HIGHLANDS HAMMOCK STATE PARK

UNIT MANAGEMENT PLAN

APPROVED

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Recreation and Parks

FEBRUARY 16, 2007

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INTRODUCTION

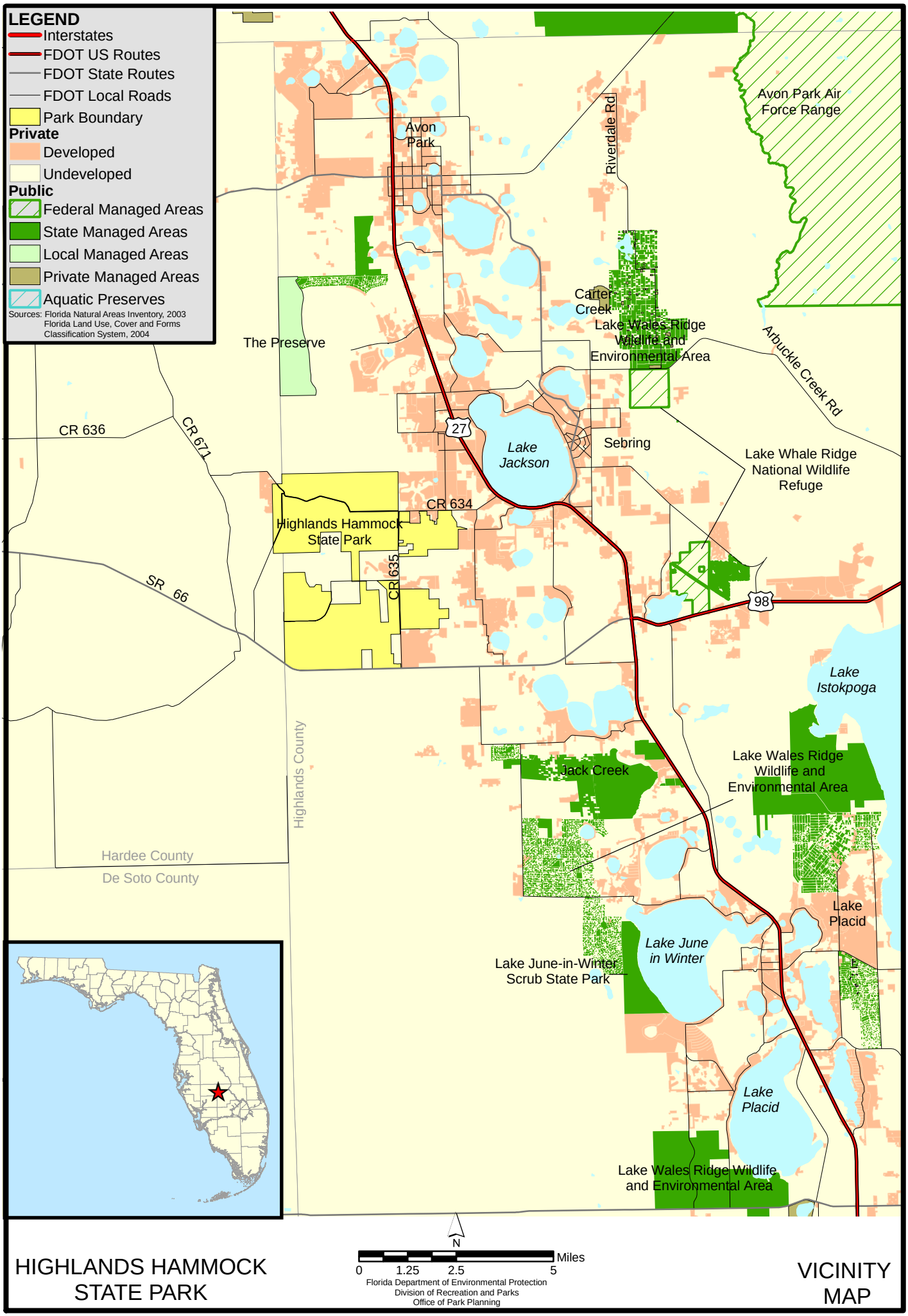
Highlands Hammock State Park is located in Hardee and Highlands Counties (see Vicinity Map). Access to the park is from U.S. Highway 27 and County Road 634 (see Reference Map), four miles west of Sebring. The park is situated at the western edge of the Lake Wales Ridge, a relict seashore dating back to when much of peninsular Florida was under water.

In 1935, Highlands Hammock State Park became one of several state parks, newly created in Florida. Its boundaries grew in the 1930s to encompass 3,800 acres. The size of the park remained fixed until 1990. Since then, additional acquisitions have expanded the area under management to 9,251.24 acres. These additional lands, south and east of the original park, are divided by County Road 635. In the narrative that follows, the original 3,800 acres will be referred to as "the original park." The newly added land to the south that is on the west side of County Road 635 will be called the south property. This is to distinguish it from the tract of southern land on the east side of County Road 635, which will be called the Seven-Lakes property. Directly north of the Seven-Lakes property is the recent acquisition, called the east property.

The early impetus to create a park came from citizens in Sebring and Avon Park during the 1920s. Funds were raised to acquire and preserve the dense, tall growth of palm and hardwood trees known as Highlands Hammock, a shady forest of natural beauty, popular among local residents. The park was dedicated in 1931. Funds were lacking for development, especially as the country was in the throes of the Great Depression; but the economic collapse spawned the Civilian Conservation Corps (CCC), and the citizens used their influence to bring the CCC to Highlands Hammock and complete the park development.

Highlands Hammock State Park is significant in the twentieth century history of Florida as one of nine elements of the New Deal-inspired Florida state park system and as one of the physical expressions of early-twentieth century recreation planning. In 1933, the CCC was the first New Deal agency to begin operations in Florida. From 1933 to 1942, the CCC and the Works Progress Administration (WPA) constructed an impressive collection of facilities throughout Florida. A considerable portion of the public recreation facilities created by these programs is preserved in the New Deal era state parks: Florida Caverns State Park, Torreya State Park, Fort Clinch State Park, O'Leno State Park, Gold Head Branch State Park, Ravine Gardens State Park, Hillsborough River State Park, Highlands Hammock State Park and Myakka River State Park.

The feature attraction in this park is the hardwood forest. The park development was designed to protect and display this feature. A loop drive allows vehicles to circle through the hammock. Parking is provided along the way to provide access to trails. One trail leads to a boardwalk elevated through a swamp. Rustic facilities built by the



HIGHLANDS HAMMOCK STATE PARK

VICINITY MAP

ORIGINAL PARK

EQUESTRIAN TRAILHEAD & CAMPING AREA

SHOP AREA

CAMP-GROUND

RANGER STATION

CCC MUSEUM & PICNIC AREA

WILDERNESS AREA CAMPING

PRIMITIVE GROUP CAMP

LITTLE CHARLEE BOWLEGS CREEK

HAMMOCK RD

TIGER BRANCH

EAST PROPERTY

SOUTH PROPERTY

SEVEN LAKES PROPERTY

Lake Jackson

SEBRING

Blue Lake

Double Lake

VAUGHN RD

S. HAMMOCK RD

HAW BRANCH

634

635

27

66

HARDEE COUNTY

HIGHLANDS COUNTY

LEGEND

- STATE & COUNTY ROADS
- PAVED PARK ROAD
- FDOT US ROUTES
- CITY LIMITS
- COUNTY BOUNDARY
- PARK BOUNDARY
- EXISTING TRAILS

HIGHLANDS HAMMOCK STATE PARK

N

4000 0 4000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

REFERENCE MAP

CCC lends a historical flavor to this scene. During the past 30 years, the progress of ecological science has brought recognition of the value of other natural features on the periphery of the hammock, which were once regarded as no more than a protective buffer of commonplace vegetation.

The park is an important component of a number of federal, state, local and privately managed conservation lands in the Lake Wales Ridge region that provide important resource protection and recreation functions (see Vicinity Map). State lands include Lake June-in-Winter Scrub State Park, Lake Wales Ridge State Forest and the Lake Wales Ridge Wildlife and Environmental Area. Avon Park Air Force Range and the Lake Wales Ridge National Wildlife Refuge are federally owned and managed. Highlands County manages The Preserve and The Nature Conservancy manages Saddle Blanket Lakes Preserve. Public access to the Lake Wales Ridge National Wildlife Refuge is limited to guided tours only. Remaining conservation lands provide for hiking, biking, horseback riding, picnicking, fishing, primitive camping and wildlife viewing. Hunting is allowed at Avon Park, Lake Wales Ridge State Forest, and the Lake Wales Ridge Wildlife and Environmental Area.

At Highlands Hammock State Park, public outdoor recreation and conservation is the designated single use of the property (see Addendum 1). There are no legislative or executive directives that constrain the use of this property.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Highlands Hammock State Park as a unit of Florida's state park system. It identifies the objectives, criteria and standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the October 25, 2001, approved plan. All development and resource alteration encompassed in this plan is subject to the granting of appropriate permits; easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes, and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code.

The plan consists of two interrelated components. Each component corresponds to a particular aspect of the administration of the park. The resource management component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management problems and needs are identified, and specific management objectives are established for each resource type. This component

provides guidance on the application of such measures as prescribed burning, exotic species removal and restoration of natural conditions.

The land use component is the recreational resource allocation plan for the unit. Based on considerations such as access, population and adjacent land uses, an optimum allocation of the physical space of the park is made, locating use areas and proposing types of facilities and volume of use to be provided.

In the development of this plan, the potential of the park to accommodate secondary management purposes ("multiple uses") was analyzed. These secondary purposes were considered within the context of the Division's statutory responsibilities and an analysis of the resource needs and values of the park. This analysis considered the park natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For Highlands Hammock State Park, it was determined that a limited timber harvest could compliment, and not interfere, with the primary purpose of resource-based outdoor recreation and resource restoration. This compatible secondary management purpose is addressed in the Resource Management Component of the plan. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than the forest management activities mentioned above) are not consistent with this plan or the management purposes of the park.

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It has been determined that limited timber management activities are appropriate for natural community restoration and are compatible with the primary purposes of resource conservation and resource-based outdoor recreation. They also generate revenue to further enhance management.

The use of private land managers to facilitate restoration and management of this unit was also analyzed. Decisions regarding this type of management (such as outsourcing, contracting with the private sector, use of volunteers, etc.) will be made on a case-by-case basis as necessity dictates.

MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, the Division of Recreation and Parks (Division) is charged with the responsibility of developing and operating Florida's recreation and parks system. These are administered in accordance with the following policy:

> It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to

> acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.

The Trustees have also granted management authority of certain sovereign submerged lands to the Division under Management Agreement MA 68-086 (as amended January 19, 1988). The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation. The agreement is intended to provide additional protection to resources of the park and nearshore areas and to provide authority to manage activities that could adversely impact public recreational uses.

Many operating procedures are standard system wide and are set by policy. These procedures are outlined in the Division's Operations Manual (OM) that covers such areas as personnel management, uniforms and personal appearance, training, signs, communications, fiscal procedures, interpretation, concessions, camping regulations, resource management, law enforcement, protection, safety and maintenance.

In the management of Highlands Hammock State Park, a balance is sought between the goals of maintaining and enhancing natural conditions, stewardship of cultural resources and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation on the park's natural, aesthetic and educational attributes.

Park Goals and Objectives

The following park goals and objectives express the Division's long-term intent in managing the state park. At the beginning of the process to update this management plan, the Division reviewed the goals and objectives of the previous plan to determine if they remain meaningful and practical and should be included in the updated plan. This process ensures that the goals and objectives for the park remain relevant over time.

Estimates are given for the funding and staff resources needed to implement the management plan based on these goals, objectives and priority management activities.

Funding priorities for all state park management and development activities are reviewed each year as part of the Division's legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also pursues a wide range of other funds and staffing resources, such as grants, volunteers and partnerships with agencies, local governments and the private sector, for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Natural and Cultural Resources

1. Establish and maintain invasive exotic plant species removal program.
   - **A.** First priority species for removal are cogon grass, climbing fern, air potato and Dianella lily. Seek funding for removal by contract.
   - **B.** Second priority species for removal are soda apple and coral ardesia.
   - **C.** Also, remove Guinea grass and ginger lily.
   - **D.** Within three years, eliminate *Phoenix reclinata* palms from the hydric hammock.

2. Design and implement restoration of highly altered communities or areas.
   - **A.** Investigate lease of improved, Bahia grass pastures for grazing in return for pasture restoration funded by the lessee.

3. Establish and maintain exotic destructive animal species removal program.
   - **A.** Hold feral pig numbers to the lowest possible level.
   - **B.** Hold nine-banded armadillo numbers to the lowest possible level.

4. Protect, restore and maintain natural communities.
   - **A.** In mesic flatwoods, reduce the density of South Florida slash pine trees to allow mechanical treatment of saw palmettos.
   - **B.** On seepage slopes reduce the density of South Florida slash pine trees where shading by the canopy has impacted the extent of ground cover of grasses.

5. Establish and maintain prescribed fire program.
   - **A.** Flatwoods and seepage slope communities should be burned at least once every three years. Seepage slopes may need to be burned more frequently.
   - **B.** Reintroduce fire into basin marshes to prevent them from becoming swamps. Mechanical treatment may also be needed.
   - **C.** Reintroduce prescribed burning in each of the park's scrub and scrubby flatwoods communities as soon as possible after necessary mechanical treatment or logging.

6. Protect, restore and maintain native plant diversity, and natural relative abundance.
   - **A.** Monitor the status of hooded pitcher plants.
   - **B.** Develop a plan, using Recovery Plans and recent research, that includes a monitoring strategy for State and/or Federally listed scrub- and scrubby flatwoods-dependent plant species, and that can be used to guide habitat

management.

C. Continue to inventory and submit records for new locations of rare species.

7. Protect, restore and maintain native animal diversity, and natural relative abundance.

A. Prepare a new Florida Scrub-jay habitat management plan that reflects recent habitat management activities and outlines a strategy for further habitat restoration that will increase Florida Scrub-jay numbers.

B. Map gopher tortoise burrows after prescribed burns in zones where they have not yet been mapped.

8. Protect, restore and maintain natural hydrological regimes.

A. Continue work to prepare a plan for hydrological restoration.

B. Restore ditches caused by erosion of roads and firelanes on seepage slopes.

C. Evaluate an objective-based vegetation management (OBVM) approach to managing natural communities that provide habitat for Florida Scrub-jays.

9. Protect, restore and maintain water quality conditions.

A. Initiate water quality testing for sources flowing into the park from agricultural land, especially from large citrus groves adjacent to the park.

B. Ascertain the need for soil sampling near an historical cattle dip vat within the park.

10. Protect park boundaries to improve resource management and avoid encroachment.

A. Provide fencing along the southern portion of the eastern boundary of the south property.

B. Replace fencing along the northern, eastern and southern boundaries of the Seven-Lakes property.

C. Move or replace fencing on the east property to align it with the correct property boundary.

D. Provide fencing along the eastern boundary north of County Road 634 to deter access to the portion of the park along the power line easement.

11. Preserve the New Deal Era cultural resources by restoring and maintaining the historic structures to their original condition and appearance, to the extent possible. This will be accomplished through collaboration between park and District management, Bureau of Design and Recreation Services, Bureau of Natural and Cultural Resources and DHR Bureau of Historic Preservation.

A. Create and implement cyclical maintenance programs for all New Deal Era resources.

B. Develop a cultural landscape plan to ensure that future planning and design of projects considers treatment of the original, CCC developed areas of the park as elements in a cultural landscape.

C. Acquire funding for restoration and rehabilitation design studies of all New Deal Era resources in the park.

D. Conduct architectural and/or engineering evaluations of the historic structures.

E. Produce design drawings and budget estimates to accomplish restoration or adaptive rehabilitation projects, including necessary modifications to provide universal accessibility.

F. Acquire funding for restoration and rehabilitation and undertake the necessary work.

12. Recognize and publicize the unique nature of the New Deal Era parks.

A. Document CCC resources in Highlands Hammock as a component of a nomination for Florida's New Deal Era parks to the National Register of Historic Places as a multiple or thematic resource.

B. Promote public visitation to New Deal Era parks as visits to a family-oriented past.

C. Develop park specific interpretive programs that explain the origin of the New Deal Era parks, relating these earliest public conservation and stewardship efforts in Florida to current environmental concerns and land use or land management issues.

D. Cooperate with the Florida Trust for Historic Preservation, DHR, federal agencies, local educators and local trades in the development of technical curricula for historic preservation training.

13. Protect existing archaeological sites and conduct archaeological surveys to identify new sites.

A. In particular, surveys of areas outside of protected zones (See Conceptual Land Use Plan map) are needed, especially sites subject to potential, development-related impacts.

B. Identification and protection of archaeological resources should be guided by the Division of Historical Resources' Ground-disturbing Review Matrix for the appropriate steps to follow.

Recreation

1. Continue to provide quality resource based outdoor recreational and interpretive programs and facilities at the state park.

A. Maintain a system of hiking, biking and equestrian trails that provide access to the resources of the park for users of varying ability.

B. Provide opportunities for extended stays at the park through both primitive and developed camping experiences.

C. Maintain areas for picnicking and the gathering of families and groups.

D. Provide quality food service operation to service park visitors.

E. Maintain a diversity of programming opportunities that includes static interpretive displays, exhibits, ranger-led talks, walks, tours and special events.

2. Seek funding to expand recreational and interpretive opportunities through the improvement of programs and the development of new use areas and facilities, as outlined in this management plan.

A. Implement necessary improvements to the park campground and primitive

group camp to meet current park service standards.

B. Reconfigure the layout of wilderness camping area to improve the visitor experience.

C. Establish a day use area on the Seven-Lakes property.

D. Improve food service at the park by expanding the Hammock Inn.

E. Improve hiking and biking opportunities through the development of new trails.

F. Improve equestrian facilities through the relocation of horseback riding trails and the equestrian camping area.

Administration/Operations

1. Seek funding to improve/expand support facilities to service the needs of park visitors and staff.

A. Expand the administrative office.

B. Provide/maintain sufficient infrastructure (roads, parking, restrooms) in public use areas.

C. Evaluate potential circulation improvements at the entrance station to ensure public safety while maintaining the efficient flow of traffic on County Road 634.

D. Provide new facilities for storage (CCC Museum) and maintenance (shop).

E. Establish a residence site near the south property.

2. Continue to provide quality visitor and operational services.

A. Secure staff or equivalent resources to enhance existing personnel capacity to manage newly added park acreage and expanded facilities.

B. Conduct regular inspections of use areas and facilities and correct deficiencies to provide a safe, clean and well-maintained environment for visitors and staff.

C. Maintain vehicles, tractors, fire suppression equipment and other land management equipment in good/working condition.

D. Provide staff with appropriate training opportunities in visitor services, resource management, park operations, general maintenance and interpretation.

E. Maintain partnerships with federal, state and local agencies and non-governmental organizations.

F. Conduct community outreach activities to enhance public awareness and support of the park.

G. Recruit and maintain volunteer support to assist staff with park operations.

H. Enhance ecotourism programs through partnerships and park concession operations.

I. Continue to improve universal access to park facilities in compliance with the Americans with Disabilities Act.

3. Support land use planning policies, regulations and acquisition initiatives that serve to enhance management and protection of park resources.

A. Network with other land and water management and regulatory entities to coordinate and enhance regional resource management and protection efforts.
B. Monitor proposed land use changes outside the park that may impact resource integrity, and engage in the land use planning process, when necessary, to advance the long-term interests of the park.
C. Pursue acquisition of areas deemed important to be managed as part of the park.

Management Coordination

The park is managed in accordance with all applicable Florida Statutes and administrative rules. Agencies having a major or direct role in the management of the park are discussed in this plan.

The Department of Agriculture and Consumer Services, Division of Forestry (DOF), assists Division staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FFWCC), assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within park boundaries. In addition, the FFWCC aids the Division with wildlife management programs, including the development and management of Watchable Wildlife programs. The Department of State, Division of Historical Resources (DHR) assists staff to assure protection of archaeological and historical sites. The Department of Environmental Protection (DEP), Office of Coastal and Aquatic Managed Areas (CAMA) aids staff in aquatic preserves management programs. The DEP, Bureau of Beaches and Wetland Resources aids staff in planning and development of erosion control projects. Emphasis is placed on protection of existing resources as well as the promotion of compatible outdoor recreational uses.

Public Participation

The Division provided an opportunity for public input by conducting a public workshop and an advisory group meeting. A public workshop was held on October 11, 2006. The purpose of this meeting was to present this draft management plan to the public. An Advisory Group meeting was held on October 12, 2006. The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss the draft management plan.

Other Designations

Highlands Hammock State Park is not within and has not been designated as an Area of Critical State Concern as defined in section 380.05, Florida Statutes. Currently it is not under study for such designation or inclusion. Highlands Hammock State Park has been designated a site on the Great Florida Birding Trail developed by the FFWCC. The park is a component of the Florida Greenways and Trails System.

All waters within the original park property and portions of the south property (86

acres from Grantor Livingston and 793 acres from Grantor The Nature Conservancy), have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code. Surface waters in this unit are also classified as Class III waters by DEP. This park is not within or adjacent to an aquatic preserve as designated under provision of the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes).

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

The Division of Recreation and Parks has implemented resource management programs for preserving for all time the representative examples of natural and cultural resources of statewide significance under its administration. This component of the unit plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. The stated management measures in this plan are consistent with the Department's overall mission in ecosystem management. Cited references are contained in Addendum 2.

The Division's philosophy of resource management is natural systems management. Primary emphasis is on restoring and maintaining, to the degree practicable, the natural processes that shape the structure, function and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management may be implemented when the recovery or persistence of a species is problematic provided it is compatible with natural systems management.

The management goal of cultural resources is to preserve sites and objects that represent all of Florida's cultural periods as well as significant historic events or persons. This goal may entail active measures to stabilize, reconstruct or restore resources, or to rehabilitate them for appropriate public use.

Because park units are often components of larger ecosystems, their proper management is often affected by conditions and occurrences beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program (to assess resource conditions, evaluate management activities and refine management actions), review of local comprehensive plans and review of permit applications for park/ecosystem impacts.

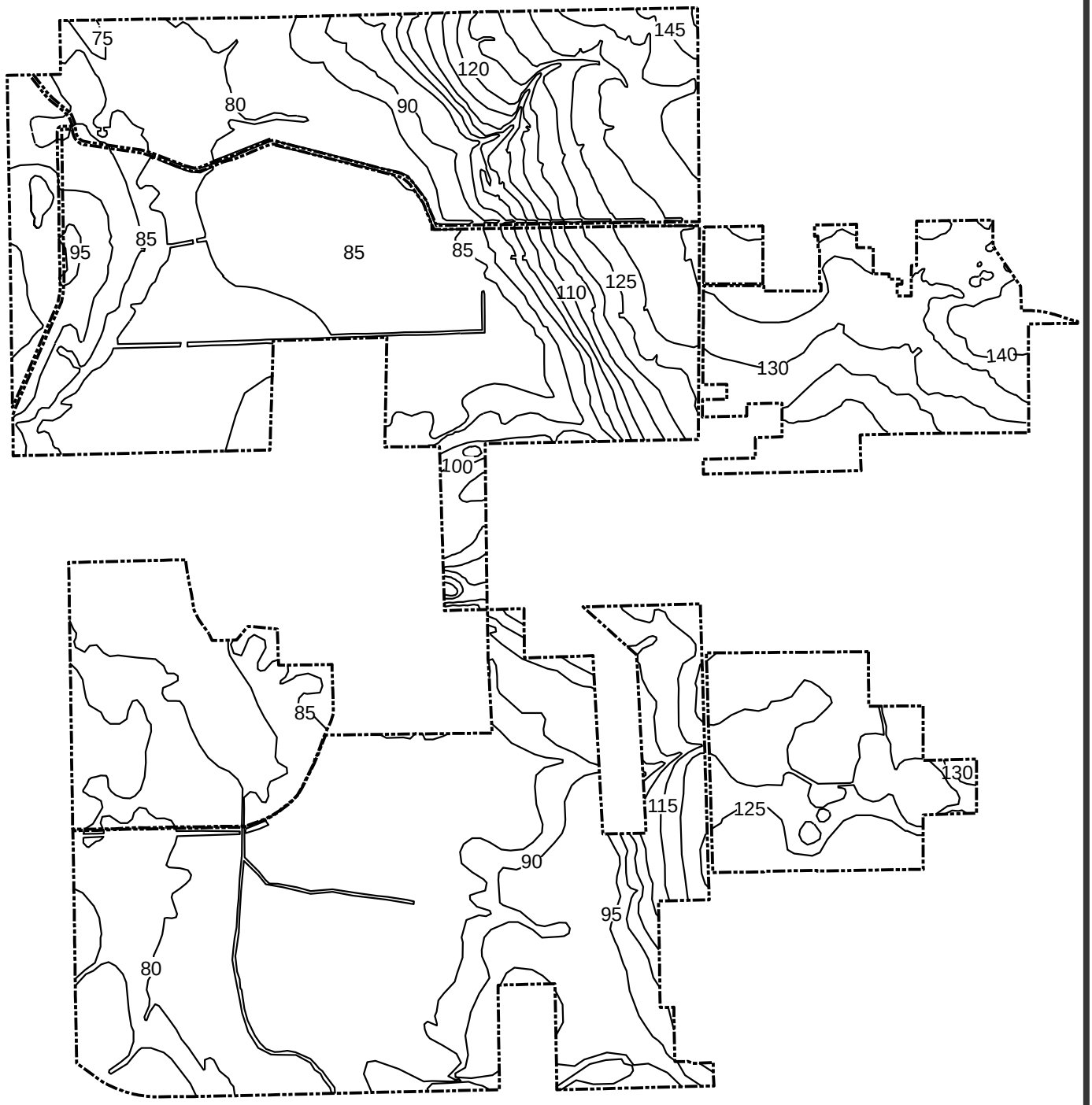
RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

Topography

The eastern boundary of Highlands Hammock State Park lies atop the western edge of the Lake Wales Ridge. Here is found the highest elevation in the park: 151 feet mean sea level (msl). From this high point, the land slopes downhill to a topographical low of less than 80 feet msl (see Topographic Map).

The park hydrology and vegetation is a notable expression of this topographical relief. The flat basin of the upper Little Charlie Bowlegs Creek provides one example. Much of it extends through the park, south to north, as a broad conduit, below the 85 and 80-foot



LEGEND

Topographic Lines

Park Boundary

N

0 1,250 2,500 5,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

HIGHLANDS HAMMOCK STATE PARK

TOPOGRAPHIC MAP

contours. Most of the swamp and marsh vegetation of the park occupies these wet flatlands. The hydric hammock, for which the park is named, is also situated between the 80 and 85-foot contours. Most of the cutthroat grass in the park grows on the slope of the Lake Wales Ridge between 85 and 100 feet. The scrub and scrubby flatwoods vegetation occurs above 115 feet. The ridge and its slope give rise to both Tiger Creek and Haw Branch, which originate in the eastern parts and flow downhill toward the soggy flats in the western third of the park.

There have been human alterations to the topography. The most extensive of these is a canal, with its lateral feeders, which has altered the sheet flow in the swamps and marshes south of Little Charlie Bowlegs Creek. Smaller ditches occur on the Seven-Lakes property and the east property. There are two borrow pits in the park. One may date back to the CCC era. Clay was taken from this excavation to use on service roads, in locales where the sand is very soft. Another borrow pit is just north of State Road 66, in Section 21, on the property. Apparently, fill was taken from this pit and used in constructing the highway. There are also some smaller, excavated sites in the former pasture on the south property. These were created to provide water for cattle.

Geology

Highlands Hammock State Park lies within the Highlands Ridge and Western Flatlands regions. The Highlands Ridge is an ancient shoreline formed during the Yarmouth and Sangamon interglacial stages of the Pleistocene. It is largely composed of marine sands, sandy limestone and deltaic deposits of the Hawthorn and Citronella formations. Both of these geological types formed when the world's water level was higher and the older continental landmass to the north was eroding to the south. The surface of the ridge is a relic dune, almost totally covered with sand. It was shaped by wind and wave action during periods of higher sea level.

The park land surface reflects a shaping pattern typical of the weaker Gulf wave energy, whereas, on the east side of the Highlands Ridge (approximately 4 miles east of Sebring), the escarpment is steeper and exhibits characteristics typical of the Atlantic Ocean's stronger waves. As sea level fell, a series of terraces were left behind, marking previous shorelines. Many of these terraces can still be seen today; the western edge of the park provides a good example.

