Threatened and Endangered Species Survey

Waterford Steam Electric Station, Unit 3

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Table of Contents

List of Appendices

INTRODUCTION

The Waterford Steam Electric Station Unit 3 (WF3) is located in St. Charles Parish, Louisiana, on the west (right descending) bank of the Mississippi River at River Mile 129.6, approximately 25 miles west of New Orleans, Louisiana, and approximately 50 miles southeast of Baton Rouge, Louisiana. WF3 uses water from the Mississippi River for cooling purposes. Much of the site is classified as developed industrial land. There are several sugarcane fields outside the WF3 plant perimeter fence, but within the Entergy Louisiana, LLC (ELL) property boundary, and there is a rather limited amount of disturbed woodlands. Water resources, other than the Mississippi River, include several drainage and stormwater ditches.

As part of the WF3 license renewal activities, a survey was conducted at the ELL property, on which WF3 is located, to assess the habitat availability and presence of plants and animals that have been listed by the U.S. Fish and Wildlife Service (USFWS) and the Louisiana Department of Wildlife and Fisheries (LDWF) as being threatened, endangered, or proposed for listing. This survey, which was limited to the ELL property northeast of Highway LA-3127, included a desktop survey (to determine relevant species for St. Charles Parish, Louisiana, as well as the habitat requirements for each state and federal listed species) and a pedestrian survey (to assess the presence or absence of the organism and/or its habitat on the ELL property northeast of LA-3127). This report summarizes those survey results.

METHODOLOGY AND MATERIALS

A desktop survey was performed to determine what plant and animal species are listed as threatened, endangered, or candidate for St. Charles Parish, Louisiana. The USFWS website for listed species (endangered, threatened, or candidate) for St. Charles Parish was accessed, and the listed species were recorded and presented in Table 1. Similarly, the LDWF website for the Louisiana-listed species by parish was accessed to determine the state-listed species for St. Charles Parish, and they are presented in Table 2.

The habitats on the ELL property surveyed for threatened and endangered species (i.e., ELL property northeast of LA-3127) are largely composed of agricultural (58.5 percent) and industrial land (27.81 percent) uses (see Table 3 and Figure 1).

Table 1
Federally Listed Species in St. Charles Parish, Louisiana

Species	Occurrence	Group	Status
West Indian manatee	Seasonal	Mammal	E
Sprague's pipit	Known	Bird	C
Atlantic sturgeon	Known	Fish	T
Pallid sturgeon	Known	Fish	E

(USFWS 2014a)

Table 2
State-Listed Species in St. Charles Parish, Louisiana

Species	Status	Group
Swamp milkweed	S2	Plant
Golden canna	S4?	Plant
Floating antler-fern	S2	Plant
Marshland flatsedge	S1	Plant
Western umbrella sedge	S1	Plant
Square-stemmed monkey flower	S2	Plant
Correll's false dragon-head	S1	Plant
Brackish marsh	S3, S4	Community
Cypress-tupelo swamp	S4	Community
Freshwater marsh	S1, S2	Community
Intermediate marsh	S3, S4	Community
Live oak natural levee forest	S1, S2	Community
Bald eagle	S2N, S3B	Animal
Paddlefish	S3	Animal
Pallid sturgeon	S1	Animal
Manatee	SNA	Animal

(LDWF 2014a)

Notes:

- G1 = critically imperiled globally because of extreme rarity (5 or fewer known extant populations) or because of some factor(s) making it especially vulnerable to extinction
- G2 = imperiled globally because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extinction throughout its range
- G3 = either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single physiographic region) or because of other factors making it vulnerable to extinction throughout its range (21 to 100 known extant populations)
- G4 = apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery (100 to 1000 known extant populations)
- G5 = demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery (1000+ known extant populations)
- GH = of historical occurrence throughout its range; i.e., formerly part of the established biota, with the possibility that it may be rediscovered (e.g., Bachman's Warbler)
- GU = possibly in peril range-wide, but status uncertain; need more information
- G? = rank uncertain. Or a range (e.g., G3G5) delineates the limits of uncertainty
- GQ = uncertain taxonomic status
- GX = believed to be extinct throughout its range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered

- T = subspecies or variety rank (e.g., G5T4 applies to a subspecies with a global species rank of G5, but with a subspecies rank of G4)

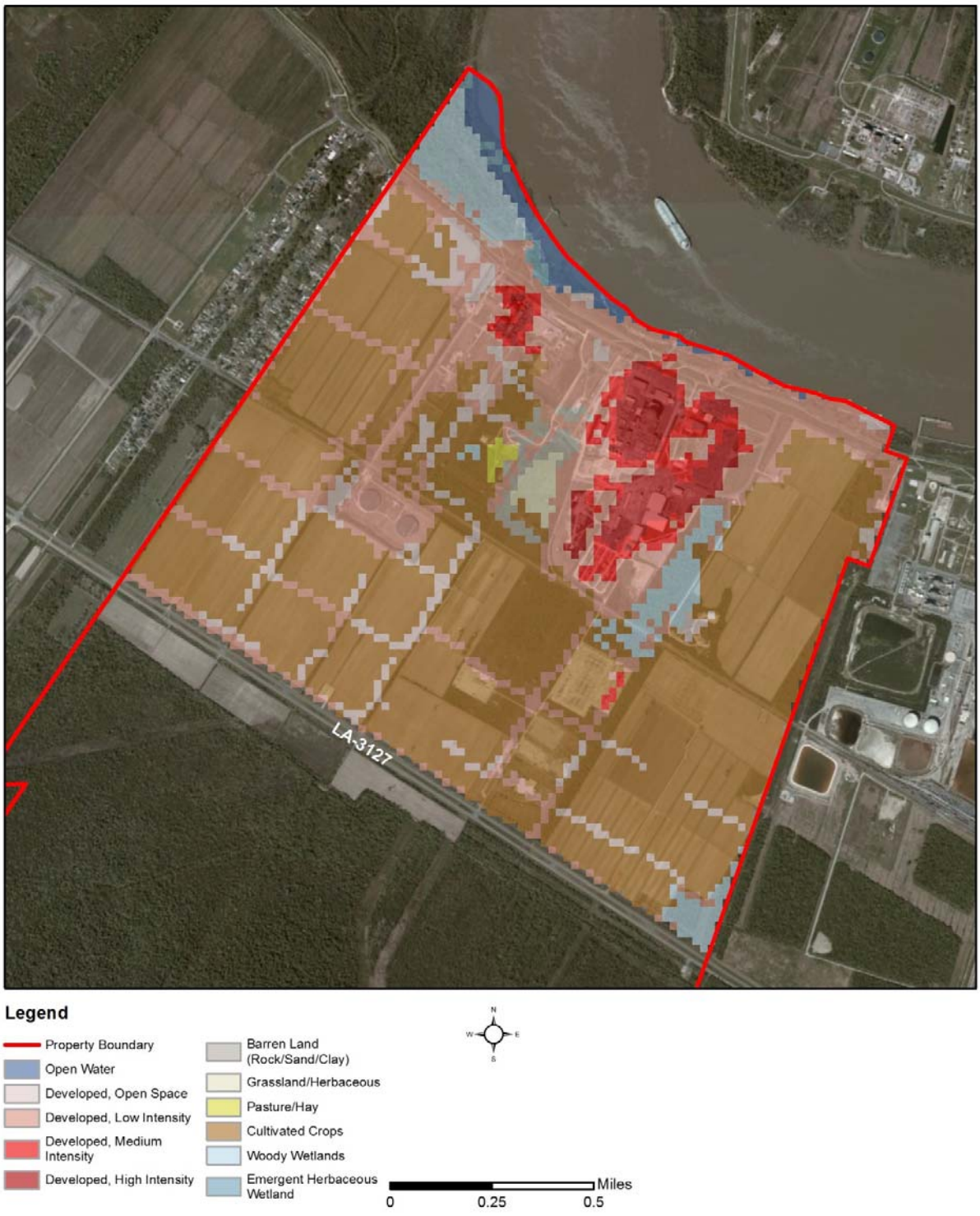
State Status Ranks:

- S1 = critically imperiled in Louisiana because of extreme rarity (5 or fewer known extant populations) or because of some factor(s) making it especially vulnerable to extirpation.
- S2 = imperiled in Louisiana because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extirpation.
- S3 = rare and local throughout the state or found locally (even abundantly at some of its locations) in a restricted region of the state, or because of other factors making it vulnerable to extirpation (21 to 100 known extant populations).
- S4 = apparently secure in Louisiana with many occurrences (100 to 1,000 known extant populations).
- S5 = demonstrably secure in Louisiana (1,000+ known extant populations)
  (B or N may be used as qualifier of numeric ranks and indicating whether the occurrence is breeding or nonbreeding).
- SA = accidental in Louisiana, including species (usually birds or butterflies) recorded once or twice or only at great intervals hundreds or even thousands of miles outside their usual range.

Table 3
Land Use/Land Cover on ELL Property Northeast of LA-3127

Description	Percent
Open water	1.90
Developed	33.05
Open space	5.24
Low intensity	20.93
Medium intensity	2.78
High intensity	4.10
Barren land (rock/sand/clay)	0.97
Grassland/herbaceous	0.60
Pasture/hay	0.22
Cultivated crops	58.28
Woody wetlands	4.62
Emergent herbaceous wetland	0.36
TOTAL	100.00

(USDA 2014)



(ESRI 2014; USDA 2014)

Figure 1
Land Use on ELL Property Surveyed
(ELL Property Northeast of LA-3127)

A description of each listed species and a summary of the species habitat requirements and basic ecology were also determined (see Appendix A for federally listed species; Appendix B for state-listed species). This basic ecological information was used to determine an approach for performing a field survey of the ELL property northeast of LA-3127. The habitat requirements of all species (except paddlefish and western umbrella sedge, which were inadvertently omitted) were summarized onto a field data sheet.

The state of Louisiana also lists five ecologically important natural communities as being present in St. Charles Parish: brackish marsh, cypress-tupelo swamp, freshwater marsh, intermediate marsh, and live oak natural levee forest (see Appendix B). Therefore, evaluation of these five natural communities was incorporated into the survey methodology.

On October 29, 2014, Mr. J. Fred Heitman, ENERCON SERVICES, INC., conducted a pedestrian survey of the ELL property northeast of LA-3127 to determine the presence or absence of federally and state-listed species for St. Charles Parish—and/or their habitat on the specified ELL property. Mr. Heitman was accompanied by Messrs. Rick Buckley and Rodney LeBlanc, Entergy Louisiana, LLC. The survey was conducted by driving a truck on public and private roads both on the ELL property and adjacent to the property to examine large tracts of land. When necessary, specific habitat types were visually surveyed by walking to more closely examine habitats for the presence of listed species. A field data sheet was used to assist in assessing the different habitat types for the species/natural communities identified in Table 1 and Table 2.

During the pedestrian survey, digital images were created of the following:

- Representative habitat types found on the property (Figures 2, 3, 4, 5, and 6)
- Shoreline along the Mississippi (Figures 2 and 3)
- Typical sugarcane field (Figure 4)
- Alligator that resides in a culvert in the industrialized part of the property (Figure 5)
- Typical drainage ditch (Figure 6)

A map of the ELL property (Appendix C, Figure C-1) was used to identify the specific areas surveyed for the presence or absence of listed species/natural communities, as well as whether habitat for the listed species was present. Field data sheets were numbered (1 through 6) to correspond with the specific areas that were surveyed on the ELL property as described in Table 4. At each specific site, a field data sheet was used to summarize field observations (see Appendix C, Figures C-2 through C-7).

Table 4
Generalized Habitats Surveyed

Location ID	General Habitat Type at Survey Location
1	Sugarcane field
2	Mississippi River bank
3	Ditches along LA-3127 and on ELL property
4	Open field associated with transmission line right-of-way
5	Sugarcane field
6	Industrialized plant area

FINDINGS

None of the federally or state-listed species were observed during the pedestrian habitat survey conducted at the ELL property on October 29, 2014. During the survey, there was potential habitat in ditches for both floating antler-fern and western umbrella sedge. However, neither of these plant species was observed on the ELL property even though ditches were extensively walked. None of the other plant species were observed on the property, nor was suitable habitat for these species observed.

The aquatic animal species, Atlantic sturgeon, pallid sturgeon, and paddlefish, potentially could be present in the Mississippi River adjacent to the ELL property; however, the river adjacent to WF3 does not provide suitable habitat for more than a transitory presence. WF3 is located on the outside bend of the river and, as such, the current flows rather rapidly at this location. The swift current would sweep the river bottom in a manner that would not be suitable for spawning of any of these species. Further, the current speed would prevent suitable feeding habitat for these fish species, particularly the paddlefish, which prefers more backwater-type areas. The manatee also prefers calm waters which are not found on the river adjacent to WF3; therefore, it would not be expected to be found at this industrial property.

Sprague's pipit, a federal candidate species, was not observed on the ELL property. This bird prefers native prairie grasslands as its habitat. Although this bird may overwinter in St. Charles Parish under proper habitat conditions, no such habitat was found on the ELL property even though transmission line rights-of-way were specifically evaluated for native grass stands.

During the survey, particular effort was made to identify the natural communities identified by the state of Louisiana as being ecologically important. These natural communities (brackish marsh, cypress-tupelo swamp, freshwater marsh, intermediate marsh, and live oak natural levee forest) were not observed on the ELL property that was surveyed.

Although bald eagles are present in the area, none were sighted during the survey.

CONCLUSIONS

The ELL property northeast of LA-3127 was surveyed for the presence or absence of federally and state-listed species (Tables 1 and 2). In general, the habitat conditions found at the ELL property were not conducive for any of the listed species. There are some ditches present that might potentially provide habitat for both the floating antler-fern and western umbrella sedge; however, neither of these species was observed in the ditches on the ELL property.

Because the ELL property is largely an ecologically highly disturbed area (an industrial site and/or agricultural fields), it is not surprising that the federally and state-listed species and ecologically important natural communities were not found.

