality
Louisiana Department of Labor
Louisiana Department of Natural Resources
Louisiana Department of Transportation and Development
Louisiana Department of Wildlife and Fisheries

10.3 Local Governments and Entities

New Orleans Regional Chamber of Commerce
Plaquemines Parish Water Department

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Appendix A
SURROUNDING WILDLIFE

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PLANT SPECIES OF KNOWN OCCURRENCE IN JEAN LAFITE NATIONAL HISTORICAL PARK AND PRESERVE IN JEFFERSON AND ST. CHARLES PARISHES, LOUISIANA.

Common Name	Scientific name	Habitat Types
Creeping burrhead	(Echinodorus cordifolius)	In mud and shallow water ponds and quiet streams
Bull-tongue arrowhead Bull-tongue Scythefruit arrowhead	Ssagittaria lancifolia	
Bull-tongue arrowhead	(Sagittaria lancifolia) ssp. media	Freshwater marsh; intermediate marsh; scrub/shrub
Duck-potato Broadleaf arrowhead Common arrowhead	(Sagittaria latifolia)	Marshes, low meadows and pond margins
Delta arrowhead	(Sagittaria platyphylla)	In mud or shallow water of marshes, streams, sloughs, swamps and ponds
Hairy fruit chervil chervil	(Chaerophyllum tainturieri)	In prairies, wet woodlands, and alluvial thickets
Spotted water hemlock Common water hemlock Poison parsnip Spotted cowbane Spotted parsley Water hemlock	(Cicuta maculata var. maculata)	In swamps and other wet places
Floating marsh pennywort Floating pennyroyal	(hydrocotyle ranunculoides)	
Umbrella pennywort Manyflower Marsh pennywort	(Hydrocotyle umbellata)	Freshwater marsh; scrub/shrub; intermediate marsh
Whorled marsh pennywort Whorled pennyroyal	(Hydrocotyle verticillata)	In open marshes and wet areas
Carolina grasswort	(Lilaeopsis carolinensis	Open mud flats of fresh water marshes
Herbwilliam Threadleaf Mock bishop weed	(Ptilimnium capillaceum)	Open bottom land, marshes, low pastures and wet roadsides ditches
Canadian black snake root Canada sanicle	(Sanicula canadensis)	Mixed deciduous woods, road banks, fence rows, and waste places
Devil's-walkingstick Angelica tree	(Aralia spinosa)	Upland and low woods, marshes and savannas
Green dragon	(Arisaema dracontium)	Rich wet woodlands and alluvial soils in woods and thickets
Coco yam Wild taro	(colocasia esculenta)	
Water-lettuce Apon-apon Laite d'eau Lechugita de agua Piste Tropical duckweed	(Pistia stratiotes)	Freshwater marsh

Common Name	Scientific name	Habitat Types
Duckweed Common duckweed Least duckweed Lesser duckweed	(Lemna minor)	Freshwater marsh; scrub/shrub; intermediate marsh
Great duck weed Common duckmeat Common duckweed Greater duckweed	(Spirodela polyrhiza)	Freshwater marsh
Water-meal Columbian watermeal	(Wolffia colombiana)	Wooded swamp
	(Wolffiella floridana)	
Sword bogmat Florida mudmidget	(Wolffiella gladiata)	Freshwater marsh
Tongue-shaped bogmat	(Wolffiella lingulata)	Freshwater marshes and ponds
Dwarf Palmetto	(Sabal minor)	Mixed deciduous hardwood
Opposite-leaf spotflower Creeping spotflower	(Acmella (acmella oppositifolia var. repens)	In mud along streams, bayous, lakes and ditches
White snake root	(Ageratina altissima var. altissima)	Rich woods usually mesic
Annual ragweed Roman wormwood Common ragweed Low ragweed Short ragweed Small ragweed ragweed	(Ambrosia artemisiifolia)	Fields, roadsides, pastures and waste places
Western ragweed	(Ambrosia cumanensis)	Along streams, roadsides, uncultivated lands, and marshy flats; abundant on the coastal plain
Cuman ragweed Perennial ragweed Western ragweed	(Ambrosia psilostachya)	
Giant ragweed Blood ragweed Great ragweed Horseweed Perennial ragweed (great) Tall ragweed	(Ambrosia trifida)	Abundant in seasonally moist stream bottoms, and overflow areas
Smooth aster	Aster laevis	
Calico aster	(Aster lateriflorus)	In swamps, wet depressions in prairies, borders of streams, ponds and sloughs
	(Aster linarifolius)	
Willowleaf aster	(Aster praealtus)	In marshes, seepages in wet meadows, prairie swales, ditches, and moist banks
Anual saltmarsh aster	(Aster subulatus)	In shallow water of ditches and pools, wet mud flats, marshes and floodplains and in the coastal saline marshes

Common Name	Scientific name	Habitat Types
	(Aster umbellatus)	
Groundsel-tree Eastern baccharis	(Baccharis halimifolia)	Power line corridors
Spanish-needles	(Bidens bipinnata)	In rich alluvial soils and other wet places
Smooth beggar tick Burmarigold	(Bidens laevis)	Scattered near and in water of sloughs, lakes, and streams, in marshes and wet meadows
Hairy beggarticks Spanish needles Beggar's tick Cobbler's pegs Fisi'uli Kofe tonga Matakaro	(Bidens pilosa)	Waste places
Straggler daisy	(Calyptocarpus vialis)	Frequent in low, wet woods at the water's edge of low gradient streams and bayous
Yellow thistle	(Cirsium horridulum)	In wet meadows and depressions, edge of streams and seepage areas
Blue mistflower	(Conoclinium coelestinum)	
Southern whitetop	(Doellingeria serococarpoides	
Clasping-coneflower	(Dracopis amplexicaulis)	Moist or wet places
False daisy	(Eclipta alba)	In the mud at edges of freshwater bodies
False daisy Yerba de tago	(Eclipta prostrata)	
Carolina elephant's foot Leafy elephantfoot	(Elephantopus carolinianus)	Dry woods
Philadelphia fleabane Philadelphia daisy	(Erigeron philadelphicus)	In many habitats but usually bogs and marshes
Dog-fennel	(Eupatorium capillifolium)	Open places, often in fields and pastures
Blue mist-flower	(Eupatorium coelestinum)	In moist wooded sandy areas, edges of ponds, along streams and in seepage areas
Richweed Snakeroot White Snakeroot	(Eupatorum rugosum)	
Late flowering thorough-wort Late flowering thoroughwory	(Eupatorium serotinum)	Mostly in bottomlands and moist woods; sometimes in drier open places
Firewheel Indian blanket Rosering gaillardia	(Gaillardia pulchella)	Sandy fields, roadsides and beach dunes
Purple-head Sneezeweed	(Helenium flexuosum)	Alluvial pastures, wet meadows, and ditches

Common Name	Scientific name	Habitat Types
Annual sunflower Common sunflower Wild sunflower	Helianthus annuus	
Flaxleaf Whitetop aster Savoryleaf aster	Lonactis linarifolius	
Annual marshelder Seacoast sumpweed	Iva annua	Fields
Jesuit's bark Bigleaf sumpweed Sump weed	Iva frutescens	Young spoil banks; brackish marshes, particularly along drainage ditches
Potato dwarf-dandelion	(Krigia dandelion)	Roadsides, fields, pastures, lawns and waste places
Canada lettuce	(Lactuca canadensis)	In marshes, alluvial thickets, muddy seepage banks, and on sandy gravel bars along streams
Woodland lettuce Florida lettuce	(Lactuca floridana)	Along streams, in wet thickets and alluvial woods, swampy grounds, and wet sands
Climbing hemp vine Climbing hemp weed	(Mikania scandens)	Frequent in river bottoms and other moist woods, and swampy back waters
Santa Maria feverfew Ragweed parthenium Whitetop weed	(Parthenium hysterophorus)	Waste places
Sweet scent	(Pluchea odorata)	Brackish marshes
Carolina desert chicory Carolina false dandelion	(Pyrrhopappus carolinianus)	Fields, dry woods, and bottomlands
Cress-leaf ragwort Butterweed Cressleaf groundsel	(Senecio glabellus)	Moist or wet shady places
Hairy leaf-cup	(Smallanthus uvedalia)	Woods and meadows on the coastal plain
Canadian goldenrod	(Solidago altissima)	Freshwater marsh, old fields, pastures and meadows
Seaside goldenrod	(Solidago sempervirens)	Frequent in marshy often slightly brackish swales and ditches
Spiny-leaf sow-thistle Perrenial sow-thistle Prickly sow-thistle	(Sonchus asper)	Roadsides, fields, pastures and waste places
Southern annual saltmarsh aster	(symphyotrichum divaricatum)	
Smooth blue aster	(symphyotrichum leave)	
Calico aster	(symphyotrichum lateriflorum)	
Willowleaf aster	(symphyotrichum praeltum)	
Perennial saltmarsh aster	(symphyotrichum tenuifolium)	Brackish marshes; scrub/shrub

Common Name	Scientific name	Habitat Types
White crownbeard Virginia crownbeard Iceweed	(Verbesina virginica)	Old fields, pastures, meadows, road banks and wooded slopes
Giant iron weed	(Veronia gigantea)	Swamp forests and marshes
Rough cockleburr Common coclkeburr	(Xanthium strumarium)	Low marshy lands and mud flats about lakes
Oriental false hawk's beard	(Younga japonica)	Moist open places
Spanish moss	(Tillandsia usneoides)	Within trees on old spoil banks
Greater water-starwort Larger water-starwort Differentleaf water-starwort Twoheadedwater-starwort Variedleaf water-starwort	(Callitriche heterophylla)	Pools, low gradient streams, bayous and ditches
Cardinal-flower	(Lobelia cardinalis)	In wet or moist soil, open places along streams, in meadows and along roadsides, about springs and ponds, in swamps where shade is not too dense
Venus'-looking-glass Clasping-leaf Venus'-looking glass Clasping bellwort Roundleaved triodanis Common Venus'-looking-glass	(Triodanis perfoliata)	Roadsides, fields and gardens
	(Triodanis biflora)	Roadsides, fields and gardens, but less frequent than preceding species
Pennsylvania bittercress Quaker bittercress	(Cardamine pensylvanica)	In swamps and wet woods, about springs, in seepage areas and along streams
Virginia pepperweed Virginian peppercress Peppergrass Poorman pepperweed Poorman's pepper Poorman's pepperwort	(Lepidium virginicum)	Dry or moist soil, fields, gardens and roadsides
Northern marsh yellowcress	(Rorippa islandica)	Low, wet mostly open habitats
Alligator Weed Pig weed	(Alternanthera phileroxoides)	Freshwater marsh; intermediate marsh; scrub/ shrub
Southern amaranth	(Amaranthus australis)	In salt and marshy places
	(Amaranthus tamariscinus)	
Sticky chickweed	(Cerastium g1omeratum)	Fields, roadsides, and waste places
Common chickweed Nodding chickweed	(Stellaria media)	Cultivated areas, meadows, and woodlands
American pokeweed Common pokeweed Inkberry Pegeonberry Poke Pokeberry	(Phytolacca americana)	In rich low ground, especially in recent clearings and along roadsides in and about depressions

Common Name	Scientific name	Habitat Types
Rouge plant Bloodberry rougeplant	(Rivina humilis)	Disturbed sites, sandy soils, dunes and hammocks
Little hogweed Akulikuli-kula Common purslane Duckweed Garden perslane Pursley Wild portulaca	(Portulaca oleracea)	On grassy slopes, moist waste areas, floodlands, dunes, and in salt marshes
Dahoon	(Ilex cassine)	Swamps, cypress ponds and near bays
Possumhaw	(Ilex deciduas)	In woods often bordering streams, ravines, and swamps
Yaupon	(Ilex vomitoria)	In low woods, hammocks, and sandy pine lands; occasionally in swamps and floodplains
Climbing dayflower Spreading dayflower	(Commelina diffusa)	In floodplain woods, stream beds, and wet clays about ponds
Whitemouth dayflower Erect dayflower	(Commelina erecta)	Dry, usually sandy soils
Virginia dayflower	(Commelina virginica)	In low woods and in water of pools
Bluejacket Ohio spiderwort	(Tradescantia ohiensis)	In wet meadows, prairies and thickets
Alternate-leaf dogwood	(Cornus alternifolia)	
Roughleaf dogwood	(Cornus drummondii)	Mixed deciduous hardwoods
Flowering dogwood	(Cornus florida)	
	(Cornus foemina)	
Water tupelo	(Nyssa aquatica)	Cypress-Tupelo
Black gum Black tupelo	(Nyssa sylvatica)	
Eastern narrow leaf sedge Amphibious sedge	(Carex amphibola)	In moist soils, woodlands, in wet soils along streams in forests, alluvial forests, and ravines
Oval leaf sedge	(Carex cephalophora)	Frequent in moist sandy soils at the base of hills and in wet pasture lands
Cherokee sedge	(Carex cherokeensis)	Low woods
Raven foot sedge	(Carex crus-corvi)	In mud on edge of lakes, ponds and streams, and in shallow water
Thin fruit sedge	(Carex flaccosperma)	In moist sandy soil in wooded areas, swampy grounds, and wet woodlands
Shoreline sedge	(Carex hyalinolepis)	In wet meadows, swamps, ditches, edges of sloughs, lakes, ponds and mud of streams
Blunt broom sedge	(Carex tribuloides)	In swampy or low wet meadows and woods of alluvial soils
Saw-grass	(Cladium jamaicense)	Often associated with Panicum dichotomum in freshwater marshes

