APPENDIX B

JEKYLL ISLAND CONSERVATION PLAN HABITATS

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JEKYLL ISLAND CONSERVATION PLAN
HABITATS

INTRODUCTION

Barrier islands are by definition dynamic rather than static. This ever-changing island of relatively coarse, young soils with low nutrient pools and exposure to winds and salt spray supports a diversity of habitats.

The front or eastern side of the island follows a general successional trajectory of bare sand, followed by grasses and weeds on the primary dunes, followed by increasingly diverse plant communities on the older dunes and interdunal swales. The older dune system components begin to pick up small shrubs and young trees. Eventually, a forest dominated by live oaks and magnolias develops on the upland, while the remnant depressional wetlands develop into a cypress, gum, bay forest in the absence of disturbance.

The back or marsh side of the island starts out as a mud flat, then develops into a low Spartina marsh, and when enough silt has settled during tidal exchanges, it may eventually become high marsh, and then a shrub scrub habitat before succeeding into forest.

Major natural disturbances, such as intense wildfire or major wind events, may alter successional trajectories by grossly changing the habitat, even completely removing portions of the island or adding new areas to the island. These major disturbances tied with frequent natural fires resulted in some upland portions of the island being dominated by longleaf pine and some wet depressions being dominated by grasses. In the absence of these disturbances in recent history, these habitats have succeeded into a more wooded condition.

Man has greatly influenced the habitat composition as well by harvesting much of the overstory wood many decades ago. The old fields that were abandoned reseeded into loblolly pine, rather than longleaf pine. These newly developed forests have succeeded in most areas to a mixed pine/hardwood

stand, though there are a few more recently abandoned areas that have succeeded into a young loblolly pine forest.

A landcover map (Figure G1) was developed from March 2005 natural color aerial imagery. This map depicts Jekyll Island and it's immediate, non-water environs from a functional habitat perspective. While each habitat type is described and mapped as if it were a completely discrete area, there are inclusions of some habitat types within others and the gradations between habitat types are often indistinct as plant and animal communities make gradual rather than rapid shifts in species composition.

Table G1. Summary of landcover types on Jekyll Island with acreage and approximate island percentage.

HABITAT TYPE	ACRES	ISLAND PERCENTAGE
Beach Systems	247.8	4.3%
Dune Systems	188.1	3.2%
Maintained Grass	1035.3	17.9%
Maritime Hardwood	1124.4	19.4%
Mixed Pine-Hardwood	475.8	8.2%
Maritime Pine	466.8	8.1%
Shrub/Scrub	328.0	5.7%
Early Successional	0.0	0%
Marsh	1614.5	27.9%
Forested Wetland	27.3	0.5%
Grassy Wetland	10.5	0.2%
Open Water	113.1	2.0%
Paved/Impervious	155.7	2.7%
TOTAL	5787.3	100%

Since landcover is slightly different from habitat, some description of the landcover types is helpful. The beach systems include intertidal beach, upper beach, and incipient dunes on the ocean side; it also includes some sandy and some oyster-shell bars on the landward side. The dune system includes primary dunes, secondary and older dunes, and grassy dunal swales, but does NOT include dunal wetlands or shrub/scrub. Maintained grass includes those areas dominated by grass that seem to be mowed on a regular basis, which includes

yards, fields, viewscapes, rights-of-way, and similar habitats; this category also includes any buildings that are surrounded by this landcover type. Maintained

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grass may also have a significant tree component overhead. Maritime hardwood stands are typically dominated by live oak, but contain a mixture of hardwoods. The mixed pine-hardwood category contains those lands having a mixture of pines, mostly loblolly pine, and hardwood. Maritime pine stands are those dominated by an overstory of pine. Shrub/scrub landcover may be found in association with dune systems, marsh edges, grassy wetlands undergoing succession, or uplands that were disturbed 5 to 10 years earlier. Early successional landcover is recently disturbed upland habitat that has not yet succeeded into shrub/scrub. The marsh landcover category includes some mudflats, levee marsh, low marsh, high marsh, and saltpans. Forested wetlands include those areas dominated by cypress, gum, tupelo, and maple that are flooded on a regular basis. Grassy wetlands are those freshwater wetland areas that have not succeeded into shrub/scrub or forest. The open water category includes freshwater and saltwater within the great Jekyll Island boundaries that does not have emergent vegetation. Paved/impervious surfaces are basically roads, parking lots, and other developed areas with inclusions of buildings and some maintained grass areas.