During earlier geologic periods, this region of peninsular Florida was an island off the mainland of North America. Its isolation provided an opportunity for both plants and animals to evolve into distinct forms. Some of these forms remain today as endemic organisms found in natural communities that are relics of ancient shorelines.

Soils

The soils reflect the topography of the Lake Wales Ridge and adjoining Western Flatlands. The Ridge contains generally deep, well-drained sandy soils while the

Flatlands have poorly drained soils. There are 28 different soil types at this park recognized by the former U.S. Soil Conservation Service (see Soil Map). Many are closely identified with specific natural communities. The soils in the lower elevations of the park are conditioned by seepage, heavy buildup of organic materials, and longer periods of inundation. Rainfall during the summer months falls on the sandy, porous soil of the adjacent uplands. Rainwater rapidly percolates downward to seep out and moisten the slopes and lower elevations of the land. Addendum 3 contains detailed soil descriptions for this park, but an abbreviated summary correlating natural communities with soil types is provided below.

Upland soils associated with scrub vegetation are Archbold fine sand (0 to 5 percent slopes), and Pomello or Satellite sands. Scrub with a sand pine overstory, and an evergreen oak understory, is located on Pomello and Satellite sands. Rosemary scrub, which forms almost pure stands, is restricted to Archbold sands. The only upland soil type associated with sandhill and xeric hammocks is Tavares sand, 0 to 5 percent slopes. Five soil types are associated with mesic flatwoods; they are Eaugallie fine sand, Immokalee sand, Malabar fine sand, Myakka fine sand, Placid, Basinger and Smyrna sand with Immokalee sand being a major soil.

Hydric soils in the park include the following: Sandy—Felda, and Bradenton; Sandy and sandy loam soils, depressional—Basinger, St. Johns, Placid, Malabar (depressional), and Chobee; and Mucky soils—Sanibel, Kaliga (two types), Samsula, Hontoon and Tequesta.

Felda fine sand and Bradenton fine sands are characteristic of hydric hammocks.

One of the important hydric soil groupings in the park is the Basinger, St. Johns and Placid soil complex. This group is a very strong (Bacchus, 1991) indicator for cutthroat grass dominated communities. These are nearly level, poorly and very poorly drained sandy soils. Locally, they are called cutthroat seeps after the dense grass that grows at these sites. Generally, these seeps are in association with sandy slopes. They are the result of water percolating from a higher to a lower position on the landscape, emerging to moisten the surface at the lower elevations. The varied soils of the cutthroat seeps tend toward prolonged saturation. Some seeps have all three soils while others have only one. Although most mapped areas are dominated by one of the three in the complex, the percentage composition of the three soils is highly variable.

The soils of depression marshes include Immokalee, Basinger, Basinger depressional, Placid, and Sanibel, while Sanibel, Samsula, Kaliga and Hontoon mucks typify baygall communities.

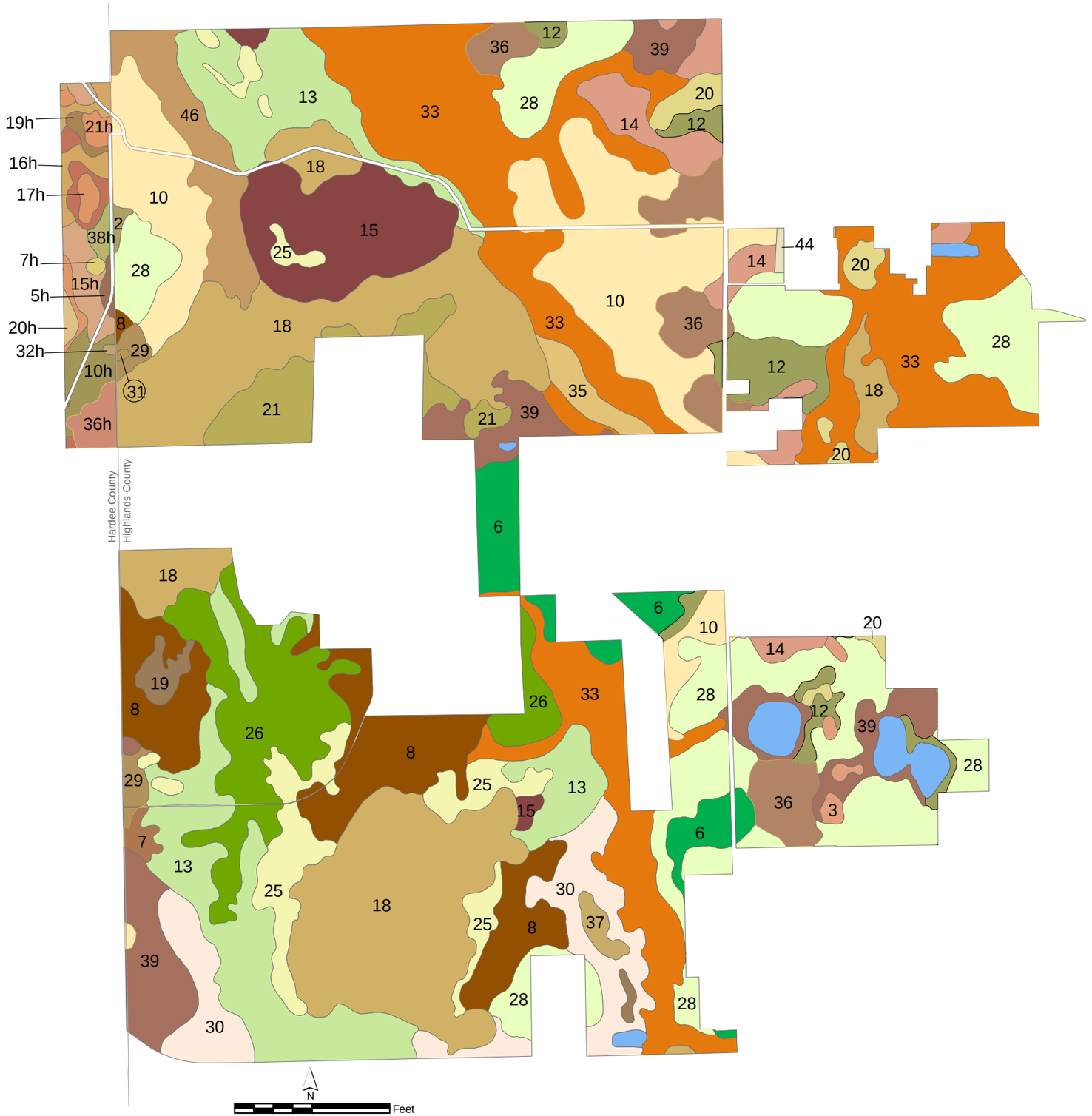
Minerals

The Florida Geological Survey report, Geology and Ground-water Resources of

LEGEND

Hardee County
- 5h-Tavares fine sand, 0 to 5 percent slopes
- 7h-Basinger fine sand
- 10h-Pomoma fine sand
- 15h-Immokalee fine sand
- 16h-Myakka fine sand
- 17h-Smyrna sand
- 19h-Ona fine sand
- 20h-Samsula muck
- 21h-Placid fine sand, depressional
- 32h-Felda fine sand, depressional
- 36h-Kaliga muck
- 38h-St Lucie fine sand

Highlands County
- 2-St Lucie sand, 0 to 8 percent slopes
- 3-Basinger fine sand, depressional
- 6-Tavares sand, 0 to 5 percent slopes
- 7-Placid fine sand, depressional
- 8-Immokalee sand
- 10-Myakka fine sand
- 12-Basinger fine sand
- 13-Felda fine sand
- 14-Satellite sand
- 15-Bradenton fine sand
- 18-Kaliga muck
- 19-Hicoria musky sand, depressional
- 20-Samsula muck
- 21-Hontoon muck
- 25-Chobee fine sandy loam, depressional
- 26-Tequesta muck
- 28-Archbold sand, 0 to 5 percent slopes
- 29-Pamona sand
- 30-Oldsmar fine sand
- 31-Felda fine sand, depressional
- 33-Basinger, St Johns, and Placid soils
- 35-Sanibel muck
- 36-Pomello sand, 0 to 5 percent slopes
- 37-Malabar sand, depressional
- 39-Smyrna sand
- 44-Satellite, Basinger-Urban land complex
- 46-Kaliga muick, frequently flooded
- Water



HIGHLANDS HAMMOCK
STATE PARK

SOILS
MAP

Highlands County, Florida states that there is pebble phosphorite in the hawthorn formation at Highlands Hammock, but it is too deep to be economically mined (Bishop 1956). However, the sandy clay of this formation has elsewhere been mined for road surfacing materials.

Hydrology

The surface hydrology is quite interesting. There are three drainageways. The greatest volume of water moves through Little Charlie Bowlegs Creek and its associated drainage basin, which traverses the park at its lowest elevation, from south to north. The creek first assumes a recognizable form in a cypress swamp in the original part of the park. The eastern edge of the creek marks the western boundary of the hammock, the central feature of the park, which extends out onto low-lying land next to the swamp. On the western side of the swamp, the land rises more steeply, covered with pines and palmettos. The drainage basin originates several miles south of the park where, before drainage canals were dug, water moved overland as sheetflow through several broad marshes. A good portion of this basin to the south has been brought within the park boundaries since 1990.

The two other drainageways are small creeks that emerge on the Highlands Ridge and run downhill to Little Charlie Bowlegs Creek. Haw Branch is a seasonal creek; it flows only when water is plentiful. It originates on the Seven-Lakes property of the park, flows north across private land for more than a mile, and reenters the park a mile south of the entrance. Tiger Branch arises just inside the park boundary and flows downhill into wetlands near the junction of the county road and the park drive.

The founders of Highlands Hammock State Park used this pattern of surface water for an engineering design that would guarantee an adequate supply of water for the hammock vegetation. As the park was taking shape, some of the country's prominent botanists came to look at the project and offer counsel to the local citizens. The botanists stressed the importance of the moisture content of the shallow soil as an essential factor in sustaining the hammock vegetation. There was a period of severe drought at this time, and there was an extreme fear of wildfire; the role of fire in maintaining pine forests in the South was not understood then, and the citizens did not reason that the hammock, which had existed for hundreds of years despite the constant occurrence of fire in the vicinity, was unlikely to be in imminent danger of destruction from drought and fire. The citizens determined to build a moat, north and south of the hammock, to guard against this imagined threat.

The resulting system of water control is attributed to Alexander Blair and a Mr. Hawkins. Blair was an engineer in the employ of Margaret Shippen Roebling, the woman who put up most of the money to purchase the park. This system was integrated with plans for roads and fences. A canal and dike was extended from the terminal point of Tiger Branch, west to Little Charlie Bowlegs Creek. The dike became

the county road. Dams were placed in the canal at intervals to step-down the surface of water as it moved toward the creek. In addition, in Little Charlie Bowlegs Creek, a dam was built to prevent the creek and swamp from draining during dry periods. Removable boards were placed in the dam during the dry season to hold water back. South of the hammock, another canal and dike were constructed running from east to west.

This protective system was unnecessary, and the boards in the dam were removed for good in 1981, after research had shown that cypress trees could eventually die out if water was permanently impounded around them: cypress seeds can only germinate and get a footing as seedlings when the swamp is dry. Nature intended that swamps should periodically be dry.

Recently acquired land south of the original park features hundreds of acres of marsh and swamp, and several miles of drainage ditches that were dug to drain them when the property was used to pasture cattle. Likewise, on the Seven-Lakes property, several of the lakes were connected by ditches in an attempt to expose the lakeshore to grazing.

Natural Communities

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors, such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and that areas which are similar with respect to these factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub--two communities with similar species compositions--generally have quite different climatic environments, and these necessitate different management programs.

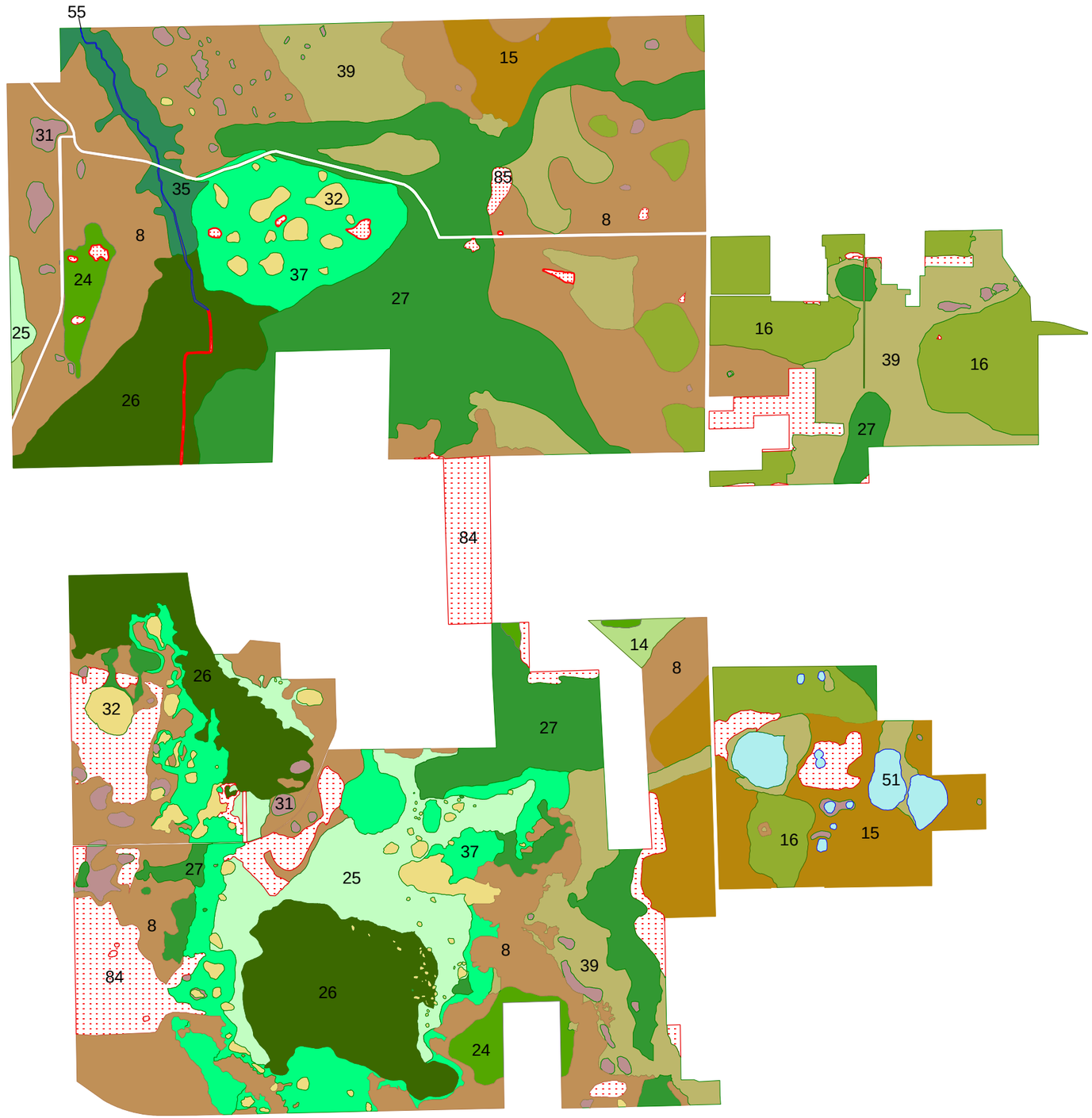
The park contains 15 distinct natural communities (see Natural Communities Map) in addition to ruderal and developed areas. Park specific assessments of the existing natural communities are provided in the narrative below. A list of plants and animals occurring in the unit is contained in Addendum 4.

Mesic flatwoods. Despite the term, mesic, the degree of moisture in the flatwoods at Highlands Hammock State Park ranges from relatively dry, with saw palmetto (*Seranoa repens*) and wiregrass (*Aristida stricta* var. *beyrichiana*) ground cover, to wet, with south Florida slash pines (*Pinus elliottii*) and cabbage palms (*Sabal palmetto*) and a fern understory. Longleaf pine (*Pinus palustris*) is prominent on better-drained sites. All flatwoods are saturated during the rainy season.

A study of flatwoods in a similar situation at nearby Archbold Biological Station

LEGEND

- 8 - Mesic Flatwoods-2323.18 ac.
- 14 - Sandhill-32.87 ac.
- 15 - Scrub-565.25 ac.
- 16 - Scrubby Flatwoods-643.06 ac.
- 24 - Xeric Hammock-122.26 ac.
- 25 - Basin Marsh-413.18 ac.
- 26 - Basin Swamp-961.73 ac.
- 27 - Baygall-1351.53 ac.
- 31 - Depression Marsh-132.00 ac.
- 32 - Dome-182.24 ac.
- 35 - Floodplain Swamp-117.35 ac.
- 37 - Hydric Hammock-708.80 ac.
- 39 - Seepage Slope-985.98 ac.
- 51 - Sandhill Upland Lake-86.43 ac.
- 55 - Blackwater Stream-5.68 ac.
- 84 - Ruderal-588.73 ac.
- 85 - Developed-30.97 ac.



HIGHLANDS HAMMOCK
STATE PARK

NATURAL COMMUNITIES
MAP

(Abrahamson *et al*. 1984) recognized five relatively distinct phases, described as follows: wiregrass flatwoods, cutthroat grass (*Panicum abscissum*) flatwoods, palmetto flatwoods, gallberry (*Ilex glabra*) flatwoods, and fern/slash pine/cabbage palm (*Woodwardia virginica* and *Osmunda cinnamomea*) flatwoods. The last can also be referred to as fern flatwoods. The wiregrass flatwoods, categorized by these authors as having more than 50 percent wiregrass, does not occur as such at this park. Two of the four other phases—the more mesic ones—are described in the paragraphs below but, in deference to FNAI categorization, are not mapped separately in this plan. The remaining "phases"—cutthroat grass seeps and fern ground cover type seeps – are, in this plan, described under the seepage slope natural community type.

Cutthroat grass is prominent in one of the mesic flatwoods types, but it does not assume the near total dominance that it does in wetter sites discussed below under "Seepage Slopes." This grass is interspersed with rather robust saw palmetto and/or gallberry. Fetterbush (*Lyonia lucida*) and south Florida slash pines are usually abundant. Dwarf live oak (*Quercus minima*), dwarf St. John's-wort (*Hypericum reductum*), and wax myrtle (*Myrica cerifera*) are often present, but do not dominate.

Portions of the palmetto flatwoods phase at Highlands Hammock have a shrub layer composed almost entirely of saw palmetto (usually dense and 1-2 m tall); other portions contain gallberry and fetterbush, or gallberry and cutthroat grass, in varying abundance. The overstory is of slash pines or slash and longleaf pines. Where pines are sparse, an open savannah-like aspect prevails. Numerous herbaceous species including blackroot (*Pterocaulon pycnostachyum*), white- top aster (*Seriocarpus tortifolius*), and wiregrass are characteristic, particularly in those examples having a history of fire management. Scrub palmetto (*Sabal etonia*) is occasional on the drier parts of the moisture gradient. Other shrubs of drier spots include dwarf huckleberry (*Gaylussacia dumosa*), wax myrtle, staggerbush (*Lyonia fruticosa*), blueberries (*Vaccinium* spp.), gopher apple (*Licania michauxii*), and tarflower (*Bejaria racemosa*). The palmetto phase is often distinct around some of the park lakes and depression marshes (locally called seasonal ponds), because of an abrupt transition from saw palmetto to the vegetation of the marsh or lakeshore. In wetter spots, yellow-eyed grasses (*Xyris* spp.), bog buttons (*Lachnocaulon anceps* and *L. minus*) and false foxglove (*Agalinus fasciculata*) are found. Wetter examples of this phase begin to grade into the cutthroat grass seepage slopes.

The gallberry-fetterbush flatwoods phase has a well-developed and diverse shrub layer either with or without Florida slash pines. Fetterbush and gallberry are especially abundant. Tarflower and staggerbush are also conspicuous elements. Saw palmetto often attains high coverage values and large size. Within two years following fire, dwarf huckleberry and shiny blueberry (*Vaccinium myrsinites*) reach high shoot densities and frequencies, but are shaded out relatively quickly as the taller shrubs overtop them.

Sandhill. The sandhill community type in the southern Lake Wales Ridge differs from

its counterpart farther north. The tree layer is comprised of south Florida slash pine, turkey oak (*Quercus laevis*), and often scrub hickory (*Carya floridana*). Longleaf pine is uncommon to rare in sandhill communities of the Lake Wales Ridge; it is replaced by south Florida slash pine (Abrahamson et al. 1984). The mature turkey oaks in the southern ridge sandhills tend to be smaller than in typical north Florida sandhills. Although at Highlands Hammock State Park there is no typical sandhill community, as such, a suite of sandhill species, together with an appropriate topographical location and soil type, indicate a sandhill-like remnant in two locations. One occurs in the western part of the original park, just east of Hammock Road, where personnel and a group camp have been placed. The other is just south of Vaughn Road near a golf course development. Both sites have Tavares sand soils, which are indicative of sandhill vegetation. In addition to some flatwoods species, representative sandhill plant species include turkey oak, bluejack oak (*Quercus incana*), some longleaf pine, Coastal Plain dawnflower (*Stylisma patens*), Florida greeneyes (*Berlandiera subacaulis*) and Indian plantain (*Arnoglossum floridanum*). Both sites have adjacent xeric hammock communities that are likely derived from a degradation of prior sandhill vegetation due to the absence of fire. Increased fire frequency will be used to attempt to restore these marginal sandhills.

Scrub. The scrub at this park is principally on Pomello and Satellite sands. Although there is some gradation between them, two phases of scrub may be recognized: one with a sand pine *(Pinus clausa)* overstory and predominantly evergreen oak understory, and the other dominated by rosemary *(Ceratiola ericoides)*, often in almost pure stands. Most of the sand pines in the former scrub phase have been removed, either by logging or by hurricanes. Upon re-introduction of fire, the scrub habitat should become suitable for Florida Scrub-jays.

The oak-dominated understory phase is a three-layered community, consisting of sand pines, now largely removed, shrubs and ground cover. A good example is on the Seven-Lakes property. Characteristic woody species are myrtle oak *(Quercus myrtifolia)*, sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), staggerbush, hog plum (*Ximenia americana*), scrub holly (*Ilex opaca* var. *arenicola*), scrub bay *(Persea borbonia* var. *humilis),* and scrub hickory. Saw palmetto and scrub palmettos are common in the lower shrub layer. Other shrubs include bigflower pawpaw (*Asimina obovata*), gopher apple and October flower (*Polygonella polygama*). Ground cover consists mostly of sprouts of the shrub layer species; herbs are scarce. The most common herbaceous species include beak sedge *(Rhynchospora megalocarpa),* milk peas *(Galactia* spp.), chapman's pea *(Chapmannia floridana)*, and witchgrass (*Dichanthelium portoricense*). Epiphytes such as Spanish moss *(Tillandsia usneoides)* and ball moss *(Tillandsia recurvata),* true mosses, and lichens are present.

The rosemary phase is an open community with the shrub layer dominated by even-aged stands of rosemary, varying in height up to nearly three meters in mature stands.

A good example is west of County Road 635, opposite the Seven-Lakes property. Here rosemary forms nearly pure stands, which are interspersed with clumps of oaks, especially the scrub oak *(Quercus inopina)* (Johnson and Abrahamson, 1982). Sand pine is often scarce and even absent in some places within this community subtype. Almost consistently present, but making up less than five percent of the cover, are saw palmetto and scrub palmetto, and the shrubs: staggerbush, rusty lyonia (*Lyonia ferruginea*), scrub buckthorn *(Sideroxylon tenax),* and scrub bay. Herbaceous species are mostly perennial rosettes, many of which are endemic to this community. These include scrub blazing star (*Liatris ohlingerae*) and nodding pinweed (*Lechea cernua*). In spring, pineland scaly-pink (*Stipulicida setacea*) is conspicuous in rosemary scrub. The lichens *Cladina evansi, C. subtenuis, Cladonia leporina* and *C. prostrata,* cover more of the ground between the shrubs than does the herbaceous flora. The spike moss, (*Selaginella arenicola*), is sometimes abundant, but after about 20 years without fire the species of *Cladina* and *Cladonia* overgrow it and may eliminate it from the stand (Johnson, A.F. unpublished data). In the park, the rosemary phase is restricted to Archbold soils. Based on aging of rosemary, the rosemary scrub subtype has not burned in 25-30 years. Of course, when fire does occur in this habitat, the adult rosemary will be eliminated and regenerate from seed.

Scrubby flatwoods. The best examples of this community in the park are found on Pomello sand, 0-5 percent slopes, and are found primarily in locations on the east side of the park. Three small patches are near the eastern boundary of the original park. In these, the tree canopy is not as dense as in those on the Seven-Lakes property. The largest acreage is found north and south of Blue Lake and on the east property.

Tree presence is variable, consisting of an occasional South Florida slash pine or sand pine. The average height of the oak and lyonia shrub layer is 1-2 m, with the taller examples on the Seven-Lakes property. Compared to mesic flatwoods in the park, herbaceous vegetation is sparse, consisting of wiregrass and a few forbs. *Cladonia/Cladina* lichen cover and sand spikemoss coverage can be considerable in all but recently burned areas. Floristically, the scrubby flatwoods are intermediate between the oak understory phase of sand pine scrub and mesic flatwoods communities. Scrubby flatwoods differ from typical mesic flatwoods in this region in that they occur on well-drained soils where there is no standing water even under extremely wet conditions. The exception to this generalization is for herbaceous-dominated openings with seasonally saturated soils. These microhabitats support some wetland or facultative wetland herbs. The water table in scrubby flatwoods is still higher than in sand pine scrub.

The dominant species in the park's scrubby flatwoods include sand live oak, myrtle, Chapman's oak, staggerbush, fetterbush, saw palmetto, tarflower, wiregrass and shiny blueberry. Scrub oak, is less common here than elsewhere in the region, for example, at Archbold Biological Station or even at Lake June Scrub State Park. Herbaceous species

of this community are often restricted to openings in the scrub oaks, and include honeycombhead (*Balduina angustifolia*), pennyroyal (*Piloblephis rigida*), and October flower. These herbaceous openings also support large populations of such wetland species as dwarf sundew (*Drosera brevifolia*), yellow hatpins (*Syngonanthus flavidulus*), spikerush (*Eleocharis baldwinii*), and yellow-eyed grass (*Xyris brevifolia*). The presence of these herbaceous species, indicative of seasonally saturated soils, serves to distinguish scrubby flatwoods from scrub, which has open patches of excessively drained white sand soil and does not support any wetland herbs. In addition, scrubby flatwoods at the park lack any scrub endemic plant species, including such widespread and characteristic species as garberia (*Garberia heterophylla*) and scrub bay. This is especially apparent in scrubby flatwoods that have not been burned in recent years. This is the case in some of the examples in the Seven-Lakes property.

Shrub species of scrubby flatwoods, shared by drier flatwoods sites, include fetterbush, tarflower, blueberries (*Vaccinium myrsinites* and *V. darrowii*), and staggerbush. Palafoxia (*Palafoxia feayi*) is conspicuous, frequently growing above the shrub canopy. Gopher apple, pinweeds (*Lechea cernua* and *L. deckertii*), and scrub rockrose (*Helianthemum nashii*) commonly form the ground cover in the more open areas; greenbrier (*Smilax auriculata*) is a frequent climber.

The fire frequency can be as often as five years for some patches, while other parts of the same patch may escape fire for 10 to 15 years. Prescribed fire in these patches should be accomplished as much as possible without the use of firebreaks between this community and others such as mesic flatwoods. The goal should be that only parts of a particular patch burns in most fires, leaving some of the oaks unburned, while rejuvenating the growth of those in the burned portion. Only the scrubby flatwoods in the original park has been subject to prescribed burning since the last unit management plan. However, some acreage on the newer parcels has burned in wildfires. In addition, pine trees have been thinned in the scrubby flatwoods on the Seven-Lakes property. All the scrubby flatwoods community on the newer properties requires burning to retard succession to a xeric or oak hammock and promote oak growth to maintain its distinctiveness from mesic flatwoods and to support oak-dependent wildlife (e.g. – Florida Scrub-jay).