Common Name	Scientific name	Habitat Types
Royal flatsedge Sticky flatsedge	(Cyperus elegans)	In moist calcareous soil, edges of lakes, ponds, and tanks, and wet gravel creek beds
Redroot flatsedge Redroot nutgrass	(Cyperus erythrorhizos)	Abundant in marshy places, sand flats, and in shallow water of lakes and ponds
Chufa Chufa flatsedge Yellow nutgrass Yello nutsedge	(Cyperus esculentus)	Abundant in disturbed loamy or sandy soils, and in shallow waters of lakes and ponds
Nutgrass Haspan flatsedge	(Cyperus haspan)	Freshwater marsh; scrub/shrub
	(Cyperus hermaphroditus)	
Rice field flatsedge	(Cyperus iria)	Wet clay in coastal rice-growing areas, in water of freshwater canals, and on edge of ponds
Pond flatsedge	(Cyperus ochraceus)	Abundant in shallow water and mud, and edge of lakes and ponds
Fragrant flatsedge Rusty flatsedge	(Cyperus odoratus)	In mud of swamps, ditches and streams, and at edges of lakes and creeks
Sharpscale flatsedge	(Cyperus oxylepis)	Infrequent in coastal areas of Texas and Louisiana
Strawcolored flatsedge Strawcolor nutgrass	(Cyperus strigosus)	Freshwater marsh; scrub/shrub; intermediate marsh
Southern flatsedge	(Cyperus thyrsiflorus)	Rare in rich loam and shaded river woods
Green flatsedge	(Cyperus virens)	Abundant in moist places, in shallow water, and on edges of lakes, ponds, and streams
Gulf coast spikerush Gulf coast spikesedge	(Eleocharis cellulosa)	
Creeping spike-rush	(Eleocharis fallax)	Freshwater marsh
Yellow spike-rush	(Eleocharis flavescens)	Freshwater marsh
	(Eleocharis macrostachya)	
Small fruit spike-rush	(Eleocharis microcarpa)	On sandy loams, in mud and shallow water of ponds and streams, and depressions in savannas
Sand spike-rush	(Eleocharis montevidensis)	In moist soil, in shallow water streams and ponds, and in wet granitic sands
Common spike-rush Creeping spikerush Spikesedge	(Eleocharis palustris)	Marshes, vernal pools, wet meadows, ditches, flooded lands, and alkaline mud
Squarestem spikerush Squarestem spikesedge	(Eleocharis quadrangulate)	
Hairy-umbrella sedge	(Fuirena squarrosa)	Freshwater marsh; scrub/shrub
Starrush whitetop	(Rhynchospora colorata)	

Common Name	Scientific name	Habitat Types
Short-bristle horned beak sedge	(Rhynchospora corniculata)	Frequent in mud, on edge of lakes, and along edge of swamps
Chairmaker's bulrush American bulrush Olney bulrush schoenoplectus	(Schoenoplectus americanus)	Low often moist ground, in water and near seepage areas
California bulrush	(Schoenoplectus californicus)	Sedge association in freshwater marsh
	(Scirpus californicus)	
Bulrush Woolgrass	(Scirpus cyperinus)	Wet or boggy places, in water and muddy places
Drooping bulrush	(Scirpus lineatus)	Meadows, swales, edge of lakes and ponds, and in low wettish thickets
	(Scirpus olneyi)	
Rufous bulrush	(Scirpus pendulus)	Marshes and ditches
Broom sedge Bushy bluestem	(Andropogon glomeratus)	Freshwater marsh; scrub/shrub
Small carp-grass Hairy jointgrass	(Arthraxon hispidus)	Wet soil in waste places
Giant cane	(Arundinaria □igantean)	Bogs, mesic woods, savannas and dry woods
Switchcane	(Arundinaria gigantean ssp. Tecta	
Rhodes grass	(Chloris gayana)	Fields and waste places
Variable rosette grass Variable panic grass	(Dichanthelium commutatum)	Low or swampy woods
Smooth crab grass Small crab grass	(Digitaria ischaemum)	Established as a weed over much of the U.S.
Hairy crab grass Northern crab grass Crabgrass Large crabgrass Purple crabgrass Redhair crabgrass	(Digitaria sanguinalis)	Disturbed soil along roads, in fields and gardens, margins of ponds, and wet gravel bars
Barnyard grass Japanese millet Cockspur Watergrass	(Echinochloa crusgalli)	Low fields, marshes and waste places
Walter's millet Coast cockspur	(Echinochloa walteri)	Freshwater marsh; intermediate marsh; scrub/ shrub
Indian goose-grass Crowsfoot grass Goose grass Manienie ali'l Silver crabgrass Wire grass	(Eleusine indica)	Common weed in lawns, gardens and waste places
Virginia wild rye	(Elymus virginicus)	In mud and water of streams, ponds and marshy areas

Common Name	Scientific name	Habitat Types
Little love grass	(Eragrostis minor)	Waste places
	(Erianthus giganteus)	
Nodding fescue	(Festuca subverticillata)	Fields and waste places
Little barley Little wild barley	(Hordeum pusillum)	Dry or sterile, especially alkaline soils
Southern cutgrass	(leersia hexandra)	
Catchfiy grass	(Leersia lenticularis)	Sloughs, bayous, swamps, ditches, and in mud and shallow water
Whitegrass	(Leersia virginica)	Swamps and bogs along bayous, rivers and streams, and sand flats on the edge of ponds
Bearded sprangletop sprangletop	(Leptochloa fascicularis)	Freshwater marsh
Long-leaf basket grass Bristle baskergrass	(Oplismenus hirtellus)	Shaded areas
Short-leaf basket grass	(Oplismenus hirtellis ssp. Setarius)	Low woods and maritime forests
Beaked panic grass Beaked panicum	(Panicum anceps)	Sandy well-drained forested uplands, in wet prairies, swampy meadows, and edges of lakes and streams
Fall panic grass Fall panicum Fall panic Western witchgrass	(Panicum dichotomiflorum)	Freshwater marsh; scrub/shrub
Maidencane Mountain panic	(Panicum hemitomon)	Freshwater marsh; intermediate marsh; scrub/shrub
Red-top panic grass Redtop panicum	(Panicum rigidulum)	Freshwater marsh
Switchgrass	(Panicum virgatum)	Fresh or brackish marshes, seepage areas, swamps about lakes and edges of ponds
Jointed crown grass Knotgrass Knotroot paspalum	(Paspalum distichum)	Brackish and freshwater marshes
Longtom	(Paspalum lividum)	
Bahia grass	(Paspalum notatum)	Pastures, roadsides and waste places
Vasey's grass	(Paspalum urvelli)	
Pearl millet	(Pennisetum glaucum)	Fields and cultivated areas
Timothy canary grass	(Phalaris angusta)	Open ground at low altitudes
Carolina canary grass	(Phalaris caroliniana)	Loamy usually alluvial soils near creeks, in disturbed soils along roadsides, in fallow fields and pastures, and in shallow water
Savannah panic grass	(Phanopyrum gymnocarpon)	Wet sand in streams or shallow waters and in mud about ponds and lakes
Common Reed	(Phragmites australis)	Young spoil banks; intermediate marsh

Common Name	Scientific name	Habitat Types
Annual blue-grass Spear grass Walk grass	(Poa annua)	Moist soils
Annual rabbits-foot grass Rabbit foot beardgrass Rabbitfoor polypogon	(Polypogon monspeliensis)	Moist soil near fresh water, in brackish ponds, seepage and boggy areas, marshes, and wet meadows along streams
Giant plume grass Sugarcanr plumegrass	(Saccharum giganteum)	Savannas, ditches and woodland borders
American cupscale	(Sacciolepis striata)	Freshwater marsh; scrub/shrub; intermediate marsh
Yellow bristle-grass	(Setaria geniculata)	In mud along streams, salt and freshwater marshes, in mud and shallow water about ponds and lakes
Yellow fox-tail	(Setaria glauca)	Wet soil on edge of ponds, lakes and streams, in wet meadows, ditches and gravel bars along streams
Giant bristle-grass	(Setaria magna)	Marshes, wet places, moist ditches, and bayous
Marsh bristle grass Knotroot bristlegrass Yellow bristlegrass	(Setaria parviflora)	Marshes and bayous
Johnson grass Aleppo milletgrass Herbe de Cuba Sorgho de alepo Zacate Johnson	(Sorghum halepense)	Fields, roadsides and waste places
Atlantic cordgrass Saltmarsh cordgrass Smooth cordgrass	(Spartina alterniflora)	
Big cordgrass	(Spartina cynosuroides)	In muck at tidally submerged shores of brackish bays and river-mouths; also in marshes
Saltmeadow cordgrass Marsh hay cordgrass	(Spartina patens)	Intermediate marsh
Prairie wedgescale Prairie wedgegrass	(Sphenopholis obtusata)	In moist swales, in water of creeks, in seepage areas and wet soils
Swamp wedgescale	(Sphenopholis pensylvanica)	Marshes and low wet places
Smutgrass Rattain smutgrass	(Sporobolus indicus)	Mud and moist loam, low prairies and swales, in shallow water about ponds and springy areas
St. Augustine grass	(Stenotaphrum secondatum)	Moist, especially mucky soil near the seashore
Giant cutgrass Southern wild rice	(Zizaniopsis miliacea)	Freshwater marshes in monospeciflc stands; scrub/ shrub
Japanese honeysuckle Chinese honeysuckle	(Lonicera japonica)	Floodplain woods

Common Name	Scientific name	Habitat Types
Common elderberry American elder	(Sambucus nigra)	Swamp forests, alluvial woods and pastures
Mexican elderberry Blue elder Elder Elderberry	(Sambucus nigra ssp. asciculat)	
Narrow-cell cornsalad	(Valerianella stenocarpa)	Low moist places
Common persimmon Eastern persimmon	(Diospyros virginiana)	Dry deciduous forests, pine lands, and old fields
Buckthorn bully	(Sideroxylon lycioides)	Low woods, thickets, and river banks
American snowbell Snowbell	(Styrax americanus)	Swamp forests, alluvial woods, and stream banks
Virginia three-seed mercury	(Acalypha rhomboidea)	Thinly wooded habitats and disturbed ground
Heartleaf sandmat	(Chamaesyce cordifolia)	Pine-oak woods
Pillpod sandmat	(Chamaesyce hirta)	Meadows and open woods
Spotted sandmat	(Chamaesyce maculata)	Meadows and open woods
Eyebane Nodding spurge Spotted sandmat Spotted spurge	(Chamaesyce nutans)	Dry or moist soil
Prostrate sandmat Prostrate spurge	(Chamaesyce prostrata)	Crevices of sidewalks and waste places
Chamber bitterweed Chamber bitter	(Phyllanthus urinaria)	Commonly cultivated and in disturbed habitats
Chinese tallow tree Florida aspen Chicken tree Popcorn tree Tallow tree Vegetable tallow White wax berry	(Sapium sebiferum)	Species that grows well in a variety of habitats from wetlands to sands
Tallow tree	(Triadica sebifera)	
Ellington curse Klu bush Aroma Kandaroma Klu Popinac Sweet acacia Texas huisache	(Acacia farnesiana)	
Indian joint-vetch Kat sola	(Aeschynomene indica)	Wet coastal areas
Partridge pea Showy partridge pea Sleeping plant	(Cassia □asciculate)	
Spurred butterfly pea butterfly pea	(Centrosema virginianum)	Dry sandy woods and barrens

Common Name	Scientific name	Habitat Types
Partridge pea Showy partridge pea Sleeping plant	(Chamaecrista asciculate)	Open often disturbed habitats
Prairie bundleflower Ilinois bundleflower	(Desmanthus illinoensis)	Moist or dry soil, river-banks, prairies and pastures
Hoary tick-trefoil Hoary tickclover	(Desmodium canescens)	Moist or dry soil
Dillenius' tick-trefoil	(Desmodium glabellum)	Dry woods
Smooth tick-trefoil Smooth tickclover	(Desmodium laevigatum)	Dry upland woods
Panicled-leaf tick-trefoil Panicled tickclover	(Desmodium paniculatum)	Dry woods
Honey locust	(Gleditsia tricanthos)	Woods and wooded borders
Sour clover Indian sweet-clover Annual yellow sweet-clover	(Melilotus indica)	Introduced annual throughout the region
Powderpuff Herbaceous mimosa	(Mimosa strigillosa)	Abundant in the Mississippi floodplain, prairie, and second growth pine land
Kudzu Japanese arrowroot Acha Aka Nepalem Wa yaka	(Pueraria Montana var. lobata)	Roadsides, woods and fields
Least snoutbean	(Rhynchosia minima)	Disturbed sites
Black locust False acacia Yellow locust	(Robinia pseudoacacia)	Woods and thickets
Poison bean	(Sesbania drummondii)	Rice fields, wet pastures and ditches
Peatree	(Sesbania exaltata)	Ditches, fields and freshwater marsh
Bigpod sesbania Hemp sesbania Peatree	(Sesbania herbacea)	
Purple river hemp Rattlebox	(Sesbania punicea)	Roadsides, ditches and waste places
Trailing fuzzy-bean Trailing wildbean	(Strophostyles helvula)	Beaches, open woods and clearings
Crimson clover	(Trifolium incarnatum)	Fields and roadsides
Red clover	(Trifolium pratense)	Fields and roadsides
White clover Dutch clover Ladino clover	(Trifolium repens)	Wet meadows, marshes, and in wet soil about ponds and along streams
Reversed clover Persian clover	(Trifolium resupinatum)	Lawn weed
Louisiana vetch Deerpea vetch Slim vetch	(Vicia ludoviciana)	Rich woodlands and thickets

Common Name	Scientific name	Habitat Types
Common vetch Garden vetch Slimleaf vetch	(Vicia sativa ssp. Nigra)	
Piedmont cow-pea Deerpea Hairypod cowpea	(Vigna luteola)	Freshwater marsh; intermediate marsh
Chinese wisteria	(Wisteria sinensis)	Frequently cultivated and escaping into open woods and roadsides
American hornbeam	(Carpinus caroliniana)	Stream banks and low woods
Eastern hophornbean hophornbean	(Ostrya Virginia)	
White oak	(Quercus alba)	
Laurel oak	(Quercus laurifolia)	Low ground and sandy soils
Water oak	(Quercus nigra)	Mixed deciduous hardwood; old spoil banks
	(Quercus nuttallii)	
Willow oak	(Quercus phellos)	
Texas red oak	(Quercus texana)	Bottomlands
Live oak	(Quercus virginiana)	Mixed deciduous hardwood; old spoil banks
Aquatic milkweed	(Asclepias perennis)	Low swampy ground, frequently with bald cypress, alluvial woods, sloughs and ditches
Angular-fruit milk vine	(Matelea gonocarpa)	Rich woods and thickets
Coastal rose-gentian	(Sabatia calycina)	Ditches and shaded river swamps and bottoms
Lax hornpod	(Mitreola petiolata)	In moist soil in seepage, along ditches and streams, in mud of marshes and swamps, and about ponds and lakes
Carolina crane's-bill Carolina geranium	(Geranium carolinianum)	Common weed of disturbed habitats including gardens, fields, pastures and roadsides
Spotted crane's-bill Spotted geranium	(Geranium maculatum)	
Pink wood-sorrel	(Oxalis dedilis var. corymbosa)	Locally cultivated and escaped to disturbed areas
Dillen's oxalis	(Qxalis dillenii)	Lawns, gardens, fields and waste places
Parrot's-feather Brazilian watermilfoil	(Myriophyllum aquaticum)	Pools, lakes, ponds, bayous and ditches
Sweetgum	(Liguidambar styraciflua)	Mixed deciduous hardwood; Cypress-tupelo; old spoil banks; power line corridors
American sycamore Sycamore	(Plantanus occidentalis)	Low woods
American spongeplant Frogbite	(Limnobium spongia)	
Mosquito fern Carolina mosquito fern	(Azolla caroliniana)	Freshwater marsh

