

APPENDIX F
PROTECTED SPECIES OVERVIEW

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Protected Species

Bald Eagle

Protected by the BGEPA of 1940, this large raptor is found throughout North America in riparian areas associated with coasts, rivers, lakes and reservoirs. The bald eagle usually nests near the bodies of water in which it feeds. When selecting a nest site, usually high in a dominant pine, eagles look for a site within one-half mile of water; the largest tree in the area; and an open view of the surrounding area (NatureServe 2003). Nest trees include pines (*Pinus* spp.), spruce (*Picea* spp.), firs (*Abies* spp.), cottonwoods (*Populus* spp.), oaks (*Quercus* spp.), poplars (*Populus* spp.), and beech (*Fagus* spp.). The same nest may be used year after year, or breeding pairs may alternate between two nest sites in successive years (NatureServe 2003).

Breeding habitat for this eagle most commonly includes areas close to (within 2.5 miles) coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds. The eagle prefers to roost in conifers or other sheltered sites in winter in some areas, typically selecting the larger, more accessible trees. Perching in deciduous and coniferous trees is equally common in other areas. Communal roost sites used by two or more eagles are common, and some may be used by 100 or more eagles during periods of high use. Winter roost sites vary in their proximity to food resources (up to 20 miles) and may be determined to some extent by a preference for a warmer microclimate within these sites (NatureServe 2003).

Wintering areas are commonly associated with open water, though in some areas eagles use habitats with little or no open water if other food resources (e.g., rabbit or deer carrion) are readily available. This species typically avoids areas with nearby human activity (boat traffic, pedestrians) and associated development (buildings) (NatureServe 2003).

The main threats facing the bald eagle include the loss of suitable habitat to nest and roost; death from shooting, trauma, poisoning, diseases, electrocution, and other causes. It has also been reported that human-caused environmental contaminants may reduce reproduction success (USFWS 2007). The potential impacts to bald eagles in the Study Area are discussed in Section 4.

Manatee

The manatee (*Trichechus manatus*) was federally listed as an endangered species with the passage of the Endangered Species Act in 1973. Critical habitat was designated in 1976 for the Florida subspecies, *Trichechus manatus latirostris* (50 CFR Part 17.95(a)). This large aquatic mammal can weigh between 2,200 and 3,570 pounds and has been observed during studies to be distributed in fresh, brackish, and marine environments coastal waters of the southeastern U.S. (USFWS 2001). At present, there is no critical habitat designated within the Savannah River area.

Manatees are opportunistic herbivores that feed on a wide variety of submerged, floating, and emergent vegetation in vegetated freshwater bottoms, salt marshes, and sea grass meadows.

They also utilize additional habitats for warmth (springs and deepwater areas); for drinking water (springs and freshwater runoff sites); for resting and calving (quiet, secluded tributaries and feeder creeks); and as travel corridors (open waterways and channels) (USFWS 2001).

The main threat facing the manatee is mortality or injury from boat strikes. Studies have shown that approximately 24 percent of manatee deaths in Florida alone are caused by watercraft encounters primarily because manatees swim near the water surface (USFWS 2001). Additional threats come from cold related deaths, water control structures and navigational locks, and availability of warm-water refuges in winter (USFWS 2001). The potential impacts to manatees in the lower Savannah River are discussed in Section 4.

Wood Stork

The wood stork is listed as federally endangered (the U.S. breeding population only) in the Federal Register on February 28, 1984. This large long-legged wading bird can be found in freshwater and estuarine wetlands, in close proximity to their primary nesting sites which are mainly found in cypress domes or mangrove swamps. The storks prefer depressional feeding sites in marshes or swamps where fish become concentrated during periods of falling water levels. They can also be seen feeding in freshwater marshes, narrow tidal creeks, or flooded tidal pools. At present, there is no critical habitat designated for the wood stork under the Endangered Species Act (USFWS 2010).

Wood stork nesting/range presently appears to be restricted to South Carolina, Georgia, and Florida within the United States. Records show that they used to be found breeding in most of the southeastern United States and Texas (USFWS 2010).

The main threat to the wood stork is the decline in the primary food base/prey (e.g., small fish) which is necessary to support breeding colonies. The decline in the primary prey is due to the loss of essential wetland habitat as well as changes in water hydroperiods from draining wetlands and changing water regimes due to human activities which alter water flow (USFWS 2010). The potential impacts to wood stork in the lower Savannah River are discussed in Section 4

Shortnose Sturgeon

The shortnose sturgeon (*Acipenser brevirostrum*) was federally listed as an endangered species on March 11, 1967, under the Endangered Species Preservation Act of 1966. National Marine Fisheries Service (NMFS) which is now commonly referred to as the National Oceanic and Atmospheric Administration (NOAA), assumed jurisdiction for shortnose sturgeon in 1974. This anadromous fish, which is the smallest of the three sturgeon species that occur in eastern North America, is typically found in nearshore marine, estuarine, and riverine habitats of large river systems (NOAA 2011a).