Xeric hammock. The xeric hammock community is present at sites formerly occupied by sandhill. Xeric hammock is an advanced successional stage of scrub or sandhill (FNAI, 1990). The dominant tree is either live oak (*Quercus virginiana*) or sand live oak. At this park, the presence of turkey oak and bluejack oak in these communities, along with characteristic herbaceous species, suggests that they are the direct result of fire suppression in sandhill vegetation.

Basin marsh. This community occurs on the original park and on the south property. On the original park, it has been overtaken by hardwood trees. On the south property,

the large marshes south of Little Charlie Bowlegs Creek were canalized in the 1950's so they could be used for pasture. In previous editions of the unit plan, the part of this community on the original park was classified as floodplain marsh, which was incorrect, because it is not on a river floodplain, or on alluvial soils, but rather formed in a large and irregularly shaped basin.

In basin marshes, the normal fire interval has been suggested as one to ten years (FNAI, 1990). Due to canalizing, the marsh remains dry more often than it did before these alterations. Currently, in the absence of fire, red maple (*Acer rubrum*), sweet bay (*Magnolia virginiana*) and sweetgum (*Liquidambar styraciflua*) have proliferated, in places transforming the basin marsh into a basin swamp, as has happened on the original park. Peroni and Abrahamson (1986), describe these changes, stating that before 1944, the marsh community was more extensive, reaching the edge of the cypress-dominated swamp. Reduced fire frequency led to the hardwood succession mentioned above. Following the removal of cattle from the basin marshes on the south property, red maple seedlings have appeared in large numbers.

Dominant plants in basin marshes are mostly emergent species that can tolerate prolonged flooding. Examples are maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), giant arrowhead (*Sagittaria lancifolia*), soft rush (*Juncus effusus*), Carolina willow (*Salix caroliniana*), red maple, southern cutgrass (*Leersia hexandra*), and spatterdock (*Nuphar advena* ssp. *advena*). Swamp rosemallow (*Hibiscus grandiflorus*) is especially conspicuous when in flower.

Basin swamp. Basin swamp and basin marshes in this park are in close association. Both occur in juxtaposition south of Little Charlie Bowlegs Creek. Both communities occupy an elongated, north-south basin in the western side of the park that is below 85 feet msl. In the northern part of the basin where the creek begins, basin swamp makes a transition to floodplain swamp, but south of the beginning of the creek, water once moved as sheetflow, thus the designation of basin swamp.

As discussed above, the human alterations to this hydrological system are causing dramatic vegetative shifts: basin marsh is shifting to basin swamp. Aerial photographs taken in 1943 show how much the swamp has encroached on the marsh, a trend documented by Peroni and Abrahamson (1986). They pointed out that in 1944, floodplain marsh dominated, and that the excavation of a drainage canal during the 1930s dewatered the marsh. Hardwoods began to invade, a trend that continues today. In places at the edge of the swamp, a band of smaller trees can be seen growing up in the edge of the marsh. Fire exclusion has no doubt played a role in this succession: in earlier times, the marshes would burn in dry years.

Some of the basin swamps are cypress-dominated; others are dominated by hardwoods. The dominant hardwoods are sweetgum, red maple and sweet bay. The understory can

be quite dense with buttonbush (*Cephalanthus occidentalis*), Virginia willow (*Itea virginica*), numerous fern species, including swamp fern (*Blechnum serrulatum*), two species of *Osmunda,* and several species of marsh fern (*Thelypteris*), plus herbs like false nettle (*Boehmeria cylindrica*). At times, prairie iris (*Iris hexagona*) is conspicuous, especially when in flower. Allowing for hydrological alterations, both cypress-dominated and hardwood-dominated basin swamps appear to be in good condition.

Baygall. This community covers a large expanse mostly in proximity to the three major drainages. It is also associated with the lower elevations of seepage slopes. The acreage has expanded over the last 50 years near the canals and associated roads that were used to protect the original park from fire; an example is the narrow east-west baygall strip in the northern part of the original park. It can be seen on both sides of the road that runs from the shop area across Little Charlie Bowlegs Creek to the west boundary of the park. Soil maps indicate that this baygall was once part of a seepage slope. In the absence of regular burning in the adjacent flatwoods and seepage slope vegetation, baygall vegetation will expand. Isolated patches of baygall also occur in circular depressions in the basin marsh.

Characteristic trees include loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris),* and sweet bay. Slash pine occurs primarily as a relic of an earlier stage of succession. The shrubby undergrowth includes wax myrtle, dahoon holly (*Ilex cassine*), gallberry, fetterbush, maleberry (*Lyonia ligustrina*), and high bush blueberry (*Vaccinium corymbosum*). Common climbers are Carolina jessamine (*Gelsemium sempervirens*), muscadine grape (*Vitis rotundifolia*), greenbrier, laurel-leaf greenbriar (*Smilax laurifolia*), and Virginia creeper (*Parthenocissus quinquefolia*). These species often form a dense thicket around the periphery of the bayhead and are less abundant in the interior sections. There are few herbaceous species in the most densely shaded areas, but cinnamon fern, southern beaksedge (*Rhynchospora microcarpa*), and pipewort (*Eriocaulon decangulare*) occur in slightly more open areas. The epiphyte, spreading airplant (*Tillandsia utriculata*), is occasional on large trees.

Depression marsh. There are numerous depression marshes (commonly called seasonal ponds) which are shallow depressions, usually rounded and not much larger than a few acres. None is permanently flooded; some have water every summer, and for longer periods in wet years; others have water only in the wettest years. Common features of most of the ponds are a border of saw palmetto, and a zonal pattern of hydric vegetation, which often occurs in rings or zones determined by slope, depth, and type of soil. No single pond exhibits all of the zones discussed below and in some ponds, zonal rings are absent. In particular, many lack the characteristic hypericum ring.

In the deeper ponds, the centermost zone, which is nearly always covered by standing water, or is at least moist, is dominated by a sparse stand of maidencane often associated with fringed yellow-eyed grass (*Xyris fimbriata*) and pipewort. A nearly

continuous cover of moss (*Sphagnum* spp.) may also be present. A few ponds in the original park have swamp tupelo trees (*Nyssa sylvatica* var. *biflora*). In the next shallower zone, yellow-eyed grass (*Xyris elliottii*) and or blue maidencane (*Amphicarpum muhlenbergianum*) may form a continuous cover. The species composition and vegetative cover of this zone are the most variable of any, with many of the dominants ranging into the deeper and the marginal zones as well. This zone usually dries out during the dry season. In the marginal zone cutthroat grass often dominates.

In the shallow ponds is a mixture of grasses, including broomsedge (*Andropogon spp.*) and the related sugarcane plume grass (*Saccharum giganteum*), or, in some cases, dense cutthroat grass. The outermost or marginal zone may be dominated by either a sparse stand of broomsedge with small herbs such as water smartweeds (Polygonum spp.) or a dense mat of cutthroat grass. St. John's wort (*Hypericum fasciculatum*) may or may not be present as a vegetative ring.

Two other species occasionally form pure stands in the ponds: redroot (*Lachnanthes caroliniana*) which may dominate in the maidencane zone and cordgrass (*Spartina bakeri*) which occurs in the drier portions of the *Hypericum* zone, if present.

Dome. There are two vegetation types in the park for which the "dome swamp" natural community designation is appropriate. One is composed of cypress trees, which usually have a rounded appearance from the air and a dome-shaped appearance when seen from the ground. These are few in number and are located in flatwoods near Little Charlie Bowlegs Creek, north of the county road. The other case is where circular, forested wetlands occur in solution features within the hydric hammock. As discussed below, these shallow, circular depressions within the hydric hammock were recognized by McFarlin in the late 1930s, and referred to in park base maps of the 1950s, as "Wooded Ponds". FNAI's (1990) synonym of "gum pond" seems more appropriate as they are forested mostly with hardwood trees capable of withstanding prolonged inundation. These solution-feature communities are embedded in the hydric hammock; individual canopies are actually more flat-topped than dome-shaped. Trees are characterized by buttressed bases. Common species are pop ash (*Fraxinus caroliniana*), swamp tupelo and occasionally some bald cypress (*Taxodium distichum*). Red maple is common and sweetgum trees are infrequent.

Floodplain swamp. Just north of where the service road to the housing area passes through a swamp, in the southern part of section 31, Little Charlie Bowlegs Creek takes form. At this point, the swamp, because of the creek, begins to undergo a subtle transformation and acquires an altered designation – from basin swamp to floodplain swamp. The 80-foot contour lines, which identify the borders of the swamp, narrow sharply in this vicinity, constricting the flow of water. This topographical fact perhaps influences the creation of a defined channel to convey the water that had heretofore moved as sheetflow through the marshes and swamps south of this constriction.

Bald cypress is the dominant tree. Red maple and sweet bay trees are scattered throughout. Dahoon holly trees are common in the understory, especially at the edge of the creek where they incline over the water. Pop ash trees are common in the shallow margins of the swamp near the uplands. The extensive drainage canals to the south may have altered the original hydroperiods.

Hydric hammock. This feature inspired the creation of the park. Although there is some ground sufficiently elevated to support mesic hammock species (a synonym for upland mixed forest), most of the land surface is low and flat and there are several reasons that justify classifying it as a hydric hammock. On the recently acquired south property, additional tracts of hydric hammock have been brought within the park boundaries. Here the soil type is Felda fine sand. These soils are organic and have the water table near the surface. Felda fine sands and Bradenton soil types are characteristic of wetland hardwood swamps (a synonym for hydric hammock) and cabbage palm hammocks respectively (U.S. Soil Conservation Service, 1981). Among more than 50 soil types, none of those associated with upland hardwood forests (including mesic hammocks) are found in the park.

Vegetation also justifies the hydric hammock designation of this community. Vince et al. (1989), in The Ecology of Hydric Hammocks: A Community Profile does not map Highlands Hammock in their generalized map of the state. However, they do include an example of a hydric hammock at nearby Tiger Creek. The authors of that publication cite 13 plants that are "abundant" and 18 plants that are "common" in hydric hammocks in general. All 31 of these plants are found in this community at Highlands Hammock. While none of them is restricted to hydric hammocks, and is therefore not individually diagnostic, their assemblage is. The abundant fern ground cover, particularly of *Thelypteris* spp. is more typical of hydric hammocks than of upland mixed forests (mesic hammocks).

There is also geological and hydrological evidence that supports recognition of a hydric hammock instead of a mixed hardwood forest. Hydric hammocks are known for having limestone at or within a meter of the surface. The numerous karst depressions in the main hammock of the park attest to the influence of limestone in shaping this community. Inundation cycles are more in line with hydric hammocks. The normal hydroperiod for hydric hammocks is seldom over 60 days per year (FNAI, 1990). Soil here is seldom inundated for more than 40 days a year.

At Highlands Hammock State Park, the dominant hammock vegetation consists of large live oak, cabbage palm, sweet gum, pignut hickory (*Carya glabra*), red maple, laurel oak (*Quercus laurifolia*), the wetland form of American elm (*Ulmus americana*) and red mulberry (*Morus rubra*). The abundance of pignut hickory is exceptional. It can be explained by several sites of more elevated ground within the hammock; it is ordinarily quite rare in hydric hammocks. Another difference between this hammock and typical

hydric hammocks is the presence of a suite of tropical species within the understory, including two species of wild coffee (*Psychotria nervosa*), wild lime (*Zanthoxylum fagara*), firebush (*Hamelia patens*), lancewood (*Octoea coriacea*) and marlberry (*Ardisia escallonioides*). However, since the hammocks in this park represent the southernmost extent of hydric hammocks in Florida, it should not be surprising that there is a strong tropical understory element. Understory species that are also common farther north include wax myrtle, dwarf palmetto (*Sabal minor*), beautyberry (*Callicarpa americana*), and Walter's viburnum (*Viburnum obovatum*). The last is a species typical of hydric hammocks. Common epiphytes include *Tillandsia* spp., resurrection fern (*Pleopeltis polypodioides* var. *michauxiana*), green fly orchid (*Epidendrum conopseum*) and butterfly orchid (*Encyclia tampensis*). Barb-fruit swamp mallow (*Pavonia spinifex*), which is found in only six other Florida counties, is another hydric hammock species found here. Bartram's airplant (*Tillandsia bartramii*), overlooked in earlier plant inventories, reaches its southern range extension in this park.

Stalter et al. (1981), in a study of the principal hammock of the original park, having "the objective of describing the arborescent vegetation," concluded that the dominant trees "...are similar to those in north-central Florida." In this quantitative study, those trees with highest importance values were live oak, cabbage palm, sweet gum, pignut hickory and red maple. The authors also concluded: "The absence of tropical elements from [the canopy species of] Highlands Hammock can be explained on the basis of infrequent but severe cold…" They list (but did not sample quantitatively), tropical species in the understory and ground cover. These include two species of wild coffee (*Psychotria spp.*) and marlberry. They did not list other tropical species that include myrsine (*Rapanea punctata*), firebush and lancewood. While the statements of these authors on arborescent vegetation of the hammock are probably correct as far as the canopy is concerned, the cold does not eliminate tropical species in the more protected understory.

During the years 1935-1942, John B. McFarlin prepared a work called "The Flora of Highlands Hammock State Park." The front cover to McFarlin's work is a vegetation map of the park. Here the original hammock is labeled as "low hammock" which is a term used by Harper (1915). In his description, McFarlin emphasizes how wet these communities were during the rainy season. Illustrated within the low hammock are numerous well-defined separately mapped features that appear to be water bodies. These features are labeled "Wooded Ponds" on later (1952) park base maps. They can still be seen on modern infrared aerial photographs flown about 1995. Their nearly circular shape suggests karst features. The canopy within these wooded ponds is primarily pop ash, maple, swamp tupelo, sweet gum and cypress. The only FNAI community that approximates this plant association is "dome swamp" with a more appropriate synonym of "gum pond."

Feral hog damage may have added to the demise of many of the parks terrestrial

orchids. (John Beckner, Selby Botanical Gardens, personal communication). Live oaks, although normally present in hydric hammocks in general, are not especially representative of hydric hammocks in particular. Despite many large old live oak trees, currently there is little noticeable recruitment in the hammock. The substrate may presently be too wet for seedling survival. The laurel oaks are relatively abundant, being trees that prefer wetter substrates. The hydrology today is strongly influenced by the many canals and dikes built in the CCC era to protect the hammock from fire. This may mean that when the big live oaks are gone, there will likely be few or no replacements. These observations about oaks may indicate that the hammock today is wetter than it was before the CCC era. This is all speculative; however, other factors may be involved.

Seepage slope. This is an endemic natural community restricted to central Florida, in which the dominant groundcover species is cutthroat grass, a Florida endemic. The soils are hydric, as a result of prolonged saturation and seasonal inundation from water which moves at a slow rate, laterally, through the ground during the "dry season" and over the surface during the "wet season" (Bacchus 1991). The principal indicator plant is cutthroat grass. Not all cutthroat grass seeps have a slash pine overstory, like the seeps in the park. In fact, the dense pines growing in the seeps are the result of prolonged fire exclusion. Treeless versions are found within the optimum boundaries immediately to the east of the park. Within the park, cutthroat grass is the dominant ground cover in most of the seepage community, but there is a local variant that is sometimes called fern flatwoods (Abrahamson, et al. 1984), in which ferns such as Virginia chain fern (*Woodwardia virginica*), form a conspicuous cover. These two types of seepage slope are described below, but are not mapped separately. Both types of seepage slope occur primarily on the Basinger, St. Johns and Placid soil complex. Since both types are wet, and have a fairly conspicuous canopy of south Florida slash pines, there might be an inclination to call them variants of wet flatwoods, but the combination of topography, seepage and cutthroat grass identify them as a seepage slope natural community type.

The first type of seepage slope in the park has cutthroat grass as a dominant grass cover. Oftentimes this grass is interspersed with rather robust saw palmetto and/or gallberry. Fetterbush and south Florida slash pine are usually abundant. Dwarf live oak, dwarf St. John's-wort and wax myrtle are often present but do not dominate. This phase requires frequent burning and uninterrupted lateral ground-water flow for maintenance (Bacchus, 1991). The trees and shrubs occurring here are largely the result of fire exclusion.

Cutthroat grass is still abundant in the fern groundcover seepage variant, but contrasts with the above type in having abundant ferns in the understory and with cabbage palms dominating the overstory along with slash pine. The longer name used by Abrahamson, et al. (1984) is the fern/slash pine/cabbage palm flatwoods. Chain fern

dominates the ground, with scattered patches of cinnamon fern and royal fern (*Osmunda regalis*). Besides cutthroat grass, other grasses sometimes occur, such as chalky bluestem *(Andropogon virginicus* var. *glaucus*) and maidencane. In depressions, pipewort (*Eriocaulon compressum*), arrow arum (*Peltandra virginica*), and grassleaf arrowhead (*Sagittaria graminea*) are found. The surface of the ground is extremely hummocky in this phase. Common shrubs and broad-leaved trees include wax myrtle, red maple and loblolly bay. Swamp tupelo occasionally can be found here. These species are typical of hardwood swamps, suggesting that with fire exclusion this phase might eventually develop into such a floristic association. Moreover, in some places hardwood trees have produced a dense canopy that has completely shaded out cutthroat grass.

Sandhill upland lake. These lakes are similar in shape to depression marshes in that they appear round from the air. At this park, sandhill upland lakes are distinguished from depression marshes by having water in them year round. Some have steeper sides. All occur on the Seven-Lakes property. They are typical karst solution depressions, occurring in sandy upland communities. Water depth may fluctuate during droughts. They are fed from groundwater seepage or artesian flow from underground aquifers. The nutrient levels in these lakes are usually very poor. They serve as habitat for amphibians, fish and birds. The extent to which these lakes have been affected by existing drainage ditches has not been determined. Declining groundwater in the region may exacerbate low water levels during droughty years. However, water levels in them have risen significantly since the hurricanes of 2004, and have remained high into 2006.

Blackwater stream. Little Charlie Bowlegs Creek flows through the park for approximately two miles. The name given on old maps of Florida to this creek, which flows through the western part of the hammock of the original park, was "Charlie Apopka." Little Charlie Bowlegs Creek, as it is now called, flows north of the park to join another creek to form what is known as "Big Charlie." About 3,960 feet of the drainage basin south of Little Charlie Bowlegs Creek has been canalized. Some of these canals are on parkland acquired in the last ten years. The 7,040 feet of the creek, north of the canalized drainage basin, is an undisturbed watercourse through the park, except for a dam in section 31.

Hereupon, two other drainageways are mentioned, although they are too small to be classified as streams. Historically, Tiger Branch flowed in a southwesterly direction and emptied into marshy flats in Section 5, to the east of Little Charlie Bowlegs Creek. Water from Tiger Branch was diverted by the CCC through the center of the hammock to reduce the fire risk in the hammock. Haw Branch arises in Double Lake, on the Seven-Lakes property, and drains northeast through privately owned land, to empty into the baygall in the southeastern part of the original park. It has also been channeled, on private land. Within the park, Haw Branch does not have a defined channel. Flow is dependent on rainfall. During drier years, flow ceases. It originates from upland

seepage.

Ruderal. Ruderal areas are characterized by having the natural substrate or the natural community overwhelmingly altered because of human activity. Native vegetation is sparse and is often replaced by weedy or exotic species. These areas generally require a long-term restoration effort. Former cattle pastures on the south property are conspicuous ruderal features in the park.

There is an old borrow pit in the southwestern part of the original park. It is about ten-feet deep. Pine trees have begun to grow along the edges and down into the pit.

Developed. Developed areas consist of natural communities that have been replaced by structures, and permanently cleared areas such as roads, visitor facilities, campgrounds, parking lots and concessions.

Designated Species

Designated species are those that are listed by the Florida Natural Areas Inventory (FNAI), U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FFWCC), and the Florida Department of Agriculture and Consumer Services (FDA) as endangered, threatened or of special concern. Addendum 5 contains a list of the designated species and their designated status for this park. Management measures will be addressed later in this plan.

Highlands Hammock State Park is rich in designated plant species: forty-six have been recorded. The southern location of the park places it at favorable latitude to harbor tropical plants such as strap fern (*Campyloneurum phyllitidis*), butterfly orchid and several bromeliads. Even more favorable to this lengthy list is the relic shoreline of an ancient sea, evident in the scrub and scrubby flatwoods communities spread along the eastern side of the park. Plants in these remnants of old sand dunes evolved in isolation over long periods, on islands off the coast of North America, when the sea covered most of the present day park. They remain isolated today in their sandy habitats long after the sea has receded. Garberia, scrub holly, scrub blazing star and scrub beargrass (*Nolina brittoniana*) are just a few of these scrub endemics. A few species, such as night-scent orchid (*Epidendrum nocturnum*), have not been seen in many years.

A recent report entitled "State of the Scrub" (Turner et al. 2006) about conservation of imperiled species related to Florida's Lake Wales Ridge, indicates that Highlands Hammock State Park is among the top five managed areas for protection of six endangered plant species, and one State threatened plant species (C. Kindell, FNAI, pers. comm.). In addition, the report indicates that the Park is a site of particular importance for, and vital to the conservation of, three plant species on the Lake Wales Ridge: *Polygala lewtonii*, *Schizachyrium niveum* and *Polygonella basiramia.*

As for designated animals, 46 species have been recorded. Florida panthers, wearing radio-transmitters, have been documented on occasion. These animals dispersed from the established population south of Lake Okeechobee. None has yet taken up residence in the vicinity around the park. One species requiring special management measures is the Florida Scrub-jay; a new plan for its management will be prepared to replace an initial, and now outdated, plan.

Special Natural Features

The hydric hammock, which caused the park to be established, must be considered a special natural feature. To the residents who settled in and around the small towns in Highlands County, which sprang up along the railroad that was built through it in the early twentieth century, the hammock was a forest of striking natural beauty, deserving of preservation as a public recreation site.

Part of the appeal must have been because hardwood forests with tall trees are uncommon in this region of dry, sandy soils. In a more northerly landscape where hardwood forests are widespread, it might not have been such a focus for public sentiment. However, the forest also appeals on its own aesthetic merits: the high canopy; the abundant palms; and the arching branches of live oak trees, festooned with bromeliads, make a captivating scene.

The hammock is also interesting ecologically because of the tropical understory plants, and because of its limestone substrate, pocked with solution features, which give rise to numerous, small swamps.

Another special natural feature is the abundant cutthroat grass in the park. Cutthroat grass is endemic to this region of Florida, being confined mainly to Highlands and Polk counties, with only a few outlying patches in adjacent counties. It becomes a dominant groundcover where soils are hydric due to prolonged saturation, and where seasonal inundation percolates laterally through the soil during the dry season and over the surface during the wet season. The conditions for this seepage are created by the sandy ridge topography in the counties named above. Most of the cutthroat grass that originally existed in Florida was eliminated when the sites where it grew were converted to agricultural use. Today it is protected in only a few public and private preserves. Several hundred acres have been preserved in Highlands Hammock State Park.

Cutthroat grass is a dense groundcover that will burn frequently, perhaps annually. In the absence of fire, trees and shrubs soon begin to produce a detrimental impact through shading. In the park, pine trees have grown up in cutthroat grass in a density much greater than is evident in old aerial photographs. Thinning the trees will be an important task for management. Elsewhere in the park, the hardwood trees of encroaching baygalls have developed a dense canopy over cutthroat grass, eliminating

it. At these sites, the bay trees must be removed so that cutthroat grass can recover.

Cultural Resources

Evaluating the condition of cultural resources is accomplished using a three part evaluative scale, expressed as good, fair, and poor. These terms describe the present state of affairs, rather than comparing what exists against the ideal, a newly constructed component. Good describes a condition of structural stability and physical wholeness, where no obvious deterioration other than normal occurs. Fair describes a condition in which there is a discernible decline in condition between inspections, and the wholeness or physical integrity is and continues to be threatened by factors other than normal wear. A fair judgment is cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action to reestablish physical stability.

The largest cultural resource, both in term of acreage and number of components, is the park itself, which has been open for public recreation and enjoyment since 1931, and since 1936 as a state park. Highlands Hammock State Park is significant in the twentieth century history of Florida as one of nine elements of the New Deal-inspired Florida state park system and as one of the physical expressions of early twentieth century recreation planning. Until the 1930s, the State of Florida sponsored, owned or operated parks as monuments or memorial facilities. The components of this early, first system of state parks were expressions of the deep ceremonial regard for fallen or defeated heroes of the Civil War and other conflicts. The New Deal era parks physically stated the idea that Floridians, increasingly members of an urban population, needed and indeed possessed a right to communion with Nature. That idea, one of the intellectual underpinnings of the conservation movement of the Progressive Era (1890 – 1920), realized its most widespread expression during the peacetime administrations of Franklin Delano Roosevelt (1933 – 1941).

The ideas of conservationists were made real as the Great Depression (1929 – 1941) brought widespread unemployment and near economic collapse. Floridians had already suffered nearly five years of unrelieved economic disasters, with Mediterranean fruit fly infestations, hurricanes and the collapse of the land boom bubble. In Sebring, the bursting of the bubble in 1927-1928 had an interim result of making undeveloped land available to civic-minded people who desired to "save" and create what was then called a "beauty spot". The Wall Street Crash of 1929 only confirmed that the whole nation faced hard times. Highlands Hammock, Inc., and its later partner, Florida Botanical Garden and Arboretum Assn. (1934) encountered insuperable difficulties in raising the funds needed to operate their dream attraction. The resulting Depression seemed to overwhelm Americans. Ending it seemed beyond the abilities of ordinary people, and programs to aid persons in serious want took the place of economic

development in many areas of the country, Florida among them.

Problem-solving programs in which people could play a part while contributing to the end of hard times gained popularity. Among those problems was two of particular importance: lack of employment opportunities for young men who were of an age to enter the job market, and the degradation of the land. Although the problem of unemployed young men was often described in terms of their inability to contribute to the support of their families, another aspect of the problem was what to do with an army of unskilled young men who had left school due to economic hardship and whose existence as unemployed persons would surely slow or even halt economic recovery.

The land, too, had fallen upon hard times. Although a Dust Bowl like that of the Great Plains never afflicted most of the rest of the country, almost all sections had experienced massive land and topsoil degradation. The South was particularly beset with the consequences of strip mining, timber exploitation, single crop agriculture and poor farming practices: sterilized landscapes, river floods, enormous erosion gullies and farm families forced to abandon a treasured way of life. The early organizers of Highlands Hammock, Inc. were stimulated into conservation by what they and most other southern land managers viewed as danger from near apocalyptic forest fires.

Among the New Deal programs organized to address aspects of the problems of youth unemployment, the CCC may have had the most emotionally profound effect. This agency hired the unskilled and unemployable young, put them to work under military administration, and employed skilled local men—hitherto unemployed—to transmit the rudimentary skills required to do a job. In Florida, The CCC took on two jobs, usually at the same time. The first was improving or restoring the degraded landscape (some of those actions are now frequently viewed as inappropriate land management actions), and the second, developing public recreation facilities according to professionally drawn master plans. An impressive collection of facilities was constructed throughout Florida, and considerable portions of those survive in daily use. Their builders, the young men of the 1930s, visit and revisit their creations regularly. They and many other park visitors consider the rustic appearance of CCC buildings as "real" park architecture. Florida's official memorial is the CCC Museum at Highlands Hammock State Park.

In 1933, the CCC installed Company 453 (Florida SP-3 and later SP-10) at a forestry camp at Lake Sebring. Development of the privately held Highlands Hammock, Inc. property was begun under an arrangement that improvements would receive perpetual care from the owners. In 1934 Highlands Hammock, Inc. was joined by Florida Botanical Garden and Arboretum, Inc. Between 1933 and the official dedication of Highlands Hammock State Park (March 30, 1936), CCC enrollees constructed the Herbarium and several structures in the park shop area, including the historic greenhouse, furthering the goals of Florida Botanical Garden and Arboretum, Inc. By

the time of the camp's disbanding in November 1941, over 24 structures ranging from a dam to family picnic shelters—most of the built environment present at the park today—was in place.

