

## **NASA Stennis Space Center Environmental Resources Document**

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### **5.0 Aquatic and Biotic Resources**

#### **5.1 Project Notification Under the Fish and Wildlife Conservation Act**

In the Fish and Wildlife Conservation Act of 1980 (16 U.S.C. 2901 et seq.), Congress declared that "fish and wildlife are of ecological, aesthetic, cultural, recreational, economic, and scientific value to the Nation." The purpose of the Act is "to provide financial and technical assistance to the States for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife; and to encourage all Federal departments and agencies to utilize their statutory and administrative authority...to conserve and to promote conservation of nongame fish and wildlife and their habitats." The Act authorizes the chief executive officer of any appropriate Federal department or agency to loan personnel and equipment, share appropriate scientific knowledge or information, and provide other appropriate assistance to a State for the purpose of developing or revising conservation plans. In the State of Mississippi, wildlife conservation plans are administered by the Mississippi Department of Wildlife Conservation.

#### **5.2 Fish and Wildlife Coordination Act**

The Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) was enacted by Congress to ensure that wildlife conservation would receive equal consideration and be coordinated with water resource development projects. Under this Act, "whenever the waters of any stream or other body of water are impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purposes by any department or agency of the United States", provisions must be made for the "conservation, maintenance, and management of wildlife resources." Wildlife resources "include birds, fishes, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent." The Fish and Wildlife Coordination Act is administered by the Department of Interior through the U.S. Fish and Wildlife Service (USFWS).

EPA regulations on implementation of the National Environmental Policy Act (NEPA) procedures (40 C.F.R. § 6.302(g)) require any Federal agency involved in activities that will result in control or modification of any natural body of water to consult with USFWS and the appropriate State agency to determine the "measures necessary to mitigate, prevent and compensate for project-related losses of wildlife resources and to enhance the resources." The reports and recommendation of the wildlife

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agencies must be incorporated into the environmental assessment or the environmental impact statement.

### 5.3 Flora

Four major plant community types have been identified within the SSC area (7). These community types, generally identified by the predominant type of vegetation, are:

- Pine savanna
- Bottomland hardwood
- Pitcher plant bogs and swamps
- Grasslands and marshes

Pine forest communities account for the majority of the vegetation in the uncleared portions of SSC and in the surrounding Buffer Zone. The dominant species in these communities is slash pine interspersed with some cypress, loblolly pine, swamp tupelo, red maple, and sweetgum. Oak species occur in locations that are more elevated with better drainage. The underbrush in these communities includes holly species, bayberry, huckleberry, wax myrtle, grasses, and cane (13).

Bottomland hardwood communities occur in low, poorly drained soils, which may have standing or slowly moving water. The dominant species in these communities is blackgum, swamp tupelo, and various cypress species. The underbrush includes ash species, dogwood, leatherwood, Virginia willow, poison ivy, honeysuckle, and grapes. Very few grass or forb (herbs other than grass) species occur in these communities.

Pitcher plant bogs are unique to the coastal plain of the southeastern United States and occur in low-lying, poorly drained areas with acidic soil. The few mature trees, if any are present, are generally cypress species. These communities occur where the area is burned regularly, which prevents transition to forest or bottomland hardwood-type communities. The dominant herbaceous species in pitcher plant bogs include orchids, sundews, pitcher plants, pipeworts, and yellow-eyed grass.

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Grasslands often occur in disturbed areas where the land has been cleared for construction or burned. The most common grass species in the SSC area include broomsedges and panic grasses. Other plants occurring in grassland communities include cane and rushes. In low, wet areas, pipeworts, milkworts, and sedges may occur, while in drier grasslands, throughworts, rabbit tobacco, and goldenrod may be found (13).

Results of the 1995 ecological risk assessment survey indicated that the western Fee Area is dominated by forested cover types that most commonly include pine, cypress-gum swamps, mixed pine and hardwoods, and bottomland hardwoods. The remaining area consists of grass, shrubby edge, and open brush. Most of the forests within the study area are wetlands. Stands observed in the western Fee Area contained the following: loblolly pine, longleaf pine, slash pine, black willow, water oak, southern red oak, post oak, laurel oak, black gum, sweet gum, American sycamore, red maple, red bay, sweet bay, bald cypress, American holly, cucumber tree, big leaf magnolia, black cherry, hickories, and tulip tree (16).