The shortnose sturgeon commonly occur along the east coast of North America from the St. John River in Canada to the St. Johns River in Florida where they feed on benthic insects, crustaceans, and mollusks. This sturgeon migrates from the marine environment to freshwater where it utilizes the coastal rivers as spawning habitat during late winter to early summer (NOAA 2011a). Numerous observations of the sturgeon have been noted in the Savannah River, but all are below the Augusta Canal (Marcy et al. 2005).

The main threats to the shortnose sturgeon are pollution of many large river systems and the loss of suitable habitat due to the construction of dams. Additionally, river habitat alterations from discharges, dredging, and disposal of material into rivers from development activities and impacts to coastal wetland areas also threaten the survival of the sturgeon (NOAA 2011a). The potential impacts to shortnose sturgeon in the lower Savannah River are discussed in Section 4.

Atlantic Sturgeon

The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) which is similar in appearance to the shortnose sturgeon, is typically distinguished by its larger size, smaller mouth, different snout shape, and scutes. This species of sturgeon was listed as proposed endangered on October 6, 2010 by NOAA. Atlantic sturgeons spawn in moderately flowing water in deep parts of large rivers. Eggs are deposited on bottom substrate, usually on hard surfaces such as cobble. Once spawning is complete sturgeon migrate back downstream into coastal waters and estuaries (NOAA 2011b).

The Atlantic sturgeon is also found along the east coast of North America from the St. John River in Canada to the St. Johns River in Florida where they feed on benthic insects, crustaceans, and mollusks. This sturgeon migrates from a marine environment to freshwater where it utilizes the coastal rivers as spawning habitat, beginning in February-March. Historically, this sturgeon was present in approximately 38 rivers in the United States, of which 35 rivers have been confirmed to have had a historical spawning population. Currently the Atlantic sturgeon is found in approximately 32 of these rivers, and recent spawning has been documented in approximately 20 rivers (NOAA 2011b). Numerous observations of Atlantic sturgeon have been noted in the Savannah River, but all are below the Augusta Canal (Marcy et al. 2005).

Similar to the shortnose sturgeon, the Atlantic sturgeon is threatened by the loss of habitat due to the construction of dams, pollution, and riverine habitat alterations from discharges, dredging and disposal of material from development activities, and impacts to coastal wetland areas also threaten the survival of the sturgeon. In addition, historically, overfishing of this sturgeon species led to wide-spread declines from the 1950s through the mid-1990s; the origin of the fishery dates back to colonial times (NOAA 2011b). The potential impacts to Atlantic sturgeon in the lower Savannah River are discussed in Section 4.

Robust Redhorse

The robust redhorse (*Moxostoma robustum*) is one of the largest and heaviest of the suckers found in the Savannah River drainage. The redhorse can reach lengths of more than 28 inches with a weight of up to approximately 17.5 pounds. This redhorse species is mainly found in the main-stem rivers where it collects in riffles, runs, and pools where it has been known to feed on Asian clams, snails, native mussels, and crayfish. Some adult robust redhorse have also been found in habitats that include swift currents with associated tee snags. Spawning for this species occurs in rivers over coarse gravel bed sediments (Freeman 2001).

Presently the robust redhorse is found in a portion of the Oconee River in Georgia and small populations are found in the Savannah River below New Savannah Bluff Lock and Dam, and in the Pee Dee River in North and South Carolina. Historically this fish was found in most of the

southeastern Atlantic slope river drainages, from the Altamaha River in Georgia to the Pee Dee River (Freeman 2001).

The main threats to the redhorse come from habitat loss and disruption of spawning migrations resulting from impoundments and dams, its limited population ranges, and its low rate of recruitment. In addition; threats also come from predation from non-native flathead catfish and blue catfish and a reduction in water quality due to land disturbances and associated erosion and sediment impacts (Freeman 2001). The potential impacts to robust redhorse in the lower Savannah River are discussed in Section 4.

American Eel

The American eel (*Anguilla rostrata*), North America's only catadromous fish species, has an elongated, serpentine body that swims by undulating its body. This federally proposed threatened species can reach between 20 to 48 inches in length. Presently the range of the eel includes the Atlantic Coast of North America and southern Greenland. It can also be found through the West Indies and along the Caribbean Coast of Central and South America and the Atlantic Coast of South America (Marcy et al. 2005).