The Florida Master Site File (FMSF) lists 24-recorded cultural resources within the park. All are located within the original park. Highlands Hammock has not been surveyed for cultural resources; however, it was among the nine parks studied in the 1989 Survey of New Deal Era Resources in Florida State Parks. As a consequence, 24 structures (including a now-absent fire tower) within the park have been recorded and are now recognized among the most significant physical elements of the modern history of public recreation planning and construction in Florida. The specific resources, listed by park building numbers, are:

1. 03601, Residence, (8HG655)
2. 03603, Concession, (8HG649)
3. 03604, Residence, (8HG657)
4. 03605, Residence, (8HG664)
5. 03606, Interpretive Center, 8HG650)
6. 03608, Herbarium, (8HG642)
7. 03609, Picnic Shelter 2, (8HG659)
8. 03611, Latrine 1, (8HG647) 6
9. 03613, Picnic Shelter 3, (8HG653)
10. 03614, Pump House, (8HG654)
11. 03615, Green House, (8HG643)
12. 03617, Lumber Shed, (8HG646)
13. 03618, Truck Shed, (8HG644)
14. 03619, Paint & Tool (8HG645)
15. 03623, APM Residence, (8HG663)
16. 03626, Vehicles, (8HG660)
17. 03634, Latrine 2, (8HG648)
18. 03640, Residence, (8HG658)
19. 03641, Residence, (8HG659)
20. 03642, Garage, (8HG656)
21. nn, Fire Tower (Absent), (8HG662)
22. nn, Lumber Shed, (8HG661)
23. nn, Picnic Shelter 1, (8HG651)
24. Site 8HG635

The park also maintains a collection of museum objects, composed of historic artifacts and natural history specimens, largely housed within the CCC Museum (Building 6). The objects are used in exhibits and interpretive programs about the work of the Civilian Conservation Corps and CCC enrollees throughout Florida and about the natural communities of the park.

The 1989 Survey authors were apparently confused in differentiating between a few of the park buildings, and their report reflects that confusion. Further, additional remnants of CCC or possibly earlier developmental work exist, unrecorded, as decorative stonework, bridge abutments, culverts, sewers and water control structures. The Vesper Ground, or open-air amphitheater, is also unrecorded.

RESOURCE MANAGEMENT PROGRAM

Special Management Considerations

Timber Management Analysis

Chapters 253 and 259, Florida Statutes, require an assessment of the feasibility of managing timber in land management plans for parcels greater than 1,000 acres if the lead agency determines that timber management is not in conflict with the primary management objectives of the land. The feasibility of harvesting timber at this park during the period covered by this plan was considered in context of the Division's statutory responsibilities, and an analysis of the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish old-growth characteristics to the degree practicable, with the exception of early successional communities such as sand pine scrub and coastal strand.

Much of the timber management discussed in the October 15, 2001 approved management plan has been implemented. In summary, north Florida slash pines were planted in the park in 1956, quite densely in some places. The trees were not adapted to this site and as they aged, they experienced high mortality under prescribed burning. They were removed. Elsewhere in the park, mechanical treatment of saw palmetto ground cover has been applied, or will be applied. Where pine trees are too close together to admit the equipment, trees will be thinned. In addition, sand pines in some areas have been removed, and slash pines have been thinned to facilitate Florida Scrub-jay management. Slash pines have also been thinned where dense canopy cover has shaded cutthroat grass communities. Finally, sand pines have also been removed from particular scrub communities because of hurricane damage, or so that prescribed fire can be re-introduced.

Additional Considerations

Additional acquisitions are needed at this park, most importantly to connect the two disjunct parcels that are presently separated by about half-a-mile. Beyond that, the acquisition of adjacent lands is needed to acquire the upper drainage basin south of the park, so that the best possible scheme of hydrological restoration can be devised. Adjacent Florida Scrub jay habitat is also needed so that additional numbers of birds can be brought under protection. The needed properties referred to here, and more besides, are identified on a SWFWMD, Save our Rivers project that would purchase a large tract, north and south of the park to protect the Charlie Creek Watershed.

Another consideration is the need to remove miles of interior fences on the south property, which remain from previous cattle operations.

Management Needs and Problems

A top priority is the removal of invasive exotic plants. Several species that have the

potential to destroy natural communities represented in the park are now established. These are cogongrass, climbing fern, air potato, Dianella lily and soda apple. These plants spread rapidly and will become the dominating biomass over large areas of the park if not eliminated. Dianella lily is perhaps unique to this park. Because of its former slow rate of spread, it was long overlooked as a serious threat, but during the last ten years, it passed a threshold; the rate of spread has accelerated, and the plant is dispersed throughout the park.

One other species with pernicious characteristics, but which spreads at a slower rate, is coral ardesia. Coral ardesia is a hammock understory shrub that has been spreading in Florida in the last two decades. A concentrated attack against this species must be mounted.

Exotic plant species that are somewhat confined at present, and slower to spread, are bamboo, Japanese climbing fern, ginger lily and Guinea grass. Although less prevalent, some of these are dangerous and must be removed.

Most *Phoenix reclinata* palms that were visible from the park drive, and from the nature trails, have long since been eliminated. However, these trees are still widespread in the hydric hammock, in obscure locations, and may be increasing, as many of them are of small to medium height. They must be eliminated.

The feral hog is the most problematic exotic animal. It occurs in small numbers, but causes disproportionate damage by widespread rooting in the hammock substrate. Nine-banded armadillos are present, and walking catfish have been documented but are not often seen.

The Mexican bromeliad weevil (*Metamasius callizona*) has reached the park and is destroying many bromeliads. There is at present no way to eliminate this pest.

Another very high priority for management is restoring mesic flatwoods. The actions of most importance in this project will be prescribed burning, selective thinning of pine trees, and mechanical treatment of saw palmettos.

When Highlands Hammock was created as a park in the 1930s, woodland fires were regarded as destructive and rigorously suppressed. The policy of fire-suppression remained in effect until the early 1970s. Excluding fire from the pinewoods, which had experienced frequent fires for millennia, produced vegetative changes. Broad-leafed trees began to encroach, shading the ground. Saw palmettos, once small and scattered began to grow higher and more densely, displacing grasses and herbaceous plants. The altered state of the pine forests led to a degraded habitat for some plant and wildlife species, and is often a greater fire hazard because of the accumulation of plant matter that becomes a potential fuel when dried out.

To reverse these undesirable changes, fire is applied under controlled conditions. Much progress has been achieved toward restoration of the communities in the past three decades. However, the park has been greatly enlarged in recent years, challenging the capacities of a limited park staff. The newly acquired pine forests must be burned with care because of the large amount of accumulated fuel.

In the 1970s, it was thought that the reintroduction of fire would restore the pine forests to a primeval condition. Although fire killed the encroaching hardwoods, it did not reduce the height and density of saw palmettos. That requires mechanical treatment, usually by a tractor pulling a roller-chopper. This work has been started at Highlands Hammock State Park**.** It is essential to the restoration of mesic flatwoods.

An impediment to the mechanical treatment of saw palmettos was created by pine plantations. Several plantations were established during the 1950s. The trees were planted in rows, very close together, and they were North Florida slash pines, which are not suited to long-term survival so far south. The plantations have been removed. At other locales, where pine trees are too thick to permit the passage of a tractor, they need to be thinned. In some places, where oak trees have grown up in the flatwoods during decades of fire exclusion, they need to be removed.

Another need is Florida Scrub-jay management. This species is dependent on the scrubby flatwoods natural community in an early stage of succession. The scrub natural community (commonly called sand pine scrub) will also support jays in the aftermath of a fire that has killed the sand pines. Although sand pines have been removed from most of the scrub and scrubby flatwoods in the park, and slash pine trees have been thinned in scrubby flatwoods, and scrub oaks and palmetto have been mechanically treated, the sites have not yet been prescription burned. There are at present only a few Scrub jays in the park. These include jays in two families with territories on adjacent private land that overlap the park, and one family with a territory almost entirely in the park. None of these three territories is adjacent to one another. Because of the few birds, monitoring has been done opportunistically, but at least once per year. There is a need to manage for more jays to function as part of a meta-population. Other families inhabit conserved land within dispersal distance of the park. In addition, managing scrubby flatwoods communities for Florida Scrub-jays will insure the survival of several other species that are dependent on the scrubby flatwoods.

Another need is for hydrological restoration where feasible. Drainage ditches will be filled to restore the pre-drainage hydrology on the south property. Large basin marshes have been brought within the park boundaries in the last 10 years. The marshes have been drained by miles of canals and ditches. The acreages are approximate because portions of these marshes have succeeded, or are succeeding, to hammock as hardwood trees encroach at the periphery. Proper management, in addition to restoring the pre-

drainage hydrology, will require reintroducing fire. The marshes must be burned soon to halt and reverse the hardwood encroachment, which may have accelerated due to the recent removal of cattle. Marshes probably need burning less frequently than flatwoods, but scheduling is more problematic because long hydroperiods and saturated soil (moderated in this instance by drainage) render marshes frequently unburnable, and concern about muck fires proscribes burning during dry periods. Scheduling prescribed fire will have to be flexible to take advantage of favorable conditions, and must to a degree be empirical, weighing the impact of encroachment by trees and shrubs. However, fire should not be absent for more than ten years, at most, and much shorter burn intervals are desirable.

Another need is the thinning, or removal, of pines and hardwoods, from cutthroat seeps to ensure the perpetuation of cutthroat grass, and halting erosion caused by roads and firelanes on the sloping ground of this natural community.

The hooded pitcher plant (*Sarracenia minor*) is near the southernmost extent of its range in this locale. A survey of pitcher plants in the Florida State Park System in 2000 could locate only 16 individuals. The report speculated that the population may have been reduced due to drainage and feral hogs and was in extreme peril (Johnson 2000). However, a subsequent survey documented approximately 800 plants in three discrete locations (Alvarez 2003). A number of additional plants have been found in a seepage slope community on the recently acquired east property. The community is overgrown with woody vegetation due to long fire exclusion. With proper management at this site, and others, many more plants may appear. Monitoring will continue at intervals.

Finally, there is need to consider restoration of ruderal agricultural areas, especially extensive in the recently acquired south property.
As for cultural resources, a resurvey and condition assessment of early resources (dating from before 1945) would provide management with important guidance in future planning or construction activities and facilitate any rehabilitation or restoration of structures. A comparison of the original master plan, historic revision plans and historical photographs with present mapping and inventory would protect the integrity of the cultural landscape.

A comprehensive, park wide program of periodic evaluations and cyclical maintenance can assist resource managers in identifying and tracking problems characterized by slow deterioration. Regularly scheduled cyclical maintenance enables management and staff to protect historical assets by mobilizing general and targeted maintenance, repairs or construction before further decline of structural conditions.

Most structures in the park exhibit a high degree of integrity. They are both whole and largely original. General exceptions are roofs, for example, the roof of the Assistant Park Manager's house (Bldg. 23). A roof, however, is a replaceable element, a reversible

alteration, so long as sound original or historical materials were not replaced and the design silhouette of the structure has not been altered. All except two structures in the park were in fair condition. The Guest Cottage (Bldg. 41) and its nearby storage building were observed to be in poor condition. Each was in need of concentrated maintenance attention, which would likely bring both structures into fair condition and allow ordinary, cyclical maintenance to meet most future needs.

Cultural resource surveys associated with future development in the park are likely to yield additional information about Florida's past and assist in the preservation of the sites. Two archeological sites have been associated with the park. One is a prehistoric burial mound (HG00635), and the other is a Middle Archaic artifact scatter site (HG00708) along the park's boundary. Archeological monitoring near known and suspected sites is necessary before/during ground disturbance or fire lines are constructed. Known sites should be identified on prescribed fire maps.

Management Objectives

The resources administered by the Division are divided into two principal categories: natural resources and cultural resources. The Division primary objective in natural resource management is to maintain and restore, to the extent possible, to the conditions that existed before the ecological disruptions caused by man. The objective for managing cultural resources is to protect these resources from human-related and natural threats. This will arrest deterioration and help preserve the cultural resources for future generations to enjoy.

Natural Resources

1. For invasive exotic plants, the management objective is to show significant progress in eliminating soda apple, bamboo, Guinea grass, ginger lily, climbing fern and Japanese climbing fern within one year. Progress in eliminating *Phoenix reclanata* palms should be well underway within three years. Within five years, significant progress should be made in eliminating cogongrass, coral ardesia and Dianella lily. For air potato, the objective is to remove all above ground biomass within five years. Experience has shown that many years may pass before all tubers can be dug from the ground, which is necessary to eliminate this plant. The objective with the air potato tubers is a continuous effort until they are entirely removed.
2. Populations of feral hogs and nine-banded armadillos should be held to the lowest possible numbers. For walking catfish, no control measures are known.
3. Mesic flatwoods and seepage slopes should be returned to a condition that prevailed before changes brought about in modern times, by reducing densities of pine trees and saw palmettos, and applying prescribed burning.
4. The objective of prescribed burning is to employ it in pyric communities throughout the park at appropriate fire-return intervals for each community, and as a tool for managing Florida Scrub jays and listed plant species.

5. Hooded pitcher plants should be monitored as one measure of the success of management for listed species.
6. A management plan that includes monitoring should be developed for imperiled plant species associated with scrub and scrubby flatwoods.
7. The objective for managing basin marshes is to restore their hydrological functioning and reintroduce fire to halt and reverse encroachment by hardwood trees. The early use of fire is imperative. The objective for cutthroat grass is to ensure the perpetuation of cutthroat grass
8. A hydrological restoration plan should be prepared that would include procedures for halting erosion on seepage slopes.
9. The objective for water quality testing is to characterize the chemical parameters of the water from agricultural drainage flowing into the park. The need for soil testing around the location of the cattle dip vat should be ascertained.
10. A new plan should be prepared to replace an initial plan, now outdated, that outlines the ways and means of building upon previous habitat restoration and management and that includes a monitoring strategy.
11. Gopher tortoise burrows should continue to be mapped after prescribed burns.
12. An objective-based vegetation management (OBVM) approach should be evaluated as a means of quantifying restoration goals for selected natural communities.
13. The objective for restoring ruderal agricultural land is to begin successional changes that will eventually result in the appropriate native ground cover.
14. The objectives of fencing park boundaries are to discourage illegal trespass, especially by all-terrain vehicles, delineate firelines and prevent encroachment.

Cultural Resources

1. An appropriate survey of cultural resources will be undertaken and completed at sites of future development, as determined by Division of Historical Resources guidelines, the Operations Manual, and other agency directives, policies and procedures.
2. A routine, regular program of monitoring cultural resources to record their condition should be instituted.
3. A program of cyclical care should be instituted for museum collection objects.
4. Concentrated maintenance attention to the two historic structures that are in poor condition, Buildings 41 and 26, should be a priority, and they should be brought into fair condition and thereafter undergo ordinary, cyclical maintenance.
5. A program of cyclical maintenance of cultural resources should be instituted.
6. The collection of museum objects at the park should be cataloged according to established Division standards.
7. A cultural landscape plan for the park will be developed and implemented to protect the integrity of the CCC developed areas as elements in the cultural landscape.
8. A program of monitoring museum collection objects should be instituted.

9. Architectural, as well as engineering evaluation where appropriate, should be conducted on historic resources.
10. Design drawings and budget estimates will be necessary to accomplish restoration or adaptive rehabilitation projects, including modifications to provide universal accessibility.
11. Funds should be identified for use in maintaining the historic integrity of structural cultural resources and should be identified for regular use in conserving museum collection objects, including natural history specimens.
12. The park's CCC resources will be included in a nomination of the State's New Deal Era parks to the National Register of Historic Places as a multiple or thematic resource.
13. Interpretive programs will be developed to explain the origin of the New Deal Era parks, and relate origins to current environmental issues.
14. With the cooperation of the Florida Trust for Historic Preservation, DHR, federal agencies, local educators and local trades, technical curricula will be developed for historic preservation training.

Management Measures for Natural Resources

Hydrology

The district biology staff will continue to prepare a plan for hydrological restoration, requesting assistance from other agencies as appropriate. The plan will address restoration of ditches caused by erosion of roads and firelanes on seepage slopes northwest of the shop compound. It will also address restoration of canals and ditches that drain marshes and swamps in the Little Charlie Bowlegs watershed.

The district biology staff will investigate measures to initiate water quality sampling for sources originating on adjacent agricultural land.

Prescribed Burning

The objectives of prescribed burning are to create those conditions that are most natural for a particular community, and to maintain ecological diversity within the unit's natural communities. To meet these objectives, the park is partitioned into burn zones, and burn prescriptions are implemented for each zone. The park burn plan is updated annually to meet current conditions. All prescribed burns are conducted with authorization from the Department of Agriculture and Consumer Services, Division of Forestry (DOF). Wildfire suppression activities will be coordinated between the Division and the DOF.

Prescribed burning will be continued as before, with an updated burn plan, which will identify burn zones in all newly acquired lands in the park, including basin marshes. For managing Florida Scrub jays, a specific burn regime will be instituted, targeting individual scrub and scrubby flatwoods communities.

In preparation for re-introducing prescribed burning in some zones, park staff and biologists will work with DOF to implement logging to reduce pine tree density. Thereafter, saw palmetto density will be reduced by mechanical means such as roller chopping. Where new fire lines need to be constructed along park boundaries and individual burn zones (e.g. Seven-Lakes property), soil disturbance activity will need to be sensitive to cultural resources.

Designated Species Protection

The welfare of designated species is an important concern of the Division. In many cases, these species will benefit most from proper management of their natural communities. At times, however, additional management measures are needed because of the poor condition of some communities, or because of unusual circumstances that aggravate the particular problems of a species. To avoid duplication of efforts and conserve staff resources, the Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species. Specifically, data collected by the FFWCC and USFWS as part of their ongoing research and monitoring programs will be reviewed periodically to inform management of decisions that may have an impact on designated species at the park.

Most designated species, whose welfare can be affected by park management, will likely receive adequate attention through the ordinary prescriptions for natural resource management outlined in this plan. However, as mentioned above, the welfare of a suite of rare plants, including six Federal and State endangered plants and one State threatened plant is particularly dependent on the protection that Highlands Hammock State Park has provided. Therefore, for these the goal will be to develop a management plan that will include a monitoring strategy, within the first year after approval of this plan. Any USFWS recovery plans that have been developed will be used for guidance.

The Florida Scrub-jay will require the development of a new plan to replace an initial plan that was drafted in 1999-2000. Six zones were identified in the initial plan and were used to prioritize management activities that included harvest of sand pine, mechanical treatment of scrub oaks and palmetto, and prescribed burning. Although some management has occurred in all six zones, prescribed burning remains to be applied in most. The initial draft plan is now obsolete, and a new plan should be prepared within the first 18 months after approval of this plan. A monitoring strategy should be included in the plan.

A keystone species, in scrub and scrubby flatwoods especially, is the gopher tortoise. Its burrows are mapped after prescribed burns when they are easily detected. Approximately half of the burn zones in the original park have been mapped for burrows, and mapping will continue in the association with prescribed burning.

A new approach to the restoration of natural communities makes use of Objective-

based Vegetation Management (OBVM), a program that quantifies the existing vegetative composition in selected communities and then postulates a quantitative goal. This innovation has recently been implemented in several management units of the Florida Fish and Wildlife Conservation Commission. It attempts to identify management goals for natural communities with greater precision than in the past. The first step is an initial inventory, followed by an assessment of historical conditions. This approach will be evaluated as a tool to guide management of habitat for Florida Scrub jays in the park. If implemented, specialists will have to be employed who will interact with park staff and district biologists in determining goals.

Exotic Species Control

Exotic species are those plants or animals that are not native to Florida, but were introduced because of human-related activities. Exotics have fewer natural enemies and may have a higher survival rate than do native species, as well. They may also harbor diseases or parasites that significantly affect non-resistant native species. Consequently, it is the strategy of the Division to remove exotic species from native natural communities.

Measures for the elimination of exotic plants will be carried out by following a plan, recently prepared for that purpose. The plan consists of several maps showing the distribution of the target species in the park accompanied by a text that provides guidance as to schedule and sequence for elimination of the plants. Measures will also include the seeking of funds for contract removal, especially regard to the five worst invaders. However, contracted removal should include all exotics within the specified zone.

As for improved bahiagrass pastures, consideration will be given to a cattle-grazing lease program as a means for replacing exotic grass with native ground cover. One suggestion is to offer an annual lease at no cost except that the cattleman pays for restoration of a portion of the pasture. A smaller amount of pasture is leased each year and the area recently grazed is restored.

Control of feral hogs and nine-banded armadillos is accomplished as specified in the Division's Resource Management Policy for control of exotic animals.

Problem Species

Problem species are defined as native species whose habits create specific management problems or concerns. Occasionally, problem species are also a designated species, such as alligators. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species that are considered a threat or problem. There are no problem species at this park.

Management Measures for Cultural Resources

The management of cultural resources is often complicated because these resources are

irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. Approval from Department of State, Division of Historical Resources (DHR) must be obtained before taking any actions, such as development or site improvements that could affect or disturb the cultural resources on state lands (see DHR Cultural Management Procedures).

Actions that require permits or approval from DHR include development, site excavations or surveys, disturbances of sites or structures, disturbances of the substrate, and any other actions that may affect the integrity of the cultural resources. These actions could damage evidence that would someday be useful to researchers attempting to interpret the past.

Specific management measures for the Highlands Hammock State Park cultural resources are:

1. Develop a comprehensive knowledge base of New Deal Era resources on park lands.
2. Catalog museum collection objects and maintain the catalog.
3. Develop and adopt a Scope of Collections Statement, per Chapter 16, Operations Manual.
4. Develop a cyclical maintenance plan.
5. Protect or restore the structural integrity of the surviving structures, with buildings 41 and 26 among the top priorities.
6. Soil disturbance associated with natural resource management, such as construction of new fire lines, will need to follow policy and procedures designed to protect cultural resources in unsurveyed areas.
7. Park management will utilize DHR guidelines and review agency policy, procedure and directives to initiate surveys of cultural resources at sites of future development anywhere in the park.
8. Study and map drainage systems.
9. Preserve, and restore if necessary, the cultural landscape. For example, live oak trees should be planted and maintained at the four corners of the common grounds between the Museum and the restaurant concession. The definitive period of significance established for the park is the CCC period. The cultural landscape plan for the park will acknowledge the significance of this period.
10. The Cultural Resource Plan will record the additional remnants of CCC or earlier work that exist in the park but are unrecorded, such as decorative stonework, fences, hydrologically related structures and the open-air amphitheater.
11. Develop interpretive programs about the New Deal Era parks, and design and budget for universal accessibility.
12. Initiate contacts with appropriate agencies to develop curricula for historic preservation training.

Research Needs

Natural Resources

Any research or other activity that involves the collection of plant or animal species on park property requires a collecting permit from the Department of Environmental Protection. Additional permits from the Florida Fish and Wildlife Conservation Commission, the Department of Agriculture and Consumer Services, or the U.S. Fish and Wildlife Service may also be required.

1. Research will be needed to specify the best course for hydrological restoration.
2. As management tasks are undertaken for the Florida Scrub jay, and a program of monitoring is implemented, research may be needed to identify new management strategies.

Cultural Resources

1. Research about local conditions during the 1920-1941 period should be compiled and the results used in developing public interpretive programs.
2. Specific research about the CCC enrollees who built the park should be undertaken in order to document these resources to the most complete extent possible. The results should be incorporated into the interpretive programs of the park, made available to the public and interested scholars and shared with the area historical community.
3. A development history of the park, covering the period from the end of World War I to the closure of the CCC camp, including plans, maps and photographs should be undertaken.

Resource Management Schedule

A priority schedule for conducting all management activities that is based on the purposes for which these lands were acquired, and to enhance the resource values, is contained in Addendum 6. Cost estimates are based on the most cost effective methods and recommendations currently available.

Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation, and recreation lands titled in the name of the Board of Trustees of the Internal Improvement Trust Fund (board) are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032, the board of trustees, acting through the Department of Environmental Protection (department). Highlands Hammock State Park was subject to a land management review on February 23, 2000. The review team found that the park is being managed for the purpose for which it was acquired and the actual management practices, including public access, complied with the management plan.

LAND USE COMPONENT

INTRODUCTION

Land use planning and park development decisions for the state park system are based on the dual responsibilities of the Division of Recreation and Parks. These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide outdoor recreation opportunities for Florida's citizens and visitors.

The general planning and design process begins with an analysis of the natural and cultural resources of the unit, and then proceeds through the creation of a conceptual land use plan that culminates in the actual design and construction of park facilities. Input to the plan is provided by experts in environmental sciences, cultural resources, park operation and management, through public workshops, and environmental groups. With this approach, the Division objective is to provide quality development for resource-based recreation throughout the state with a high level of sensitivity to the natural and cultural resources at each park.

This component of the unit plan includes a brief inventory of the external conditions and the recreational potential of the unit. Existing uses, facilities, special conditions on use, and specific areas within the park that will be given special protection, are identified. The land use component then summarizes the current conceptual land use plan for the park, identifying the existing or proposed activities suited to the resource base of the park. Any new facilities needed to support the proposed activities are described and located in general terms.

EXTERNAL CONDITIONS

An assessment of the conditions that exist beyond the boundaries of the unit can identify any special development problems or opportunities that exist because of the unit's unique setting or environment. This also provides an opportunity to deal systematically with various planning issues such as location, regional demographics, adjacent land uses and park interaction with other facilities.

Highlands Hammock State Park recorded 189,633 visitors in FY year 2004-05. Visitation has trended upward over the last ten years with a net increase of 11 percent during this period. Visitation peaks from January through March, corresponding to trends in the snowbird population. By Division estimates, FY 2004-05 visitors contributed $7.1 million in direct economic impact and the equivalent of 143 jobs to the local economy (Florida Department of Environmental Protection, 2005).

Existing Use of Adjacent Lands

Highlands County is largely a rural/agricultural community with the majority of

development concentrated along the U.S. Highway 27 corridor. Single-family residential communities dominate land uses to the east of the park. A golf course community is situated immediately northeast of the boundary. Undeveloped and agricultural uses lie immediately to the north, west and south with a number of active orange groves scattered throughout the area. Pasture, scattered residences on large undeveloped lots, an orange grove and a second golf course community are located on lands between the original property and the south property.

The park has a number of county roads bisecting it. Hammock Road to the west runs along the county line, cutting through the northwest corner of the original park. County Road 634 runs east west through the original park, a portion of which is unpaved and maintained by Highlands County. This road is a major commuting route to Sebring and serves as the entrance road to the park. Speed humps have been installed to slow traffic approaching from the east. As a public road, the park does not have the ability to close off its entrance outside of normal operating hours, although park connector roads, such as the campground and the loop drive, are closed at sundown. Local government abandonment of this roadway would improve park operations. County Road 635 runs north-south and divides the original park from the east and Seven-Lakes properties. Vaughn Road runs through the south property and has been closed to through traffic where the park borders the road on both sides. County Road 66 defines the boundary of the south property.

The various land uses surrounding the park all impact park resources, the visitor experience and park operations to varying degrees. Visual character and noise are affected by urban development and associated traffic. Adjacent neighborhoods present challenges to implementing the park burn program and provide potential sources of exotic species. Residential development and agricultural uses affect local hydrology and contribute to water quality and quantity problems through water use, runoff and land clearing. Little Charlie Bowlegs Creek, Haw Creek and Tiger Branch all run through private property before reaching the park. Water in these creeks affects the health of the natural communities within the park.

Planned Use of Adjacent Lands

The Future Land Use Map for Highlands County allows for an increase in mixed use adjacent to the park's southeast boundary and expansion of medium density residential uses along the east boundary (Highlands County Comprehensive Plan, 2003). Although this is in keeping with the current land use pattern, intensification in use and traffic should be anticipated due to the continuing population growth of this region.

Transportation plans for Highlands County have identified a number of new alignments and roadway improvements near the park. These improvements have the potential to complicate the use of prescribed fire, impede wildlife corridors and

habitats, impact hydrology and further fragment the park. Of particular concern are plans for the northern extension of County Road 635 and the four-laning of County Road 634.

Future development patterns in the area may exacerbate the problems outlined above associated with existing human uses of adjacent lands. Division staff will monitor proposed comprehensive plan amendments, zoning changes, development plans and road alignment proposals with the potential to affect the natural and cultural resources of the park or the park visitor experience. It will become increasingly important to ensure the interests of the park are considered in the land use regulation and development processes.

PROPERTY ANALYSIS

Effective planning requires a thorough understanding of the unit's natural and cultural resources. This section describes the resource characteristics and existing uses of the property. The unit's recreation resource elements are examined to identify the opportunities and constraints they present for recreational development. Past and present uses are assessed for their effects on the property, compatibility with the site, and relation to the unit's classification.