MARINE HABITAT DESCRIPTIONS

Nearshore sandbars and troughs

A series of ridges known as offshore sandbars form when high waves wash sand from the beaches to offshore. These offshore ridges reduce wave energy & form pockets of calmer water used by many fish, marine invertebrates, and birds. These sandbars are separated by deeper water known as troughs. During periods of calmer wave action, the sand is moved from the offshore sandbars back to the beach, generally moving a little to the south as this occurs.

Many different fish species, as well as Atlantic bottlenose dolphins, shelter and feed in the troughs and on the edges of the sandbars.

Submerged beach

A portion of the gently sloping beach is submerged or under water all the time. This shallowly flooded habitat is the home for many arthropods, annelids, and other marine invertebrates.

BEACH & DUNE HABITAT DESCRIPTIONS

Intertidal beach

This is the portion of the beach that is flooded at high tide and is exposed at low tide. This beach may be very wide (up to a mile) in areas where there is a gradual slope or as narrow as a few yards in areas that are being eroded and have a steep slope. The average wave height on many beaches in this area is 9 to 12 inches, which makes the wave energy along this portion of the coast among the lowest along the United States Atlantic Ocean coastline.

Figure G1. Image of Jekyll Island's intertidal beach with foraging shorebirds.

While most marine organisms cannot survive the daily drying and most terrestrial organisms cannot survive the daily flooding, there are a number of organisms that live in this dynamic zone. Many invertebrates, including some mollusks, annelids, and crustaceans, live in the sand of this zone. Some specialize on the edges and move back and forth with the tides. During high

tides, marine fishes, crabs, and other organisms come here to feed. During low tides, shorebirds, raccoons, ghost crabs and other mostly terrestrial animals come here to feed.

Upper beach

The upper beach is above the intertidal beach and below the primary dunes. This area is inundated during extreme tides and storm events, and the when dry, the sand is constantly moving in the wind, most often into the primary dunes. Because of this, successful establishment of plants does not occur. Wrack or debris washed up along the high tide line serves as a source of both food and shelter for many of the organisms living in this harsh environment. When the wrack is deposited near the highest portions of the upper beach, it may serve as the anchor point for a new primary dune.

Figure G2. Jekyll Island's upper beach and primary dunes.

Primary dune

As new or incipient dunes form where wind piles up sand on debris, the environment begins to moderate to the point where pioneer or invasive plants such as sea rocket, orach, beach croton, Russian thistle, or fiddle-leaf morning

glory can become established. Their leaf & root structure helps slow the wind & stabilize the sand so that a little more sand can accrete. As the dunes develop a little further, other plants such as salt meadow cordgrass, bitter panic grass, dropseed grass, sandspur, pennywort, beach elder, and prickly-pear cactus become established. Other than material from the plants that die or shed parts, there is little organic matter and little soil structure in the sand.

Eventually the real dune builder, sea oats, becomes established. The tall sea oats trap more sand. As sand builds up around the sea oats, it buries the shorter plants & increases the organic matter in the dunes. The sea oats simply form new roots & blades to keep up with the accreting sand. Because the State of Georgia recognizes the vital role sea oats play in building and stabilizing protective dune systems, disturbance or picking of sea oats is prohibited.