Also observed during the 1995 survey were multiflora rose, crab grass, rough hawksbeard, lyre-leaved sage, wild geranium, star anise, titi, waxmyrtle, sedges, spagnum moss, yellow pitcher plants, yellow-topped butterweed, yankee-weed, spiny thistle, hawk's beard, and southern dewberry.

A qualitative survey of aquatic macrophytes was conducted in aquatic habitats during the 1995 survey (16). Aquatic macrophytes observed in the aquatic habitats of the study area include soft rush, rice-cut grass, pickerelweed, spike rush, burreed, knotweed, arrow arum, mud pliantain, pennywort, watermeal, duckweed, water lily, marsh seedbox, parrot feather, bladderwort, water hyssop, narrow leaf pondweed, low water milfoil, and two-leaf water milfoil.

A list of flora species found at the SSC facility during several ecological studies is included as Appendix B (13, 16).

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### 5.4 Aquatic Fauna

The topography at SSC is generally low and flat with low gradient streams. Aquatic habitats present at the facility include the Pearl River, man-made access canals, lakes, ponds, borrow pits, drainage ditches, shallow swamps, marshes, and small creeks. Aquatic fauna include fish, as well as some amphibians and reptiles.

Surveys of the fish and benthic communities were conducted during the 1995 ecological survey of an unnamed tributary to Harper Bayou, the Pearl River and associated floodplains, Mikes River floodplain, and a drainage ditch to Harper Bayou and associated wetlands. Benthic invertebrates collected during the survey included mayfly nymphs, dragonfly and damselfly nymphs, aquatic beetles, fishfly larvae, caddisfly larvae, riffle beetle larvae, water boatmen, water striders, midge larvae, amphipods, freshwater scuds, isopods, aquatic oligocheates, freshwater snails, freshwater shrimp, freshwater mites, aquatic annelids, fingernail clams, Asian clams, and crayfish.

Twenty fish species were encountered during the 1995 survey (16). Overall, the taxa collected during the 1995 survey represented typical warm water species similar in composition and structure to those observed in other similar habitats at SSC during the 1988 survey. An ecological survey of some of the streams at SSC, performed in 1992, documented a total of 39 fish species. The streams surveyed included the East Pearl River and Mikes River. In a 1988 survey of the Pearl River, man-made access canals, marshes, and small creeks of SSC (particularly Lion Branch and Wolf Branch), 44 fish species were encountered. The fish species identified in the 1995 survey are listed in Appendix C-1. The fish species identified in the 1988 survey are listed in Appendix C-2.

Several species of sport fish have been identified at SSC, which is inclusive of mullet, yellow bass, blue catfish, bluegill, and largemouth bass in the East Pearl; and spotted gar, threadfin shad, and longear sunfish in Mikes River. Most of the species identified, including all of the sport fish, were present in the SSC access canals. A few species including pirate perch, banded pygmy sunfish, flyer, lake chubsucker, grass pickerel, green sunfish, and black bullhead were found only in Wolf Branch or Lion Branch where the water flow is sluggish and cannot support fish species requiring moving water.

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### 5.5 Terrestrial Fauna

Because of the number of diverse terrestrial habitats at SSC, including grasslands, forests, and wetland areas, a number of terrestrial animal species are found. The ecological surveys conducted in 1991, 1994, and 1995 documented several species of amphibians, reptiles, mammals, and birds that occur in terrestrial habitats (8, 9, 10, 16).

A total of 22 amphibians were documented in the west Fee Area during the 1994 and 1995 surveys (9, 10, 16). Twenty-five species of amphibians, consisting of 20 species of frogs and toads and six salamanders, were found at SSC during surveys conducted in 1991 and 1994 (8, 9, 10). A list of amphibians documented at SSC during the 1994 and 1995 surveys is included in Appendix C-1. A list of amphibians documented during the other surveys is included as Appendix C-2.