Recreation Resource Elements

This section assesses the unit's recreation resource elements those physical qualities that, either singly or in certain combinations, supports the various resource-based recreation activities. Breaking down the property into such elements provides a means for measuring the property's capability to support individual recreation activities. This process also analyzes the existing spatial factors that either favor or limit the provision of each activity.

Land Area

The uplands of Highlands Hammock consist of natural communities that vary from sandhill to dome swamp. Elevation changes with the communities from 80 to 150 ft. above sea level. Geologically, it is part of Lakes Wales Ridge. The original park is developed with trails, camping, picnicking facilities and the historic CCC buildings. The hydric hammock is the major attraction in the original park. Remaining areas of the park were more recently acquired and present a broad array of recreational and educational opportunities.

Water Area

There are three blackwater streams in Highlands Hammock State Park: Little Charlie Bowlegs Creek, Haw Branch and Tiger Branch. The natural hydrology of these streams has been considerably modified, as noted earlier in the Hydrology section.

Natural Scenery

The visual resources of this state park are exceptional, the most notable being the

hydric hammock. The dense canopy of the hammock filters the light giving visitors a unique visual experience. The hydric hammock and the contrast with the mesic flatwoods present the visitor with a rare opportunity to experience two very different environments in close proximity. The interpretative trails allow visitors to view many of these natural communities and their inhabitants at close range. The visual character of this state park provides a quality setting for nature observation, scenery appreciation and nature photography.

Significant Wildlife Habitat

The park has documented forty-six designated animal species. The Florida Scrub jay is the only species requiring special management measures. The Florida panther is an occasional visitor. The park has been designated an Important Bird Area by Audubon of Florida and is a stop on the East Section of the Great Florida Birding Trail.

Natural Features

The most significant of the natural features in the park is the approximately 690 acres of hydric hammock. The abundant cutthroat seeps and upland natural communities, especially sandhill and scrub, are of utmost regional importance since the park is one of the few remaining areas in the region where these communities remain.

Archaeological and Historical Features

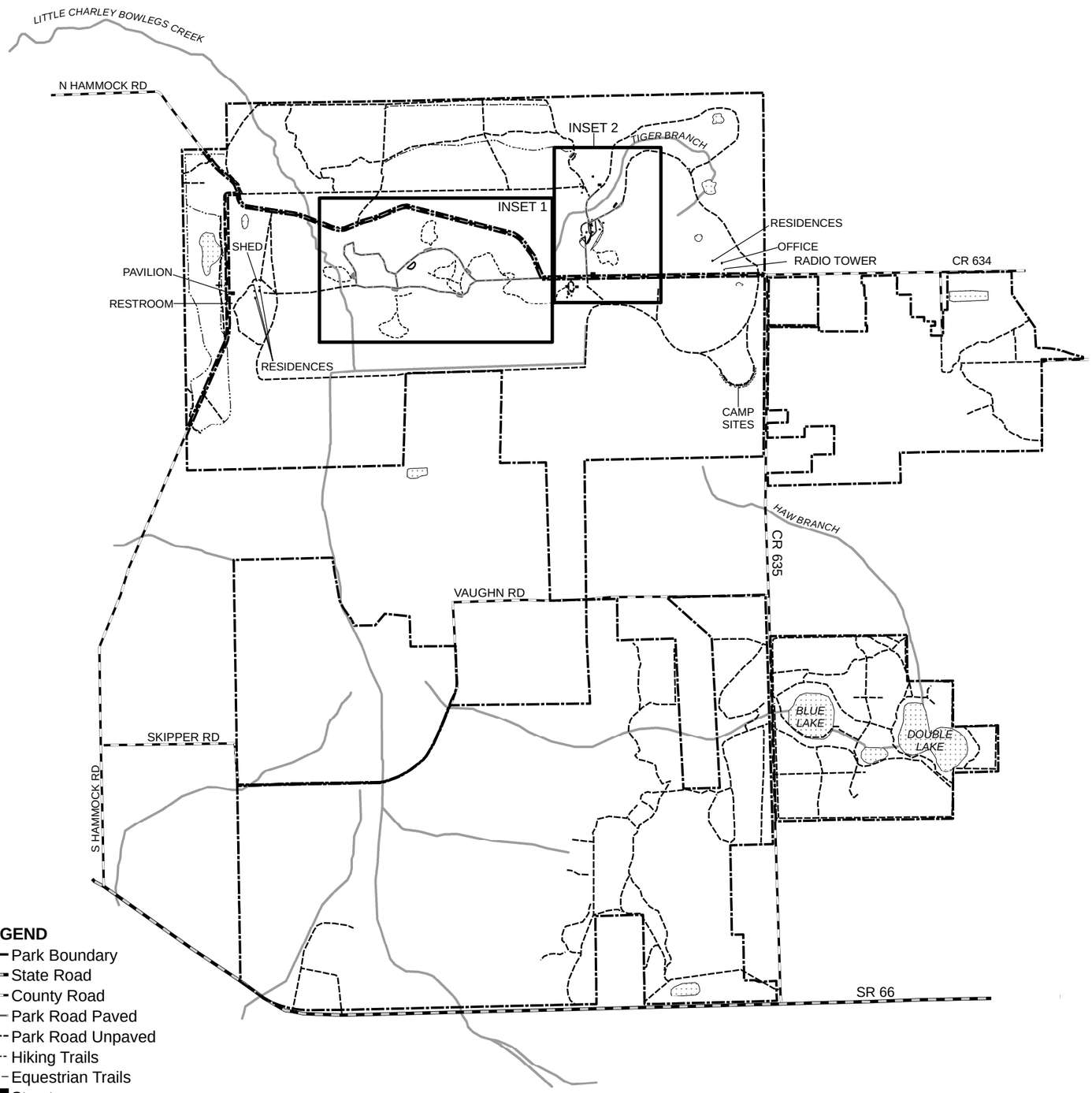
As noted earlier, twenty-four sites of pre-historic and historic importance are included in the Master Site File for Highlands Hammock State Park. It is one of the original nine parks in the Florida State park system. In 1933, the CCC installed Company 453 (Florida SP-3, and later State Park-10) near Highlands Hammock. Between 1933 and 1941, over twenty-four structures, including a dam, herbarium, picnic shelters and other structures were constructed.

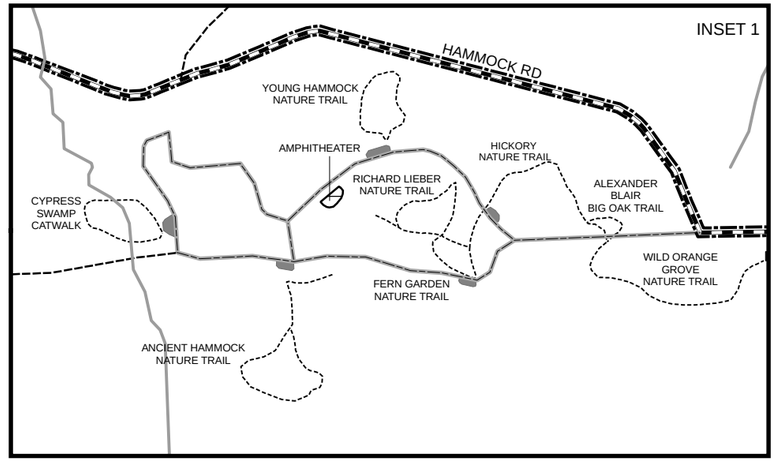
Assessment of Use

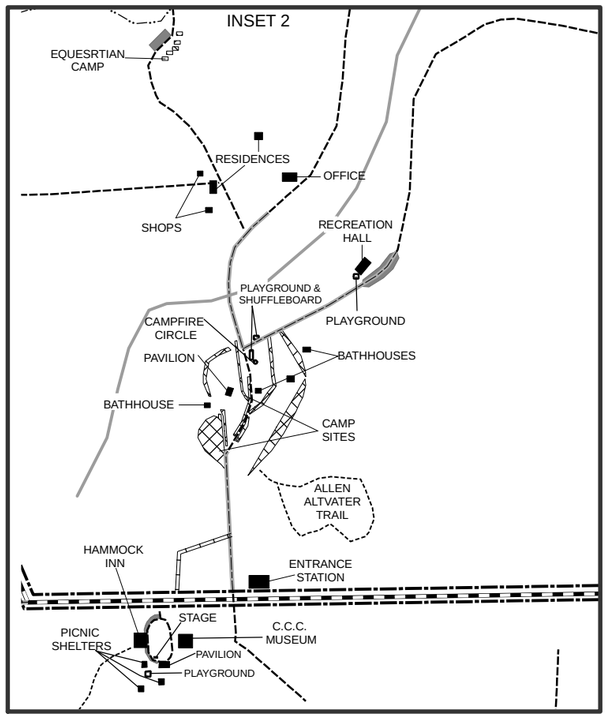
Past uses of the park, land administration issues, applicable zoning and future land use designations, current recreational activities and visitor programs, established protected zones, and existing facilities are briefly described in the following sections. All legal boundaries, structures, facilities, roads and trails existing in the unit are delineated on the Base Map.

Past Uses

The Florida Forest and Park Service began operating Highlands Hammock as a state park on August 1, 1935. Before that, Highlands Hammock was a private park owned and financed by Highlands Hammock, Inc., composed of local citizens, and the later partner Florida Botanical Garden and Arboretum Association. This private park was opened to the public in March 1931. By 1935, funding difficulties convinced the association's board to place the park in state custody. As noted earlier, between October 1936 and 1941 a CCC camp was set-up near Highlands Hammock and







LEGEND

- Park Boundary
- State Road
- County Road
- Park Road Paved
- Park Road Unpaved
- Hiking Trails
- Equestrian Trails
- Structures
- Parking Lots
- Camp Sites

N

0 1,250 2,500 5,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

HIGHLANDS HAMMOCK STATE PARK

BASE MAP

construction of many of the existing buildings occurred.

Current Recreational Use and Visitor Programs

The recreational uses currently available include picnicking, hiking, bicycle and horseback riding, camping, and natural and cultural history interpretation. The park offers a variety of programs to enhance visitor understanding of park resources including guided walks and bike rides, campfire slide shows and tram tours. The park hosts a variety of special events with the support of the park volunteer citizen support organization, Friends of Highlands Hammock, Inc. The park's most notable event is the annual Civilian Conservation Corps Festival held every November.

Protected Zones

A protected zone is an area of high sensitivity or outstanding character from which most types of development are excluded as a protective measure. Generally, facilities requiring extensive land alteration or resulting in intensive resource use, such as parking lots, camping areas, shops or maintenance areas, are not permitted in protected zones. Facilities with minimal resource impacts, such as trails, interpretive signs and boardwalks are generally allowed. All decisions involving the use of protected zones are made on a case-by-case basis after careful site planning and analysis.

At Highlands Hammock State Park all Critically Imperiled (S1), Imperiled (S2), wetland, lacustrine, riverine and scrubby flatwoods communities, and the park's namesake hammock in the original portion of the park have been designated as protected zones as delineated on the Conceptual Land Use Plan.

Existing Facilities

Highlands Hammock is one of the first state park established in Florida. At present, recreation opportunities are concentrated in the area that was originally established as a park. Many of the structures, built through the CCC program, have been preserved. The recently completed statewide CCC Museum is located in one of these buildings. The museum serves as an excellent resource for cultural interpretation at the park. A similar building, located across a central green, houses the Hammock Inn, a restaurant operated by a contracted visitor service provider. Tram tours through the hammock and flatwoods leave from this area. At the back of this green is a picnic area with pavilions built both by the CCC and of construction that is more recent.

Camping is a popular recreational activity at the park. The park contains a 138 site standard campground with four bathhouses. Most of these facilities are quite old with the exception of one bathhouse that was recently built. Additional amenities include a shuffleboard court, campfire circle, playground and a dump station. A paved access road runs through the center of the campground and provides access to the park shop, recreation hall and equestrian camping area. The park's wilderness

camping area accommodates additional RV, tent campers and small groups but provides no power or water. A second primitive group camping area is located off Hammock Road.

Equestrian, bike and hiking trails provide the visitor access with the rest of the original park.

Recreation Facilities

Standard Campground

138 campsites with utilities
Shuffleboard court
Recreation Hall w/playground
Campfire circle
Playground

Equestrian Camping Area

5 sites w/o utilities

CCC Picnic Area

CCC Museum
Hammock Inn
Picnic shelters, medium (3)
Picnic shelter, large
Playground
Tables and grilles

Primitive Group Camp

Tables and grilles
Picnic shelter, medium

Wilderness Camping Area

16 individual sites
Group campsites (2)
Tables and grilles
Open playing field (also used as parking area)
Picnic shelter, medium

Trails

Wild Orange Grove Nature Trail (0.5 mi.)
Alexander Blair Big Oak Nature Trail (0.2 mi.)
Hickory Nature Trail (0.3 mi.)
Richard Lieber Nature Trail (0.5 mi.)
Fern Garden Nature Trail (0.35 mi.)
Young Hammock Nature Trail (0.4 mi.)
Ancient Hammock Nature Trail (0.65 mi.)
Cypress Swamp Catwalk (0.4 mi.)
Allen Altvater Trail (0.5 mi.)
Equestrian Trail (11 mi.)
Bicycle Trail (8 mi.)
Interpretive displays
Open-air amphitheater (Vesper Ground)
Park tram

Support Facilities

Standard Campground

Bathhouses (4)
Dump station

Recreation Hall
Paved parking (10 vehicles)
Stabilized parking (10 vehicles)

CCC Picnic Area
Paved parking (60 vehicles)
Stabilized parking (30 vehicles)

Primitive Group Camp
Small restroom

Wilderness Camping Area
Composting restroom

Trails

Hickory paved parking (20 vehicles)
Fern Garden paved parking (6 vehicles)
Young Hammock paved parking (10 vehicles)
Ancient Hammock paved parking (10 vehicles)
Cypress Swamp paved parking (20 vehicles)
Parking for open-air amphitheater - Vesper Ground (10 vehicles)

Shop
Carpenter shop
Mechanic shop
Wood shed
Lounge and staff lockers
Detail supply shed
Tool shed
Pole barn
Tram shed
ATV shed
Flammable storage shed

Administrative Area
Interpretive office/conference room
Residence
Stabilized parking (5 vehicles)

Entrance Station
Ranger station
Bicycle storage shed

East Residence Area
Residence
Administrative office w/shed
Pumphouse / water well

West Residence Area
Residences (4)
Bunkhouse
Cottage
Garage
Pumphouse

Roads

Loop Drive (paved, 2 mi.)
Hammock Road (paved, 4.3 mi.)
Tiger Branch Drive (stabilized, 1.7 mi.)
North Branch Drive (stabilized, 1.7 mi.)
Stabilized service roads (14.5 mi.)

CONCEPTUAL LAND USE PLAN

The following narrative represents the current conceptual land use proposal for this park. As new information is provided regarding the environment of the park, cultural resources, recreational use, and as new land is acquired, the conceptual land use plan may be amended to address the new conditions (see Conceptual Land Use Plan). A detailed development plan for the park and a site plan for specific facilities will be developed based on this conceptual land use plan, as funding becomes available.

During the development of the unit management plan, the Division assesses potential impacts of proposed uses on the resources of the property. Uses that could result in unacceptable impacts are not included in the conceptual land use plan. Potential impacts are more thoroughly identified and assessed through the site planning process once funding is available for the development project. At that stage, design elements, such as sewage disposal and stormwater management, and design constraints, such as designated species or cultural site locations, are more thoroughly investigated. Advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Stormwater management systems are designed to minimize impervious surfaces to the greatest extent feasible, and all facilities are designed and constructed using best management practices to avoid impacts and to mitigate those that cannot be avoided. Federal, state and local permit and regulatory requirements are met by the final design of the projects. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, the park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses and Proposed Facilities

The original structures and engineering of the park represent the CCC and its work in creating one of the first state parks in Florida yet creates a greater need for restoration and repair of older facilities. It is important to preserve the structures associated with the park's early development but also to maintain the integrity of the designed landscape from this period. Careful planning is required to ensure that the most important design elements of the CCC are not gradually lost over time. To guide this effort, it is recommended that a cultural landscape plan be completed that will compile information about the historical development, significance, and existing character of the CCC-designed landscape and establish preservation goals. Plan

ENTRANCE STATION
*Potential Circulation Improvements & Relocation

SHOP AREA
*4-Bay Shop

CAMPGROUND
*Upgrade Facilities
*Reconfigure Circulation

OFFICE EXPANSION

WILDERNESS CAMPING AREA
*Reconfigure Campsites
*Relocate Group Camps

BIKE-PED PATH

PRIMITIVE GROUP CAMP
*Relocated Group Campsites
*Upgrade Existing Facilities

MAIN DAY USE AREA
*Hammock Inn Renovations
*Picnic Area Restroom & Shelters
*Storage Building

KOSOVE PICNIC AREA
*Restroom
*Large Shelter

POTENTIAL RESIDENCE SITES

VAUGHN ROAD

SEVEN LAKES DAY USE AREA & VICINITY
*Picnic Facilities
*Swim Area
*Boat Launch
*Restroom
*Access Road & Parking
*Hiking Trail
*Overlooks/fishing platforms

BLUE LAKE

EQUESTRIAN TRAILHEAD & PRIMITIVE CAMPING
*Watering Facilities
*Restrooms
*Shelters
*Access Road & Parking
*Equestrian Trail
*Covered Paddocks
*Designated Camping Area

634

635

66

LEGEND
- PROPOSED FACILITIES
- PROPOSED TRAILS
- LOOP ROAD BIKE LANE
- PROTECTED ZONE
- PROPOSED DEVELOPMENT AREA
- PARK BOUNDARY

HIGHLANDS HAMMOCK STATE PARK

N

3500 0 3500 Feet

Prepared by:
Florida Department of Environmental Protection
Office of Park Planning
Approved

CONCEPTUAL LAND USE PLAN

content will provide the basis for future decisions about management, treatment and use. The National Park Service's cultural landscape report process should serve as a model for development of the plan (U.S. Department of the Interior, 1998). It is recommended that the plan be completed prior to constructing facilities that introduce new uses into areas containing CCC design elements within the original park property. Improvements consistent with current uses established by the CCC (i.e. picnicking and camping) are considered appropriate and may be pursued before completion of this guiding document. Any new structures in proximity to the CCC buildings should be compatible in scale and material but clearly distinguishable from the historic structures. Improvements identified for areas of the park outside of the original park property can be pursued without the need of a cultural landscape plan.

Recreation Facilities

Interpretation. The park has expanded the tram tour during the summer months to meet visitor demand. It is recommended that an additional tram be acquired to offer more tram routes throughout the day.

Original Park. The Hammock Inn is a popular destination for park visitors. However, the building it is housed in is too small and ill equipped as a food service operation given its existing levels of use. The facility requires a larger seating area, some of it outside, modern restrooms, access for deliveries and a larger kitchen. Renovations are recommended to improve the functionality of this facility. Planned improvements will be coordinated with the DHR.

The CCC picnic area needs a restroom and two additional large picnic shelters. The Kosove picnic area needs a small restroom and additional large shelter to complete its facilities.

The tram tour loop road is used by motor vehicles, the tram, pedestrians and bicyclists. This causes congestion and at times presents unsafe conditions. Ideally, a separate paved path paralleling the loop road would be provided to improve pedestrian safety. However, the narrow width of the road corridor may preclude this option. An alternative is to increase the pavement width and stripe one side to provide a shoulder for pedestrian use while allowing room for vehicles to pass safely. Priority will be given to protecting the large oaks that comprise the hammock in the final design of the path.

Seven Lakes Property. A day use area is proposed within a ruderal area on the northwest side of Blue Lake. Picnic shelters, scattered tables and grills, small boat launch and a restroom are recommended to enhance recreational use of the lake. Given the small size of the lake, boating access will be limited to paddle craft or vessels with electric motors only. A swim area will be considered for this are in the future contingent on the park's ability to maintain a staff presence onsite during operating

hours to address visitor safety. A spur road from County Road 635 and parking for up to 50 vehicles is recommended to provide access to the area. The parking area may need to be expanded in the future to accommodate an increase in capacity if the swim area is developed. Pervious surfacing materials will be considered for the road and parking area to minimize stormwater impacts. A trail that links the proposed day use area to the lakes further east is recommended to allow hiking, fishing and nature observation in this area. Construction of up to two elevated overlooks/wildlife blinds should be considered on the lakes to facilitate yet control shoreline access and minimize disturbance to wildlife and sensitive resources.

Equestrian Facilities. The existing equestrian camping area and equestrian trail system are recommended to be relocated to the south property to provide additional room for these uses, enhance the visitor experience and reduce safety concerns at their current location. Two large pastures have been identified off the Vaughn Road corridor appropriate for an equestrian trailhead/staging area and camping area. Final determinations on the locations of these facilities will be determined once vehicular access issues have been resolved. To minimize the need for road construction it is recommended that Highlands County be approached to allow use of a portion of the Vaughn Road corridor for public access. Recommended facilities include trailer parking, trail directional signage, restroom with outside showers, large shelter, covered paddocks, watering facilities and designated camping area. Appropriate separation between day use trail riders and campers should be accommodated in the design of these facilities. The new trail system should maintain, if not exceed, the length of the system it replaces, as environmental conditions allow. Consideration will be given to allowing for shared-use of the trail system if use levels are appropriate and soil conditions suitable for biking.

Wilderness Camping Area. The proximity of the wilderness camping area to County Road 635 and private residences necessitates a relocation of a portion of the use area. The layout of campsites used by individual campers is recommended to be redesigned so that all sites are located to the west of the existing composting restroom. The restroom may need to be relocated to remain convenient to campers in this area.

The two group campsites in this area should be relocated to the vicinity of the existing primitive group camp off Hammock Road. Once the campsites are relocated, it is recommended that the former camping areas be utilized for picnicking.

Primitive Group Camp. A renovation of this area is proposed to upgrade facilities to current standards and should include restrooms with outdoor showers, three campfire circles and native landscape buffers around the use areas. The historic CCC restroom structure should be stabilized, and an appropriate adaptive reuse considered.

Standard Campground. The standard camping area is in need of refurbishing to meet

current recreation standards for size and layout of sites, vehicle access and utilities. Consideration should also be given to a redesign of the campground roads so that current traffic from the shop, playground and recreation hall does not bisect the campground. Seepage slopes in the vicinity limit opportunities for expansion. However, one option that bears further investigation is to route traffic along the eastern edge of the campground with one-way loops to the campsites. If implemented, the new campers' bathhouse would be the only facility east of the main road.

Support Facilities

The shop area needs a new 4-bay building. The existing buildings are CCC construction and present uses are degrading their condition.

The main campground road to the shop and recreation hall and the service area road need paving.

The administrative office needs to be expanded to accommodate space for staff meetings and trainings.

A small storage building is recommended behind the CCC museum.

A staff residence is recommended to be established within ruderal areas along Vaughn Road. A final location will be determined based on access to utility services and the operational needs of the south property.

At some point in the future, traffic on County Road 634 may necessitate a redesign of circulation in the area of the ranger station. Currently, traffic on the road headed west is stopped at the ranger station. The current layout does not provide for sufficient separation of park traffic and through traffic. In addition, the campground road and road leading to the primitive camping area and Kosove picnic area form a 4-way intersection just west of the ranger station. This configuration presents unsafe conditions that will only worsen as traffic increases on the public road. Traffic conditions will be monitored during the current planning cycle to evaluate the need for improvements in this area. It may be necessary to relocate the ranger station out of the road right of way in the future. Solutions to this problem will require a cooperative effort with Highlands County.

Facilities Development

Preliminary cost estimates for the following list of proposed facilities are provided in Addendum 6. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist the Division in budgeting future park improvements, and may be revised as more information is collected through the planning and design processes.

Interpretation
Tram

Original Park
Hammock Inn Renovations
CCC Picnic Area Restroom and Shelters (2 large)
Kosove Picnic Area Restroom and Shelter (1 large)
CCC Museum Storage Building
Bicycle/pedestrian Path

Seven-Lakes Day Use Area
Picnic Shelters (1 large, 2 medium)
Restroom
Swim Area
Boat Launch
Access Road and Parking (up to 50 vehicles)
Hiking Trail (2 miles)
Overlooks/wildlife blinds (2)

Equestrian Facilities
Trailer Parking
Trail Directional Signage
Large Shelter
Designated Camping Area
Restroom
Covered Paddocks
Watering Facilities

Wilderness Camping Area
Relocate Campsites

Primitive Group Camp
Restroom/Outside Showers
Campfire Circles (3)
Adaptive Reuse of CCC Restroom
Landscape Buffers

Standard Campground
Upgrade Facilities
Reconfigure Roads

Support Facilities
4-Bay Shop
Road Paving
Administrative Office Expansion
Staff Residence

Existing Use and Optimum Carrying Capacity

Recreational carrying capacity is an estimate of the number of users a recreation resource or facility can accommodate and still provide a high quality recreational experience and preserve the natural values of the site. The carrying capacity of a unit is determined by identifying the land and water requirements for each recreation activity at the unit, and then applying these requirements to the unit's land and water base. Next, guidelines are applied which estimate the physical capacity of the unit's natural communities to withstand recreational uses without significant degradation. This analysis identifies a range within which the carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 1).

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's recreational carrying capacity as shown in Table 1.

Table 1--Existing Use And Recreational Carrying Capacity

	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Camping						
Standard	1,104	1,104			1,104	1,104
Youth/Group	120	120			120	120
Equestrian	40	40			40	40
Day Use Areas						
CCC Picnic Area	116	232			116	232
Kosove Picnic Area	16	32			16	32
Seven Lakes Property			238	476	238	476
CCC Museum	50	200			50	200
Recreation Hall	150	150			150	150
Restaurant	40	160	40	160	80	320
Tram Tours	32	64	32	64	64	128
Trails						
Nature	95	380			95	380
Hiking			10	20	10	20
Bicycle	120	480			120	480
Equestrian	220	440			220	440
TOTAL	**2,103**	**3,402**	**320**	**720**	**2,423**	**4,122**

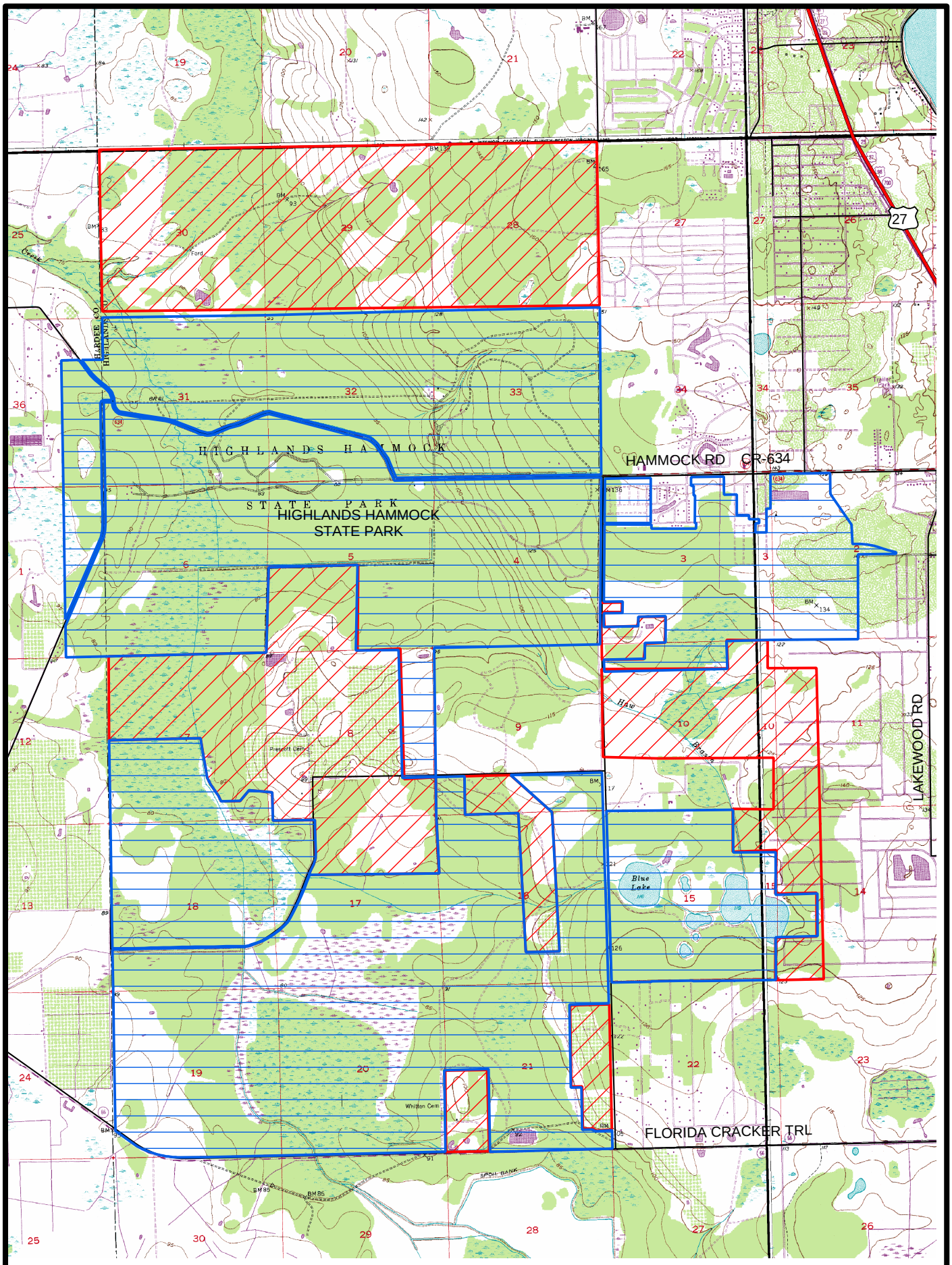
Optimum Boundary

As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency.