Figure 2
Mississippi River Bank East of WF3 Discharge Structure

Figure 3
WF3 Discharge Structure on Mississippi River—Barge Moving Upstream

Figure 4
Typical Sugarcane Field on ELL Property
(Field located North Side of LA-3127, South of the WF3 plant—WF3 Reactor in Background)

Figure 5
Medium-Sized Alligator Living in Culvert on the Heavily Industrialized Portion of ELL Property

Figure 6
Typical Wet Ditch on ELL Property
(Ditch Located South of Main Plant Area and North of LA-3127)

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Appendix A

Federally Listed Species in St. Charles Parish, Louisiana

Federally Listed Species in St. Charles Parish, Louisiana

Species	Occurrence	Group	Status
West Indian manatee	Seasonal	Mammal	E
Sprague's pipit	Known	Bird	C
Atlantic sturgeon	Known	Fish	T
Pallid sturgeon	Known	Fish	E

(USFWS 2014a)

West Indian Manatee

Manatees are protected under the Marine Mammal Protection Act, which prohibits the take (i.e., harass, hunt, capture, or kill) of all marine mammals. Manatees are found in marine, estuarine, and freshwater environments. On August 14, 2013, the USFWS determined that the West Indian Manatee includes two subspecies, the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). While morphologically distinctive, both subspecies have many common features. Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail. They are typically grey in color (color can range from black to light brown) and occasionally spotted with barnacles or colored by patches of green or red algae. The muzzle is heavily whiskered and coarse, single hairs are sparsely distributed throughout the body. Adult manatees, on average, are about 9 feet long and weigh about 1,000 pounds. At birth, calves are between 3 and 4 feet long, and weigh between 40 and 60 pounds. (USFWS 2014b)

Florida and Antillean manatees range freely between marine and freshwater habitats. Specific habitat types/use areas include foraging and drinking sites, resting areas, travel corridors, and others. Florida manatees, living at the northern limit of the species' range, have little tolerance for cold. (USFWS 2014b)

Historically, this subspecies has sought out natural, warm-water sites, including springs, deep water areas, and areas thermally influenced by the Gulf Stream, as refuges from the cold. In the 1930s and 1940s, industrial plants, including power plants, paper mills, etc., were built along coastal and riverine shoreline areas. Plants discharging large volumes of heated discharge water into areas accessible to manatees have attracted large numbers of wintering manatees to these warm-water sites ever since. In the spring, manatees leave the warm-water sites and may travel great distances during the summer, only to return to warm-water sites in the fall. (USFWS 2014b)

Manatees are herbivores that feed opportunistically on a wide variety of marine, estuarine, and freshwater plants, including submerged, floating, and emergent vegetation. Common forage plants include, but are not limited to, cord grass, algae, turtle grass, shoal grass, manatee grass, eel grass, and other plant types. Calves initially suckle and may start feeding on plants when a few months of age. Weaning generally takes place within a year of birth. Manatees also require sources of freshwater, obtained from both natural and anthropogenic sources. (USFWS 2014b)

The Florida manatees' range is generally restricted to the southeastern United States, although individuals occasionally range as far north as Massachusetts and as far west as Texas. Antillean manatees are found in coastal and riverine systems in South and Central America (from Brazil to Mexico) and in the Greater and Lesser Antilles throughout the Caribbean Basin. (USFWS 2014b)

Manatees mature at 3 to 5 years of age. Mature females go into heat for anywhere from 2 to 4 weeks. Mating activity can occur throughout the year. When in heat, females will attract numerous males and mate repeatedly; aggregations that include an estrus or focal female and numerous males are described as mating herds. Gestation lasts for about 13 months, and cows usually give birth to a single calf, although twinning is known to occur. While calving primarily

peaks in the spring, calves may be born at any time of the year. Reproductive senescence is poorly described; a known female has given birth to seven individual calves over a period of about 30 years. A calf may remain with its mother for about 2 years. Calving intervals range from 2 to 3 years. The oldest known manatee is 65 years of age. (USFWS 2014b)

Sprague's Pipit

Sprague's is the only wholly North American pipit. Males perform a very extraordinary fluttering display flight, circling high above the earth while singing an unending series of high-pitched calls, for periods of up to an hour. The current decline in the population of the Sprague's Pipit is quite likely the result of the conversion of tall-grass native prairie to extensive farmland. (Vuilleumier 2009)

The nest consists of a small cup of loose woven grass on the ground and level with it, often attached to standing vegetation to form a sort of dome; four to five eggs and one to two broods are typical. Nesting occurs May through August. Sprague's pipit feeds almost exclusively on insects (especially crickets and grasshoppers) when breeding, but it occasionally eats seeds. (Vuilleumier 2009)

Sprague's pipit is truly North American. It breeds along the border of Canada and the United States in dry open, tall-grass upland habitat, especially native prairie systems in the northernmost part of the Great Plains. Most migrate to Mexico in winter, where habitat is similar to breeding grounds. (Vuilleumier 2009)

Atlantic Sturgeon

The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. Atlantic sturgeon can grow to approximately 14 feet long and can weigh up to 800 pounds. They are bluish-black or olive brown dorsally with paler sides and a white belly, and they have five major rows of dermal scutes. (NOAA 2015)

Atlantic sturgeon are similar in appearance to shortnose sturgeon (*Acipenser brevirostrum*), but can be distinguished by their larger size, smaller mouth, different snout shape, and scutes. Atlantic sturgeon have been aged to 60 years. There is generally faster growth and earlier age at maturation in more southern populations. (NOAA 2015)

Spawning adults migrate upriver in spring, beginning in February–March in the south, April–May in the mid-Atlantic, and May–June in Canadian waters. In some areas, a small spawning migration may also occur in the fall. Spawning occurs in flowing water between the salt front and fall line of large rivers. Atlantic sturgeon spawning intervals range from 1 to 5 years for males and 2 to 5 years for females. Fecundity of female Atlantic sturgeon is correlated with age and body size and ranges from 400,000 to 8,000,000 eggs. The average age at which 50 percent of maximum lifetime egg production is achieved is estimated to be 29 years, which is approximately 3 to 10 times older than for other bony fish species. (NOAA 2015)

Atlantic sturgeon are anadromous; adults spawn in freshwater in the spring and early summer, and migrate into estuarine and marine waters where they spend most of their lives. In some southern rivers, a fall spawning migration may also occur. They spawn in moderately flowing

water (18–30 inches/second) in deep parts of large rivers. Sturgeon eggs are highly adhesive and are deposited on bottom substrate, usually on hard surfaces (e.g., cobble). It is likely that cold, clean water is important for proper larval development. Once larvae begin migrating downstream they use benthic structure (especially gravel matrices) as refuges. Juveniles usually reside in estuarine waters for months to years. (NOAA 2015)

Following spawning, males may remain in the river or lower estuary until the fall; females typically exit the rivers within 4 to 6 weeks. Juveniles move downstream and inhabit brackish waters for a few months and, when they reach a size of about 30–36 inches, they move into nearshore coastal waters. These immature Atlantic sturgeon travel widely once they emigrate from their natal rivers. Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (33–164 foot depth) nearshore areas dominated by gravel and sand substrates. Long distance migrations away from spawning rivers are common. (NOAA 2015)

Atlantic sturgeon are benthic feeders and typically forage on benthic invertebrates such as crustaceans, worms, mollusks. The Altamaha River supports one of the healthiest Atlantic sturgeon populations in the southeast United States, with more than 2,000 subadults captured in research surveys in the past few years, 800 of which were 1 to 2 years of age. The Atlantic sturgeon population appears to be stable. (NOAA 2015)

Studies have consistently found populations to be genetically diverse and indicate that there are about 10 populations that can be statistically differentiated. However, there is some disagreement among studies, and results do not include samples from all rivers inhabited by Atlantic sturgeon. (NOAA 2015)