Any species of amphibian capable of inhabiting poorly drained lowlands with a vegetation cover of pine and mixed hardwood is likely to be found at SSC. Frog and toad species likely to inhabit SSC, but not found during the 1991 and 1994 surveys, include *Pseudacris ornata*, *Rana capito*, *Rana heckscheri*, and *Scaphiopus holbrooki*. Salamander species likely to be found at SSC, but undocumented to date, include *Ambystoma maculatum*, *Ambystoma talpoideum*, *Ambystoma texanum*, *Desmognathus auriculatus*, *Desmognathus fuscus*, *Eurycea cirrigera*, *Hemidactylum scutatum*, *Pseudotriton ruber*, *Pseudotriton montanus*, and *Siren intermedia*.

A total of 33 terrestrial and aquatic reptiles were documented in the west Fee Area during the 1994 and 1995 surveys (9, 10, 16). The 1991 and 1994 ecological studies documented 18 species of terrestrial reptiles (8, 9, 10). These included 14 species of snakes, six of lizards, and the alligator. A list of aquatic and terrestrial reptiles documented at SSC during the 1994 and 1995 surveys is included in Appendix C-1. A list of aquatic reptiles documented at SSC during the 1988 and 1991 surveys is included as Appendix C-2. A list of terrestrial reptiles documented at SSC during the 1988 and 1991 surveys is included in Appendix D.

Reptile species not documented at the SSC facility, but likely to occur there because of habitat preference and range, include eastern worm snakes, scarlet snakes, Mississippi ring neck snakes, southern hognose snakes, mole snakes, scarlet kingsnakes, pine woods snake, Gulf Coast ribbon snakes, eastern garter snakes, rough earth snakes, smooth earth snakes, eastern coral snakes, eastern diamondback rattlesnakes, canebrake rattlesnakes, eastern glass lizards, slender glass lizards, and Mediterranean geckos. Aquatic snake species not documented at SSC, but with ranges and habitat

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preferences that make them likely to occur at SSC include mud snakes, rainbow snakes, and midland water snakes. Turtle species known to inhabit the Pearl River wetlands of Hancock County and, therefore, likely to be present at SSC include *Graptemys kohnii*, *Kinosternon carinatum*, *Kinosternon minor*, and *Apalone spinifera*.

A total of 25 mammals were documented in the west Fee Area during the 1994 and 1995 surveys (9, 10, 16). Thirty-four species of mammals plus one bat were documented at the SSC facility during the ecological surveys conducted in 1991 and 1994. (It should be noted, though, that these studies emphasized land mammals, and the 1994 study was conducted only during the summer months.) The list of mammals documented at SSC appears in Appendix D.

Mammal species that are likely to occur at SSC, but were not documented by these studies, include least shrews, Mississippi myotis bats, eastern pipistrel bats, big brown bats, hoary bats, eastern yellow bats, seminole bats, evening bats, eastern big-eared bats, Mexican freetail bats, southern flying squirrels, fulvous harvest mice, pine voles, Norway rats, black rats, gray fox, longtail weasels, and minks.

A total of 63 birds were documented in the west Fee Area during the 1994 and 1995 surveys (9, 10, 16). During an ecological survey conducted in March through May of 1988, incidental observations of birds at SSC were recorded (7). During the 1991 survey, walking surveys were conducted from January through June to document bird species present at SSC. A survey of the birds of SSC, which was conducted in 1994, combines information gathered in 1991 and 1994. These ecological surveys also documented birds that use the SSC facility for nesting. A total of 142 birds species were documented by the two surveys, with 87 of these species nesting at SSC (8). A list of birds documented at SSC appears in Appendix D.

### 5.6 Major Environmental Considerations for Proposed Actions

All construction and testing operations must be coordinated through NASA Environmental Management so that environmental impacts can be properly assessed. Any major project undertaken at SSC should include an evaluation of impacts to flora and fauna and biotic habitats. Projects should be designed to promote conservation of flora and fauna and biotic habitats consistent with the conservation plans established by the Mississippi Department of Wildlife Conservation.

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Threatened and endangered species are further discussed in Section 6.0 of this Environmental Resources Document.

### 5.7 References

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