Identification of lands on the Optimum Boundary Map is solely for planning purposes and not for regulatory purposes. A property's identification on the optimum boundary map is not for use by any party or other government body to reduce or restrict the lawful right of private landowners. Identification on the map does not empower or require any government entity to impose additional or more restrictive environmental land use or zoning regulations. Identification is not to be used as the basis for permit denial or the imposition of permit conditions.

The optimum boundary map reflects lands identified for direct management by the Division as part of the park. These parcels may include public as well as privately owned lands that improve the continuity of existing park lands, provide additional natural and cultural resource protection, and/or allow for future expansion of recreational activities.

Several parcels of land have been identified to complete the optimum boundary of Highland Hammocks State Park. These parcels are important to provide additional scrub-jay habitat, improve resource and recreational linkages, buffer the park from incompatible uses, protect the health of the waters and species habitats around Little Charlie Bowlegs Creek and Haw Branch and facilitate resource management. The additions will also provide more uniform boundaries. At this time, no lands are considered surplus to the needs of the park.



HIGHLANDS HAMMOCK STATE PARK

N

0 1,500 3,000 6,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Park
Office of Park Planning

LEGEND

- Park Boundary
- Optimum Boundary

OPTIMUM BOUNDARY MAP

Addendum 1—Acquisition History and Advisory Group Documentation

Sequence of Acquisition

The State of Florida has acquired Highlands Hammock State Park to protect, develop, operate, and maintain the property for public outdoor recreational, park, conservation, historic and related purposes.

The initial acquisition took place on July 31, 1935 as a result of a donation to the State of Florida from Highlands Hammock, Inc. The donation consisted of approximately 1,064 acres and became Highlands Hammock State Park. Subsequent acquisitions have been made since then using funds from the CARL and P/2000 programs.

On January 23, 1968, the Trustees transferred the management authority of Highlands Hammock State Park to the Division of Recreation and Parks (Division), under lease No. 2324. In 1988, the Trustees assigned a new lease number, Lease No. 3622, to the park without making any changes to the terms and conditions of Lease No. 2324.

In accordance with the lease agreement with the Trustees, the park will be managed for the conservation and protection of natural, historic and cultural resources and provide resource-based public outdoor recreation which is compatible with the conservation and protection of the property. Currently the Division manages the park under Lease No. 3622 for a period of ninety-nine (99) years. This lease will expire on January 22, 2067.

Title Interest

The Trustees hold fee simple title to Highlands Hammock State Park.

Special Conditions on Use

Highlands Hammock State Park is designated single-use to provide resource-based public outdoor recreation and other related uses. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than the forest management activities mentioned above) are not consistent with this plan or the management purposes of the park.

Outstanding Reservations

Following is a listing of outstanding rights, reservations, and encumbrances that apply to Highlands Hammock State Park.

Instrument: ..... Warranty Deed
Instrument Holder: ..... Highlands Hammock, Inc.
Beginning Date: ..... July 31, 1935
Ending Date: ..... There is no specific ending date given.
Outstanding Rights, Uses, Etc.: ..... The property shall be used for state park purposes only.

Instrument: ..... Warranty Deed
Instrument Holder: ..... The Florida Botanical Garden and Arboretum Association, Inc.
Beginning Date: ..... August 18, 1936
Ending Date: ..... There is no specific ending date given.
Outstanding Rights, Uses, Etc.: ..... The property shall be used for State Park, State Forest, State Arboretum and Botanical Garden purposes.

Instrument: ..... Easement
Instrument Holder: ..... DEP/DRP
Beginning Date: ..... March 20, 1973
Ending Date: ..... Coterminous with Trustees Lease No. 3622.
Outstanding Rights, Uses, Etc.: ..... The easement allows Peace River Electric Cooperative, Inc. to construct, repair, and maintain an electrical transmission line.

Instrument: ..... Easement
Instrument Holder: ..... DEP/DRP
Beginning Date: ..... October 7, 1986
Ending Date: ..... Until it is abandoned.
Outstanding Rights, Uses, Etc.: ..... The easement allows Sebring Utilities Commission to construct, install, operate and maintain a distribution system for the transmission and distribution of electricity.

Instrument: ..... Warranty Deed
Instrument Holder: ..... The Nature Conservancy
Beginning Date: ..... December 4, 1990
Ending Date: ..... There is no specific ending date given.
Outstanding Rights, Uses, Etc.: ..... The deed is subject to a 7-foot wide distribution easement Florida Power Corporation and the Southwest Florida Water Management District's rules, regulations, and assessments as required.

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Represented by:
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Janice Scroggie-Anderson, Chair
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Heartland Chapter
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Beverly Spuckler
(equestrian user)
4474 Deerwood Dr.
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Chet Brojek
(running representative)
3310 Par Road
Sebring, Florida 33872

Larry Ford
167 West Center Avenue
Sebring, Florida 33870

The Advisory Group appointed to review the proposed land management plan for Highlands Hammock State Park was held on October 12, 2006. Carl Cool represented Commissioner Bob Bullard, Mike McMillian represented Jeff McGrady and Janet Magee represented Ann Bonnett. Commissioner Timmerman, Mayor Hensley, Don Bates, Charles Mathen, Tim Elder, Mike Wisenbaker, Al Greulich and Beverly Spuckler did not attend. All other appointed Advisory Group members were present. Attending staff were Valinda Subic, Terry Hingten, Peter Anderson, Dorothy Harris, Ken Alvarez and Michael Kinnison.

Summary Of Advisory Group Comments

Carl Cool asked for staff to clarify what was needed for public access related to the Vaughn Road corridor. Staff explained that granting use of a portion of the corridor for public access would facilitate the relocation of equestrian facilities on the south property. Mr. Cool indicated that the County would be able to accommodate this need. He recommended establishing a road connection through the park that would connect CR 634 (Hammock Road) and Vaughn Road to establish a more direct connection between the original park and the south property. Staff responded that a road through this area was not practical given the presence of extensive wetlands.

Chet Brojek discussed the park's role in supporting a variety of long distance running events, including high school cross country programs. He expressed interest in working with park staff to educate the running community to the variety of trails at the park and expand the number of events hosted at the park. He closed by stating that the park was an important community asset and acknowledging the tremendous cooperation exhibited by park staff.

Robert Fritz said that Highlands Hammock was the topic of many inquiries received by the historical society. He was interested in strengthening information sharing between the historical society and the park staff to improve public education and archival records. Mark Deyrup asked about the possibility of completing oral histories of the CCC vets that frequent the park. Mr. Fritz expressed interest in including this as part of the historical society's ongoing oral history project.

Carl Cool stated that he wanted to present three recommendations that dealt with public safety. He discussed the proximity of the wilderness camping area to CR 635 and suggested it be relocated west of the park ranger station to enhance security. He also recommended moving the ranger station east in closer proximity to the park gate. His final recommendation involved reconfiguring the wilderness camping area road so that it would intersect with CR 634 inside the proposed location of the entrance station. Mr. Cool followed these recommendations by discussing the origins of CR 634 and stating that county abandonment of this road was in the best long-term interests of the park. He discussed past (unsuccessful) efforts by the County to pave the road to address safety and maintenance problems and indicated that recently passed legislation exempting paving projects from permitting requirements was likely to result in the eventual paving of this road. He discussed the Shumaker Road extension project north of the park, part of the Highlands County long range transportation plan, that would eliminate the need to keep CR 634 open to the public. He added, however, that Hardee County has outstanding reservations about this project. He suggested another option for closing Hammock Road (634) that involves a land exchange to allow extension of CR 635 to the north. He

explained that in order to extend 635 north, the County needs approximately 100 feet of right of way along one mile of the north eastern boundary of the park. He suggested that in exchange for the use of state park lands for this purpose, the County would abandon its interest in CR 634. Larry Ford objected to the idea of an exchange stating that he felt it was unnecessary and that traffic impacts to the park from CR 635 would increase if the road were improved. Staff clarified that the advisory group process was not the venue to resolve this issue and that the County would need to submit a written proposal to the Division of Recreation and Parks for consideration.

Mark Deyrup stated that his primary interest was with the conservation of natural habitats. He expressed satisfaction with the plan and its comprehensiveness. However, he expressed caution at the scope of work that was outlined in the plan and recommended focusing on what is readily achievable. He emphasized the importance of monitoring to assess progress towards meeting management goals and felt that the plan was lacking in this regard. He recommended developing simple monitoring protocols that are easy to follow. He also stressed the importance of documenting data collection methods and to keep both paper and electronic files. He emphasized how documentation is essential to understanding long-term results, keeps track of the resources necessary to complete the work and can be used to obtain funding. Staff responded that the scope of the plan objectives is a reflection of the work that needs to be done at the park. Staff discussed the current methods used to document resource management activities and acknowledged there are ways to improve in this area.

Janice Scroggie Anderson discussed the Florida Trail Association's trail work on nearby conservation lands. She suggested establishing elevated wildlife observation points on the Seven Lakes property to enhance wildlife viewing while minimizing disturbance. Ms. Scroggie-Anderson advocated separation of different trail user types. Ken Alvarez discussed a potential trail connection between the original park and the south property along a dike that is contingent on acquisition of adjacent private lands (Livinston Tract).

Larry Ford inquired if there had been any efforts towards acquiring the Hollenberg property. He indicated that a recent sale of the property had not gone through and that it may be a good time to approach the owners. Mr. Ford asked as to what time period natural communities are restored. Staff explained that natural community management strives to restore and maintain conditions that existed prior to European influences on the land. Staff explained the role of the Florida Natural Areas Inventory in determining natural community types in the state, the different management requirements for pyrrhic communities at the park and the importance of restoration for the survival of listed species. Mr. Ford recommended locating a staff residence further south, particularly if additional lands are acquired in this area.

Mark McMillian complemented staff on a well-written plan. He asked for clarification on plans for grazing leases and expressed caution on their use on public lands. Staff replied that any grazing leases would be tied to plans for restoring pasture areas by requiring an increasing amount of pasture be restored over time. Mr. McMillian asked about park efforts at removing wild hogs. Staff indicated that the park works with a private contractor to remove hogs. Mr. McMillian discussed how encroaching development makes prescribed burning more difficult. He discussed research that questioned the use of mechanical treatment in scrub but indicated that it can be successful when combined with the use of fire. Staff explained that the park has a burn plan that

provides the specifics for using prescribed fire in the different communities at the park. Mr. McMillian stated that objective-based vegetative monitoring is extremely time consuming and expensive. He was skeptical that the park had the resources to implement this monitoring technique and that it may even be difficult to find a contractor to do the work. He emphasized the need to monitor land use changes around the park and to provide comment on proposals that may be detrimental to the park. He closed by asking the group to recommend the creation of a park biologist position at the park. All advisory group members present agreed with his recommendation.

Pete Anderson provided no comments.

Janet Magee provided no comments at the time of the meeting. The following comments were later submitted in writing: Ms. Magee stated that the closing of the county road through the park was very important due to the safety of campers and visitors. She pointed out the importance of the Seven-Lakes property in providing new water-based recreational opportunities and generating revenue. She closed by complementing staff on the quality of plan that had been prepared.

Carl Cool asked if fencing plans along the eastern boundary would be designed to restrict wildlife from crossing CR 635 to avoid conflicts with automobiles. He wondered if it might be appropriate to consider a "deer fence" and wildlife crossing under the roadway. Staff clarified that the plan was referring to the need for a boundary fence in this area. Staff and others were skeptical of the efficacy of these types of improvements given the presence of private lands in the area and the absence of high-profile listed species on the property (panthers and bears). Mr. Cool discussed the use of the power line easement along the northeast boundary of the park and the Golf Hammock subdivision by ATVs. He indicated that the current CCC-era fence is approximately 50 feet west of the actual park boundary and that a portion of the private lots are within the easement, which allows access to this area. He suggested the park improve fencing along its boundary to help keep all terrain vehicles out of the power line easement. Mr. Cool closed by recommending the plan add an objective that supports removal of the public roads through the park.

Ken Alvarez explained that all state parks that involved the Civilian Conservation Corps have fences that do not align precisely with park boundaries. He discussed the need to establish a boundary fence that is aligned with the legal boundary of the park.

The following comments were submitted in writing by David Ferro of the Division of Historic Resources:

<u>Purpose and Scope of Plan</u>
Should Chapter 267 be referenced in this section?
Response: Chapter 267 is referenced in the plan addendum, Management Procedures for Archaeological and Historical Sites and Properties on State Owned or Controlled Lands.

<u>Management Program Overview</u>
In the last paragraph of this section, stewardship of cultural resources should be included as part of the balanced approach to management of the property.
Reference to the development of technical curricula for historic preservation training should include cooperation with DHR.

Goal 13 is lacking in its scope given likelihood of ground disturbance associated with proposed development in other areas of the park.
Recording of existing known historic resources should be a priority.

Resource Description and Assessment
Is the phrase "ideal way" the routine way in which the evaluative scale for assessing conditions of cultural resources is described.
Response: Yes, this approach to cultural resource assessment is included in all state park management plans.

Resource Management Program
Is the harvesting of timber a concern regarding possible affects on archaeological resources?
Response**:** No significant ground disturbance occurs during timber harvests other than compaction associated with truck traffic. Timber harvesting impacts are similar to other management activities such as prescribed burning.
Management objectives associated with cyclical maintenance (#12-14 and 18) do not seem to provide a firm commitment or reflect a high priority.
Repair of structures in poor condition (Guest Cottage and storage building) not referenced in Management Objectives section.
Change reference regarding archaeological monitoring from recommended to mandatory near known and suspected sites.

Management Measures for Cultural Resources
There is a lack of consistency between goals and objectives and specific management measures for cultural resources. Management measures necessary to address stated objectives are lacking.
How old are cabbage palms and oaks planted along the main drive? Has a period of significance been established for the park? Were the palms and oaks introduced during period of significance or later?
Response: The period of significance for the park coincides with the park's establishment through the CCC presence (early 1930s - early 1940s). The referenced palms and oaks were planted at a much later time.

Research Needs
Consider including comprehensive cultural resources survey and cultural landscape inventory under this section.

Conceptual Land Use Plan
Include improved cultural resource protection as a goal of the proposed reorganization of facilities.
Any fire hazard issues with the existing restaurant facility could be eliminated via rehabilitation and proper design.
Any new structures in proximity to the CCC buildings should be compatible in scale and material but clearly distinguishable from the historic structures.

Priority Schedule and Cost Estimate
Costs associated with proposed reconnaissance survey may be insufficient for the level of work necessary for the development of a management program addressing archaeological resources, historic structures and landscape features, including the cultural landscape.

Organization of costs implies low priority for maintenance of historic structures. Costs for maintenance of structures, museum object conservation and collections storage appear too low.

Staff Findings

The following staff comments and revisions are provided in response to public input received on the Highlands Hammock State Park management plan.

Facility Locations
The recommended relocation of the ranger station and wilderness camping area road would not achieve the stated objective of increasing security unless CR 634 were no longer a public road. It is currently premature to consider realigning facilities as long as the park is unable to control access on this roadway. The plan currently calls for relocating a portion of campsites in the wilderness camping area that will improve the visitor experience and security of this area.

Existing recommended locations for a staff residence are considered optimal for park operations given the current boundary configuration.

Seven-Lakes Property
To address public safety concerns, the plan will also be revised to reflect that establishing a swim area at Blue Lake be contingent on the ability to provide a staff presence onsite during operating hours.

Trails
Staff do not recommend establishing bike trails on the Seven-Lakes property, as was recommended at the October 11th public meeting, due to incompatible soil conditions (soft sands). The suitability of the terrain on the south property to accommodate bicycles will be evaluated as part of the development of proposed trails in this area. Consideration will be given to managing proposed trails for shared-use (horseback riding/hiking/biking).

Establishing a second network of equestrian trails to accommodate endurance riding at the park, as was recommended at the October 11th public meeting, is not recommended at this time. The length of trails planned for the south property will be maximized to the extent possible given existing environmental conditions.

The provision of at least one wildlife overlook in the Seven-Lakes area will be recommended.

Staffing
The plan will be revised to identify the need for a park biologist.

Boundary Encroachment
Park staff will evaluate options along the north eastern boundary to deter ATV access and other encroachments.

Public Roads within Park
A statement that local government abandonment of CR 634 would benefit park operations will be added to the Existing Use of Adjacent Lands section.

Cultural Resources

It is important to not only preserve the structures associated with the park's early development but also to maintain the integrity of the designed landscape from this period. It is not possible to freeze time and avoid all improvements in the public use areas of the park as current recreational needs of park visitors cannot be ignored. However, careful planning is required to ensure that the most important design elements of the CCC are not gradually lost over time. To guide this effort, it is recommended that the plan identify the need for a cultural landscape report that will compile information about the historical development, significance, and existing character of the CCC-designed landscape and establish preservation goals. Report content will provide the basis for future decisions about management, treatment and use. Until completion of the report, staff recommend that renovations be pursued to the Hammock Inn to meet the operational needs of the food service operation as opposed to constructing a new building in the vicinity.

Plan will be revised to address inconsistencies between stated goals and objectives, management needs and problems, management objectives and management measures and to more accurately reflect the Division's standard management practices as they relate to protecting cultural resources from ground disturbing activity, particularly in areas targeted for facility development.

Plan will be revised to reflect commitment to recording known cultural sites with the Florida Master Site file.

Plan will be revised to clarify that archaeological monitoring will occur during ground disturbing activity near known or suspected sites.

Cost estimates for proposed cultural resource management actions will be reviewed and revised where appropriate. Current organization of cost items is not intended to imply a hierarchy of priorities. The cost estimate merely includes all priority management actions identified in the plan.

Addendum 2—References Cited

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Addendum 3—Soils Descriptions

HIGHLANDS COUNTY

3) Basinger fine sand, depressional. This very poorly drained, sandy soil is in wet depressions. The mapped areas are irregular in shape and range from 5 to more than 50 acres. The slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layers, in sequence, are light brownish gray sand to a depth of 16 inches, light gray sand to a depth of 32 inches, and dark grayish brown sand to a depth of 48 inches. The underlying material to a depth of 80 inches or more is dark grayish brown sand and grayish brown sand. Included in mapping are small areas of Immokalee, Myakka, Placid, and Valkaria soils. In most areas, the included soils make up 10 to 30 percent of the map unit.
The available water capacity of this Basinger soil is low. The permeability is rapid. Internal drainage is very slow because of the high water table. This soil is ponded for 4 to 6 months each year. Most of the acreage of this soil is in natural vegetation. The natural vegetation consists of pickerelweed, maidencane, cutgrass, sand cordgrass, St. Johnswort, and chalky bluestem. A few areas are in water-tolerant trees.

6) Tavares sand, 0 to 5 percent slopes . This nearly level to gently sloping, moderately well drained soil is on moderately high sandy ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to about 50 acres. The slopes are smooth to convex. Typically, the surface layer is dark grayish brown sand about 6 inches thick. The upper part of the underlying material, to a depth of about 56 inches, is yellow and very pale brown sand. The lower part to a depth of 80 inches or more is white sand. The available water capacity of this Tavares soil is very low. The permeability is rapid or very rapid. The water table is at a depth of 48 to 72 inches for 1 to 4 months during the summer rainy season. During dry periods, the water table may recede below these depths. Most of the acreage of this soil has been left in natural vegetation. The natural vegetation consists of sand pine, slash pine, longleaf pine, south Florida slash pine, turkey oak, and sand live oak. The understory consists of scattered saw palmetto, pineland threeawn, and various other forbs.

7) Placid fine sand, depressional. This nearly level, very poorly drained soil is in depressional areas on the flatwoods and along the edges of swamps and marshes in the county. The depressional areas are circular, and the areas along the edges of swamps and marshes are irregular in shape. These mapped areas range from less than 1 acre to about 70 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the upper part of the surface layer is black fine sand about 3 inches thick. The lower part, to a depth of 11 inches, is very dark gray sand. The substratum to a depth of 80 inches is fine sand. It is in layers of light brownish gray and dark grayish brown. Included with this soil in mapping are small areas of Basinger, Felda, Samsula, and Sanibel soils. In some areas are soils that are similar to Placid soils except they have 2 to 6 inches of muck on the surface. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Placid soil is low. The permeability is rapid. This soil is ponded for much of the year. The water table is generally within 10 inches of the surface for the rest of the year, but during long dry periods, it may recede to a depth of more than 30 inches. Most of the acreage of this soil is in natural vegetation of bays and other water-tolerant trees and sawgrass, pickerelweed, arrowhead, redroot, St. Johnswort, cutthroat grass, and maidencane.

8) Immokalee sand . This nearly level, poorly drained soil is on broad flatwoods and in lower areas in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to more than 500 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is black sand about 6 inches thick. The subsurface layer, to a depth of 37 inches, is gray and white sand. The subsoil to a depth of 80 inches is black sand. Included with this soil in mapping are small areas of Basinger, Felda, Myakka, Pomello, Satellite, and Smyrna soils. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Immokalee soil is low. The permeability is moderate. The water table is within 12 inches of the surface during the summer rainy season. Generally, it is between depths of 12 and 40 inches for the rest of the year. The water table may recede to a depth of more than 40 inches during extended dry periods. Also, this soil can have a perched water table over the subsoil for short periods after heavy rainfall. Most of the acreage of this soil is in improved pasture and native rangeland. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, running oak, saw palmetto, gallberry, fetterbush, pineland threeawn, chalky bluestem, low panicum, and various other native grasses.

10) Myakka fine sand. This nearly level, poorly drained soil is in low, broad, flatwood areas in the county. The mapped areas are irregular in shape and range from 10 to 200 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and light brownish gray sand. The subsoil to a depth of about 80 inches is black and dark brown sand. Included with this oil in mapping are small areas of Basinger, Immokalee, Placid, Satellite, Smyrna, and Valkaria soils. In most areas, the included soils make up 10 to 35 percent of the map unit. The available water capacity of this Myakka soil is very low. The permeability is moderate. The water table is at a depth of less than 12 inches during the summer rainy season. Generally, it is at a depth of 12 to 40 inches during the rest of the year. During extended dry periods, the water table recedes to a depth of more than 40 inches. Also, this soil can have a perched water table because of the permeability of the subsoil. Significant acreage remains in natural vegetation that consists mainly of slash pine, south Florida slash pine, longleaf pine, fetterbush, gallberry, running oak, waxmyrtle, and saw palmetto. Pineland threeawn is the dominant grass; but depending on range condition, there are significant amounts of creeping bluestem, lopsided indiangrass, chalky bluestem, and other grasses.

12) Basinger fine sand. This poorly drained nearly level soil is on the low flatwoods and in sloughs and poorly defined drainageways. The mapped areas are irregular in shape and range from 10 to 50 acres or more. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine sand. Included with this soil in mapping are small areas of Felda, Immokalee, Myakka, Placid, and Valkaria soils. In some places are soils that are similar to Basinger soil, but the subsoil is not as brown as that in Basinger soil. In most areas, the included soils make up 10 to 25 percent of the map unit. The available water capacity of this Basinger soil is low. The permeability is rapid. The water table is within 12 inches of the surface for 2 to 5 months during the summer rainy season. Generally, it is between depths of 12 and 40 inches for 6 months or more but may recede to a lower depth during extended dry periods. Most of the acreage of this soil remains in natural vegetation. The natural vegetation consists of slash pine, south Florida slash pine, gallberry,

pineland threeawn, cutthroat grass, maidencane, bluestem, St. Johnswort, and cordgrass.

13) Felda fine sand. This nearly level, poorly drained soil is on broad, low flats and in large drainageways in the flatwoods part of the county. The mapped areas are irregular in shape and range from 20 to more than 500 acres. The slopes are smooth and range from 0 to 1 percent. Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and dark grayish brown fine sand. The subsoil, to a depth of 36 inches, is gray very fine sandy loam. The upper part of the substratum, to a depth of 68 inches, is light gray fine sand. The lower part to a depth of more than 80 inches is dark grayish brown fine sand. Included with this soil in mapping are small areas of Bradenton, Hicoria, Malabar, Pineda, Tequesta, and Valkaria soils. In most areas, the included soils make up 10 to 20 percent of the map unit. The available water capacity of this Felda soil is low. The permeability is moderate or moderately rapid. The water table is within 12 inches of the surface during the summer rainy season. During the rest of the year, the water table is between depths of 12 and 40 inches except during dry periods when it may recede to a lower depth. The natural vegetation of this soil consists of slash pine, south Florida slash pine, cabbage palm, waxmyrtle, pineland threeawn, various species of bluestems, sand cordgrass, maidencane, saw palmetto, and fetterbush.

14) Satellite sand. This somewhat nearly level, poorly drained soil is on slightly elevated ridges on the flatwoods and on lower ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 10 to more than 100 acres. The slopes are generally smooth to convex and range from 0 to 2 percent. Typically, the surface layer is dark gray sand about 4 inches thick. The underlying material to a depth of 80 inches is white fine sand that has brown mottles in the upper part of this horizon. Included with this soil in mapping are small areas of Archbold, Basinger, Daytona, Duette, Immokalee, Myakka, and Pomello soils. In most areas, the included soils make up 10 to 20 percent of the map unit. The available water capacity of this Satellite soil is very low. The permeability is very rapid. The water table is at a depth of 12 to 40 inches for 2 to 6 months. Most of the acreage of this soil is in natural vegetation. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, myrtle oak, Chapman oak, and sand live oak. The understory consists of saw palmetto and pineland threeawn.

15) Bradenton fine sand. This nearly level, poorly drained soil is on hammocks and in open areas on the flatwoods. The mapped areas are irregular in shape and range from 5 to more than 50 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 14 inches, is light gray fine sand. The subsoil, to a depth of 44 inches, is gray very fine sandy loam. White calcium carbonate nodules are in the lower part of the subsoil. The substratum to a depth of 80 inches is light brownish gray and greenish gray loamy sand and very fine sandy loam. Included with this soil in mapping are small areas of Felda, Hicoria, Malabar, and Pineda soils. In most areas, the included soils make up 15 to 20 percent of the map unit. The available water capacity of this Bradenton soil is moderate. The permeability is moderate. The water table is within 12 inches of the surface during the summer rainy season. During the rest of the year, the water table is generally between depths of 12 and 40 inches except during dry periods when it may recede to a lower depth. The natural vegetation of this soil consists mostly of live oak, cabbage palm, a few pines, saw palmetto, and various species of bluestems and panicums.