Interdune meadow

Behind each wave of dunes are shallow, flat meadows vegetated by a much more diverse flora than the dunes. These meadows are usually dominated by a diversity of grasses, but also include many forbs and woody plants. The actual plant composition of these meadows is highly variable depending on how old the meadow is and what type of soils are in the meadow. Some of the plants that are commonly found in these areas include camphorweed, wild bean, butterfly pea, pennywort, dune primrose, yucca, squareflower, grass-leaf golden aster, spurge-nettle, and firewheels. This area is an important foraging area for many herbivorous and insectivorous animals, as well as a nesting area for some early successional birds.

Secondary and older dunes

As the dunes and meadows become older and soils become better, woody plants begin to become established. These woody plants begin out-compete the shade intolerant dune and meadow species. As the meadow species drop out, the shade tolerant understory begins to form with species like green brier, Hercules' club, muscadine, Virginia creeper, pepper vine, buckthorn, red bay, yaupon, groundsel-tree, saw palmetto, wax myrtle, red cedar, and live oak. As these dunes and vegetation grows older, a multi-dimensional canopy

begins to form with the shrubby species and immature shade-tolerant overstory s species forming understory and midstory.

MARSH HABITAT DESCRIPTIONS

The elevational differences between the different marsh types are measured in inches, but the differences caused by this elevation are great. Some species travel through all the types of marsh habitat as either the dry ground or the shallow water that they favor moves through the habitat. A diverse and dynamic invertebrate community of crab, shrimp, bivalve, snail, and insect species occurs here that attracts many birds, fish and mammals to feed in these areas. The shallow water with high organic matter combined with the structure offered by the marsh grasses makes these habitats a preferred area for the young of many marine species to lay their eggs or for their young to grow. These include many species of commercial interest such as: shrimp, crabs, flounder, speckled sea trout, and menhaden.

Odum and Smith (1981) ranked the importance of coastal marshes during different portions of their life history for 4 major groups of wildlife that are of interest commercially and recreationally. Their rankings, shown in the table below, quickly indicate how important our marshes are to commercial fishermen, recreational fishermen, wildlife watchers, and the overall ecology of this area.

Table G2. Utilization of marsh habitats by organisms (after Odum and Smith, 1981)

WILDLIFE GROUP	LIFE HISTORY STAGE		
	REPRODUCTION	NURSERY OR BROOD AREA	FEEDING
SHELLFISH	Low	High	High
FINFISH	High	High	High
WATERFOWL & SHOREBIRDS	Low-moderate	Low-moderate	High
MAMMALS	High	High	High

Mud flats

Mud flats are shallowly flooded flat expanses of silt deposited near shorelines and delta areas. These areas are typically flooded for the majority of

the day with exposure limited to minutes or hours. While these areas do not support vascular plant growth, their algae and invertebrate communities are an important food resource for many invertebrates and birds during the brief time they are exposed. Peterson (1981) outlined importance of the dynamic microalgal community in this habitat for supporting a diverse invertebrate community that in turn serves as a resource for shorebirds and aquatic predators. While the lack of vegetation and easily observed organisms in this habitat make it seem barren for a few short hours on each tide cycle, it is very important for many species.

Figure G3. Willet and periwinkles foraging on one of Jekyll Island's mud flats.

Levee salt marsh

The tidal creeks are bound by a region that is flushed and has new nutrient inputs twice a day. This allows the vegetation that grows on these sites to reach its potential. The smooth cordgrass on these levees will typically reach 6 feet in height. At the extreme edges of some of these habitats oyster shell bars form that sustain sea ox-eye daisy and several other plants. Oysters, mud fiddler crabs, purple marsh crabs, periwinkles, mud snails, and coffee bean snails are

often found in the levee salt marshes and in the low salt marshes. Marsh wrens, red-winged blackbirds, and rails are also found in these habitats.

Low salt marsh

Behind the levees is the low salt marsh that is flooded for almost half a day. Because this area is flooded with shallow water with large quantities of suspended organic matter for many hours a day and the subsurface black mud absorbs heat, these areas often have very low oxygen availability.