Common Name	Scientific name	Habitat Types
Water-spangles Water fern	(Salvinia minima)	Pools of streams, bayous and canals
Water hickory	(Carya aguatica)	Swamps and floodplains
Pecan	(Carya illinoensis)	Orchard within the park
Soft rush Common rush Lamp rush	(Juncus effusus)	Freshwater marsh
Poverty rush Field rush Path rush Slender rush Slender yard rush Wiregrass	(Juncus tenuis)	Wet sands in woods, in wet soils on edge of ponds, lakes and streams
Salt heliotrope Quail plant Seaside heliotrope	(Heliotropium curassavicum)	In sandy soil along beaches, about ponds, and saline flats
Tuberous gromwell Tuberous stoneseed	(Lithospermum tuberosum)	Mixed deciduous forests
Largeseed forget-me-not Southern forget-me not	(Myosotis macrosperma)	Moist woods
Giraffehead Common henbit Henbit deadnettle	(Lamium amplexicaule)	Pastures, fields, roadsides, lawns and waste places
Motherwort Common motherwort	(Leonurus cardiaca)	Pastures, roadsides and waste places
Taperleaf water-horehound Taperleaf bugleweed	(Lycopus rubellus)	In marshes, swamps, bogs, meadows, ditches, seepage areas and shallow water
Virginia water-horehound Virginia bugleweed	(Lycopus virginicus)	Alluvial thickets along streams, sloughs, and lakes, wet meadows, and along ditches
Blood sage	(Salvia coccinea)	Disturbed sites
Lyre-leaf sage	(Salvia lyrata)	Roadsides, meadows and open wood lands
Mousesear	(Stachys crenata)	In shaded rocky or gravelly soils in woods, ravines, prairies, and in mud on edge of ponds and lakes
Smooth hedge-nettle Slender betony	(Stachys tenuifolia)	Rich bottomlands, lake shores, muddy bayous, swamps, marshes, low woods and wet meadows
American beauty berry	(Callicarpa americana)	Woods, moist thickets, wet slopes, low rich bottomlands and edge of swamps
Hedgeflower Lantana Largeleaf lantana	(Lantana camara)	Escaped cultured species found on roadsides and waste places
Frog fruit Lanceleaf frog fruit Northern frogfruit	(Phyla lanceolata)	

Common Name	Scientific name	Habitat Types
Turkey-tangle frog-fruit Frogfruit Sawtooth frogfruit Turkey tangle	(Phyla nodiflora)	Wet or moist soil, fields, thickets and beaches
Brazilian vervain	(Verbena brasiliensis)	Waste places, dry sandy soil, coastal prairies, in swamps and marshes and seepy banks of ponds
Tuberous vervain	(Verbena rigida)	Widespread throughout the south on waste grounds and roadsides
White vervain White verbena	(Verbena urticifolia)	Low rich or open woods, wet meadows, thickets, river floodplains, pastures and stream sides
Camphor tree Camphor laurel	(Cinnamomum camphora)	Mixed deciduous hardwood
Redbay	(Persea borbonia)	In woods, swamps, along streams and about seashores
Sassafras	(Sassafras albidum)	Fence rows, woodland margins and old fields
Yellow star-grass Hypoxis	(Hypoxis)	Wet woods, swamps, bottomlands
Copper iris Red-flag	(Iris fulva)	In marshes and wet meadows, ditches and on stream banks
Giant blue iris	(Iris giganticaerulea)	Freshwater habitats
Pale-yellow iris Yellow flag	(Iris pseudacorus)	Ponds and open woods
Annual blue-eyed grass	(Sisyrinchium rosulatum)	Lawns, meadows, and roadsides
Meadow garlic Canada garlic Wild onion	(Allium canadense)	Roadsides, wet meadows, woods and fields
Swamp lily Seven sisters	(Crinum americanum)	Swamps, marshes, edge of water in ditches and lakes
Carolina spiderlily	(Hymenocallis caririniana)	In wet sandy areas, meadows, swamps and marshes
Crow poison	(Nothoscordum bivalve)	Usually in moist soils in prairies and open woods
Common water hyacinth Floating water hyacinth Jacinthe d'eau Jacinto de agua Lirio acuatico Mbekambekair anga	(Eichhornia crassipes)	
Pickerelweed	(Pontrderia cordata)	
Fringed greenbriar Saw greenbriar	(Smilax bona-nox)	Most abundant in cut-over habitats
Chinaroot	(Smilax hispida)	Alluvial woods, swamp forests and stream banks

Common Name	Scientific name	Habitat Types
Horsebriar Bullbriar Common catbriar Common greenbriar Horsebriar Roundleaf greenbriar	(Smilax rotundifolia)	Deciduous woods and usually moist thickets
Bristly greenbriar	(Smilax tamnoides)	
Southern magnolia	(Magnolia grandiflora)	Swamp forests, maritime forests and low woods
Halberd-leaf rosemallow Scarlet rosemallow	(Hibiscus laevis)	Marshes, and shallow water of ponds and streams
Crimson-eyed rosemallow Marshmallow	(Hibiscus moscheutos ssp. lasiocarpos)	In marshes and low wet areas on the edges of woods, ditches and along low gradient streams
Salt-marsh mallow Virginia salt marsh mallow Virginia salt marsh williw	(Kosteletzkya virginica)	Freshwater marsh; intermediate marsh
Three-lobe false mallow	(Malvastrum coromandelianum)	Weed of disturbed sites
Carolina bristlemallow Carolina modiola	(Modiola caroliniana)	In water and mud on edge of lakes and in salt marshes, and lawns
Cuban jute Arrowleaf sida	(Sida rhombifolia)	In sandy-clayey soils in meadows, brushlands, low open woods and alluvial soils
Southern waxmyrtle Southern bayberry	(Myrica cerifera)	Cypress-tupelo; young spoil banks; power line corridors; freshwater marsh in isolated stands; scrub/shrub
Valley redstem Purple ammnnia	(Ammannia coccinea)	In mud of ditches, ponds, marshes, lakes and streams
Columbian waxweed	(Cuphea carthagenesis)	On edge of low wet woods and swamps
Winged lythrum	(Lythrum alatum var. lanceolatum)	Meadows, prairies, marshes, about lakes and ponds, ditches and depressions
Wand lythrum	(Lythrum lineare)	
Wing-leaf primrose willow Wing-leaf water primrose	(Ludwigia decurrens)	Swamps and shallow water
	(Ludwigia grandiflora)	
Anglestem primrose williw Anglestem waterprimrose	(Ludwigia leptocarpa)	Freshwater marsh; scrub/shrub
Mexican primrose willow	(Ludwigia octovalvis)	In swamps, marshes and other wet places
Marsh primrose willow Marsh seedbox	(Ludwigia palustris)	
Creeping water primrose Foating primrose Floating primrose willow	(Ludwigia peploides)	
Creeping primrose willow Creeping water purslane	(Ludwigia repens)	

Common Name	Scientific name	Habitat Types
Uruguayan water-primrose Uruguayan primrose willow water primrose	(Ludwigia uruguayensis)	Freshwater marsh
King's-cureall common evening primrose hoary evening primrose	(Oenothera biennis)	Fields and waste places
Pinkladies Showy evening primrose	(Oenothera speciosa)	Roadsides and dry open places
Southern water nymph Guadalupe water nymph common water nymph	(Najas guadalupensis)	Attached to bottom and floating just below surface of water in ponds, lakes, springs, ditches and springs in fresh or brackish water
Heartleaf pondweed Spotted pondweed	(Potamogeton pulcher)	
Carolina fanwort Fanwort	(Cabomba caroliniana)	In lakes, ponds and quiet streams
Coontail Coon's tail Hornwort Common hornwort	(Ceratophyllum demersum)	Freshwater marsh; intermediate marsh
American white waterlily White waterlily American waterlily	(Nymphaea odorata)	In ponds, lakes, slow streams and ditches
Green fly orchid	(Epidendrum conopseum)	Found on magnolia, tupelo gum, and some oaks on the trunks in shady areas
Water-spider orchid Waterspider bog orchid Waterspider false reinorchid	(Habenaria repens)	In streams, ditches, swamps, on the margins of ponds and lakes
Marsh ladies tresses	(Spiranthes odorata)	Stoloniferous colonies in water and mud of swamps, marshes, and along wooded streams
Bluestem prickly poppy	(Argemone albiflora)	Dry, open, often sandy places
Eastern red-cedar red cedar juniper	(Juniperus virginiana)	Old fields, mesic woodlands to xeric locations
Bald cypress	(Taxodium distichum)	Mixed deciduous hardwood; Cypress-Tupelo; old spoil banks
Lizard's tail	(Saururus cernuus)	In water or muddy soils of lakes, swamps, and streams
Common plantain Broadleaf plantain Buckhorn plantain Great plantain Rippleseed plantain	(Plantago major)	In marshes, wet meadows, in water on edge of streams, ponds, and lakes, and wet gravel bars along streams
American buckwheat vine buckwheat vine redvine	(Brunnichia ovata)	Woods near streams, lakes and ponds
Southern smartweed Denseflower knotweed	(Polygonum densiflorum)	Freshwater marsh

Common Name	Scientific name	Habitat Types
Swamp smartweed	(Polygonum hydropiperoides)	In marshes, wet meadows, in and on the edge of water of streams, ponds and lakes
Dotted smartweed	(Polygonum punctatum)	Freshwater marsh; intermediate marsh; scrub/ shrub
Bushy knotweed Tall knotweed Yellow knotweed Yellow-flower knotweed	(Polygonum ramosissimum)	In marshes, edge of streams, ponds and lakes, and seasonally wet areas
Bog smartweed	(Polygonum setaceum)	In marshes, wet meadows, in and on the edge of water of streams, ponds and lakes
Jumpseed	(Polygonum virginianum)	In water or in seepage along streams and about lakes, and in low, rich woodlands
Curly dock	(Rumex crispus)	In shallow water of streams, about ponds and lakes, and commonly in seasonally wet places
Fiddle dock	(Rumex pulcher)	In mud at edge of lakes and ponds, bogs and muddy areas
Swamp dock	(Rumex verticillatus)	Wet meadows, in water of ponds, swamps, marshes, and along edges of streams
Ebony spleenwort	(Asplenium platyneuron)	Rocky woods, old fields, sandy pine lands, thickets and road banks
Netted chain fern	(Woodwardia areolata)	Acid swamps, bogs and wet pine lands
Bracken Bracken fern Northern bracken fern Western bracken fern	(Pteridium aquilinum)	
Carolina mosquito fern Sensitive fern	(Onoclea sensiblis)	Muddy ditches, marshes, swamps and seepage areas
Japanese Climbing Fern	(Lygodium japonicum)	Mesic woods to ditch edges
Floating antler fern	(Ceratopteris pteridoides)	Shallow shores and backwaters of creeks and bayous
Resurrection fern	(Pleopeltis polypodioides var. polypodioides)	Epiphytic upon trees where shade is provided for colony
Kunth's maiden fern	(Thelypteris kunthii)	Swamps, along streams and in crevices of moist, sandy to calcareous soils
Southern marsh fern	(Thelypteris palustris)	Scrub/shrub
Scarlet pimpernel	(Anagallis arvensis)	Wet sands in prairies and flat lands
Seaside brook-weed Water brookweed Smallflower water pimpernel	(Samolus valerandi ssp. parviflorus)	In wet soils and about various types of wet rocks, along streams and in marshes
Carolina coralbead Carolina snailseed Redberry moonseed	(Cocculus carolinus)	
Canadian moonseed Common moonseed	(Menispermum canadense)	

Common Name	Scientific name	Habitat Types
Swamp leather flower Curly virgins bower	(Clematis crispa)	Wet soils, climbing on shrubs, along streams and low woodlands
Sweet autumn virgin's bower Latherleaf clematis Yam-leaved clematis	(Clematis terniflora)	Waste places
Devil's darning needles Virginia bower Virgin's bower	(Clematis virginiana)	Low woods and stream banks
Prairie buttercup	(Ranunculus platensis)	Introduced species of disturbed areas
Low spearwort Weak buttercup	(Ranunculus pusillus)	In shallow water and mud of ditches, marshes, bogs, seepage areas and ponds
Celery-leaf buttercup Cursed buttercup	(Ranunculus sceleratus)	Borders of lakes, streams and marshland, often thriving in brackish of alkaline sites
Three-lobe buttercup	(Ranunculus trilobus)	Old fields, waste places and lawns
Alabama supplejack	(Berchemia scandens)	Swamps and wet woods chiefly on the coastal plain
Peppervine	(Ampelopsis arborea)	Along streams, in and on edge of forest swamps, and in waste places
Heartleaf peppervine Heartleaf ampelopsis	(Ampelopsis cordata)	In rich woodlands and bottomlands along rivers and streams
Virginia creeper American ivy Fiveleaved ivy Woodbine	(Parthenocissus quinquefolia)	Moist soil
Graybark grape Sweet grape	(Vitis cinerea)	River and creek banks, in marshes, about lakes, bottomlands, and pond margins
Muscadine Muscadine grape	(Vitis rotundifolia)	Moist soil
Green hawthorn	(Crataegus viridis)	Mixed deciduous hardwood
Indian strawberry India mock strawberry	(Duchesnea indica)	Edge of low woods and thickets, seepage areas and marshes, along roadsides, and in old fields
White avens	(Geum canadense)	In swamps, in mud at edge of lakes and streams, and in moist rich woods
Black cherry Black chokecherry	(Prunus serotina)	Woodlands, pastures, and fence rows
Macartney rose	(Rosa bracteata)	
Allegheny blackberry	(Rubus allegheniensis)	
Prickly Florida blackberry Sawtooth blackberry	(Rubus argutus)	
Southern dewberry	(Rubus trivialis)	Chiefly in dry or sandy soils
Appalachian barren strawberry	(Waldsteinia fragarioides)	
Common buttonbush Buttonbush	(Cephalanthus occidentalis)	Freshwater marsh
Virginia buttonweed	(Diodia virginiana)	In swamps, wet meadows, marshes, coastal prairies and in mud along streams and about ponds