16) Valkaria fine sand. This nearly level, poorly drained soil is on the low flatwoods and in sloughs and poorly defined drainageways. The mapped areas are irregular in shape and range

from 10 to 100 acres or more. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 16 inches, is light gray fine sand. The subsoil, to a depth of 51 inches, is yellowish brown and light yellowish brown fine sand. The substratum to a depth of 80 inches or more is light gray fine sand. Included with this oil in mapping are small areas of Basinger, Felda, Immokalee, Malabar, Myakka, and Satellite soils. In most areas, the included soils make up 10 to 25 percent of the map unit. The available water capacity of the Valkaria soil is low. The permeability is rapid. The water table is within 12 inches of the surface for 2 to4 months during the summer rainy season. Generally, it is between depths of 23 to 40 inches for 6 months or more but may recede to a lower depth during extended dry periods. Many areas of this soil remain in natural vegetation that consists of slash pine, south Florida slash pine, gallberry, pineland threeawn, cutthroat grass, maidencane, bluestem, St. Johnswort, and cordgrass.

17) Malabar fine sand. This nearly level, poorly drained soil is in low, narrow to broad sloughs or in poorly defined drainageways on the flatwoods. The mapped areas are irregular in shape and range from 10 to more than 100 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 14 inches, is light gray fine sand. The upper part of the subsoil, to a depth of 48 inches, is yellow, yellowish brown, and light yellowish brown fine sand. The lower part to a depth of more than 80 inches is greenish gray fine sandy loam. Included with this soil in mapping are small areas of Basinger, Felda, Pineda, and Valkaria soils. In some places are soils that are similar to Malabar soil but have a layer of organic staining just above the loamy subsoil. In most areas, the included soils make up 15 to 25 percent of the map unit. The available water capacity of this Malabar soil is low. The permeability is slow or very slow. The water table generally is within 12 inches of the surface for 2 to 6 months during the summer rainy season. During the rest of the year, it is generally between depths of 12 and 40 inches. During dry periods, the water table may recede to a lower depth for a short time. The natural vegetation of this soil consists of slash pine, south Florida slash pine, cabbage palm, saw palmetto, waxmyrtle, pineland threeawn, and sedges.

18) Kaliga muck. This nearly level, very poorly drained, organic soil is in swamps and marshes. This soil is mainly in large, irregularly shaped areas in a marsh south of Lake Istokpoga. The mapped areas range from 15 to 200 acres. The slopes are smooth to concave and range from 0 to 1 percent. Typically, the upper part of the surface layer is black muck about 6 inches thick. The lower part, to a depth of 39 inches, is dark brown muck. The underlying material, to a depth of 45 inches, is grayish brown very fine sand. Below that layer, to a depth of 68 inches, is dark gray very fine sandy loam. The lower part to a depth of 80 inches is grayish brown very fine sand. Included with this soil in mapping are small areas of Felda, Hicoria, Samsula, and Tequesta soils. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Kaliga soil is very high. The permeability is slow or very slow. Under natural conditions, this soil is ponded for 6 to 9 months in most years. The water table is generally within 10 inches of the surface for the rest of the year. Smaller areas of this soil remain in natural vegetation of sweet bay, cypress, red maple, blackgum, willow, St. Johnswort, sawgrass, arrowhead, pickerelweed, and maidencane.

19) Hicoria mucky sand, depressional. This nearly level, very poorly drained sol is in wet depressions. This soil is ponded for much of the year. The mapped areas range from 3 to 40 acres. The slopes are smooth to concave and range from 0 to 2 percent. Typically, the upper part

of the surface layer is black mucky sand about 4 inches thick. The lower part, to a depth of 15 inches, is black fine sand. The subsurface layer, to a depth of 21 inches, is light gray sand. The upper part of the subsoil, to a depth of 39 inches, is dark gray fine sandy loam. The lower part, to a depth of 52 inches, is grayish brown fine sandy loam. Included with this soil in mapping are small areas of Felda, Placid, Sanibel, and Tequesta soils. In places are areas of soils that are similar to Hicoria soil, but they have a fine textured subsoil at a depth of more than 40 inches. The included soils make up 10 to 15 percent of the map unit. The available water capacity of this Hicoria soil is high. The permeability is moderately slow or slow in the subsoil. In most areas, this soil is ponded most of the year. The water table is at a depth of 10 inches or less much of the rest of the year. It can recede to a lower depth during extended dry periods and during the winter. Most areas of this soil remain in natural vegetation. The natural vegetation consists of cypress, red maple, blackgum, willow, and bay trees and pickerelweed, arrowhead, maidencane, sawgrass, and other water-tolerant plants.

20) Samsula muck. This nearly level, very poorly drained, organic soil is in depressions, swamps, and marshes. The mapped areas vary considerably in shape and size. Generally, the smaller areas are circular and range from 3 to 15 acres, and the larger areas are very irregular in shape and range from 50 to more than 200 acres. The slopes are smooth to concave and range from 0 to 1 percent. Typically, the surface layer is black muck about 36 inches thick. The upper part of the underlying material, to a depth of 45 inches or more, is black sand. The lower part, to a depth of 65 inches or more, is dark gray, grayish brown, and gray sand. Included with this soil in mapping are small areas of Basinger, Hontoon, Placid, and Sanibel soils. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Samsula soil is high. The permeability is rapid. Under natural conditions, this soil is ponded for 6 to 9 months in most years. The water table is at a depth of 10 inches or less for the rest of the year. Many small areas of this soil remain in native vegetation of cypress, sweetbay, red maple, St. Johnswort, sawgrass, waxmyrtle, arrowhead, pickerelweed, and maidencane.

21) Hontoon muck. This nearly level, very poorly drained, organic soil is in the marshes and swampy areas. Most mapped areas range from 5 to 50 acres, but a few areas range from 100 to more than 500 acres. These areas are irregular in shape. The slopes are smooth to concave and range from 0 to 1 percent. Typically, the upper part of the organic surface layer is dark reddish brown muck 15 inches thick. Below this layer, to a depth of 65 inches, is black muck. The upper part of the underlying material, to a depth of 73 inches, is black mucky sand. The lower part to a depth of more than 80 inches is dark gray sand. Included with this soil in mapping are small areas of Basinger, Placid, and Samsula soils. In most areas, the included soils make up 10 to 20 percent of the map unit. The available water capacity of this Hontoon soil is very high. The permeability is rapid. Under natural conditions, this soil has a water table at or above the surface except during extended dry periods. Some areas of this soil remain in natural vegetation of sweetbay, blackgum, and other water-tolerant trees. The understory consists of fern, maidencane, sawgrass, and pickerelweed.

25) Chobee fine sandy loam, depressional. This nearly level, very poorly drained soil is in depressions on the flatwoods and in swamps and marshes. The mapped areas range from 3 to 40 acres. The slopes are smooth to concave and range from 0 to 1 percent. Typically, the surface layer is black fine sandy loam about 18 inches thick. The upper 3 inches of that layer is stratified muck and fine sandy loam. The subsoil, to a depth of 57 inches, is gray and dark gray sandy clay loam and fine sandy loam. The substratum to a depth of 80 inches is gray fine sand.

Included with this soil in mapping are small areas of Felda, Hicoria, Placid, and Tequesta soils. In places are areas of soils that are similar to Chobee soil. These similar soils either have an organic layer that is more than 6 inches thick above the mineral horizon or a fine textured subsoil at a depth of more than 40 inches, or have both. In most areas, the included soils make up 10 to 15 percent. The available water capacity of this Chobee soil is moderate. The permeability is slow or very slow. This soil is ponded most of the year. Much of the rest of the year, the water table is at a depth of 10 inches or less. Generally, in dry periods during the winter, it recedes to a lower depth. Most areas of this soil remain in natural vegetation, which consists of cypress, bays, red maple, and other water-tolerant trees. The understory in marsh areas consists of pickerelweed, arrowhead, waxmyrtle, sawgrass, and other water-tolerant plants.

26) Tequesta muck. This nearly level, very poorly drained soil is in marshes and depressions in the county. This soil also is along the Kissimmee River flood plain in former oxbows and dendritic patterns leading into the river. Generally, the mapped areas range from 5 to 300 acres, but a few areas are much larger. The slopes are smooth to concave and range from 0 to 2 percent. Typically, the organic surface layer is black muck about 12 inches thick. Below that layer, to a depth of 17 inches, is black fine sand. The subsurface layer, to a depth of 32 inches, is light brownish gray fine sand. The subsoil, to a depth of 77 inches, is dark gray fine sandy loam. The substratum to a depth of 80 inches or more is light gray fine sand. Included with this soil in mapping are small areas of Basinger, Hicoria, Kaliga, and Sanibel soils. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Tequesta soil is moderate. The permeability is moderately slow. Under natural conditions, this soil is ponded for most of the year. The water table is within 10 inches of the surface the rest of the year. The natural vegetation of this soil consists of arrowhead, waxmyrtle, pickerelweed, sawgrass, and other water-tolerant grasses. A few areas are in water-tolerant trees.

28) Archbold sand, 0 to 5 percent slopes, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on moderately high ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to 75 acres. The slopes are smooth to convex. Typically, the surface layer is gray sand about 4 inches thick. The underlying material to a depth of 80 inches or more is white sand. The available water capacity of the Archbold soil is very low. The permeability is very rapid. The water table is at a depth of 40 to 60 inches during the summer rainy season. It recedes to a lower depth during the rest of the year. The natural vegetation consists of sand pine, south Florida slash pine, Chapman oak, myrtle oak, and sand live oak. The understory consists of saw palmetto and scattered pineland threeawn.

29) Pomona sand. This nearly level, poorly drained soil is in the low, flatwood areas that are adjacent to the Hardee County line. The mapped areas are irregular in shape and range from 10 to 50 acres. The slopes are smooth and range from 0 to2 percent.

Typically, the surface layer is black sand about 6 inches thick. The subsurface layer, to a depth of 29 inches, is gray and light gray sand. The upper part of the subsoil, to a depth of 51 inches, is dark brown and very dark grayish brown sand coated with organic matter. Below that layer, to a depth of 61 inches, is light brownish gray sand. The lower part to a depth of 80 inches or more is gray sandy loam.

Included with this soil in mapping are small areas of Basinger, EauGallie, Felda, Myakka, and

Placid soils. In places is a soil that is similar to Pomona soil, but it has a loamy subsoil at a depth of less than 40 inches. In most areas, the included soils make up 20 to 50 percent of the map unit.

The available water capacity of this Pomona soil is moderate. The permeability is moderately slow or slow. The water table is at a depth of less than 12 inches during the summer rainy season. Generally, during the rest of the year, it is at a depth of 12 to 40 inches and recedes to a lower depth during extended dry periods. Also, this soil can have a perched water table because of the permeability of the subsoil.

The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, waxmyrtle, fetterbush, gallberry, and saw palmetto. Pineland threeawn is the dominant grass; but depending on conditions, there are significant amounts of creeping bluestem, chalky bluestem, bushy bluestem, lopsided indiangrass, maidencane, and other grasses.

30) Oldsmar fine sand. This nearly level, poorly drained soil is in the flatwood areas that are adjacent to sloughs and streams in the county. The mapped areas are irregular in shape and range from 10 to 50 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 32 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of 54 inches, is black, dark brown, and brown fine sand. The lower part, to a depth of 60 inches, is grayish brown sandy clay loam. The substratum to a depth of 80 inches is yellowish brown fine sand. Included with this soil in mapping are areas of EauGallie, Immokalee, Myakka, and Smyrna soils. In places are soils that are similar to Oldsmar soil, but they have a loamy or clayey layer with 40 inches of the surface. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of this Oldsmar soil is low. The permeability is slow or very slow. The water table is within 12 inches of the surface during the summer rainy season. It is at a depth of 12 to 40 inches the rest of the year. The water table may be perched above the upper part of the subsoil during periods of high rainfall. The natural vegetation of this soil consists of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, chalky bluestem, pineland threeawn, low panicum, scattered hypericum, and other native forbs and grasses.

33) Basinger, St. Johns, and Placid soils. These nearly level, poorly drained and very poorly drained soils are in seep areas in the county. Locally, they are called cutthroat seeps because of the cutthroat grass that grows vigorously in these areas. Generally, these seep areas are in association with the central ridge in the county. They are the result of water seeping from a higher to a lower position on the landscape. These areas tend to remain wetter for longer periods than similar soils outside the seep areas. The mapped areas range from 50 to more than 1,000 acres. The slopes are dominantly 0 to 2 percent but occasionally range up to 5 percent near the edge of ridges. The composition of soils in these cutthroat seep areas is highly variable. Similarity of landscape position, land use, and management preclude mapping the soils separately. Some areas contain all three soils while others contain only one of the named soils. The percentage composition is highly variable, although most mapped areas are dominated by one of the major soils. Typically, the surface layer of Basinger soil is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand with many bodies of dark grayish brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine

sand. Typically, the surface layer of St. Johns soil is black sand about 11 inches thick. The subsurface layer, to a depth of 26 inches, is light brownish gray sand. The upper part of the subsoil, to a depth of 31 inches, is very dark brown sand. The next layer, to a depth of 49 inches, is black sand. The next layer, to a depth of 70 inches, is dark yellowish brown sand. The lower part to a depth of 80 inches is very dark gray sand. Typically, the surface layer of Placid soil is black sand about 7 inches thick. Below that layer, to a depth of 14 inches, is very dark gray sand. The underlying material to a depth of 80 inches is gray sand. Included in mapping are small areas of Myakka, Samsula, Sanibel, and Smyrna soils. Some places have small areas of a soil that is similar to Placid soil, but the soil has a surface layer that is more than 24 inches thick. The available water capacity of Basinger and Placid soils is low. It is moderate in St. Johns soil. The permeability of Basinger and Placid soils is rapid, and it is moderate or moderately slow in the subsoil of St. Johns soil. The soils in this map unit have a water table within 12 inches of the surface most of the year. Interspersed throughout the map unit are shallow depressions that are ponded for several months during the rainy season. The natural vegetation consists dominantly of cutthroat grass, pineland threeawn, longleaf pine, south Florida slash pine, and slash pine. Other vegetation in some area includes St. Johnswort, waxmyrtle, creeping bluestem, fetterbush, gallberry, maidencane, and saw palmetto and bay trees.

35) Sanibel muck. This nearly level, very poorly drained soil is in marshes, swamps, and poorly defined drainageways. The mapped areas are irregular in shape and mostly range from 10 to 100 acres, but East of Lake Istokpoga are some mapped areas that are several hundred acres in size. The slopes are smooth to concave and range from 0 to 2 percent. Typically, the organic surface layer is black muck about 8 inches thick. Below that layer, to a depth of 15 inches, is black mucky fine sand. The upper part of the underlying material, to a depth of 63 inches, is gray sand. The lower part to a depth of 80 inches or more is light brownish gray sand. Included with this soil in mapping are small areas of Basinger, Kaliga, Placid, Samsula, and Tequesta soils. In places are soils that are similar to Sanibel soil, but they have a finer textured material in the substratum. In most areas, the included soils make up 15 to 30 percent of the map unit. The available water capacity of this Sanibel soil is low. The permeability is rapid. Runoff is slow. Under natural conditions, the water table is above the surface for 2 to 6 months during the wet seasons. During the rest of the year, it is at a depth of less than 10 inches. Natural fertility is moderate, and the content of organic matter is high. Natural vegetation in this soil consists of cypress and other water-tolerant trees and pickerelweed, maidencane, and other water-tolerant grasses.

36) Pomello sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on slightly elevated ridges and knolls in the flatwoods part of the county and is also to a small extent in the ridge part of the county. The mapped areas are irregular in shape and mostly range from 10 to 30 acres. The slopes are generally smooth to convex. Typically, the surface layer is dark gray sand about 4 inches thick. The subsurface layer, to a depth of 56 inches, is white sand. The upper part of the subsoil, to a depth of 62 inches, is mixed dark reddish brown and dark brown sand. The lower part to a depth of 80 inches or more grades to brown sand. Included with this soil in mapping are small areas of Daytona, Duette, Immokalee, Orsino, and Satellite soils. In places are some small areas of soils along the Kissimmee River that are similar to Pomello soil, but they have brighter colors in the subsurface layer than Pomello soil and support hardwood hammock vegetation. In most areas, the included soils make up 10 to 15 percent of the map unit. The available water capacity of the Pomello soil is very low. The permeability is moderately rapid. The water table is at a depth of 24 to 40 inches for 2 to 5

months. It is generally higher during the summer rainy season but may recede to a depth of more than 60 inches during the dry winter and other extended dry periods. Natural vegetation in this soil consists of south Florida slash pine, longleaf pine, slash pine, sand live oak, Chapman oak, myrtle oak, fetterbush, saw palmetto, and scattered pineland threeawn.

37) Malabar sand, depressional. This nearly level, very poorly drained soil is in the concave areas on the flatwoods and along the edges of swamps and marshes. The mapped areas are irregular in shape and range form 10 to 50 acres. The slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is dark gray sand about 5 inches thick. The subsurface layer, to a depth of 18 inches, is light gray sand. The upper part of the subsoil, to a depth of 48 inches, is brownish yellow and yellowish brown sand. The lower part, to a depth of 59 inches, is gray sandy loam. The substratum to a depth of more than 72 inches is light gray sand and loamy sand. Included with this soil in mapping are small areas of Basinger, Felda, Hicoria, Placid, and Valkaria soils. In places are soils that are similar to Malabar soil, but they have thin layers of muck on the surface. In most areas, the included soils make up 20 to 30 percent of the map unit. The available water capacity of the Malabar soil is low. The permeability is slow or very slow. This soil is ponded for 4 to 6 months each year. The water table is generally within 10 inches of the surface for the rest of the year. During long dry periods, it may recede to a depth of more than 30 inches. The natural vegetation of this soil consists of arrowhead, maidencane, pickerelweed, and St. Johnswort. A few areas are in water-tolerant trees.

38) Eaugallie fine sand. This nearly level, poorly drained soil is in the flatwood areas that are adjacent to sloughs and drainageways. The mapped areas are irregular in shape and range from 6 to 320 acres or more. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 26 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 40 inches, is black and dark reddish brown fine sand. The lower part to a depth of 80 inches is light brownish gray sandy clay loam and fine sandy loam. Included with this soil in mapping are small areas of Felda, Immokalee, Myakka, Oldsmar, Pomona, and Smyrna soils. In places are soils that are similar to EauGallie soil, but they have a loamy layer within 40 inches of the surface. In most areas, the included soils make up 5 to 30 percent of the map unit. The available water capacity of the EauGallie soil is low. The permeability is moderate to slow. The water table is within 12 inches of the surface during the summer rainy period. During the rest of the year, it is at a depth of 12 to 40 inches. A perched water table above the hardpan layer, or the upper subsoil, may be evident during periods of high rainfall. The natural vegetation in this soil consists of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, running oak, pineland threeawn, and various species of bluestems, panicums, and other grasses.

39) Smyrna sand. This nearly level, poorly drained soil is on the broad flatwoods in the county. The mapped areas are irregular in shape and range from 20 to 500 acres. The slopes are smooth and range from 0 to2 percent. Typically, the surface layer is dark gray sand about 5 inches thick. The subsurface layer, to a depth of 15 inches, is light gray fine sand. The subsoil, to a depth of about 35 inches, is black, dark brown, and brown fine sand. The upper part of the substratum, to a depth of 45 inches, is light yellowish brown fine sand. The middle part, to a depth of 56 inches, is light gray fine sand. The lower part to a depth of 80 inches is white sand. Included with this soil in mapping are small areas of Basinger, Immokalee, Myakka, Placid, and Valkaria soils. In most areas, the included soils make up 10 to 20 percent of the map unit. The available water capacity of the Smyrna soil is low. The permeability is moderate or moderately rapid. The water

table is at a depth of less than 12 inches during the summer rainy season. Generally, during the rest of the year, it is at a depth of 12 to 40 inches. During extended dry periods, the water table can recede to a lower depth. Also, this soil can have a perched water table because of the permeability of the subsoil. The natural vegetation of this soil consists of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, waxmyrtle, and running oak. Pineland threeawn is the dominant grass; but depending on range conditions, there are significant amounts of creeping bluestem, lopsided indiangrass, panicum, and other grasses.

46) Kaliga muck, frequently flooded. This nearly level, very poorly drained soil is on a long narrow flood plain that is adjacent to the streambed on Arbuckle Creek. The mapped areas range from 25 to more than 100 acres. The slopes are smooth and range from 0 to 2 percent. Typically, the surface layer is black muck about 6 inches thick. Below that layer, to a depth of 39 inches, is dark brown muck. The upper part of the underlying material, to a depth of 45 inches, is a thin layer of grayish brown very fine sand. The next layer, to a depth of 68 inches, is dark gray very fine sandy loam. The lower part to a depth of 80 inches is grayish brown very fine sand. Included with this soil in mapping are small areas of Basinger, Felda, Hicoria, Samsula, Sanibel, and Tequesta soils. In most areas, the included soils make up 15 to 35 percent of the map unit. The available water capacity of this Kaliga soil is very high. The permeability is slow or very slow. The seasonal high water table is at a depth of less than 12 inches for very long periods in most years. These soils are subject to flooding for long periods during seasons of high rainfall. The flooding results in deposition and removal of sediment and debris. In the lowest areas on the flood plain, the muck is generally thicker. On higher bars, the soils have a thick, sandy surface layer stratified with buried organic material. On the more sloughlike areas on the landscape, the soils have a thin, organic layer underlain by sand. The natural vegetation consists of maidencane, duckpotato, arrowhead, pickerelweed, and waxmyrtle and buttonbush, bays, red maple, blackgum, and cypress trees.

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5) Tavares fine sand, 0 to 5 percent slope. This is a moderately well drained soil on low ridges and knolls throughout the county. Individual areas are irregular in shape and range from 5 to 40 acres in size. Slopes are smooth to concave. Typically, the surface layer is very dark grayish brown fine sand about 5 inches thick. The underlying material to a depth of 80 inches is fine sand. The upper 19 inches is light yellowish brown, the next 26 inches is very pale brown, the next 19 inches is white, and the lower 11 inches is very pale brown. Included with this soil in mapping are small areas of Adamsville, Candler, Sparr, and Zolfo soils. Also included are a few areas of soils that have a dark surface layer more than 10 inches thick. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent. In most years this Tavares soil has a water table at a depth of 40 to 80 inches for 6 to 10 months and at a depth below 80 inches during very dry periods. The available water capacity is very low, and natural fertility is low. Permeability is rapid. The natural vegetation includes slash and longleaf pine, blackjack, turkey, and post oak, and an understory of pineland threeawn, low panicums, and broomsedge bluestem.

7) Basinger fine sand. This is a poorly drained, nearly level soil in poorly defined drainageways and sloughs in the flatwoods. Individual areas are irregular in shape and range form 5 to 25 acres. Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is

black and dark gray fine sand about 7 inches thick. The subsurface layer is light brownish gray fine sand to a depth of 14 inches. The next layer is dark brown fine sand mixed with grayish brown fine sand to a depth of 24 inches. The substratum is brown fine sand to a depth of 30 inches and light gray fine sand to a depth 80 inches. Included with this soil in mapping are similar soils that have a black surface layer 10 to 13 inches thick and that are in small depressions. Also included are small areas of Myakka, Ona, and Smyrna soils on higher positions near the edges of areas of this Basinger soil. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent. In most years, if this Basinger soil is not drained, the water table is at a depth of less than 10 inches for 2 to 6 months and at a depth of 10 to 30 inches for more than 6 months. Permeability is very rapid throughout. The available water capacity is very low, and natural fertility is low. The natural vegetation is mainly longleaf and slash pine and an understory consisting of waxmyrtle, St. John's wort, pineland threeawn, and saw palmetto.

10) Pomona fine sand. This is a nearly level, poorly drained soil in large areas on low ridges in the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent. Individual areas are broad and oblong and range from 15 to 200 acres in size. Typically, the surface layer is black fine sand about 3 inches thick. The subsurface layer is fine sand about 24 inches thick. The upper 7 inches is gray, and the lower 17 inches is light gray. The subsoil extends to a depth of 80 inches. The upper 8 inches is dark reddish brown fine sand coated with organic matter, the middle 22 inches is brown fine sand, and the lower 23 inches is gray fine sandy loam. Included with this oil in mapping are small areas of Basinger, Myakka, Smyrna, and Wauchula soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped area, the included soils make up either less than 10 percent or more that 15 percent. In most years, this Pomona soil has a water table at a depth of 10 inches for1 to 3 months and at a depth of less than 40 inches for more than 6 months. The available water capacity is very low to low in all layers except the lower part of the subsoil, where it is moderate. Natural fertility is low. Permeability is moderate in the upper part of the subsoil, moderately slow in the lower part of the subsoil, and rapid in the other layers. The natural vegetation includes longleaf and slash pine and saw palmetto, gallberry, waxmyrtle, and pineland threeawn.

15) Immokalee fine sand. This is a poorly drained, nearly level soil on broad low ridges and low knolls in the flatwoods. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 5 inches thick. The subsurface layer is gray fine sand to a depth of about 44 inches. The subsoil is fine sand to a depth of 80 inches. The upper 4 inches is black, and the lower 32 inches is dark reddish brown. Included with this oil in mapping are small areas of Myakka, Ona, Placid, and Pomello soils. In 80 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 10 or more than 15 percent. In most years, the water table is at a depth of less than 10 inches for 2 months and at a depth of 10 to 40 inches for more than 8 months. It is at a depth of more than 40 inches during dry periods. The available water capacity is low. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is low. The natural vegetation consists mainly of longleaf and slash pine and an undergrowth of saw palmetto, gallberry, waxmyrtle, and pineland threeawn.

16) Myakka fine sand. This is a nearly level, poorly drained soil in broad areas in the flatwoods.

Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is very dark grayish brown fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of 21 inches. The subsoil is fine sand about 25 inches thick. The upper 4 inches is very dark gray, the next 5 inches is dark reddish brown, the next 10 inches is dark brown, and the lower 6 inches is brown. The substratum is pale brown and light brownish gray fine sand to a depth of 80 inches. Included with this soil in mapping are areas of similar soils that have a black surface layer more than 8 inches thick. Also included are small areas of Adamsville, Basinger, Pomona, Smyrna, and Pompano soils. In 85 percent of the mapped areas, the included soils make up 10 to 15 percent of the acreage. In 15 percent of the mapped areas, the included soils make up either less than 10 percent or more than 15 percent. In most years this Myakka soil has a water table at a depth of less than 10 inches for 1 to 4 months. The water table recedes to a depth of more than 40 inches during very dry seasons. The available water capacity is moderate in the subsoil but is very low in the other layers. Permeability is rapid in the surface layer and substratum and moderate or moderately rapid in the subsoil. Internal drainage is slow, and runoff is slow. Natural fertility is low. The natural vegetation includes longleaf and slash pine and an understory of saw palmetto, running oak, gallberry, waxmyrtle, huckleberry, pineland threeawn, and scattered fetterbushes.

17) Smyrna fine sand. This is a nearly level, poorly drained soil in the flatwoods. Individual areas are irregular in shape and range from 3 to 20 acres in size. Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer is light gray sand to a depth of 16 inches. The subsoil is organic-coated sand to a depth of 29 inches. The upper part is black, and the lower part is dark reddish brown and dark brown. Below the subsoil, there is a light gray sand to a depth of 48 inches and dark brown sand to a depth of 80 inches or more. Included with this soil in mapping are Immokalee, Myakka, and Ona soils. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent. In most years, this Smyrna soil has a water table at a depth of less than 10 inches for 1 to 4 months and at a depth of 10 to 40 inches for more than 6 months. Permeability is moderate. Natural fertility is moderate. The available water capacity is moderate in the subsoil and very low to low in the other layers. The native vegetation includes longleaf and slash pine and an undergrowth of saw palmetto, running oak, gallberry, waxmyrtle, and pineland threeawn.

18) Cassia fine sand. This is a nearly level, somewhat poorly drained soil on low ridges slightly higher than the adjacent flatwoods. Individual areas are irregular in shape and range from 5 to 15 acres in size. Slopes range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layer is white sand to a depth of 27 inches. The subsoil is sand to a depth of 65 inches. In the upper 7 inches it is dark reddish brown, and the grains are coated with organic material; in the next 23 inches it is brown or pale brown, and in the lower 8 inches it is dark grayish brown and contains black very firm fragments. The substratum to a depth of 80 inches or more is very pale brown and light gray sand. Included with this soil in mapping are small areas of Immokalee and Pomello soils. In 90 percent of the mapped areas, the included soils make up 5 to 12 percent of the acreage. In 10 percent of the mapped areas, the included soils make up either less than 5 or more than 12 percent. This Cassia soil has a water table at a depth of 15 to 40 inches for about 6 months and at a depth below 40 inches during dry periods. The available water capacity is very low to low except in the subsoil, where it is moderate. Natural fertility is low. Permeability is rapid in the surface and subsurface layers and

moderate to moderately rapid in the subsoil. The natural vegetation consists of scattered slash and longleaf pine, dwarf and sand live oak, saw palmetto, pineland threeawn, running oak, and broomsedge bluestem.