Figure G4. Marshes and tidal waters of Glynn County.

High salt marsh

High salt marsh is only a few inches higher in elevation than low salt marsh, but that extra height greatly reduces the amount of time this habitat is inundated by tidal water. During normal tides, this area is inundated for less than 2 hours per day. Because water has moved into the soil & is being evaporated, this area tends to have a high salt concentration. When cordgrass survives in these areas, it is typically less than a foot in height. Salt-tolerant species like glasswort, saltwort, and salt grass are typically found in these areas. In shallow depressions, the salt content may be even higher, to the point where it inhibits all plant growth and forms an open, bare area known as a saltpan. This higher, somewhat sandier habitat favors sand fiddler crabs and wharf crabs.

Figure G5. Male black-bellied plover foraging on the edge of a saltpan in Jekyll's high marsh.

UPLAND HABITAT DESCRIPTIONS

Shrub/scrub

These habitats typified by a dominance of low-growing brushy plants occur in areas that are transitioning from early successional grass and forb habitats to woody habitats. They typically occur on older sand dunes and on marsh edges. In the dunes, these habitats are often dominated by sand or twin live oak, wax myrtle, and groundsel tree. On marsh edges, a mixture of marsh elder, groundsel tree, wax myrtle, yaupon, and saltcedar are often found.

Maritime oak forests

The maritime oak forest dominated by live oak is the climax community on Jekyll Island. Without some disturbance such as clearing for agriculture, wildfire, or hurricanes, live oaks and their associates should over a long period of time dominate the upland portions of Jekyll Island. While this is the climax

community, the other successional and disturbance communities are critical for many of the plant and animal species that live on Jekyll Island.

Figure G6. Maritime live oak forest.

Spreading live oaks in the canopy share this community type with southern magnolia, cabbage palms, and scattered pignut hickory, loblolly pine, and slash pine. Water oak, laurel oak, yellow poplar, sweetgum, red maple, tupelo, and sycamore are also found in the overstory. The understory contains red bay, yaupon, American holly, sparkleberry, wax myrtle, and saw palmetto. Muscadine, greenbrier, Virginia creeper, trumpet creeper, cross vine, and other vines stretch from the forest floor to the canopy. Spanish moss and resurrection fern are often found growing on tree trunks and large limbs in the climax forest; in some areas, they join ball moss and perhaps green fly orchid.

Maritime pine forests

The maritime pine forests found on Jekyll Island by the early Europeans were likely dominated by longleaf pine with some slash and loblolly pine. As these pines were harvested for naval stores and island structures, young hardwoods in the understory usually replaced them. Some areas were completely cleared for agricultural use or as a safety zone around structures. These areas often reseeded with loblolly pine, which is the dominant pine on the island today. There are some small patches of loblolly pine that are

approximately 25 to 40 years old and other patches of older pine that date back to field abandonment of the Jekyll Island Club era. These pine stands usually have a midstory composed of the same hardwood species found in the maritime hardwood forests with a very similar understory.

Infrequent wildfire or intentional fires set by native Americans or early settlers for a variety of reasons would have helped maintain pine stands with an open, diverse understory. The predominance of large pines in the middle portion of Jekyll Island is a remnant of the abandonment of the exhausted agricultural fields at the end of the plantation era on Jekyll Island.

Mixed pine/hardwood forests

There are some mixed pine/hardwood forests on Jekyll Island that are transitional forests between maritime pine forests and maritime oak forests. In the absence of a major disturbance, the relict pines in these areas will succumb to wind, insects, lightning, or some other cause and be replaced by the hardwoods already growing up under them.

Upland early successional habitats

While there are some beachside early successional habitats, there are no significant upland early successional habitats found on Jekyll Island. The areas that were present historically have succeeded into shrub-scrub, pines, or hardwoods of various ages. The small patches of younger even-aged pines, as well as historical photography, bear witness to the fact that these habitats have been present on Jekyll Island in fairly recent history.