Historically, threats to Atlantic sturgeon included overharvesting (which led to widespread declines in Atlantic sturgeon abundance) and commercial fishing from the 1950s to the 1990s. Current threats include bycatch of sturgeon in fisheries targeting other species; habitat degradation and loss from various human activities such as dredging, dams, water withdrawals, and other development; habitat impediments including locks and dams; and ship strikes. Although there are no known diseases threatening Atlantic sturgeon populations, there is concern that non-indigenous sturgeon pathogens could be introduced through aquaculture operations. (NOAA 2015)

Pallid Sturgeon

The pallid sturgeon was first recognized as a species different from shovelnose sturgeon by S. A. Forbes and R. E. Richardson in 1905, based on a study of nine specimens collected from the Mississippi River near Grafton, Illinois. They named this new species *Parascaphirhynchus albus*. Later reclassification assigned it to the genus *Scaphirhynchus*. (USFWS 2014c)

Pallid sturgeon have a flattened, shovel-shaped snout; a long, slender, and completely armored caudal peduncle; and they lack a spiracle. As with other sturgeon, the mouth is toothless, protrusible, and ventrally positioned under the head. The skeletal structure is primarily composed of cartilage rather than bone. (USFWS 2014c)

Pallid sturgeon are bottom-oriented, large-river obligate fish inhabiting the Missouri and Mississippi rivers and some tributaries from Montana to Louisiana. Pallid sturgeon evolved in the diverse environments of the Missouri and Mississippi river systems. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that met the habitat and life history requirements of pallid sturgeon and other native large-river fishes. Pallid sturgeon have been documented over a variety of available substrates, but are often associated with sandy and fine bottom materials. (USFWS 2014c)

Substrate association appears to be seasonal. During winter and spring, a mixture of sand, gravel, and rock substrates are used. During the summer and fall, sand substrate is most often used. In the Middle Mississippi River, pallid sturgeon transition from predominantly sandy substrates to gravel during May, which may be associated with spawning. In these river systems and others, pallid sturgeon appears to use underwater sand dunes. (USFWS 2014c)

Across their range, pallid sturgeon have been documented in waters of varying depths and velocities. Depths at collection sites range from about 2 feet to greater than 65 feet, though there may be selection for areas at least 2.6 feet deep. Despite the wide range of depths associated with capture locations, one commonality is apparent: this species is typically found in areas where relative depths (the depth at the fish location divided by the maximum channel cross section depth expressed as a percent) exceed 75 percent. Bottom water velocities associated with collection locations are generally < 4.9 fps with reported averages ranging from 1.9 to 2.9 fps. (USFWS 2014c)

Data on food habits of age-0 pallid sturgeon are limited. In a hatchery environment, exogenously feeding fry will readily consume brine shrimp suggesting zooplankton and/or small invertebrates are likely the food base for this age group. Data available for age-0 *Scaphirhynchus* indicate mayflies (Ephemeroptera) and midge (Chironomidae) larvae are important. Juvenile and adult pallid sturgeon diets are generally composed of fish and aquatic insect larvae with a trend toward piscivory as they increase in size. Based on the above diet data and habitat utilization by prey items, it appears that pallid sturgeon will feed over a variety of substrates. However, the abundance of Trichoptera in the diet suggests that harder substrates like gravel and rock material may be important feeding areas. (USFWS 2014c)

Pallid sturgeon can be long-lived, with females reaching sexual maturity later than males. Based on wild fish, estimated age at first reproduction was 15 to 20 years for females and approximately 5 years for males. Like most fish species, water temperatures influence growth and maturity. Female hatchery-reared pallid sturgeon maintained in an artificially controlled environment can attain sexual maturity at age 6, whereas female pallid sturgeon subject to colder winter water temperatures reached maturity around age 9. Thus, age at first reproduction likely is variable and dependent on local conditions. Females do not spawn each year. (USFWS 2014c)

Observations of wild pallid sturgeon collected as part of the conservation stocking program in the northern part of the range indicates that female spawning periodicity is 2 to 3 years. Fecundity is related to body size. The largest upper Missouri River fish can produce as many as 150,000 to 170,000 eggs, whereas smaller bodied females in the southern extent of the range may only produce 43,000 to 58,000 eggs. Spawning appears to occur between March and July, with lower latitude fish spawning earlier than those in the northern portion of the range.

Adult pallid sturgeon can move long distances upstream prior to spawning, and females likely are spawning at or near the apex of these movements. This behavior can be associated with spawning migrations. Spawning appears to occur over firm substrates, in deeper water, with relatively fast, turbulent flows, and is driven by several environmental stimuli including flow, water temperature, and day length. (USFWS 2014c)

Incubation rates are governed by and depend on water temperature. In a hatchery environment, fertilized eggs hatch in approximately 5 to 7 days. Incubation rates may deviate slightly from this in the wild. Newly hatched larvae are predominantly pelagic, drifting in the currents for 11 to 13 days and dispersing hundreds of miles downstream from spawn and hatch locations. (USFWS 2014c)

Douglas (1974) reports that two specimens of the pallid sturgeon were collected from East Carroll Parish in the Mississippi River at Lake Providence. These were young specimens weighing approximately 1.5 and 3.0 pounds, respectively.

Appendix B

State-Listed Species in St. Charles Parish, Louisiana

State-Listed Species in St. Charles Parish, Louisiana

Species	Status	Group
Swamp milkweed	S2	Plant
Golden canna	S4?	Plant
Floating antler-fern	S2	Plant
Marshland flatsedge	S1	Plant
Western umbrella sedge	S1	Plant
Square-stemmed monkey flower	S2	Plant
Correll's false dragon-head	S1	Plant
Brackish marsh	S3, S4	Community
Cypress-tupelo swamp	S4	Community
Freshwater marsh	S1, S2	Community
Intermediate marsh	S3, S4	Community
Live oak natural levee forest	S1, S2	Community
Bald eagle	S2N, S3B	Animal
Paddlefish	S3	Animal
Pallid sturgeon	S1	Animal
Manatee	SNA	Animal

(LDWF 2014a)

Notes:

- G1 = critically imperiled globally because of extreme rarity (5 or fewer known extant populations) or because of some factor(s) making it especially vulnerable to extinction
- G2 = imperiled globally because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extinction throughout its range
- G3 = either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single physiographic region) or because of other factors making it vulnerable to extinction throughout its range (21 to 100 known extant populations)
- G4 = apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery (100 to 1000 known extant populations)
- G5 = demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery (1000+ known extant populations)
- GH = of historical occurrence throughout its range; i.e., formerly part of the established biota, with the possibility that it may be rediscovered (e.g., Bachman's Warbler)
- GU = possibly in peril range-wide, but status uncertain; need more information
- G? = rank uncertain. Or a range (e.g., G3G5) delineates the limits of uncertainty
- GQ = uncertain taxonomic status
- GX = believed to be extinct throughout its range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered
- T = subspecies or variety rank (e.g., G5T4 applies to a subspecies with a global species rank of G5, but with a subspecies rank of G4)

State Status Ranks:

- S1 = critically imperiled in Louisiana because of extreme rarity (5 or fewer known extant populations) or because of some factor(s) making it especially vulnerable to extirpation.
- S2 = imperiled in Louisiana because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extirpation.
- S3 = rare and local throughout the state or found locally (even abundantly at some of its locations) in a restricted region of the state, or because of other factors making it vulnerable to extirpation (21 to 100 known extant populations).
- S4 = apparently secure in Louisiana with many occurrences (100 to 1,000 known extant populations).
- S5 = demonstrably secure in Louisiana (1,000+ known extant populations)
  (B or N may be used as qualifier of numeric ranks and indicating whether the occurrence is breeding or nonbreeding).
- SA = accidental in Louisiana, including species (usually birds or butterflies) recorded once or twice or only at great intervals hundreds or even thousands of miles outside their usual range.