Common Name	Scientific name	Habitat Types
Stiff marsh bedstraw Dye bedstraw	(Galium tinctorium)	Freshwater marsh; intermediate marsh
Sticky-willy Bedstraw Catchweed bedstraw Cleavers Cleaverwort Goose grass Scarthgrass White hedge	(Galium aparine)	In rich woods, thickets, prairies, seashores and waste ground, and in seepage along streams
Cottonwood Eastern cottonwood Common cottonwood Plains cottonwood	(Populus □eltoids)	Along water courses, near dwellings, roadsides, and in deep alluvial soils
Black willow	(Salix nigra)	Old spoil banks; young spoil banks; power line corridors
Christmas mistletoe Bigleaf mistletoe Downy mistletoe	(Phoradendron tomentosum)	Widely distributed in hardwood trees
Boxelder Western boxelder Boxelder maple California boxelder Ashleaf maple Manitoba maple	(Acer negundo)	Mixed deciduous hardwood and stream banks
Red maple	(Acer rubrum)	Mixed deciduous hardwood; cypress-tupelo; old spoil banks; scrub/shrub
Drummond's maple	(Acer rubrum ssp. Drummondii)	
Poison ivy	(Rhus radicans)	
	(Rhus toxicodendron)	
Eastern poison ivy Poison ivy	(Toxicodendron radicans)	Stream bottoms and swampy lowlands
Western poison ivy Poison ivy	(Toxicodendron rydbergii)	
Chinaberry tree Indian lilac Chinaberry Lelah Paraiso Pride of India White cedar	(Melia azedarach)	Commonly cultivated, often on woodland borders and in disturbed habitats
Citrus	(Citrus)	
Love in a puff Balloonvine	(Cardiospermum halicacabum)	Exotic escaped from cultivation that grows in moist thickets to shaded disturbed habitats
Goldenrain tree	(Koelreuteria paniculata)	Often cultivated and found growing in disturbed habitats
Branched foldwing	(Dicliptera brachiata)	

Common Name	Scientific name	Habitat Types
Gulf Swampweed	(Hygrophila lacustris)	Freshwater marsh; scrub/shrub
Loose justica Looseflower water-willow Lance-leaved water willow	(Justicia ovata var. lanceolata)	In wet and swampy grounds and edge of water in low woods and marshes
Britton's wild petunia	(Ruellia brittoniana)	Waste places
Violet wild petunia Ruellia Wild petunia	(Ruellia nudiflora)	Cultivated species that is found in disturbed areas
Crossvine	(Bignonia capreolata)	Moist woods
Trumpet creeper Common trumpetcreeper Cow-itch	(Campsis radicans)	Moist woods, fence rows, and road sides
Juniper-leaf	(Polyprenum procumbens)	Old fields, thin woodlands, roadsides and waste places
Humped bladderwort Conespur bladderpod	(Utricularia gibba)	Freshwater marsh
Swollen bladderwort	(Utricularia inflata)	
Carolina ash	(Fraxinus caroliniana)	Low woods, swamps and along rivers
Green ash	(Fraxinus pennsylvanica)	Mixed deciduous hardwood; cypress-tupelo
Pumpkin ash	(Fraxinus profunda)	Low woods, usually in swamps and along rivers
Japanese privet	(Ligustrum japonicum)	Waste places
Glossy privet Tree privet	(Ligustrum lucidum)	Waste places and field borders
European privet Wild privet	(Ligustrum vulgare)	
Purple false fox-glove	(Agalinis purpurea)	Moist sandy soil in bogs, seepage areas, moist prairies, open pinelands, and barrens along shores
Herb-of-grace Coastal waterhyssop	(Bacopa monnieri)	Freshwater marsh; intermediate marsh; scrub/shrub
Japanese mazus	(Mazus pumilus)	Lawns, roadsides, and wet bottom lands
Axilflower	(Mecardonia acuminata)	In ditches, bogs, wet depressions, swamps, and pine flatlands
Baby jump up	(Mecardonia procumbens)	In mud and water of ditches, lagoons, ponds and streams, and in moist soils of depressions
Shade mudflower	(Micranthemum umbrosum)	
Sharpwing monkey flower	(Mimulus alatus)	In wet areas, about lakes and in marshes, and in wet mud of ponds
Oilfield-toadflax Canada toadflax Oldfield toadflax	(Nuttalanthus canadensis)	Fallow fields, roadsides and waste places
Wand mullein	(Verbascum virgatum)	Sand hills, sandy roadsides and waste places

Common Name	Scientific name	Habitat Types
Necklace weed Neckweed Purslane speedwell	(Veronica peregrina)	In water of tanks and streams, open flatwoods, swamps, marshes and wet meadows
Birdeye speedwell Persian speedwell Birdseye speedwell Winter speedwell	(Veronica persica)	Gardens, lawns, roadsides, and waste places
Carolina pony's foot Grass ponyfoot	(Dichondra carolinensis)	Damp open ground, in mud on edge of lakes and ponds, edge of swamps and marshes, and lawns
Redstar Mexican morningglory Red morningglory Scarlet morninglory Starglory Wooly tidestromia	(Ipomoea coccinea)	Cultivated and fallow fields, roadsides and waste places
Morning glory Ipomoea	(Ipomoea X leucantha)	Cultured hybrid that escapes to disturbed habitats
Tie-vine Cotton morningglory Sharppod morningglory	(Ipomoea cordatotriloba var. cordatotriloba)	Thickets, fields, wet depressions and flats, roadsides and disturbed ground
Salt-marsh morning glory	(Ipomoea sagittata)	Freshwater marsh; intermediate marsh
Hairy clustervine Clustervine	(Jacquemontia taminifolia)	Cultivated fields and roadsides
Small-flower baby-blue-eyes	(Nemophila aphylla)	Damp rich woods
Seaside-petunia	(Calibrachoa parviflora)	In moist or wet soil in streambeds, near lakes, shallow streams, along beaches and muddy flats
Cutleaf ground-cherry Lanceleaf groundcherry	(Physalis angulata)	Common weed in cultivated fields, roadsides, and fence rows
American black night shade	(Solanum americanum)	A weed in disturbed habitats
Carolina horsenettle Apple of Sodom Bull nettle Devil's tomato Horsenettle Sand briar	(Solanum carolinense)	Fields and waste places; especially in sandy soil
West Indian nightshade Black nightshade Eastern black nightshade Nightshade	(Solanum ptychanthum)	
Bushy St. Johnswort Dense st. johnswort	(Hypericum densiflorum)	
St. Andrew's Cross	(Hypericum hypericoides var. hypericoides)	Mostly in light sandy soils in open pine-hardwood and hardwood forests; also in thickets and bogs
Shrubby St. Johnswort	(Hypericum prolificum)	
	(Hypericum spathulatum)	

Common Name	Scientific name	Habitat Types
	(Hypericum walteri)	
Greater marsh St. Johnswort	(Triadenum walteri)	In or on the edge of water along streams, in bogs and swamps, and about ponds and lakes
Southern cattail	(Typha domingensis)	In brackish or fresh marshes and pools
Broadleaf cattail Common cattail Cattail	(Typha latifolia)	Freshwater marsh in monospecific stands; intermediate marsh
White mulberry Mulberry	(Morus alba)	About dwellings, in pastures and occasionally along streams
Black mulberry	(Morus nigra)	Near dwellings, roadsides and disturbed areas
Red mulberry	(Morus rubra)	Rich woods
Sugar-berry Sugar hackberry	(Celtis laevigata)	Mixed deciduous hardwood; old spoil banks
	(Celtis mississippiensis)	
Water elm Planertree	(Planera aguatica)	Mixed deciduous hardwood
American elm	(Ulmus americana)	Mixed deciduous hardwood; usually in moist, fertile soil
Slippery elm	(Ulmus rubra)	Moist woods
Bog hemp Small-spike false nettle	(Boehmeria cylindrica)	Scrub/shrub
Canadian clear weed	(Pilea pumila)	In moist or wet, rich soils of woods
Heartleaf nettle Slim stinging nettle	(Urtica chamaedryoides)	Moist woods and thickets
Texas gourd	(Cucurbita texana)	In debris and piles of driftwood, often climbing into trees, and along rivers
Guadalupe cucumber Drooping melonnettle	(Melothria pendula)	In sandy and moist rich soils, wettish thickets, banks and canals of streams, and near the coast
Purple passion flower	(Passiflora incarnata)	Fields, roadsides fence rows, and thickets
Yellow passion flower Passionflower	(Passiflora lutea)	Mixed deciduous woodlands and thickets
Southern coastal violet	(Viola septemloba)	Wet lowland forests, often by streams, swamps, and pine savannas
Common blue violet Hooded blue violet	(Viola sororia)	Alluvial woods and wooded slopes
Primrose-leaved violet Primrose violet Violet	(Viola primulifolia)	Pond and stream margins, bogs, savannas, ditches, thickets and low wet woods
Indian shot Bandanna of the Everglades	(Canna flaccida)	About lakes and in marshes and swamps along the coast
Narrow-leaf whitetop	(Dichromena colorata)	Swales, ditches and wet places
Elephant's ear	(Colocasia antiquorum)	Along streams in freshwater marshes
Purple meadow rue	(Thalictrum dasycarpum)	Meadows, swamps and damp thickets, on rich wooded slopes or along wooded streams

FISH SPECIES OF KNOWN OR PROBABLE OCCURRENCE IN JEAN LAFITE NATIONAL HISTORICAL PARK AND PRESERVE IN JEFFERSON AND ST. CHARLES PARISHES, LOUISIANA.

Common Name	Scientific name	Habitat Types
Atlantic stingray*	(Dasyatis sabina)	From the inshore Gulf shelf to freshwater
Alligator gar*	(Lepisosteus spatula)	Larger lakes, rivers and brackish waters of the Gulf Coast
Longnose gar	(Lepisosteus osseus)	Lakes, bayous, oxbows and river backwaters
Shortnose gar	(Lepisosteus platostomas)	Lakes, oxbows and larger rivers
Spotted gar *	(Lepisosteus oculatus)	Clear waters of lakes, bayous, oxbows and lotic backwaters
Bowfin*	(Amia calva)	Swamps, sloughs, borrow pits, lakes, ditches and sluggish steams
Ladyflsh*	(Elops saurus)	Juveniles widespread in open water bays to freshwater
American eel*	(Anguilla rostrata)	Males near coastal waters, while females ascend to the source of most river systems
Gulf menhaden*	(Brevoortia patronus)	Widespread from fresh to saline water
Gizzard shad*	(Dorosoma cepedianum)	Large rivers, reservoirs, lakes, swamps, floodwater pools and estuaries
Threadfin shad	(Dorosoma petenese)	Large rivers, reservoirs and lakes
Bay anchovy*	(Anchoa mitchilli)	Widespread in open bays and estuaries
Common carp *	(Cyprinus carpio)	Reservoirs, lakes, sluggish streams, rivers and ditches
Golden shiner*	(Notemigonus crysoleucas)	Lakes, ponds, sloughs, reservoirs and quiet pools of streams
River shiner	(Notropis blennius)	Large rivers but avoiding areas of strong currents
Blacktail shiner	(Notropis venustus)	From placid waters of lakes and bayous to swift waters of rivers and streams
River carpsucker	(Carpoides carpio)	Impoundments, backwaters, oxbows and pools of low gradient streams
Bigmouth buffalo	(Ictiobus cyprinellus)	Lakes, rivers, oxbows and sloughs
Smallmouth buffalo	(Ictiobus bubalus)	Lakes, rivers, oxbows and large rivers
Spotted sucker	(Minytrema melanops)	Larger impoundments to small creeks
Lake chubsucker	(Erimyzon sucetta)	Lakes, bayous, oxbows and backwater pooi areas of rivers and streams
Creek chubsucker	(Erimyzon oblongus)	Smaller rivers, streams, creeks and rarely in impoundments
Blacktail redhorse	(Moxostoma poecilurum)	Larger impoundments, streams and rivers
Black bullhead*	(Ameiurus melas)	Farm ponds, lakes, oxbows and streams
Yellow bullhead *	(Ameiurus natalis)	Farm ponds, lakes and backwaters of streams and rivers
Sea catfish	(Anus felis)	Bays, large canals, bayous and marsh lakes
Blue catfish*	(Ictalurus furcatus)	Lakes, ponds, bayous, canals and larger streams
Channel catfish*	(Ictalurus punctatus)	Lakes, ponds, bayous, streams and rivers
Flathead catfish*	(Pylodictis olivaris)	Reservoirs, large rivers, and low gradient streams
Redfin pickerel	(Esox americanus)	Natural lakes, sloughs, borrow pits, ditches and sluggish steams

*Indicates that the species has been identified within the park

Common Name	Scientific name	Habitat Types
Pirate perch *	(Apbredoderus sayanus)	Sluggish waters of swamps, borrow pits, marshes over organic debris substrate
Atlantic needlefish*	(Strongylura marina)	Bays, lakes to freshwater often ascending rivers
Sheephead minnow*	(Cyprinodon variegatus)	Protected marsh waters and along shorelines
Golden topminnow*	(Fundulus chrysotus)	Lentic environs along shores in backwaters and pools of slower moving streams and rivers
Starhead topminnow	(Fundulus notti)	Lakes, ponds and quiet backwaters with streams
Marsh killifish*	(Fundulus confluentus)	Protected marsh areas, bayous, canals, ditches and ponds
Gulf killifish*	(Fundulus grandis)	Widespread in protected marshes and along shorelines
Bayou killifish*	(Fundulus pulvereus)	Protected marsh areas, ditches, canals, and ponds
Saltmarsh killiflsh	(Fundulus jenkinsi)	Protected marsh areas
Rainwater killifish*	(Lucania parva)	Protected marsh areas and along shorelines
Blackspotted topminnow	(Fundulus olivaceus)	Quiet waters near rooted aquatics or leaf litter
Blackstripe topminnow	(Fundulus notatus)	Quiet waters near rooted aquatic plants
Mosquitofish*	(Gambusia affinis)	Quiet waters of lakes, ponds, river back waters and oxbows among aquatic plants
Least killifish*	(Heterandia formosa)	Fresh and brackish water swamps, bayous and roadside ditches with abundant vegetation
Sailfin molly*	(Poecilia latipinna)	Marshes, lowland streams and swamps
Tidewater silverside*	(Menidia beryllina)	Shorelines of bays and estuaries
Brook silverside	(Labidesthes sicculus)	Lakes, bayous, oxbows, borrow pits, streams and rivers
Gulf pipefish	(Syngnathus scovelli)	Along shorelines and areas with dense vegetation ascending into freshwater
Flier*	(Centrarchus macropterus)	Lakes, bayous, ponds and swamps
Banded pygmy sunflsh*	(Elassoma zonatum)	Older ponds, lakes, borrow pits, bayous and lotic backwater with abundant aquatic plants
Green sunfish*	(Lepomis cyanellus)	Lakes, ponds, bayous, rivers, oxbows and streams
Warmouth *	(Lepomis gluosus)	Impoundments, bayous, oxbows, sloughs, swamps, and low gradient streams
Orangespotted sunfish*	(Lepomis humilis)	Borrow pits, drainage ditches, small bayous and low gradient silty streams
Bluegill*	(Lepomis macrochirus)	Lakes, ponds, bayous, oxbows and with aquatic vegetation
Dollar sunfish	(Lepomis marginatus)	Pools of creeks, small to medium rivers and swamps over sand to mud bottoms
Longear sunfish	(Lepomis megalotis)	Reservoirs, lakes, streams and rivers associated with aquatic vegetation
Redear sunfish*	(Leopmis microlophus)	Lakes, ponds and protected pools in streams
Spotted sunfish*	(Lepomis punctatus)	Lakes, bayous and streams with structure
Bantum sunfish*	(Lepomis symmetricus)	Lakes, bayous and lotic backwaters associated with aquatic vegetation