FRESHWATER WETLAND HABITAT DESCRIPTIONS

Freshwater wetlands on Jekyll Island are important for many plant and animal species. There are a variety of freshwater wetlands on Jekyll Island of which some are dominated by hardwoods and some by grasses and shrubs. Others are ephemeral, lasting only days after a hard rain and others hold water throughout the year. This variety of wetlands is important for the amphibians and freshwater fish that occur on Jekyll and for the other plants and animals that depend on these areas for food and fresh water. The wetlands are especially important during periods of drought when the remnant water and the newly

sprouting vegetation around the drying water holes help meet many species needs.

Hardwood sloughs

The hardwood sloughs on Jekyll are narrow bands between relict dunes that are dominated by cypress and gum.

Grassy depressional wetlands

Some depressional wetlands dominated by grasses and mixtures of forbs occur between the relatively new dunes near the south end of Jekyll Island. These wetlands are important breeding areas for many birds and amphibians, as well as being important foraging areas for many wildlife species. There are also some large grassy wetlands with some shrubs currently invading them scattered around the southern half of the island. Many of these wetlands are in the process of becoming wooded wetlands in the absence of fire on a landscape level. At least one of these wetlands may be fed by artesian sources.

These wetlands are typically shallower than the hardwood sloughs and have a relatively low population of fish because they dry out frequently. This drying out is critical for many of the species that live and breed in these ponds because their populations would be greatly reduced if predatory fish lived in these wetlands. Some of the wetlands that have been "improved" by digging holes that hold water year around do not have as many amphibians around them as the shallower wetlands that dry out each year.

Open ponds

There are some areas of open water in the hardwood sloughs and grassy depressional wetlands, however the majority of the open water wetlands (ponds and small lakes) on the island are manmade. They appear to either have been dug out to borrow material or dug for the purpose of building a pond. Rixon Lake, Major Horton Pond, the Amphitheater Pond, and the ponds associated with the golf courses are the main bodies of open fresh water on Jekyll Island.

DEVELOPED HABITAT DESCRIPTIONS

The enabling legislation for Jekyll Island State Park limits development to no more than 35% of the island's area. The areas that have been developed on

Jekyll Island can be broken into 3 main categories: residential development, commercial development, and recreational development.

The residential developments are grouped primarily in the center of the island with some development on the southern end. These are typically small lots with some remaining overstory trees with groundcover dominated by exotic grasses, flowers, and shrubs. These areas are a likely source of exotic plants that may invade the more natural portions of Jekyll in the future.

The commercial developments are currently of one of two types: 1) intensive development with lots of asphalt and islands of aesthetically-pleasing exotic plants, such as around the conference center and the open, grassy area surrounding the air strip or 2) a less intensive development that maintains some native plants (particularly overstory hardwoods) that are supplemented with exotic plantings, such as around the Jekyll Island Club.

The recreational developments are dominated acreage wise by the golf courses, but also include the soccer fields, picnic areas, and beach access parking areas.

HABITATS OF SPECIAL NOTE

All of the habitats on Jekyll Island are special for one reason or another. Some of these reasons are provision of habitat for rare species, others are important for supporting a diversity of species, others are important for producing species of economic value, others are important because of their aesthetics, and others are economically important themselves. The entire dune system is important because it is the most important layer of protection from major storm events. The primary dune building species, sea oats, is protected by the state. The marsh system surrounding the island is important in protecting the mainland and supplying aesthetic and economic benefits to the entire state. The maritime oak forests along the southeastern coast are almost gone because they are generally on higher ground and are aesthetically pleasing, comparatively easy places to put commercial and residential development. The open grassy wetlands, shrub-scrub habitats, and open maritime pinelands are disappearing from the coastal areas because of the interruption of natural disturbance

processes, primarily fire. Early successional habitats are basically non –existent on Jekyll Island. Developed habitats are important because they provide for the human use that creates educational opportunities and an economic value to support the natural values on Jekyll Island.

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