Swamp Milkweed

Swamp milkweed (*Asclepias incarnate*) is in the milkweed family (Asclepiadaceae). It ranges from Florida west to New Mexico, and north to Nova Scotia and Manitoba. (LDWF 2014b)

It is a robust, perennial milkweed from a short rootstock to 6.5 feet tall in Louisiana, and it has milky sap which is characteristic of most milkweeds. Leaves are numerous, opposite, linear-lanceolate to ovate-elliptic, 2.4 to 6 inches long and to 1.6 inches broad with rounded to heart-shaped bases and acute to acuminate tips. Flower color is bright rose-purple (rarely white). Fruit is an erect follicle ("pod"), having seeds with a long tuft of hairs at one end which allows wind dispersal. (LDWF 2014b)

Swamp milkweed flowers from June to September. It requires full sun to partial shade, and is almost always found in wetlands. Louisiana occurrences are in freshwater swamps and marshes; however, it may also occur in ditches. Threats to swamp milkweed are subsidence of fresh marsh and saltwater intrusion. (LDWF 2014b)

In Louisiana, swamp milkweed is found in the Pontchartrain, Barataria, and Terrebonne river basins. (LDWF 2014b)

Golden Canna

Golden canna (*Canna flaccida)* is a member of the canna family (Cannaceae). It ranges includes the states of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas, and is found as an exotic in Virginia. (LDWF 2014c)

It is a large perennial which grows to nearly 4 feet tall, with green herbaceous stems and large flat leaves. Leaves alternate, to about 24 inches long and with obvious parallel veins; leaves not variegated, which is the case in many cultivated exotic cannas. Flowers are solid yellow (with no red or orange), irregular-shaped, and in terminal racemes. (LDWF 2014c)

Golden canna blooms from May to August, requires full sun, and is almost always found in wetlands. Habitat for golden canna is fresh marsh and open swamps. Because this plant is cultivated and used as an ornamental, some occurrences could be escapes. Records from northern Louisiana are probably escapes. Threats to golden canna are saltwater intrusion, conversion of marsh to open water, and lack of knowledge regarding status in Louisiana. (LDWF 2014c)

In Louisiana, golden canna is found in the Pearl, Pontchartrain, Barataria, Terrebonne, Vermilion-Teche, Mermentau, Calcasieu, and Sabine river basins. (LDWF 2014c)

Floating Antler-Fern

Floating antler-fern (*Ceratopteris pteridoides*) is a member of the water fern family (Parkeriaceae). Its range includes Florida and Louisiana and south to the West Indies, Central and South America, and southeastern Asia (Vietnam). (LDWF 2014d)

It is a dimorphic fern with two types of fronds: fertile and sterile. Sterile fronds form a basal rosette and are broad, thin, and glabrous, with net-like venation; simple with pinnate to palmate

lobing; ultimate segments are round, and the basal lobes opposite. Petiole bases are inflated to aid in floating. Fertile fronds are erect, longer than the sterile fronds, and have very narrowly divided segments with in-rolled margins. Buds or small vegetative plantlets are present on sterile frond margins and eventually separate to form new plants. (LDWF 2014d)

Floating antler-fern requires full sun to shade, and is almost always found in wetlands. It occurs in swamps, sluggish bayous, and ditches and canals; is usually floating, but occasionally stranded in mud during low-water periods. Threats to floating antler-fern are few given its aquatic habitat and ability to float freely, but saltwater intrusion is presumably a threat. (LDWF 2014d)

In Louisiana, floating antler-fern is found in the Pontchartrain, Barataria, Terrebonne, Atchafalaya, and Vermilion-Teche river basins. (LDWF 2014d)

Marshland Flatsedge

Marshland flatsedge (*Cyperus distinctus*) is a member of the sedge family (Cyperaceae). Its range includes Florida, Georgia, Louisiana, and South Carolina. (LDWF 2014e)

It is a stout perennial flatsedge with glabrous, round stems, 16 to 24 inches tall, and inflorescence of hemispheric heads on 5 to 9 stalks (= rays). Achenes are three angled, the body linear oblong, and about 0.06 to 0.08 inches long by 0.01 to 0.02 inches wide, and perched atop a minute stipe (stalk). Achenes are narrowed toward the base then becoming swollen with spongy bases. (LDWF 2014e)

Marshland flatsedge flowers from July to October and requires full sun. It usually is found in wetlands. Louisiana has several known occurrences with very little specific habitat data. One occurrence is from the Bonne Carré Spillway in “low wet areas”. Another collection was from a “wet meadow” at Audubon Park in New Orleans. The most recent record is from a wet ditch between U.S. Highway 11 and Interstate Highway 10 in Orleans Parish near Lake Pontchartrain. Threats to marshland flatsedge are characterized as very little basic information on status, habitat preference, and associate species in Louisiana. (LDWF 2014e)

In Louisiana, marshland flatsedge is found in the Pontchartrain river basin. (LDWF 2014e)

Western Umbrella Sedge

Western umbrella sedge (*Fuirena simplex*) is a member of the sedge family (Cyperaceae). This sedge ranges from Arizona east to Mississippi and throughout the southern Great Plains. It is often found in wetland areas. (LBJWC 2014)

The western umbrella sedge is perennial that reaches up to 1 foot tall. It is rather grass-like in appearance with a fibrous root. Leaves are alternate, simple, and linear. Leaf veins are parallel, and inflorescence is a spikelet. The plant blooms August through November and has a green bloom with the perianth absent. (LBJWC 2014)

Square-Stemmed Monkey Flower

Square-stemmed monkey flower (*Mimulus ringens*) is a member of the figwort family (Scrophulariaceae). Its range is the eastern half of Canada and the United States, except Florida, and it is found in several western states. (LDWF 2014f)

This plant is about 12 to 40 inches tall, and a perennial. Leaves are opposite, sessile, sometimes clasping the stem, and angles of the stem are rounded and NOT winged (the common *M. alatus* has sharp winged angles on the stem). Flowers are lavender, with two lips: upper with two petals and lower with three petals. When fully open, flowers resemble a monkey face. Pedicels (flower stalks) are relatively long, 0.7 to 1.6 inches. (LDWF 2014f)

It flowers from April to September (to November—stage of development depends on water levels) and requires full sun to part shade. It is almost always found in wetlands. Louisiana occurrences are on sand bars, banks, and in battures of large rivers such as the lower Atchafalaya and Mississippi. Threats to square-stemmed monkey flower are channel dredging and soil deposition; lock and dam construction and operation; and shoreline stabilization, such as lining river banks with rock (riprap). (LDWF 2014f)

In Louisiana, square-stemmed monkey flower is found in the Pontchartrain, Mississippi, Barataria, Atchafalaya, Vermilion-Teche, Red, and Ouachita river basins. (LDWF 2014f)

Correll's False Dragon-Head

Correll's false dragon-head (*Physostegia correllii*) is a member of the mint family (Lamiaceae). It ranges from Louisiana and Texas to Mexico. (LDWF 2014g)