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Common Name	Scientific name	Habitat Types
Largemouth bass*	(Micropterus salmoides)	Lakes, ponds, reservoirs, sluggish streams or river backwaters
Spotted bass	(Micropterus punctulatus)	Lakes, reservoirs, streams and main channels of large rivers
White crappie	(Pomoxis annularis)	Larger lakes, ponds, rivers and streams
Black crappie*	(Pomoxis nigromaculatus)	Clearer lakes, rivers and streams
Freshwater drum	(Aplodinotus grunniens.)	Lakes, rivers and large impoundments
Spotted seatrout*	(Cynoscion nebulosus)	Bayous and shallow marsh lakes in brackish to saline environments
Spot*	(Leiostomus xanthurus)	Protected marsh waters as juveniles and spreading to open bays and estuaries as maturation progresses
Red drum*	(Sciaenops ocellata)	Brackish to saline marshes, ponds and passes
Striped mullet*	(Mugil cephalus)	Widespread from brackish lakes and canals to freshwater ditches, bayous and streams
White mullet	(Mugil curema)	Occasional inhabitant of open water areas and near shore typically as juveniles
Fat sleeper*	(Dormitator maculatus)	Canals, ditches and bayous
Freshwater goby	(Gobionellus shufeldti)	Widespread in fresh to brackish water
Naked goby	(Gobiosoma bosci)	Widespread in fresh to brackish water
Southern flounder*	(Paralichthys lethostigma)	Common over soft mud bottoms in bays
Hogchoker*	(Trinectes maculatus)	Common in bays and shallow gulf

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HERPETOFAUNAL SPECIES OF KNOWN OR PROBABLE OCCURRENCE IN JEAN LAFITE NATIONAL HISTORICAL PARK AND PRESERVE IN JEFFERSON AND ST. CHARLES PARISHES, LOUISIANA.

Common Name	Scientific name	Habitat Types
Western lesser siren*	(Siren intermedia nettingi)	Variety of shallow water habitats
Central newt*	(Notophthalmus viridescens louisianensis)	Swales, swamplands and wooded ponds in river bottoms
Three-toed amphiuma*	(Amphiuma tridactylum)	Any unpolluted, mucky place within its range
Two-toed amphiuma	(Amphiuma means)	Ditches, sloughs, pools, ponds, rice fields, swamps, and streams
Smallmouth salamanader*	(Ambystoma texanum)	Any area where moisture is abundant
Southern dusky salamander*	(Desmognathus auriculatus)	Below fall line around springs, swamps or muddy streams
Dwarf salamander*	(Eurycea quadridigitata)	Under logs and debris in low, damp places
Gulf Coast toad*	(Bufo valliceps valliceps)	Roadside ditches to barrier beaches
Fowler's toad*	(Bufo woodhouseii fowleri)	In sandy areas around lakes or river valleys
Woodhouse's toad*	(Bufo w. woodhouseii)	Marshes, swales, river bottoms, irrigated areas, and urban areas
Southern toad*	(Bufo terrestris)	Bottomlands and uplands especially where sandy soils exist
Northern cricket frog*	(Acris c. crepitans)	Edges of small, shallow streams and ponds
Spring peeper*	(Pseudacris crucifer)	Marshes, swamps and pools on low bushes and grasses in wooded areas
Green tree frog*	(Hyla cinerea)	Any place well supplied with water and dampness
Bird-voiced tree frog*	(Hyla avivoca)	Permanent wooded swamps; creeks and larger waterways of the south
Squirrel tree frog*	(Hyla squirellai)	Buildings, gardens, fields and open woods
Cope's gray tree frog*	(Hyla chrysoscelis)	Ubiquitous in permanent and temporary water; found on trees and bushes in woodland edges
Gray tree frog*	(Hyla versicolor)	Ubiquitous in permanent and temporary water; found on trees and bushes in woodland edges
Upland chorus frog *	(Psuedacris triseriata feriarum)	Grassy swales, moist woodlands, river bottom swamps, ponds, bogs and marshes
Southern chorus frog*	(Pseudacris nigrita nigrita)	Pine flatwoods, wet meadows, ditches, and moist woodlands
Eastern narrowmouth toad*	(Gastrophryne carolinensis)	Fields, woodlands and margins of any water body
Bullfrog*	(Rana catesbeiana)	Marshes, ponds, lakes and rivers
Pig frog*	(Rana gyrilio)	Strongly aquatic; at edges of lakes, marshes, and cypress bays
Bronze frog*	(Rana c. clamitans)	Swamps, brooks, streams, ponds, and edges of lakes
Southern leopard frog*	(Rana utricularia)	Rivers, lakes, streams, marshes and ponds
Greenhouse frog	(Eleutherodactylus p. lanirostris)	Gardens, greenhouses, dumps, and small stream valleys

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Common Name	Scientific name	Habitat Types
Stinkpot turtle*	(Sternotherus odoratus)	Any permanent water
Razorback musk turtle*	(Sternotherus carinatus)	Streams and river swamps
Mississippi mud turtle*	(Kinosternon subrubrum hippocrepis)	Bayous, lagoons and river swamps
Yellow mud turtle*	(Kinosternon f. flavescens)	Mud bottoms of pools, ponds, marshes, canals and cattle tanks
Common snapping turtle*	(Chelydra s. serpentina)	Any aquatic situation preferably with mud and vegetation
Alligator snapping turtle*	(Macroclemys teniminckii)	Deep water of rivers, oxbows, sloughs, swamps and sluggish streams
Gulf Coast box turtle*	(Terrapene carolina major)	Open woodlands, thickets, and woodland edges
Mississippi map turtle	(Graptemys kohnii)	Slow moving rivers and lakes with dense vegetation
Southern painted turtle*	(Chrysemys picta dorsalis)	Ponds, marshes, ditches, edges of lakes, backwater streams, and river pools
Red-eared slider*	(Trachemys scripta elegans)	Prefers muddy bottomed, quiet water with dense vegetation
Eastern river cooter*	(Pseudomys concinna concinna)	Rivers, ditches and cattle tanks
Cooter	(Pseudemys floridana)	Sluggish or unmoving waters
Eastern chicken turtle*	(Deirochlys r. reticularia)	Lentic waters of ponds, marshes and sloughs
Western chicken turtle*	(Deirochlys reticulari miaria)	Lentic waters of ponds, marshes, and sloughs
Midland smooth softshell*	(Apalone m. mutica)	Lakes, ponds and rivers
Mississippi diamondback terrapin*	(Malaclemys terrapin pileata)	Marshes and estuaries of gulf coast
Western spiny softshell *	(Apalone spinifera hartwegi)	Small streams, rivers, ponds and lakes
Green anole*	(Anolis carolinensis)	From wooded areas, cypress swamps and in shrubbery near human dwellings
Mediterranean gecko*	(Hemidactylus t. turcicus)	Near human habitation where insects congregate
Ground skink*	(Scincella lateralis)	Dry pine or deciduous woods, clearings to moist streambanks
Five-lined skirk*	(Eumeces fasciatus)	Dry to damp woods, brushy areas, rotten logs and stumps
Broad-headed skink*	(Eumeces laticeps)	From swamp forests to empty urban lots strewn with debris
Slender glass lizard*	(Ophisaurus attenuatus)	Oak and pine woodlands, fields, grassy areas and brush piles
Eastern glass lizard*	(Ophisaurus ventralis)	Wet meadows and grasslands; pine flatwoods
Diamondback water snake*	(Nerodia r. rhombifer)	Near water of ponds, swamps, lakes, and cattle tanks
Mississippi green water snake*	(Nerodia cyclopion)	Edges of lakes and ponds, swamps, marshes and rice fields
Yellow-bellied water snake*	(Nerodia erythrogaster flavigaster)	Near water of ponds, swamps and lakes

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Common Name	Scientific name	Habitat Types
Broad-banded water snake*	(Nerodia fasciata confluens)	Permanent aquatic ponds, marshes, and lakes
Gulf salt marsh snake	(Nerodia clarkii clarkii)	Gulf coastal salt meadows, swamps, and marshes; rarely enters freshwater habitats
Delta crayfish snake*	(Regina rigida deltae)	Near edges of lakes, ponds, streams, swamps and marshes
Graham's crayfish snake*	(Regina grahamii)	Edges of creeks, sloughs, ponds, ditches under logs
Marsh brown snake*	(Storeria dekayi limnetes)	Salt marshes on levees
Florida red-belly snake*	(Storeria occipitomaculata obscura)	Open woods, bogs from sea level to mountains
Eastern garter snake*	(Thamnophis s. sirtalis)	Fields, marshes, meadows, gardens and roadsides ften near water
Gulf Coast ribbon snake*	(Thamnophis proximus orarius)	Near most permanent water of lakes, streams, swamps and rivers
Eastern hognose snake	(Heterodon platvrhinos)	Open woods, uplands, hillsides, fields and dry, sandy areas
Mississippi ringneck snake*	(Diadophis punctatus stictogenys)	Woodlands, near water, rock-covered hillsides and field edges
Western mud snake*	(Farancia abacura reinwardtii)	Marshes, swamps and ditches
Blackmask racer*	(Coluber constrictor latrunculus)	Bottomland hardwoods and cypress regions
Rough green snake*	(Opheodrys aestivus)	Streamside and roadside near small trees and bushes
Texas rat snake*	(Elaphe obsoleta lindheimeri)	Dry or moist woods to rocky canyons
Speckled king snake*	(Lampropeltis getula holbrooki)	Woods, hayfields, pastures, meadows, roadsides and near water
Louisiana milk snake*	(Lampropeltis triangulum amaura)	Fields, open woods, river bottoms under logs or in stumps
Southern copperhead*	(Agkistrodon c. contortrix)	Hillsides, upland woods, swamps and cypress-bordered streams
Western cottonmouth*	(Agkistrodon piscivorus leucostoma)	Lakes, streams, sloughs, swamps, marshes and rivers
Timber rattlesnake*	(Crotalus horridus)	Cane thickets and swamplands
Western pigmy rattlesnake*	(Sistrurus miliarius streckeri)	Bottomlands, swamps, marshes and wet prairies
American alligator*	(Alligator mississippiensis)	Ponds, swamps and rivers near water

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AVIAN SPECIES OF KNOWN OR PROBABLE OCCURRENCE IN JEAN LAFITE NATIONAL HISTORICAL PARK AND PRESERVE IN JEFFERSON AND ST. CHARLES PARISHES, LOUISIANA.

Common Name	Scientific name	Status	Habitat Types
Red-throated loon	(Gavia stellata)	Scarce winter migrant	Bays, estuaries, lakes, ponds and ocean
Common loon*	(Gavia immer)	Uncommon winter migrant	Lakes, ponds and rivers; oceans and bays in winter
Western grebe	(Aechmophorus occidentalis)	Casual winter resident	Lakes, inlets and bays
Horned grebe*	(Podiceps auritus)	Scarce winter resident	Marshes, ponds and lakes
Eared grebe	(Podiceps nigricollis)	Rare winter resident	Open bays and ocean
Pied-billed grebe*	(Podilymbus podiceps)	Uncommon resident	Lakes, ponds, sluggish streams
American white pelican*	(Pelecanus erythrorhynchos)	Rare migrant	Marshy lakes and coastal lagoons
Brown pelican*	(Pelecanus occidentalis)	Casual migrant	Sandy coastal beaches and lagoons
Double-crested cormorant*	(Phalacrocorax auritus)	Common winter resident	Lakes, rivers, swamps and coasts
Olivaceous cormorant	(Phalacrocorax olivaceus)	Common winter resident	Freshwater marshes, ponds and lakes
Anhinga*	(Anhinga anhinga)	Uncommon resident	Freshwater ponds and swamps with thick vegetation
Magnificent* Frigatebird	(Fregata magnificens)	Rare resident	Coast
Great blue heron*	(Ardea herodias)	Common resident	Lakes, ponds, rivers and marshes
American bittern*	(Botaurus lentiginosus)	Uncommon winter resident	Freshwater and brackish marshes and marshy lake shores
Cattle egret*	(Bubulcus ibis)	Common resident	Dry land in open fields, breeds near water with other herons
Green-backed heron**	(Butorides striatus)	Locally common summer resident	Lake margins, streams, ponds and marshes
Great egret*	(Casmerodius albus)	Locally common resident	Freshwater and salt marshes, marshy ponds and tidal flats
Little blue heron*	(Egretta caerulea)	Rare resident	Freshwater swamps, lagoons and thickets
Reddish egret*	(Egretta rufescens)	Uncommon local resident	Salt and brackish marshes, breeds among willows and shrubs
Snowy egret*	(Egretta thula)	Irregular summer resident	Salt marshes, ponds, rice fields and shallow coastal bays
Tricolored heron*	(Egretta tricolor)	Irregular migrant	Swamps, bayous, coastal ponds, salt marshes, mud flats and lagoons
Least bittern**	(Ixobrychus exilis)	Rare resident	Freshwater marshes where cattails and reeds predominate
Black-crowned night heron*	(Nycticorax nycticorax)	Irregularly, fairly	Marshes, swamps and wooded streams
Yellow-crowned night heron*	(Nyctanassa violacea)	Uncommon summer resident	Wooded swamps and coastal thickets
Wood stork	(Mycteria americana)	Rare migrant	On or near coasts
Roseate Spoonbill	(Ajaia ajaia)	Rare, local resident	Salt to shallow freshwater marshes

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** Species that has been identified and breeds within the park