This species of eel can be found in a wide variety of habitats that include marine, estuaries to large rivers and small streams where they favor backwater areas. The American eel lay their eggs in the ocean waters of the Sargasso Sea. As the larvae/juveniles mature they migrate into brackish water (inland tidally influenced areas) where they continue to mature. Once they mature enough, the eels move upstream into totally freshwater habitats where they spend the remainder of their lives until they migrate back down to saltwater to spawn (Marcy et al. 2005).

The threats to the American eel come from the disruption of spawning migrations resulting from impoundments and dams, mortalities associated with hydropower turbines, climate change, parasites, overfishing, and a reduction in water quality and habitat due to land disturbances and associated erosion and sediment impacts (USFWS 2011). The potential impacts to American eel in the lower Savannah River are discussed in Section 4.

Yellow Lampmussel

The yellow lampmussel (*Lampsilis cariosa*) is a freshwater mussel species that is listed as a federal species of concern. It can be found in river basins from the Ogeechee River Basin in Georgia to Nova Scotia, Canada (Price 2005a and Savidge 2007).

This species was found in a 2006 field study that surveyed for mussels from the Augusta Shoals area, downstream to the tidewater area in Savannah, Georgia. Within the 2006 study area, numerous sites contained yellow lampmussel sites where they were found in mostly sandy substrate at a variety of water depths (Savidge 2007).

Studies show that the yellow lampmussel can be significantly affected by incremental differences in the volume of water within its preferred habitat. Additionally, the mussel, like most mussel species can be affected by sedimentation and pollution (Price 2005a). The potential impacts to yellow lampmussel in the lower Savannah River are discussed in Section 4.

Atlantic Pigtoe

The Atlantic pigtoe is a freshwater mussel species that is listed as a federal species of concern and state listed as endangered in Georgia (Price 2005b). The range of this species is from the Ogeechee River Basin in Georgia to the James River Basin in Virginia (Savidge 2007).

The Atlantic pigtoe occurs in medium size streams to large rivers, where it prefers a substrate composed of coarse sand and gravel at the downstream edge of riffles. It requires fast flowing, well oxygenated streams and fairly pristine habitats, but can be found in other substrates and habitat environments (Price 2005b and Savidge 2007). A 2006 field study found the Atlantic pigtoe in the Augusta Shoals area (Savidge 2007).

The main threats to the Atlantic pigtoe are development and agriculture practices. These activities increase pollution into the river systems as well as add to the low oxygen conditions that are now found in those habitats that used to be suitable for the mussel (Price 2005b). The potential impacts to Atlantic pigtoe in the lower Savannah River are discussed in Section 4.

Savannah Lilliput

The Savannah lilliput is a small freshwater mussel species that is listed as a federal species of concern and state special concern in South Carolina (Price 2005c). The range of this species is from the Altamaha River Basin in Georgia to the Neuse River Basin in North Carolina (Savidge 2007).

The Savannah lilliput can be found in areas of shallow water along the edges of streams, rivers, and reservoirs (Price 2005c). A 2006 field study found only one lilliput mussel at cut-off bend near Gray's Landing in the Savannah River. The habitat located in the survey area included shallow slack-water with a sandy mud substrate (Savidge 2007).

The main threats to the Savannah lilliput come from the fact that it inhabits shallow areas of the river and these areas are vulnerable to off-road vehicles, droughts, and water drawdowns. In addition, increased pollution into the river systems could make habitats unsuitable for the mussel (Price 2005c). The potential impacts to Savannah lilliput in the lower Savannah River are discussed in Section 4.

Shoals Spider-lily

The shoals spider-lily (*Hymenocallis coronaria*), a federal species of concern, is a herbaceous perennial monocot plant species that grows up to approximately three feet tall and reproduces by seeds or bulbs which split off from existing bulbs and become lodged among rocky, soil-covered crevices. Plants usually become established from seeds during low flows in summer months. Strap-shaped basal leaves begin to emerge from the water in mid-April and reach lengths of over 30 inches (Duke Energy 2006).

The range of the shoals spider-lily is limited and generally occurs near the Fall Line in central Alabama, Georgia, and South Carolina where it can occur in rocky shoals of major streams and rivers, or between exposed bedrock (Duke Energy 2006). The known population of this spider-

lily is on the Savannah River below Interstate 20 near the Savannah River Bluffs Heritage Preserve near Aiken, South Carolina (SCDNR 2006).

The main threats to the shoals spider-lily are excessive sedimentation, grazing by deer and other animals during low water, water depth and frequency of inundation, and invasive plant intrusion (Duke Energy 2006). The potential impacts to shoals spider-lily in the lower Savannah River are discussed in Section 4.

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