It is a robust plant, somewhat succulent, up to about 40 inches tall, and stems are often unbranched. It is a hardy perennial with elongate rhizomes. Mid-stem leaves are opposite, sessile (not stalked), and usually widest in the middle with large sharp teeth. Leaves decrease in size from mid- to upper-stem, and flowers are pink and tubular with two lips. It flowers from May to September, requires full sun, and is almost always found in wetlands. (LDWF 2014g)

Louisiana occurrences are all in roadside ditches. Elsewhere it occurs along river banks, often growing in flowing water. Vigorous growth of rhizomes allows Correll's false dragon-head to be competitive in disturbed areas. Non-natural habitats such as drainage and irrigation ditches and wet utility ROWs represent potential habitat. Threats to Correll's false dragon-head are dredging/scraping of ditches for maintenance and installation of water lines and other utilities; herbicides used in roadside management, potentially exotic invasive species; and apparently it is naturally rare (?). (LDWF 2014g)

In Louisiana, Correll's false dragon-head is found in the Pearl, Pontchartrain, Barataria, Mermentau, Calcasieu, and Sabine river basins. (LDWF 2014g)

Brackish Marsh

Brackish marsh is a rare natural community in Louisiana. This community is usually found between salt marsh and intermediate marsh, although it may occasionally lie adjacent to the Gulf of Mexico; experiences irregular tidal flooding and is dominated by salt-tolerant grasses. It

may have small pools or ponds scattered throughout. Plant diversity and soil organic matter content are higher in brackish marsh than in salt marsh, and wire grass (*Spartina patens*) is typically dominant. Two other major autotrophic groups in brackish marsh are epiphytic algae and benthic algae. Vertebrate species population levels are generally higher in brackish marsh compared to salt marsh. (LDWF 2014h)

Salinity averages about 8 parts per trillion (ppt), and this community may be changed to another marsh type by shifts in salinity levels. Brackish marsh acts as nursery areas for myriads of larval forms of shrimp, crabs, redfish, seatrout, menhadden, etc., and also as important waterfowl habitat. This habitat functions as a nitrogen and phosphorus sink, thereby improving the quality of water that passes through this ecosystem, and it can alleviate the effects of storms and flooding by acting as a buffer and providing storage for large amounts of water. (LDWF 2014h)

The pre-settlement extent of brackish marsh is estimated to have been between 500,000 and 1,000,000 acres with 50 to 75 percent remaining today. At present, the total acreage of brackish marsh appears to be increasing due to shifts in marsh salinity levels. However, stable viable examples of brackish marsh are becoming rare in Louisiana. These marshes may be found in the Pearl, Pontchartrain, Mississippi, Barataria, Terrebonne, Vermilion-Teche, Mermentau, Calcasieu, and Sabine river basins. (LDWF 2014h)

Cypress-Tupelo Swamp

Bald cypress and water tupelo are the predominant trees in swamps. Swamps are deep water areas that are flooded most of the time. They differ from marshes in that swamps have trees and marshes do not. The range of these swamps in the United States is along the Atlantic Coastal Plain from Delaware to Florida and up the Mississippi River valley northward to southern Illinois. They are classified as bottomland, hardwood forests and can be found along river channels, oxbow lakes, floodplains, and low-lying areas. (Campbell 2002)

Freshwater Marsh

Freshwater marsh is generally located adjacent to intermediate marsh along the northernmost extent of the coastal marshes, although it may occur beside coastal bays where freshwater input is entering the bay (e.g., Atchafalaya Bay). Small pools or ponds may be scattered throughout this community. Floristic composition of these sites is quite heterogeneous and is variable from site to site. Salinities are usually less than 2 ppt and normally average about 0.5-1.0 ppt. Frequency and duration of flooding, which are intimately related to microtopography, seem to be the primary factors governing species distributions. Substrate, current flow, salinity, competition, and allelopathy are also important in determining species distribution patterns. (LDWF 2014i)

Freshwater marsh has the greatest plant diversity of any of the marsh types. One report claims 92 plant species in freshwater marsh versus only 17 different species in salt marsh. This community has the highest soil organic matter content of any marsh type, and it is frequently dominated bymaidencane (*Panicum hemitomon*). Epiphytic and benthic algae are two other major autotroph groups in freshwater marsh. A significant portion of freshwater marsh is floating marsh (flotant), which occurs in the Deltaic Plain of southeast Louisiana. (LDWF 2014i)

Wildlife populations are generally highest in this marsh type and it supports high numbers of wintering waterfowl. Freshwater marsh acts as important nursery areas for the young of many marine species, such as croaker, seatrout, blackdrum, flounder, and juvenile brown and white shrimp. Saltwater intrusion may cause a change to a more saline marsh type or even open water, if the increase in salinity levels is rapid and persistent. (LDWF 2014i)

Freshwater marsh has undergone the largest reduction in acreage of any of the marsh types over the past 20 years. Pre-settlement acreage was estimated at 1 to 2 million acres, but has been reduced by 25 to 50 percent of this original extent. The largest contiguous tracts of fresh marsh occur in Terrebonne, St. Mary, Vermillion, Cameron, LaFourche and St. Charles parishes. These marshes may be found in the Pearl, Pontchartrain, Mississippi, Barataria, Terrebonne, Atchafalaya, Vermilion-Teche, Mermentau, Calcasieu, and Sabine river basins. (LDWF 2014i)

Intermediate Marsh

As a natural community, intermediate marsh lies between brackish marsh and freshwater marsh, although it infrequently may be adjacent to the Gulf. Intermediate marsh has an irregular tidal regime and is oligohaline (salinity of 3 to 10 ppt). Dominated by narrow-leaved, persistent species, particularly wire grass, this marsh may have small pools or ponds scattered throughout. Soil organic matter content in intermediate marsh is higher than in brackish marsh. (LDWF 2014jc)

Intermediate marsh is characterized by a higher diversity of species than salt or brackish marsh, although many of the same species are found in freshwater marsh, and some of the species are found in brackish marsh. This marsh type is important to many species of avian wildlife: it supports large numbers of wintering waterfowl and is critical nursery habitat to larval marine organisms. Gradual changes in salinity conditions can cause this habitat to shift towards brackish marsh. Two other major autotrophic groups in intermediate marsh are epiphytic and benthic algae, and intermediate marsh is the smallest in extent of the four marsh types. (LDWF 2014j)

Intermediate marsh pre-settlement acreage was estimated at 100,000 to 500,000 acres, but has been reduced by 50 to 75 percent of this original extent. The largest contiguous tracts of intermediate marsh occur in Cameron, Vermilion, Terrebonne, and Lafourche parishes. These marshes may be found in Pearl, Pontchartrain, Mississippi, Barataria, Terrebonne, Atchafalaya, Vermilion-Teche, Mermentau, Calcasieu, and Sabine river basins. (LDWF 2014j)

Live Oak Natural Levee Forest

Live oak natural levee forest occurs principally in southeastern Louisiana on natural levees or frontlands, and on “islands” within marshes and swamps. This community is similar in some respects to coastal live oak-hackberry forest in that both develop on natural ridges in the coastal zone, and overstory dominants are comparable; however, natural levee forests have a greater species richness and diversity. Composed primarily of sandy loams and clays, these ridges range from 4 to 6 feet above sea level. Soil pH is circumneutral (6.6–7.0), and organic matter content is high. Live oak natural levee forest is important wildlife habitat and serves as vital resting habitat for trans-Gulf migratory birds. (LDWF 2014k)