Common Name	Scientific name	Status	Habitat Types
White ibis**	(Eudocimus albus)	Scarce summer resident	Marshy sloughs, mud flats, lagoons, and swamp forests
White-faced ibis*	(Plegadis chihi)	Scarce summer resident	Salt marshes, brushy coastal islands, and freshwater marshes
Glossy ibis*	(Plegadis falcinellus)	Scarce migrant	Marshes, swamps, flooded fields, coastal bays and estuaries
Wood duck*	(Aix sponsa)	Fairly common resident	Wooded rivers, ponds, swamps, and freshwater marshes
Pintail*	(Anas acuta)	Uncommon winter resident	Marshes, prairie ponds and salt marshes in winter
American wigeon*	(Anas americana)	Common winter resident	Marshes, ponds, and shallow lakes
Northern shoveler	(Anas clypeata)	Uncommon winter resident	Marshes, prairie potholes, salt brackish marshes
Green-winged teal*	(Anas crecca)	Locally common winter resident	Marshes, ponds and marshy lakes
Cinnamon teal	(Anas cyanoptera)	Scarce migrant	Ponds, marshes, reservoirs and sluggish streams
Blue-winged teal*	(Anas discors)	Locally common winter migrant	Marshes, shallow ponds and lakes
Mottled duck**	(Anas fulvigula)	Common year-round resident	Freshwater or saltwater marshes; mostly coastal
Mallard*	(Anas platyrhynchos)	Common winter resident	Ponds, lakes and marshes
American black duck	(Anas rubripes)	Rare winter resident	Marshes, lakes, streams, coastal mud flats and estuaries
Gadwall*	(Anas strepera)	Locally common winter resident	Freshwater marshes, ponds, rivers, and locally in salt marshes
Greater white-fronted goose*	(Anser albifrons)	Common winter resident	Salt marshes, coastal bays, grain fields and freshwater marshes
Lesser scaup *	(Aythya affinis)	Common winter resident	Lakes, rivers, ponds, marshes and saltwater bays
Redhead*	(Aythya americana)	Uncommon winter resident	Lakes, bays and often salt water in winter
Ring-necked duck*	(Aythya collaris)	Common winter resident	Wooded lakes, ponds and rivers
Greater scaup *	(Aythya marila)	Scarce winter resident	Lakes, bays, ponds and often wintering on saltwater bays
Canvasback*	(Aythya valisineria)	Uncommon winter resident	Lakes, bays and estuaries
Canada goose*	(Branta canadensis)	Common winter resident	Lakes, bays rivers and marshes; often feeding in stubble fields
Bufflehead*	(Bucephala albeola)	Uncommon winter resident	Mainly on salt bays and estuaries
Common goldeneye*	(Bucephala clangula)	Scarce winter resident	Mainly along the coast in bays and inlets
Snow goose *	(Chen caerulescens)	Common winter resident	Salt marshes, coastal bays, grain fields and freshwater marshes
Ross' goose	(Chen rossii)	Rare winter resident	Salt marshes, coastal bays, grain fields and freshwater marshes
Oldsquaw	(Clangula hyemalis)	Rare winter resident	Open bays and inshore waters
Trumpeter swan*	(Cygnus buccinator)	Uncommon resident	Marshy lakes and bays
Tundra swan	(Cygnus columbianus)	Rare accidental	Marshy lakes and bays
Fulvous tree duck	(Dendrocygna bicolor)	Common winter resident	Wooded streams and ponds

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** Species that has been identified and breeds within the park

Common Name	Scientific name	Status	Habitat Types
Black-bellied tree duck	(Dendrocygna autumnalis)	Uncommon winter resident	Wooded streams and ponds
Hooded merganser*	(Lophodytes cucullatus)	Common winter resident	Wooded ponds, lakes, rivers and tidal channels
White-winged Scoter*	(Melanitta fusca)	Rare winter resident	Coastal bays
Surf scoter*	(Melanitta perspicillata)	Rare winter resident	Almost entirely on the ocean and in large coastal bays
Common merganser	(Mergus merganser)	Rare winter resident	Wooded rivers, ponds and wintering on saltwater bays
Red-breasted merganser*	(Mergus serrator)	Uncommon winter resident	Principally on the ocean and salt bays
Masked duck	(Oxyura dominica)	Scarce winter resident	Freshwater marshes, lakes, ponds saltwater bays and rivers
Ruddy duck*	(Oxyura jamaicensis)	Uncommon winter resident	Freshwater marshes, lakes, ponds salt bays and rivers
Turkey vulture*	(Cathartes aura)	Common resident	Mainly deciduous forests, woodland and adjacent farmlands
Black vulture*	(Coragyps atratus)	Common resident	Open country; breeds in light woodlands and thickets
Cooper's hawk*	(Accipiter cooperii)	Uncommon summer resident	Deciduous and coniferous forests, especially those with clearings
Sharp-shinned hawk*	(Accipiter striatus)	Fairly common summer resident	Dense coniferous forests and sometimes in deciduous forests
Golden eagle	(Aquila chrysaetos)	Rare accidental migrant	Mainly deciduous mountain forests; most any habitat during migration
White-tailed hawk	(Buteo albicaudatus)	Rare accidental migrant	Coastal prairie, grassland or scrub in semiarid country
Harlan's hawk	(Buteo harlani)	Rare winter resident	Deciduous forest and adjacent open country
Red-tailed hawk*	(Buteo jamaicensis)	Common resident	Deciduous forest and adjacent open country
Rough-legged hawk	(Buteo lagopus)	Scarce winter migrant	Open plains, agricultural areas and marshes
Red-shouldered hawk*	(Buteo lineatus)	Locally fairly common resident	Deciduous woodlands especially with standing water
Broad-winged hawk*	(Buteo platypterus)	Rare resident	Chiefly deciduous woodland
Ferruginous hawk	(Buteo regalis)	Rare accidental migrant	Open grasslands of the Great Plains
Swainson's hawk	(Buteo swainsoni)	Sporadic migrant	Open plains, grasslands and prairie
Northern Harrier*	(Circus cyaneus)	Common winter resident	Marshes and open grasslands
Swallow-tailed kite*	(Elanoides forficatus)	Uncommon spring migrant	Woodlands near marshes or swamps
Bald eagle*	(Haliaeetus leucocephalus)	Rare winter resident	Lakes, rivers, marshes and seacoasts
Mississippi kite*	(Ictinia mississippiensis)	Scarce summer resident	Open woodland and mixed scrub near water
Osprey*	(Pandion haliaetus)	Casual winter resident	Lakes, rivers and seacoasts
Harris' hawk	(Parabuteo unicinctus)	Rare accidental migrant	Semiarid regions in scrub

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** Species that has been identified and breeds within the park

Common Name	Scientific name	Status	Habitat Types
Caracara	(Caracara cheriway)	Rare accidental winter resident	Prairies, savannahs, and semi-arid areas
Merlin*	(Falco columbarius)	Rare winter migrant	Coniferous forests
Prairie falcon	(Falco mexicanus)	Rare accidental migrant	Prairies and occasional over wooded areas
Peregrine falcon*	(Falco preregrinus)	Scarce migrant	Open country, especially along rivers, near lakes and the coast
American kestrel*	(Falco sparverius)	Uncommon resident	Towns, cities, parks, farm lands and open country
Northern bobwhite	(Colinus virginianus)	Fairly common resident	Pastures, grassy roadsides and farm lands
Wild turkey*	(Meleagris gallopavo)	Rare resident	Open woodlands and forests with scattered natural clearings
Ringneck pheasant	(Phasianus colchicus)	Rare, introduced resident	Farmlands, pastures and grassy woodland edges
Greater prairie chicken	(Tympanuchus cupido)	Rare to locally abundant	Undisturbed tall-grass prairie
Attwater's prairie chicken	(Tympanuchus cupido attwateri)	Rare resident	Coastal tall-grass prairie
Whooping Crane	(Grus americana)	Extremely rare migrant	Winters on coastal prairie
Sandhill Crane	(Grus canadensis)	Rare migrant	Prairies and grain fields during migration and winter
Yellow rail	(Cotumicops noveboracensis)	Rare resident	Grassy marshes and wet meadows
American coot*	(Fulica americana)	Common winter resident	Open ponds, marshes, saltwater bays and inlets
Common gallinule**	(Gallinula chloropus)	Uncommon resident	Freshwater marshes and ponds with cattails and other aquatic plants
Black rail	(Laterallus jamaicensies)	Rare resident	Coastal salt marshes, more rarely in inland freshwater marshes
Purple gallinule**	(Porphyrula martinica)	Uncommon resident	Freshwater marches with lily pads, pickerel weed and other aquatics
Sora*	(Porzana carolina)	Uncommon migrant	Flooded fields, wood flats and freshwater marshes
King rail**	(Rallus elegans)	Locally rare resident	Freshwater marshes, borrow ditches and salt marshes
Virginia rail*	(Rallus limicola)	Rare migrant	Cattails and reeds or fresh and brackish marshes
Clapper rail	(Rallus longirostris)	Uncommon accidental resident	Saltwater marshes
Snowy plover	(Charadrius alexandrius)	Rare migrant	Flat sandy beaches; alkali beds; sandy areas with little vegetation
Piping plover	(Charadrius melodus)	Rare migrant	Mud flats, flooded fields,lakeshores and ponds
Semipalinated plover*	(Charadrius semipalmatus)	Common migrant	Shallow pools in salt marshes, lake shores in the interior
Killdeer*	(Charadrius vociferus)	Common resident	Open country; plowed fields, golf courses and short grass prairies
Wilson's plover	(Charadrius wilsonia)	Scarce winter migrant	Sand beaches and mud flats

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** Species that has been identified and breeds within the park

Common Name	Scientific name	Status	Habitat Types
Lesser golden plover*	(Pluvialis dominica)	Scarce spring migrant	Coastal beaches, mud flats, inland prairies and plowed fields
Black-bellied plover*	(Pluvialis squatarola)	Scarce migrant	Mud flats, lake shores, ponds and flooded fields
Black-necked stilt**	(Himantopus mexicanus)	Uncommon migrant	Salt marshes, shallow coastal bays, and occasional freshwater marshes
American avocet*	(Recurvirostra americana)	Uncommon migrant	Freshwater marshes, lakes and salt and brackish marshes
Spotted sandpiper*	(Actitis macularia)	Common migrant	Open country and wooded areas with water nearby
Ruddy turnstone	(Arendia interpres)	Rare accidental	Rocky, pebbly, and sandy coasts and beaches
Upland sandpiper*	(Bartramia longicauda)	Rare migrant	Mudflats and lakeshores in migration
Sanderling	(Calidris alba)	Common migrant	Ocean beaches, sandbars, occasional mud flats, inland lakes and river shores
Dunlin*	(Calidris alpina)	Rare migrant	Beaches, extensive mud and sand flats, inland lake and river shore
Baird's sandpiper*	(Calidris bairdii)	Rare migrant	Inland areas with grassy pools, wet meadows, lake and river shores
Red Knot	(Calidris canutus)	Rare migrant	Tidal flats and rocky shores, beaches in inland areas
White-rumped sandpiper*	(Calidris fuscicollis)	Locally common migrant	Flats, grassy pools, wet meadows and shores in winter
Purple sandpiper	(Calidris maritima)	Rare migrant	Rocky coasts and promontories
Western sandpiper*	(Calidris mauri)	Spring and fall migrant	Shores, mud flats, grassy poois and wet meadows
Pectoral sandpiper*	(Calidris melanotos)	Common migrant	Wet, short-grass areas, grassy pools, salt creeks and meadows
Least sandpiper*	(Calidris minutilla)	Common migrant	Grassy pools, bogs, open marshes, flooded fields and mud flats
Semipalmated sandpiper*	(Calidris pusillus)	Rare migrant	Lake and river shores, flats, salt marsh pools and coastal beaches
Willet	(Catoptrophorus semipalmatus)	Uncommon migrant	Coastal beaches, freshwater and salt marshes, lake shores and wet prairies
Common snipe*	(Gallinago gallinago)	Common winter resident	Freshwater marshes, ponds, flooded meadows and fields
American oystercatcher	(Haematopus palliatus)	Uncommon migrant	Sandy and pebbly beaches, mud flats borders of salt marshes
Short-billed dowitcher*	(Limnodromus griseus)	Common migrant	Mud flats, creeks, salt marshes and tidal estuaries
Long-billed dowitcher *	(Limnodromus scolopaceus)	Common migrant	Mud flats, marshy pools, and margins of freshwater ponds
Marbled godwit*	(Limosa fedoa)	Rare migrant	Salt marshes, tidal creeks, mud flats and sea beaches
Hudsonian godwit	(Limosa haemastica)	Rare migrant	Chiefly mud flats
Stilt sandpipe	(Micropalama himantopus)	Uncommon migrant	Grassy pools and shores of ponds and lakes
Whimbrel*	(Numenius phaeopus)	Casual winter migrant	Flooded fields and mud flats
Red-necked phalarope	(Phalaropus lobatus)	Rare migrant	Open ocean, beaches, fiats, lake and river shores

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** Species that has been identified and breeds within the park

Common Name	Scientific name	Status	Habitat Types
Wilson's phalarope*	(Phalaropus tricolor)	Scarce migrant	Prairie pools and marshes, lake and river shores; coastal pools
American woodcock*	(Scolopax minor)	Scarce resident	Moist woodland and thickets near open fields
Lesser yellowlegs*	(Tringa flavipes)	Uncommon migrant	Marshy ponds, lake and river shore
Greater yellowlegs*	(Tringa melanoleuca)	Uncommon migrant	Pools, lakeshores and tidal and flats
Solitary sandpiper*	(Tringa solitaria)	Casual migrant	Inland ponds, bogs, wet swampy places and woodland streams
Buff-breasted sandpiper*	(Tryngites subruflcollis)	Uncommon migrant	Short-grass fields, meadows and prairies
Black tern*	(Chlidonias niger)	Common migrant	Freshwater marshes, marshy lakes and sandy coasts
Herring gull*	(Larus argentatus)	Uncommon migrant	Lakes, rivers, estuaries and beaches
Laughing gull*	(Larus atricilla)	Common year-round resident	Coastal; may wander slightly inland
Ring-billed gull*	(Larus delawarensis)	Uncommon winter resident	Lakes, rivers and beaches in the winter
Franklin's gull	(Larus pipixcan)	Fairly common migrant	Lakes, rivers, ponds and marshes
Bonaparte's gull*	(Larus philadephia)	Uncommon winter resident	Mud flats, lakes ponds and flooded fields
Pomarine jaeger*	(Stercorarius pomarinus)	Rare migrant	Coastal areas
Bridled tern*	(Sterna anaethetus)	Rare migrant	Coastal
Least tern*	(Sterna antillarum)	Rare migrant	Sandy and pebbly beaches along the coast; sandbars in large rivers; often in landfills
Caspian tern*	(Sterna caspia)	Rare vagrant	Shores of lakes and large rivers; along seacoast
Forster's tern	(Sterna forsteri)	Rare migrant	Salt and freshwater marshes
Common tern*	(Sterna hirundo)	Rare migrant	Lakes, ponds, rivers, coastal beaches and islands
Royal tern*	(Sterna maxima)	Rare accidental	Sandy beaches
Gull-billed tern*	(Sterna nilotica)	Rare accidental	Coastal marshes and beaches
Sandwich tern*	(Sterna sandvicensis)	Rare accidental	Coastal beaches and islands
Black skimmer*	(Rynchops niger)	Rare resident	Coast
Inca dove	(Columbina inca)	Rare resident	Farnlands, parks, gardens and open country with scattered trees and shrub
Rock dove*	(Columba livia)	Common resident	City parks, suburban gardens and farmland
Common ground-dove	(Colombiana passerina)	Rare resident	Open areas, fields, gardens, farm land and roadsides
Mourning dove*	(Zenaidra macroura)	Common resident	Open fields, parks and lawns with many trees and shrubs
Yellow-billed cuckoo*	(Coccyzs americanus)	Common summer resident	Moist thickets, overgrown pastures and sparse woodlands
Black-billed cuckoo*	(Coccyzus erythropthalmus)	Rare migrant	Moist thickets, orchards, willows and overgrown pastures