These forests occur in the Deltaic Plain of extreme southeastern Louisiana parishes from Orleans and St. Bernard parishes westward to St. Mary Parish. Of the original 500,000 to 1,000,000 acres in Louisiana, currently only 1 to 5 percent of pre-settlement extent remains. These forests may be found found in the Pontchartrain, Mississippi, Barataria, Terrebonne, Atchafalaya, and Vermilion-Teche river basins. (LDWF 2014k)

Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) is no longer protected as a rare species, but is protected as a migratory bird. It is a very large raptor. Adults exhibit a dark brown body, white head and tail, and a large yellow bill. Immature birds are dark brown with pale underwing coverts, irregular light base of tail and black bill. Sub-adults are intermediate between immatures and adults and exhibit various amounts of white mottling on body. The bald eagle requires 4 to 5 years to attain adult plumage. Wings are very long, broad and rounded at the tip with primary feathers often widely separated, and wings are held flat when soaring. Adults grow to 3.5 feet in length with wingspread of 7.5 feet. (LDWF 2014l)

Bald eagles nest primarily in the tops of cypress trees near open water, and feed in open lakes and rivers. Typically they feed on fish (either self-caught or robbed from other birds, especially ospreys), as well as carrion, waterfowl, coots, muskrats, and nutria. (LDWF 2014l)

Bald eagles breed throughout the United States, southern Canada, and Baja California, although it is rare away from the coast. They winter throughout the United States along river systems, large lakes, or coastal areas. In Louisiana, they nest primarily in southeastern coastal parishes and occasionally on large lakes in northern and central parishes; however, such nests are less successful. (LDWF 2014l)

Louisiana birds nest in winter and early spring. Nests are very large (up to about 8 feet across and 11 feet deep), and they are used year after year. Alternate nests may be constructed by a breeding pair, and the birds may alternate between the two nests annually. They usually produce up to three eggs per clutch. Incubation period is about 35 days; young fledge 72 to 78 days after hatching. Threats to the bald eagle are accumulation of pesticide residues (especially DDT) causing thinning of egg shells, which reduces reproductive success rate; loss of habitat; human disturbances to nesting pairs during nesting season. (LDWF 2014l)

In Louisiana, bald eagles are found in the Atchafalaya, Barataria, Mississippi, Ouachita, Pearl, Pontchartrain, Red, Sabine, Terrebonne, and Vermilion-Teche river basins. (LDWF 2014l)

Paddlefish

Paddlefish are one of the most distinctive freshwater fishes in North America. They possess several primitive features including a cartilaginous skeleton, and a heterocercal tail and spiracles. They have an elongate, spatulate snout, which is dorso-ventrally flattened and longer than the rest of the head, small imbedded scales, an elongate operculum, and relatively small eyes. Adult weight may reach 100 pounds, and up to 5 feet in length (without the paddle). Life expectancy is 15 years (although individuals are known to live 30 years or more). (LDWF 2014m)

Paddlefish are usually found in large, free-flowing rivers but they are also frequently found in impoundments. They feed exclusively on zooplankton. Males reach sexual maturity in 7 years, females in 9 to 10 years. They spawn in shallow, fast-moving waters above gravel bars in early spring during high water; preferred temperatures are around 50 to 60°F. Eggs hatch in about 9 days. (LDWF 2014m)

Paddlefish were formerly found throughout the Mississippi River and Great Lakes drainages, but now are restricted to the Mississippi River drainage and apparently declining in the periphery of its range. In Louisiana, this species is probably found throughout most of the major river systems and in larger impoundments. Threats to the paddlefish are habitat alteration through actions such as river modification and the construction and operation of dams; pollution as well as fertilizer and pesticide runoff; siltation of spawning habitats from soil erosion; and harvesting, which has in the past caused a decrease in population. (LDWF 2014m)

In Louisiana, paddlefish are found in the Atchafalaya, Calcasieu, Mermentau, Mississippi, Ouachita, Pearl, Pontchartrain, Red, and Vermilion-Teche river basins. (LDWF 2014m)

Pallid Sturgeon

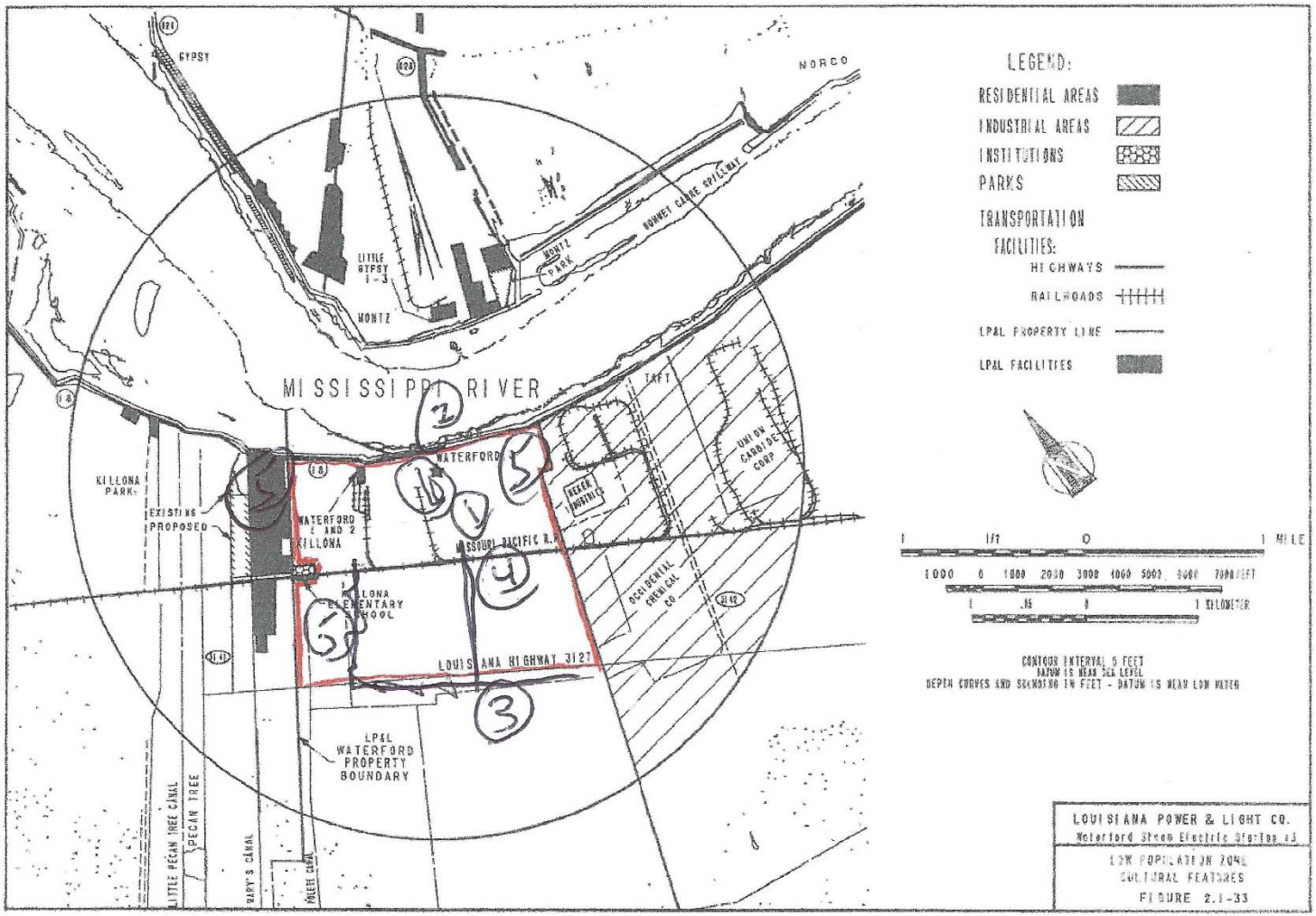
The pallid sturgeon is also federally listed and is described in Appendix A; therefore, the description is not repeated here.