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Groove-billed Ani *	(Crotphaga sulcirostris)	Rare accidental	Arid agricultural land especially where there are cattle
Roadrunner	(Geococcyx californianus)	Uncommon resident	Open arid country with plenty of thickets
Common barn~owl*	(Tyto alba)	Uncommon resident	Often around human habitations in open to partly open country
Long-eared owl	(Asio otus)	Scarce accidental	Deciduous and evergreen forests
Short-eared owl	(Asio flammeus)	Scarce winter migrant	Freshwater and salt marshes, open grassland, prairies and dunes
Burrowing owl	(Athene cunicularia)	Rare accidental	Plains, deserts, fields and air ports
Great horned owl*	(Bubo virginianus)	Uncommon resident	Ubiquitous, frequenting forest desert, open country, swamps and parks
Screech owl*	(Otis asio)	Common resident	Open deciduous woods, orchards, suburban areas and lakeshores
Barred owl*	(Strix varia)	Uncommon resident	Low wet woods and swamp forest
Chuck-will's widow *	(Caprimilgus carolinensis)	Common resident	Open woodland and clearings near farming country
Whip-poor-will*	(Caprimilgus vociferus)	Uncommon summer resident	Dry open woodland near fields
Common nighthawk*	(Chordeiles minor)	Uncommon summer resident	Aerial, but open country generally; also cities and towns
Chimney swift*	(Chaetura pelagica)	Common summer resident	Breeds and roosts in chimneys
Buff-bellied hummingbird*	(Amazilia yucatanensis)	Rare resident	Wood margins and thickets
Ruby-throated hummingbird*	(Archilochus colubris)	Common summer lands	Suburban gardens, parks and wood
Rufous hummingbird*	(Selasphorus rufus)	Rare resident	Wood margins and thickets
Belted kingfisher*	(Ceryle alcyon)	Common resident	Rivers, lakes and saltwater estuaries
Ivory-billed woodpecker	(Campephilus principalis)	Rare resident	Deep forests
Northern flicker*	(Colaptes auratus)	Common resident	Open country with trees; parks and rural estates
Pileated woodpecker*	(Dryocopus pileatus)	Uncommon resident	Dense forests and borders
Golden-fronted woodpecker	(Melanerpes aurifrons)	Common resident	Open woods in dry country and river bottoms with trees
Red-bellied woodpecker*	(Melanerpes carolinus)	Common resident	Open and swamp woodland; parks and feeders during migration
Red-headed woodpecker*	(Melanerpes erythrocephalus)	Common resident	Open country, farms, rural roads, open woodlands and golf courses
Red cockaded woodpecker	(Picoides borealis)	Rare resident	Pine forests, especially yellow and longleaf
Downy woodpecker*	(Picoides pubescens)	Common resident	Wood lots, parks and gardens
Ladder-backed woodpecker	(Picoides scalaris)	Uncommon vagrant	Arid areas with thickets and trees
Hairy woodpecker*	(Picoides villous)	Common resident	Deciduous forest

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Yellow-bellied sapsucker*	(Sphyrapicus varius)	Common resident	Young, open deciduous or mixed forest with clearings; also parks, yards and gardens
Olive-sided flycatcher*	(Contopus borealis)	Fairly common migrant	Near openings, burns, ponds and bogs
Western wood pewee	(Contopus sordidulus)	Uncommon migrant	Open woodland, woodland edges and orchards
Eastern wood pewee*	(Contopus virens)	Fairly common summer resident	Forest, open woodland, orchards, shade trees and roadsides
Alder flycatcher*	(Empidonax alnorum)	Uncommon fall migrant	Mature deciduous forests; often near water
Yellow-bellied flycatcher*	(Empidonax flaviventris)	Fairly common migrant	Willow thickets and second growth woodlands
Least flycatcher*	(Empidonax minimus)	Fairly common migrant	Open country, shade trees, parks, orchards, roadsides and forest edge
Willow flycatcher*	(Empidonax traillii)	Uncommon migrant	Swampy thickets; upland pastures and old abandoned orchards
Acadian flycatcher*	(Empidonax virescens)	Uncommon summer resident	Wooded ravines; beech-maple forests
Great crested flycatcher*	(Myiarchus crinitus)	Fairly common summer	Open forest, orchards and large trees near agrarian land
Vermilion flycatcher	(Pyrocephalus rubinus)	Rare winter resident	Trees and shrubs in open river bottoms and along roadsides
Eastern phoebe*	(Sayornis phoebe)	Uncommon resident	Open woodland near streams; bridges cliffs and buildings with ledges
Scissor-tailed flycatcher*	(Tyrannus forficata)	Common summer resident	Open country along roadsides; ranches with scattered trees and bushes; fence wires and posts
Eastern kingbird*	(Tyrannus tyrannus)	Common summer resident	Open country, farms, orchards, roadsides, lake shores and rivers
Western kingbird*	(Tyrannus verticalis)	Scarce migrant	Open country; ranches, roadsides, streams and ponds with trees
Horned lark	(Eremophila alpestris)	Scarce winter resident	Plains, fields, airports and beaches
Cliff swallow*	(Hirundo pyrrhonota)	Uncommon summer resident	Open country, buildings, cliffs, lake shores and marshes
Barn swallow*	(Hirundo rustica)	Uncommon summer resident	Agricultural land, suburban areas, marshes and lake shores
Purple martin *	(Progne subis)	Common summer	Open woodland, residential areas and agricultural land
Bank swallow*	(Riparia riparia)	Uncommon migrant	Rivers and streams near sand banks
Southern rough-winged swallow*	(Stelgidopteryx ruficollis)	Uncommon summer resident	Streams and rivers in the vicinity of man-made structures and banks
Tree swallow*	(Tachycineta bicolor)	Common migrant	Rivers and streams near sand banks

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Common Name	Scientific name	Status	Habitat Types
American crow*	(Corvus brachyrhynchos)	Common resident	Woodlands, farmland and suburban areas
Fish crow*	(Corvus ossifragus)	Uncommon resident	Low coastal country, lakes, rivers, and swamps
Blue jay*	(Cyanocitta cristata)	Common resident	Oak forest, parks and yards
Tufted titmouse*	(Parus bicolor)	Common resident	Swamp or moist woodland and shade trees; city parks
Carolina chickadee*	(Parus carolinensis)	Common resident	Deciduous woodlands and residential areas
Red-breasted nuthatch*	(Sitta canadensis)	Scarce winter resident	Coniferous forests
White-breasted nuthatch	(Sitta carolinensis)	Fairly common resident	Deciduous and mixed forest
Brown-headed nuthatch	(Sitta pusilla)	Common resident	Coniferous and mixed forests
Brown creeper*	(Certhia americana)	Uncommon winter resident	Deciduous and mixed woodlands
Marsh wren*	(Cistothorus palustris)	Scarce resident	Fresh and brackish marshes with cattails, bulrushes or sedges
Sedge wren*	(Cistothorus platensis)	Uncommon winter resident	Grassy freshwater marshes, brackish~ marshes and wet meadows
Bewick's wren	(Thiyomanes bewickii)	Uncommon winter resident	Thickets, brush piles, hedgerows, open woodlands, and scrubby areas
Carolina wren*	(Thryothorus ludovicianus)	Common resident	Woodland thickets, ravines and rocky slopes with brush
House wren*	(Troglodytes aedon)	Common winter resident	Parks, woodland edges, farmlands and residential areas
Winter wren*	(Troglodytes troglodytes)	Uncommon winter resident	Dense tangles and thickets in coniferous and mixed forests
Veery*	(Catharus fuscescens)	Scarce migrant	Moist deciduous woodlands and willow thickets
Hennit thrush*	(Catharus guttata)	Uncommon winter migrant	Coniferous and mixed forests; deciduous woodlands and thickets
Gray-cheeked thrush *	(Catharus minima)	Uncommon migrant	Coniferous and mixed forests
Swainson's thrush*	(Catharus ustulatus)	Uncommon migrant	Coniferous forests and willow thickets
Wood thrush *	(Hylocichla mustelina)	Fairly common resident	Moist deciduous woodlands with a thick understory, parks and gardens
Eastern bluebird*	(Sialia sialis)	Common resident	Open farm lands with scattered trees
American robin*	(Turdus migratorius)	Common resident	Gardens, agrarian lands, cities and open woodland
Blue-gray gnatcatcher*	(Polioptila caerulea)	Fairly common summer	Open, moist woodland and brushy streamside thickets
Ruby-crowned kinglet*	(Regulus calendula)	Uncommon winter resident	Coniferous and deciduous forests; also thickets in winter
Golden-crowned kinglet*	(Regulus satrapa)	Uncommon winter resident	Old, dense conifer stands, deciduous forest and thickets

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Gray catbird*	(Dumetella carolinensis)	Uncommon summer resident	Thickets and brush, gardens and residential areas
Northern mockingbird*	(Mimus polglottos)	Common resident	Parks, residential areas, farmlands and open country with thickets
Sage thrasher	(Oreoscoptes mentanus	Rare accidental	Dense thickets and lowland scrub
Brown thrasher*	(Toxostoma rufum)	Fairly common resident	Thickets, fields with scrub and woodland borders
American pipit	(Anthus rubescens)	Winter migrants	Open fields
Water pipit*	(Anthus spinoletta)	Fairly common winter resident	Beaches, barren fields, agrarian land and golf courses
Sprague's pipit	(Anthus spragueii)	Scarce migrant	Short-grass plains and plowed fields
Cedar waxwing *	(Bombycilla cedrorum)	Irregularly common winter resident	Open woodlands, orchards and residential areas
Loggerhead shrike*	(Lanius ludovicianus)	Fairly common resident	Grasslands, orchards, open areas with trees, open grassy woodlands
Starling*	(Sturnus vulgaris)	Common resident	Cities, farmlands, ranches and suburban areas
Bell's vireo	(Vireo belhi)	Uncommon summer	Dense bottomland thickets, willow scrub and mesquite
Yellow-throated vireo*	(Vireo flavifrons)	Fairly common summer resident	Forest edge in tall deciduous trees along streams, roadsides, Orchards and parks
Warbling vireo *	(Vireo gilvus)	Fairly common migrant	Deciduous woodlands near streams; isolated groves and shade trees
White-eyed vireo*	(Vireo griseus)	Uncommon resident	Dense swampy thickets and hillsides with blackberiy and briar tangles
Red-eyed vireo*	(Vireo olivaceus)	Common summer resident	Deciduous forest and shade trees in residential areas
Philadelphia vireo*	(Vireo philadelphicus)	Rare migrant	Open second growth woodlands; clearings; river and lake thickets
Solitary vireo*	(Vireo solitaris)	Uncommon migrant	Coniferous and mixed forests
Evening grosbeak	(Coccothraustes vespertinus)	Rare winter resident	Coniferous and deciduous woodland; suburban areas
Black-throated blue warbler*	(Dendroica caerulescens)	Rare migrant	Mixed deciduous and evergreen wood lands with thick undergrowth
Bay-breasted warbler*	(Dendroica castanea)	Fairly common migrant	Coniferous and mixed forests
Cerulean warbler*	(Dendroica cerulea)	Scarce migrant	Open woodland near streams
Yellow-rumped warbler*	(Dendroica coronata)	Fairly common migrant	Coniferous and mixed forests
Prairie warbler*	(Dendroica discolor)	Scarce summer resident	Open scrub, old pastures and hillsides
Yellow-throated warbler*	(Dendroica dominica)	Uncommon migrant	Dry uplands to swampy places of pine, oak, sycamore and cypress
Blackburnian warbler*	(Dendroica fusca)	Uncommon migrant	Mixed forests
Magnolia warbler*	(Dendroica magnolia)	Fairly common migrant	Any place where shrubbery or trees occur

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Palm warbler*	(Dendroica palmarum)	Rare winter resident	Open places, weedy fields and borders of marshes
Chestnut-sided warbler*	(Dendroica pensylvanica)	Uncommon migrant	Young, open second-growth woodlands and scrub
Yellow warbler*	(Dendorica petechia)	Common migrant	Most thickets along streams and in swampy areas and gardens
Pine warbler*	(Dendroica pinus)	Fairly common resident	Pine forests
Blackpoll warbler *	(Dendroica striata)	Rare migrant	Coniferous forests and tall trees
Cape May warbler*	(Dendroica tigrina)	Rare migrant	Woodlands in migration
Black-throated green warbler*	(Dendroica virens)	Uncommon migrant	Open stands of pine and various habitats during migration
Common yellowthroat* *	(Geothlypis trichas)	Common migrant	Moist thickets and grassy marshes
Worm-eating warbler*	(Helmitheros vermivorus)	Rare summer resident	Chiefly dry wooded hillsides
Blue grosbeak*	(Guiraca caerulea)	Rare summer resident	Brushy, moist pastures and roadside thickets
Yellow-breasted chat*	(Icteria virens)	Common summer resident	Dense thickets, dry brushy hillsides and streamside tangles
Swainson's warbler*	(Limnothlypis swainsonii)	Scarce summer resident	Wooded swamps and southern cane-brakes; rhododendron thickets
Black & white warbler*	(Mniotilta varia)	Locally common summer resident	Primary and secondary deciduous forest; parks, gardens and lawns with trees and shrubs
Connecticut warbler	(Oporornis agilis)	Rare migrant	Low wet woods and damp thickets
Kentucky warbler*	(Oporornis formosus)	Uncommon summer resident	Low, moist woodland with abundant undergrowth; often in ravines
Mourning warbler*	(Oporornis philadelphia)	Scarce migrant	Forest clearings with briars; wet woods with thick undergrowth
Panda warbler*	(Parula americana)	Uncommon migrant	Coniferous and mixed woodlands
Lazuli bunting	(Passerina amoena)	Rare migrant	Dry, brushy ravines and slopes; cleared areas and weedy pastures
Painted bunting*	(Passerina ciris)	Scarce migrant	Brushy tangles, hedgerows, briar patches, woodland edges and swampy thickets
Indigo bunting*	(Passerina cyanea)	Fairly common summer resident	Brushy slopes, old pastures, over grown farmland, woodland clearings and forest-field ecotone ecotone with tall shrubs; old orchards
Rose-breasted grosbeak*	(Pheucticus ludovicianus)	Common migrant	Woodland-open field
Black-headed grosbeak	(Pheucticus melanocephalus)	Very scarce migrant	River bottoms, lake shores and swampy places
Prothonotary warbler*	(Prothonotaria citrea)	Uncommon summer resident	Wooded swamps, flooded bottomland forest and streams with dead trees
Ovenbird*	(Seiurus aurocapillus)	Uncommon migrant	Mature, dry forest with little underbrush