Manatee

The West Indian manatee is also federally listed and is described in Appendix A; therefore, the description is not repeated here.

Appendix C

Survey Area and Field Data Sheets



Area marked in Red for pedestrian survey

Figure C-1
Map Showing Pedestrian Survey Area and Data Collection Locations (1–6)

T&E Species Habitat Evaluation and Survey Form

(1)

Project Name Waterford JTS Survey Project Number _____

Date 10-29-14 Site Location Sugar Cane Field

LAT/LONG _____

Describe Survey Area Habitat: (1) Sugar ~~Cane~~ cane field

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	N/A	
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.	NO	NO
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.	N/A	NO
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	↓	↓
Swamp Milkweed Asclepias incarnata	Freshwater swamps		
Golden canna Canna flaccida	Freshwater swamps and swamps		
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous		
Marshland flatsedge Cyperus distinctus	Low wet areas		
Correll's false dragon-head Physostegia correllii	Roadside ditches		
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers		
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water		

Comments:

Figure C-2
Field Data Sheet No. 1
(Evaluation of Habitat in Sugarcane Field)

T&E Species Habitat Evaluation and Survey Form

(2)

Project Name Waterford T&E Survey/Project Number _____

Date 10-28-14 Site Location _____

LAT/LONG _____

Describe Survey Area Habitat: Mississippi River
walked along river east of discharge

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	NO	NO
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.	N/A	
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.	NO	NO
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	NO	NO
Swamp Milkweed Asclepias incarnata	Freshwater swamps	NC	NC
Golden canna Canna flaccida	Freshwater swamps and swamps	NC	NC
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous	NO	NO
Marshland flatsedge Cyperus distinctus	Low wet areas	NO	NO
Correll's false dragon-head Physostegia correllii	Roadside ditches	NO	NO
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers	YES	NO
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water	YES	NO

Comments: Paddlefish NO
NO T&E fish — impingement dumpster
Sturgeon & paddlefish may swim by here but current is very strong in this outside bend. Active barge traffic in mid channel. No preferred habitat for fish or manatee (i.e. no slow water)

Figure C-3
Field Data Sheet No. 2
(Evaluation of Habitat on Mississippi River Bank)

T&E Species Habitat Evaluation and Survey Form

(3)

Project Name Waterford T+E Survey Project Number _____

Date 10-29-14 Site Location Hwy 3127 ditches

LAT/LONG _____

Describe Survey Area Habitat: ditches along hwy + on waterford site

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	N/A	NO
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.	↓	↓
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.	↓	↓
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	↓	↓
Swamp Milkweed Asclepias incarnata	Freshwater swamps	~o	~o
Golden canna Canna flaccida	Freshwater swamps and swamps	~o	~o
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous	YES	~o
Marshland flatsedge Cyperus distinctus	Low wet areas	~o	~o
Correll's false dragon-head Physostegia correllii	Roadside ditches	↓	↓
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers	↓	↓
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water	↓	↓

Comments:

Figure C-4
Field Data Sheet No. 3
(Evaluation of Habitat in Ditches along LA-3127 and on ELL Property)

T&E Species Habitat Evaluation and Survey Form

(4)

Project Name Waterford T&E Survey Project Number _____

Date 10-29-14 Site Location S side RR tracks Saf plant

LAT/LONG _____

Describe Survey Area Habitat: ROW open field

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	NA	NC
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.	NC	NC
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.	NA	NA
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	NA	NA
Swamp Milkweed Asclepias incarnata	Freshwater swamps		
Golden canna Canna flaccida	Freshwater swamps and swamps		
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous		
Marshland flatsedge Cyperus distinctus	Low wet areas		
Correll's false dragon-head Physostegia correllii	Roadside ditches		
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers		
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water	NC	NC

Comments:

Figure C-5
Field Data Sheet No. 4
(Evaluation of Habitat in Open Field Associated with Transmission Line Rights-of-Way)

T&E Species Habitat Evaluation and Survey Form

(5)

Project Name Waterford T+E Survey Project Number _____

Date 10-29-14 Site Location _____

LAT/LONG _____

Describe Survey Area Habitat: Cane fields various around S,T,L

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	No	No
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.		
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.		
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.		
Swamp Milkweed Asclepias incarnata	Freshwater swamps		
Golden canna Canna flaccida	Freshwater swamps and swamps		
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous		
Marshland flatsedge Cyperus distinctus	Low wet areas		
Correll's false dragon-head Physostegia correllii	Roadside ditches		
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers		
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water		

Comments:

Figure C-6
Field Data Sheet No. 5
(Evaluation of Habitat in Sugarcane Field)

T&E Species Habitat Evaluation and Survey Form

(6)

Project Name Waterford T & E Survey Project Number _____

Date 10-29-14 Site Location _____

LAT/LONG _____

Describe Survey Area Habitat: Plant area - manicured lawns & developed areas

Species	Required Habitat	Habitat Present	Species Present
West Indian Manatee, *Trichechus manatus*	West Indian manatees prefer shallow, slow-moving waters of rivers, estuaries, saltwater bays, canals and coastal areas. They can move easily between freshwater and saltwater environments, but prefer freshwater.	NO	NO
Sprague's Pipit, *Anthus spragueii*	Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in MN, Mt, ND, and SD as well as south-central Canada. Wintering occurs in the southern States of AZ, TX, OK, AR, MS, LA, and NM.	NO	
Gulf Sturgeon, *Acipenser oxyrinchus desotoi*	Gulf sturgeon require large areas of diverse habitat that have natural variations in water flow, velocity, temperature, and turbidity. In the spring (March to May), most adult and sub-adult Gulf sturgeon return to their natal river, where sexually mature sturgeon spawn, and the population spends until October or November in freshwater.	NO	
Pallid Sturgeon, *Scaphirhynchus albus*	Bottom dwellers in the Missouri and Mississippi rivers. Found in areas of strong current that have firm sand substrates in the main river channels. Pallid sturgeons evolved and adapted to living close to the bottom of large, silty rivers with natural a hydrograph. Their preferred habitat has a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	NO	
Swamp Milkweed Asclepias incarnata	Freshwater swamps		
Golden canna Canna flaccida	Freshwater swamps and swamps		
Western antler fern Ceratopteris pteridoides	Swamps, ditches, sluggish boyous		
Marshland flatsedge Cyperus distinctus	Low wet areas		
Correll's false dragon-head Physostegia correllii	Roadside ditches		
Square-stemmed monkey flower Mimulus ringens	Sand bars and banks of Mississippi and Atchafalaya Rivers		
Bald Eagle Haliaeetus leucocephalus	Nests in the tops of cypress trees and feeds in open water		

Comments:

Figure C-7
Field Data Sheet No. 6
(Evaluation of Habitat in Industrialized Plant Area)