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Louisiana waterthrush*	(Seiurus motacilla)	Uncommon local summer resident	Hillside brooks, river swamps and along sluggish streams
Northern waterthrush*	(Seiurus noveboracensis)	Common migrant	Wooded swamps, lake shores and cool bogs
American redstart*	(Setophaga ruticilla)	Common summer resident	Second-growth woodlands; thickets with saplings
Dickcissel*	(Spiza americana)	Uncommon summer resident	Open country in grain or hay fields and in weed patches
Bachman's Warbler*	(Vermivora bachmanii)	Rare resident	Woodlands
Golden-winged warbler*	(Vermivora chrysoptera)	Uncommon migrant	Moist situations of sapling stage, old fields and pastures
Blue-winged warbler*	(Vermivora pinus)	Rare migrant	Sapling stage old field and pasture thickets in heavy forests
Tennessee warbler*	(Vermivora peregrina)	Uncommon migrant	Open mixed woodlands; brushy areas during migration
Orange-crowned warbler*	(Vermivora celata)	Uncommon winter resident	Thickets and brushy woodlands
Nashville warbler*	(Vermivora ruficapilla)	Fairly common migrant	Woodland edges, thickets in open mixed forest or brushy borders of swamps
Hooded warbler*	(Wilsonia citrina)	Fairly common summer resident	Mature, moist forest ravines with luxuriant undergrowth; wooded swamps
Wilson's warbler*	(Wilsonia pusilla)	Fairly common migrant	Moist woodland thickets along streams and bogs
Canada warbler*	(Wilsonia canadensis)	Common migrant	Cool, moist woodland with thick undergrowth
Bobolink	(Dolichonyx oryzivorus)	Rare migrant	Prairies, meadows and marshes
Western meadowlark	(Sturnella neglecta)	Rare migrant	Meadows, plains and prairies
Eastern meadowlark	(Sturnella magna)	Common summer resident	Meadows, pastures, prairies and open country generally
Orchard oriole*	(Icterus spurius)	Common summer resident	Orchards, parks, gardens and trees along lakes and rivers
Northern oriole*	(Icterus galbula)	Uncommon summer	Deciduous woodland and shade trees
Yellow-headed blackbird	(Xanthocephalus xanthocephalus)	Uncommon migrant	Freshwater marshes
Red-winged blackbird**	(Agelaius phoeniceus)	Common summer resident	Marshes, swamps, wet and dry meadows, and pastures
Rusty blackbird*	(Euphagus carolinus)	Uncommon winter resident	Wooded swamps and damp woods with pools
Brewer's blackbird	(Euphagus cyanocephalus)	Uncommon winter resident	Wooded swamps and damp woods with pools
Common grackle*	(Quiscaluis aviscula)	Common winter resident	Lawns, parks, fields, and open woodland

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Great-tailed grackle	(Quiscalius mexicanus)	Scarce resident	Marshes along the coast and inland farmlands
Boat-tailed grackle**	(Quiscalius major)	Uncommon resident	Marshes along the coast
Bronzed cowbird	(Molothrus aeneus)	Common resident	Forested regions; especially cut over areas
Brown-headed cowbird*	(Molothrus ater)	Common resident	Fields, woodland edges, suburban areas and agrarian areas
Scarlet tanager*	(Piranga olivacea)	Uncommon migrant	Mature oak and pine woodland
Summer tanager*	(Pranga rubra)	Common summer resident	Open woodlands and shade trees
Northern cardinal*	(Cardinalis cardinalis)	Common resident	Woodland edges, thickets, brushy swamps and gardens
Green-tailed towhee	(Pipilo chlorura)	Casual resident	Brushy thickets
Rufous-sided towhee*	(Pipilo ervthrophthalmus)	Common winter resident	Thickets and brushy woodland edges
Lark bunting	(Calamospiza melanocorys)	Casual winter resident	Open plains and fields
Sharp-tailed sparrow*	(Ammospiza caudacuta)	Uncommon winter resident	Drier grassy portions of salt marsh and inland to grassy, freshwater marshes
Henslow's sparrow	(Ammodramus henslowii)	Rare winter resident	Moist or dry grassland with scattered weeds and small shrubs
LeConte's sparrow*	(Ammodramus caudacutus)	Uncommon winter resident	Moist grassland and boggy dry fields in winter
Grasshopper sparrow	(Ammodramus savannarum)	Rare winter resident	Open grassy and weedy meadows, pastures and plains
Seaside sparrow	(Ammospiza maritima)	Rare accidental	Exclusively grassy salt marsh
Lark sparrow*	(Chondestes grammacus)	Uncommon resident	Grassland with scattered bushes and trees; open country generally
Savannah sparrow *	(Passerculus sandwichensis)	Common winter resident	Fields, prairies, salt marshes grassy dunes
Vesper sparrow	(Pooecetes gramineus)	Fairly common winter resident	Fields, pastures and roadsides in farming country
Bachman's sparrow	(Aimophila aestivalis)	Uncommon resident	Dry, open pine or oak woods, weedy fields and pastures
Dark-eyed junco*	(Junco hyemalis)	Common winter resident	Coniferous or mixed forests, fields, gardens, parks and roadway thickets
Tree sparrow	(Spizella arborea)	Uncommon winter resident	Fields, weedy woodland edges and roadside thickets
Chipping sparrow*	(Spizella passerina)	Common resident	Grassy woodland edges, gardens, city parks, brushy pastures and lawn
Clay-colored sparrow	(Spizella pallida)	Rare migrant	Brushy grasslands and prairies
Field sparrow *	(Spizella pusilla)	Fairly common resident	Abandoned fields and pastures over grown with weeds, scattered bushes and small saplings

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Harris' sparrow	(Zonotrichia querula)	Common winter resident	Dense river-bottom thickets; wood land borders, clearings and brush piles
White-crowned sparrow*	(Zonotrichia leucophrys)	Common winter resident	Open woods and gardens
White-throated sparrow*	(Zonotrichia albicollis)	Common winter resident	Brushy undergrowth in coniferous woodland, pastures and suburbs
House sparrow*	(Passer domesticus)	Common resident	Cities, towns and agrarian land
Fox sparrow	(Passereila illiaca)	Fairly common winter resident	Dense woodland thickets, weedy pastures and brushy roadsides
Lincoln's sparrow	(Melospiza lincolnii)	Common winter resident	Brushy bogs, pastures, willow or alder thickets
Swamp sparrow*	(Melospiza georgiana)	Common winter resident	Freshwater marshes, wooded swamps, weedy fields, parks and brush piles
Song sparrow *	(Melospiza melodia)	Common winter resident	Thickets, pastures, city parks and undergrowth in gardens
Lapland longspur	(Calcarius lapponicus)	Scarce winter resident	Open windswept fields and grassy coastal dunes; coastal parking lots
Smith's longspur	(Calcarius pictus)	Casual winter resident	Open grassy plains
Chestnut-collared longspur	(Calcarius ornatus)	Scarce winter resident	Dry elevated prairies and short grass plains
Pine siskin*	(Carduelis pinus)	Uncommon winter resident	Coniferous and mixed woodlands, alder thickets and brushy pastures
Purple finch*	(Carpodacus purpureus)	Uncommon winter resident	Mixed and coniferous woodlands; ornamental garden conifers
American goldfinch*	(Carduelis tristis)	Fairly common winter resident	Brushy thickets, weedy grasslands and nearby trees

* Denotes that the species has been identified within the park
** Species that has been identified and breeds within the park

Table B-5

MAMMALIAN SPECIES OF KNOWN OR PROBABLE OCCURRENCE IN JEAN LAFITE NATIONAL HISTORICAL PARK AND PRESERVE IN JEFFERSON AND ST. CHARLES PARISHES, LOUISIANA .

Common Name	Scientific name	Habitat Types
Opossum*	(Didelphis virginiana)	Deciduous woodlands, prairies, marshes and farmlands
Alston mouse opossum	(Marmosa alstoni)	Small forests with tangles of vines and marshes
Mexican mouse opossum	(Marmosa mexicana)	Moist loamy soils
Eastern mole*	(Scalopus aguaticus)	Forested areas and their associated meadows and openings
Short-tailed shrew*	(Blarina brevicauda)	Grasslands generally but occasionally under logs and leaf litter in moist forested areas
Least shrew*	(Cryptotis parva)	Hollow trees, abandoned houses and culverts
Southeastern myotis*	(Myotis austroriparius)	Various habitats where the soil is suitable
Nine-banded armadillo*	(Dasypus novemcinctus)	Woodlands
Eastern pipistrelle*	(Pipistrellus subflavus)	Forested areas in hollow trees and crevices in buildings
Big brown bat	(Eptesicus fuscus)	Forested areas and orchards
Red bat*	(Lasiurus borealis)	Forested areas in association with
Seminole bat*	(Lasiurus seminolus)	Spanish moss
Northern yellow bat *	(Lasiurus intermedius)	Forested areas
Evening bat*	(Nycticeius humeralis)	Forested areas in hollow trees
Rafinesque's big-eared bat*	(Plecotus rafinesquii)	Buildings, cisterns and culverts
Brazilian free-tailed bat*	(Tadarida brasillensis)	Old buildings and hollow trees
Red fox*	(Vulpes fulva)	Various woodland habitats
Gray fox*	(Urocvon cinereoargenteus)	Inhabitant of wooded areas, particularly mixed hardwood forests
Coyote*	(Canis latrans)	Desert scrub to grasslands into forested areas
Red wolf *	(Canis rufus)	Formerly from eastern Texas, now apparently restricted to Gulf Coast counties
Louisiana Black Bear*	(Ursus americanus luteolus)	Heavily wooded areas and canebrakes
Raccoon*	(Procyon lotor)	Broad-leaf woodlands and mixed pine forests
Ringtail *	(Bassariscus astutus)	Less common in woodlands preferring rocky areas
Long-tailed weasel	(Mustela frenata)	Variety of habitats from woodlands, thickets and grasslands
Mink*	(Mustela vison)	Associated with watercourses and lakes
River otter*	(Lutra canadensis)	Lakes and larger streams
Eastern spotted skunk*	(Spilogale putorius)	Woodlands to tall grass prairies
Striped skunk*	(Mephitis mephitis)	Wooded or brushy areas and associated farmlands

*Denotes that the species has been identified within the park

Common Name	Scientific name	Habitat Types
Hog-nosed skunk*	(Conepatus mesoleucus)	Foothill and partly timbered or brushy sections
Mountain lion*	(Felis concolor coryi)	Almost every kind of habitat within their range
Bobcat*	(Lynx rufus)	Thickets to rocky outcrops
Feral hog*	(Sus scrofa)	Forested areas and thickets where introduced or escaped from farmlands
White-tailed deer*	(Odocoileus virginianus)	Brushlands to forested areas
Bison	(Bison bison)	Prairies to wooded areas
Thirteen-lined groundsquirrel*	(Spermophilus tridecemlineatus)	Short to tall grass prairies, field borders
Eastern gray squirrel *	(Sciurus carolinensis)	Bottomlands and hammocks of live and water oaks to mixed hardwood uplands
Fox squirrel*	(Sciurus niger)	Variety of forested habitats preferring upland forests of more open mixed hardwood
Southern flying squirrel*	(Glaucomys volans)	Forested areas where den trees are available
Plains pocket gopher*	(Geomys bursarius)	Sandy soils where the topsoil is 4 inches or more in depth
Hispid pocket mouse*	(Perognathus hispidus)	Sandy or other friable soil covered with scattered to moderate herbaceous vegetation
Beaver*	(Castor canadensis)	Along streams, rivers, lakes and ponds
Eastern harvest mouse*	(Reithrodontomys humulis)	Ecotones and early successional stages, climax grasslands
Fulvous harvest mouse*	(Reithrodontomys fulvescens)	Grassy areas with shrub-type vegetation climax grasslands
Pygmy mouse*	(Baiomys taylori)	Low grassy and weeded areas
White-footed mouse*	(Peromyscus leucopus)	Various habitats within woodlands
Cotton mouse*	(Peromyscus gossypinus)	Woodland habitats along watercourses near open fields
Golden mouse*	(Ochrotomys nattali)	Arboreal in forested habitats
Marsh rice rat*	(Oryzomys palustris)	Marshy areas with grasses and sedges
Hispid cotton rat*	(Sigmodon hispidus)	Tallgrass areas of bluestem, cordgrass or sedges
Eastern wood rat*	(Neotoma floridana)	Swamplands, forested uplands to arid plains
Pine vole*	(Pitymys pinetorum)	Woodland areas where leaf litter and lodged grasses affords protection
Muskrat *	(Ondatra zibethicus)	Marshy areas of creeks, rivers and lakes
House mouse*	(Mus musculus)	Various habitats particularly near human habitation
Roof rat *	(Rattus rattus)	Various commensal habitats associated with man
Norway rat*	(Rattus norvegicus)	Various commensal habitats associated with man
Nutria*	(Myocastor coypus)	Swamps, marshes and along rivers and lakes
California jackrabbit*	(Lepus californicus)	Coastal tallgrass prairies to desert mountains
Eastern cottontail	(Sylvilagus floridanus)	Brushlands and marginal, ecotonal areas
Swamp Rabbit *	(Sylvagus aquaticus)	Poorly drained river bottoms and coastal marshes

*Denoted that the species has been identified within the park