19) Ona fine sand. This is a poorly drained, nearly level soil in the flatwoods. Individual areas are irregular in shape and range from 3 to 100 acres in size. Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is black fine sand about 9 inches thick. The subsoil is dark reddish brown loamy fine sand to a depth of 16 inches. The substratum is fine sand to a depth of 80 inches or more. The upper 8 inches is brown, the next 18 inches is pale brown, the next 18 inches is light gray, and the lower 20 inches is brown. Included with this soil in mapping are small areas of Basinger, Immokalee, Myakka, and Placid soils. Also included are wet spots and small ponds. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent. In most years, this Ona soil has a water table at a depth of 10 to 40 inches for 4 to 6 months. The water table rises to a depth of less than 10 inches for 1 to 2 months and may recede to a depth of more than 40 inches during very dry seasons. Permeability is moderate. Natural fertility is moderate. The available water capacity is moderate in the surface layer and subsoil and very low to low in the other layers. The natural vegetation includes slash and longleaf pine, gallberry, and widely spaced saw palmetto, huckleberry, and pineland threeawn.

20) Samsula muck. This is a very poorly drained, nearly level organic soil in low depressions. Individual areas are irregular in shape and range from 3 to 100 acres in size. Slopes are less than 2 percent. Typically, the surface layer is black muck about 25 inches thick. Below the muck, there is fine sand to a depth of 65 inches or more. In the upper 8 inches, the fine sand is black. In the lower 32 inches, it is light gray. Included with this soil in mapping are areas of similar soils except that the organic material is less than 16 inches thick. Also included are small areas of soils that have organic material to a depth of 52 inches or more. Also included are areas of soils that are loamy within a depth of 52 inches. In 80 percent of the mapped areas, the included soils make up 8 to 12 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 8 percent or more than 12 percent. This Samsula soil has a water table at or near the surface for 6 to 12 months of the year. If the soil is not drained, it is covered by water for very long periods. The available water capacity is very high in the organic layer and very low in the sandy layers. Permeability is rapid throughout. Natural fertility is moderate, and the content of organic matter is very high. The native vegetation consists of loblolly bay, scattered cypress, maple, gum, and pine, and a ground cover of greenbrier, ferns, and other aquatic plants.

21) Placid fine sand, depressional. This is a very poorly drained soil in wet depressions and in poorly defined drainageways in the flatwoods. Individual areas are irregular in shape and range from 3 to 20 acres in size. Slopes are less than 1 percent. Typically, the surface layer is fine sand about 18 inches thick. It is it is black in the upper 6 inches and very dark gray in the lower 12 inches. The underlying material is grayish brown or light brownish gray fine sand to a depth of 80 inches or more. Included with this soil in mapping are small areas of Basinger and Pompano soils. Also included are small areas of similar soils that have a well-decomposed organic surface layer 3 to 12 inches thick. In 80 percent of the mapped areas, the included soils make up 12 to 17 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 12 percent or more than 17 percent. In most years, this Placid soil is covered by water for 6 months or more. The available water capacity is high in the surface and layer and low in the

underlying material. Permeability is rapid throughout. Internal drainage is slow because it is impeded by a shallow water table. Natural fertility and the content of organic matter are high to a depth of about 15 inches and low below that depth. The native vegetation consists of pond pine, bay, cypress, gum, pickerelweed, rushes, sedges, maidencane, and other water-tolerant grasses.

32) Felda fine sand, depressional. This is a nearly level, poorly drained soil in depressions. Individual areas are irregular in shape and range from 10 to 60 acres in size. Slopes are smooth to concave and are less than 2 percent. Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand to a depth of about 26 inches. The upper 5 inches is grayish brown, and the lower 16 inches is light gray. The subsoil is sandy loam about 22 inches thick. The upper 10 inches is gray, and the lower 12 inches is grayish brown. The substratum is light gray fine sand to a depth of 80 inches. Included with this soil in mapping are small areas of Bradenton and Holopaw soils and a few small areas of organic soils. In 85 percent of the mapped areas, the included soils make up about 8 percent of the acreage. In 15 percent of the mapped areas, the included soils make up either more or less than 8 percent. In most years, water stands on this soil for more than 6 months. The available water capacity is low, and natural fertility is medium. Permeability is moderate to moderately rapid. The natural vegetation consists mainly of cypress, cattails, cabbage palm, maidencane, and sawgrass.

38) St. Lucie fine sand. This is an excessively drained, nearly level soil on ridgetops, knolls, and dunes in areas of sand hills. Individual areas range from 5 to 20 acres in size. Slopes are smooth to concave and range from 0 to 2 percent. Typically, the surface layer is dark gray fine sand about 4 inches thick. The underlying material is white fine sand to a depth of 80 inches. Included with this soil in mapping are small areas of Pomello and Tavares soils. The soils on the small ridges in the flatwoods are likely to have a water table during the rainy season. In 80 percent of the mapped areas, the included soils make up 5 to 10 percent of the acreage. In 20 percent of the mapped areas, the included soils make up either less than 5 percent or more than 10 percent. This St. Lucie soil has a water table at a depth of 72 to 120 inches. The available water capacity is very low. Natural fertility is very low. Permeability is very rapid throughout. The natural vegetation includes sand pine, scrub live oak, scattered turkey and bluejack oak, and an understory of scattered saw palmetto, creeping dodder, rosemary cactus, moss, and lichens.

Addendum 4—Plant And Animal List

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Rosary pea *	*Abrus precatorius*	
Slender copperleaf	*Acalypha gracilens*	
Hispid starburr	*Acanthospermum hispidum*	
Southern red maple	*Acer rubrum*	
Giant leather fern	*Acrostichum danaeifolium*	
Beach false foxglove	*Agalinis fasciculata*	
Flax-leaf false foxglove	*Agalinis linifolia*	
Ten-lobe false foxglove	*Agalinis obtusifolia*	
Woman's tongue *	*Albizia lebbeck*	
Yellow colic-root	*Aletris lutea*	
Spiny amaranth *	*Amaranthus spinosus*	
Common ragweed	*Ambrosia artemisiifolia*	
Cluster-spike indigo-bush	*Amorpha herbacea*	
Pepper vine	*Ampelopsis arborea*	
Blue maidencane	*Amphicarpum muhlenbergianum*	
Bushy bluestem	*Andropogon glomeratus* var. *pumilus*	
Splitbeard bluestem	*Andropogon ternarius*	
Chalky bluestem	*Andropogon virginicus* var. *glaucus*	
Broomsedge	*Andropogon virginicus* var. *virginicus*	
Groundnut	*Apios americana*	
Nodding nixie	*Apteria aphylla*	
Coralberry *	*Ardisia crenata*	
Marlberry	*Ardisia escallonioides*	
Jack-in-the-pulpit	*Arisaema triphyllum*	
Corkscrew threeawn	*Aristida gyrans*	
Threeawn	*Aristida purpurescens*	
Bottlebrush threeawn	*Aristida spiciformis*	
Wiregrass	*Aristida stricta* var. *beyrichiana*	
Indian plantain	*Arnoglossum floridanum*	
Curtiss' milkweed	*Asclepias curtissii*	15
Feay's milkweed	*Asclepias feayi*	
Pinewoods milkweed	*Asclepias humistrata*	
Few-flower milkweed	*Asclepias lanceolata*	
Pedicellate milkweed	*Asclepias pedicellata*	
Butterflyweed	*Asclepias tuberosa*	
Bigflower pawpaw	*Asimina obovata*	
Smallflower pawpaw	*Asimina parviflora*	
Dwarf pawpaw	*Asimina pygmaea*	
Netted pawpaw	*Asimina reticulata*	
Bicolored spleenwort	*Asplenium heterochroum*	
Big carpetgrass	*Axonopus furcatus*	
Carolina mosquito fern	*Azolla caroliniana*	
Groundsel tree; Saltbush	*Baccharis halimifolia*	
Lemon bacopa	*Bacopa caroliniana*	
Coastal water hyssop	*Bacopa monnieri*	
Coastalplain honeycombhead	*Balduina angustifolia*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Bamboo *	*Bambusa vulgaris*	
White screwstem	*Bartonia verna*	
Tarflower	*Bejaria racemosa*	
Rattan vine; Supplejack	*Berchemia scandens*	
Greeneyes	*Berlandiera pumila*	
Florida greeneyes	*Berlandiera subacaulis*	
Spanish needles	*Bidens alba* var. *radiata*	
Smallfruit beggarticks	*Bidens mitis*	
Pineland rayless goldenrod	*Bigelowia nudata* subsp. *australis*	
Toothed midsorus fern	*Blechnum serrulatum*	
Small-spike false nettle	*Boehmeria cylindrica*	
Red spiderling	*Boerhavia diffusa*	
Small-head doll's daisy	*Boltonia diffusa*	
Dissected grape-fern	*Botrychium biternatum*	
American blueheart	*Buchnera americana*	
Watergrass *	*Bulbostylis barbata*	
Capillary hairsedge	*Bulbostylis ciliatifolia*	
Ware's hairsedge	*Bulbostylis warei*	
Northern bluethreads	*Burmannia biflora*	
Southern bluethreads	*Burmannia capitata*	
American beautyberry	*Callicarpa americana*	
Roseling	*Callisia graminea*	
Florida scrub roseling	*Callisia ornata*	
Bottlebrush *	*Callistemon vimenale*	
White cypress-pine *	*Callitris glaucophylla*	
Bearded grasspink	*Calopogon barbatus*	
Many-flower grasspink	*Calopogon multiflorus*	8
Pale grasspink	*Calopogon pallidus*	
Tuberous grasspink	*Calopogon tuberosus*	
Trumpet-creeper	*Campsis radicans*	
Long strap fern	*Campyloneurum phyllitidis*	
Golden canna	*Canna flaccida*	
Indian shot *	*Canna indica*	
Hairy bitter-cress *	*Cardamine pensylvanica*	
Sedge; Coconut grass	*Carex alata*	
Prickly bog sedge	*Carex atlantica* subsp. *capillacea*	
Bearded sedge	*Carex comosa*	
Elliott's sedge	*Carex elliottii*	
Hop sedge	*Carex lupulina*	
Deer-tongue	*Carphephorus corymbosus*	
Vanilla plant; Vanilla-leaf	*Carphephorus odoratissimus* var. *subtropicanus*	
Hairy chaffhead	*Carphephorus paniculatus*	
Scrub hickory	*Carya floridana*	
Pignut hickory	*Carya glabra*	
Madagascar periwinkle *	*Catharanthus roseus*	
New Jersey tea	*Ceanothus americanus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Sugarberry	*Celtis laevigata*	
Southern sandspur	*Cenchrus echinatus*	
Slender sandspur	*Cenchrus gracillimus*	
Coast sandspur	*Cenchrus spinifex*	
Coinwort; Spadeleaf	*Centella asiatica*	
Spurred butterfly-pea	*Centrosema virginianum*	
Buttonbush	*Cephalanthus occidentalis*	
Rosemary	*Ceratiola ericoides*	
Water horn fern	*Ceratopteris pteridoides*	
Partridge pea	*Chamaecrista fasciculata*	
Wild sensitive plant	*Chamaecrista nictitans* var. *aspera*	
Hairy spurge; Pill-pod sandmat	*Chamaesyce hirta*	
Eyebane; Hyssop-leaf sandmat	*Chamaesyce hyssopifolia*	
Milk purslane; Spotted sandmat	*Chamaesyce maculata*	
Chapman's pea	*Chapmannia floridana*	
Pineland daisy; Wooly sunbonnets	*Chaptalia tomentosa*	
Slender woodoats	*Chasmanthium laxum* var. *laxum*	
Longleaf chasmanthium	*Chasmanthium laxum* var. *sessiliflorum*	
Lamb's-quarters; Pigweed *	*Chenopodium album*	
Mexican tea *	*Chenopodium ambrosioides*	
White fringe tree	*Chionanthus virginicus*	
Florida raphis	*Chrysopogon pauciflorus*	
Cottony goldenaster	*Chrysopsis gossypina*	
Florida goldenaster	*Chrysopsis highlandsensis*	
Coastal plain goldenaster	*Chrysopsis scabrella*	
Scrubland goldenaster	*Chrysopsis subulata*	
Spotted water hemlock	*Cicuta maculata*	
Camphor tree *	*Cinnamomum camphora*	
Purple thistle	*Cirsium horridulum*	
Nuttall's thistle	*Cirsium nuttallii*	
Sour and sweet orange,grapefruit *	*Citrus x aurantium*	
Lemon *	*Citrus x limon*	
Tangerine *	*Citrus reticulata*	
Jamaican sawgrass	*Cladium jamaicense*	
Pine-hyacinth	*Clematis baldwinii*	
Net-leaf leatherflower	*Clematis reticulata*	
Turk's-turban *	*Clerodendrum indicum*	
Tread-softly; Finger-rot	*Cnidoscolus stimulosus*	
Wrinkled jointtail	*Coelorachis rugosa*	
Wild taro; Elephant's-ear *	*Colocasia esculentum*	
Dayflower *	*Commelina diffusa*	
Erect dayflower	*Commelina erecta*	
Blue mistflower	*Conoclinium coelestinum*	
Dwarf horseweed	*Conyza canadensis* var. *pusilla*	
Spring coralroot	*Corallorhiza wisteriana*	
Leavenworth's tickseed; Coreopsis	*Coreopsis leavenworthii*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Swamp dogwood	*Cornus foemina*	
String lily	*Crinum americanum*	
Smooth rattlebox *	*Crotalaria pallida* var. *obovata*	
Tropical rattlebox *	*Crotalaria retusa*	
Rabbit-bells	*Crotalaria rotundifolia*	
Showy rattlebox *	*Crotalaria spectabilis*	
Tropical croton	*Croton glandulosus*	
Michaux's croton	*Croton michauxii*	
Toothachegrass	*Ctenium aromaticum*	
Columbian waxweed	*Cuphea carthagenensis*	
Dodder	*Cuscuta americana*	
Leafless swallow-wort	*Cynanchum scoparium*	
Bermudagrass *	*Cynodon dactylon*	
Coastal plain flatsedge	*Cyperus cuspidatus*	
Slender flatsedge	*Cyperus filiculmis*	
Sheathed flatsedge	*Cyperus haspan*	
LeConte's flatsedge	*Cyperus lecontei*	
Alabama swamp flatsedge	*Cyperus ligularis*	
Many-spike flatsedge	*Cyperus polystachyos*	
Pine-barren flatsedge	*Cyperus retrorsus*	
Purple flatsedge *	*Cyperus rotundus*	
Straw-color flatsedge	*Cyperus strigosus*	
Tropical flatsedge	*Cyperus surinamensis*	
Four-angle flatsedge	*Cyperus tetragonus*	
Scrub ti-ti	*Cyrilla racemiflora*	
Durban crowfootgrass *	*Dactyloctenium aegyptium*	
Whitetassels	*Dalea carnea*	
Feay's prairie clover	*Dalea feayi*	
Summer-farewell	*Dalea pinnata* var. *adenopoda*	
Western tansy-mustard	*Descurainia pinnata*	
Hairy small-leaf tick-trefoil	*Desmodium ciliare*	
Florida tick-trefoil	*Desmodium floridanum*	
Panicled tick-trefoil	*Desmodium paniculatum*	
Dixie tick-trefoil *	*Desmodium tortuosum*	
Three-flower tick-trefoil *	*Desmodium triflorum*	
Dianella lily; Flax lily *	*Dianella caerulea*	
Needleleaf witchgrass	*Dichanthelium aciculare*	
Variable witchgrass	*Dichanthelium commutatum*	
Cypress witchgrass	*Dichanthelium dichotomum*	
Witchgrass	*Dichanthelium ensifolium*	
Witchgrass	*Dichanthelium ensifolium* var. *breve*	
Erect-leaf witchgrass	*Dichanthelium erectifolium*	
Lax-flower witchgrass	*Dichanthelium laxiflorum*	
Egg-leaf witchgrass	*Dichanthelium ovale*	
Witchgrass	*Dichanthelium portoricense*	
Wooly panic-grass	*Dichanthelium scabriusculum*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Carolina pony-foot	*Dichondra carolinensis*	
Seven-angle foldwing	*Dicliptera sexangularis*	
Southern crabgrass	*Digitaria ciliaris*	
Slender crabgrass	*Digitaria filiformis*	
Longleaf fingergrass	*Digitaria gracillima*	15
Blanket crabgrass	*Digitaria serotina*	
Shaggy crabgrass	*Digitaria villosa*	
Rough buttonweed; Poor Joe	*Diodia teres*	
Virginia buttonweed	*Diodia virginiana*	
Air potato *	*Dioscorea bulbifera*	
Persimmon	*Diospyros virginiana*	
Dwarf sundew	*Drosera brevifolia*	
Pink sundew	*Drosera capillaris*	
Narrow-leaved sundew	*Drosera intermedia*	8,39
West Indian chickweed	*Drymaria cordata*	
Florida shield fern	*Dryopteris ludoviciana*	
Three-way sedge	*Dulichium arundinaceum*	
Twinflower	*Dyschoriste oblongifolia*	
Large barnyardgrass *	*Echinochloa crus-galli*	
Common water hyacinth *	*Eichhornia crassipes*	
Baldwin's spikerush	*Eleocharis baldwinii*	
Horsetail spikerush	*Eleocharis equisetoides*	
Yellow spikerush	*Eleocharis flavescens*	
Viviparous spikerush	*Eleocharis vivipara*	
Florida elephant's-foot	*Elephantopus elatus*	
Spurred neottia	*Eltroplectris calcarata*	37
Carolina scalystem	*Elytraria caroliniensis*	
Butterfly orchid	*Encyclia tampensis*	32,26,37
Dingy-flowered epidendrum	*Epidendrum anceps*	37
Green fly orchid	*Epidendrum conopseum*	32,26,37
Night-scent orchid	*Epidendrum nocturnum*	37
Feather lovegrass *	*Eragrostis amabilis*	
Elliott lovegrass	*Eragrostis elliottii*	
Coastal lovegrass	*Eragrostis virginica*	
Fireweed	*Erechtites hieraciifolia*	
Centipedegrass *	*Eremochloa ophiuroides*	
Oakleaf fleabane	*Erigeron quercifolius*	
Daisy fleabane; Prairie fleabane	*Erigeron strigosus*	
Early white-top fleabane	*Erigeron vernus*	
Flattened pipewort	*Ericaulon compressum*	
Giant pipewort; Ten-angle pipewort	*Eriocaulon decangulare*	
Fragrant eryngium	*Eryngium aromaticum*	
Baldwin's eryngium	*Eryngium baldwinii*	
Rattlesnake-master	*Eryngium yuccifolium*	
Cherokee bean	*Erythrina herbacea*	
Surinam cherry *	*Eugenia uniflora*	

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
American strawberry bush	*Euonymus americana*	
Dogfennel	*Eupatorium capillifolium*	
Yankeeweed; Dogfennel	*Eupatorium compositifolium*	
False fennel	*Eupatorium leptophyllum*	
Mohr's thoroughwort	*Eupatorium mohrii*	
Roundleaf thoroughwort	*Eupatorium rotundifolium*	
Late-flowering thoroughwort	*Eupatorium serotinum*	
Florida pine spurge	*Euphorbia inundata*	
Lesser Florida spurge	*Euphorbia polyphylla*	
Flat-topped goldenrod	*Euthamia caroliniana*	
Common fig *	*Ficus carica*	
Slender fimbry	*Fimbristylis autumnalis*	
Hairy fimbry	*Fimbristylis puberula*	
Pop ash	*Fraxinus caroliniana*	
Cottonweed; Plains snake-cotton	*Froelichia floridana*	
Saltmarsh umbrellasedge	*Fuirena breviseta*	
Southern umbrellasedge	*Fuirena scirpoidea*	
Lance-leaf blanket flower	*Gaillardia aestivalis*	
Elliott's milk-pea	*Galactia elliottii*	
Eastern milk-pea; Florida milk-pea	*Galactia regularis*	
Downy milk-pea	*Galactia volubilis*	
Coastal bedstraw	*Galium hispidulum*	
Hairy bedstraw	*Galium pilosum*	
Stiff marsh bedstraw	*Galium tinctorum*	
Pennsylvania everlasting; Cudweed	*Gamochaeta pensylvanica*	
Spoon-leaf purple everlasting	*Gamochaeta purpurea*	
Garberia	*Garberia heterophylla*	15
Southern gaura	*Gaura angustifolia*	
Dwarf huckleberry	*Gaylussacia dumosa*	
Carolina jessamine	*Gelsemium sempervirens*	
Wild geranium; Carolina crane'sbill	*Geranium carolinianum*	
African flame lily *	*Gloriosa superba*	
Globe amaranth *	*Gomphrena serrata*	
Loblolly bay	*Gordonia lasianthus*	
Rough hedge-hyssop	*Gratiola hispida*	
Branched hedge-hyssop	*Gratiola ramosa*	
Rein orchid	*Habenaria distans*	26,32
Tooth-petal false rein orchid	*Habenaria floribunda*	
Long-horn false rein orchid	*Habenaria quinqueseta*	
Water-spider false rein orchid	*Habenaria repens*	
Firebush	*Hamelia patens*	
Jinglebell orchid	*Harrisella filiformis*	32
Florida hartwrightia	*Hartwrightia floridana*	8,39
Spanish daisy; Yellowdicks	*Helenium amarum*	
Pine-barren rock rose	*Helianthemum corymbosum*	
Florida scrub rockrose	*Helianthemum nashii*	

Common Name	***Scientific Name***	**Primary Habitat Codes (for designated species)**
Narrow-leaved sunflower	*Helianthus angustifolius*	
Rayless sunflower	*Helianthus radula*	
Swamp rosemallow	*Hibiscus grandiflorus*	
Crimsoneyed rosemallow	*Hibiscus moscheutos*	
Hawkweed; Queendevil	*Hieracium gronovii*	
Coastal plain hawkweed	*Hieracium megacephalon*	
Innocence; Round-leaf bluet	*Houstonia procumbens*	
Many-flower marsh pennywort	*Hydrocotyle umbellata*	
Whorled pennywort	*Hydrocotyle verticillata*	
Skyflower	*Hydrolea corymbosum*	
West Indian marshgrass *	*Hymenachne amplexicaulis*	
Spider lily	*Hymenocallis rotata*	
Coastal plain St. John's-wort	*Hypericum brachyphyllum*	
Round-pod St. John's-wort	*Hypericum cistifolium*	
Peel-bark St. John's-wort	*Hypericum fasciculatum*	
Pineweed; Orange-grass	*Hypericum gentianoides*	
St. Andrew's-cross	*Hypericum hypericoides*	
Dwarf St. John's-wort	*Hypericum mutilum*	
Myrtle-leaf St. John's-wort	*Hypericum myrtifolium*	
Dwarf St. John's wort	*Hypericum reductum*	
Four-petal St. John's-wort	*Hypericum tetrapetalum*	
Creeping bramble fern	*Hypolepis repens*	
Swamp yellow-star grass	*Hypoxis curtissii*	
Fringed yellow-star grass	*Hypoxis juncea*	
Musky mint	*Hyptis alata*	
Carolina holly; Sand holly	*Ilex ambigua*	
Dahoon holly	*Ilex cassine*	
Gallberry; Inkberry	*Ilex glabra*	
Scrub holly	*Ilex opaca* var. *arenicola*	
Cogongrass *	*Imperata cylindrica*	
Carolina indigo	*Indigofera caroliniana*	
Rough hairy indigo *	*Indigofera hirsuta*	
Trailing indigo *	*Indigofera spicata*	
Moonflower	*Ipomoea alba*	
Tievine	*Ipomoea cordatotriloba*	
Ocean-blue morning-glory	*Ipomoea indica*	
Glade morning-glory	*Ipomoea sagittata*	
Juba's bush	*Iresine diffusa*	
Prairie iris	*Iris hexagona*	
Virginia willow; Virginia sweetspire	*Itea virginica*	
Lamp rush; Soft rush	*Juncus effusus* subsp. *solutus*	
Bog rush	*Juncus elliottii*	
Grass-leaf rush; Shore rush	*Juncus marginatus*	
Many-head rush	*Juncus polycephalus*	
Lesser creeping rush	*Juncus repens*	
Needle-pod rush	*Juncus scirpoides*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Pineland water-willow	*Justicia angusta*	
Saltmarsh mallow; Virginia fen-rose	*Kosteletzkya virginica*	
Short-leaf flatsedge	*Kyllinga brevifolia*	
Asian flatsedge *	*Kyllinga squamulata*	
Bloodroot; Carolina redroot	*Lachnanthes caroliniana*	
White-head bog-buttons	*Lachnocaulon anceps*	
Small's bog-buttons	*Lachnocaulon minus*	
Woodland lettuce	*Lactuca floridana*	
Lantana *	*Lantana camara*	
Nodding pinweed	*Lechea cernua*	15,16
Deckert's pinweed	*Lechea deckertii*	
Thyme-leaf pinweed	*Lechea minor*	
Hairy pinweed	*Lechea mucronata*	
Rice cutgrass; Southern cutgrass	*Leersia hexandra*	
Little water duckweed	*Lemna obscura*	
Pale duckweed	*Lemna valdiviana*	
Poorman's pepper	*Lepidium virginicum*	
Leadtree *	*Leucaena leucocephala*	
Chapman's gayfeather	*Liatris chapmanii*	
Garber's blazing star	*Liatris garberi*	
Scrub blazing star	*Liatris ohlingerae*	15,16
Shortleaf blazing star	*Liatris tenuifolia*	
Gopher apple	*Licania michauxii*	
Pine lily; Catesby's lily	*Lilium catesbaei*	8,39
Frog's-bit	*Limnobium spongia*	
Blue toadflax	*Linaria canadensis*	
Florida toadflax	*Linaria floridana*	
Malaysian false-pimpernel *	*Lindernia crustacea*	
Yellowseed false pimpernel	*Lindernia dubia* var. *anagallidea*	
Savannah false pimpernel	*Lindernia grandiflora*	
Sweetgum	*Liquidambar styraciflua*	
Bay lobelia	*Lobelia feayana*	
Glade lobelia	*Lobelia glandulosa*	
White lobelia	*Lobelia paludosa*	
Winged primrose-willow	*Ludwigia alata*	
Seaside primrose-willow	*Ludwigia maritima*	
Smallfruit primrose-willow	*Ludwigia microcarpa*	
Mexican primrose-willow	*Ludwigia octovalvis*	
Marsh primrose-willow	*Ludwigia palustris*	
Peruvian primrose-willow	*Ludwigia peruviana*	
Creeping primrose-willow	*Ludwigia repens*	
Shrubby primrose-willow	*Ludwigia suffruticosa*	
Savannah primrose-willow; Seedbox	*Ludwigia virgata*	
Sky-blue lupine; Oak ridge lupine	*Lupinus diffusus*	
Foxtail clubmoss	*Lycopodiella alopecuroides*	
Slender clubmoss	*Lycopodiella caroliniana*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Nodding clubmoss; Staghorn clubmoss	*Lycopodiella cernua*	8,39
Taper-leaf water hoarhound	*Lycopus rubellus*	
Rose rush	*Lygodesmia aphylla*	
Japanese climbing fern *	*Lygodium japonicum*	
Old World climbing fern *	*Lygodium microphyllum*	
Rusty lyonia; Rusty staggerbush	*Lyonia ferruginea*	
Coastal plain staggerbush	*Lyonia fruticosa*	
Maleberry	*Lyonia ligustrina*	
Fetterbush; Shinyleaf	*Lyonia lucida*	
Wing-angle loosestrife	*Lythrum alatum* var. *lanceolatum*	
Mariana maiden fern *	*Macrothelypteris torresiana*	
Southern magnolia	*Magnolia grandiflora*	
Sweet bay	*Magnolia virginiana*	
Florida adder's-mouth orchid	*Malaxis spicata*	
Slim-leaf Barbara's-buttons	*Marshallia tenuifolia*	
Angular-fruit milkvine	*Matelea gonocarpa*	
Melaleuca; Punk tree *	*Melaleuca quinquenervia*	
Chinaberry *	*Melia azedarach*	
Creeping cucumber	*Melothria pendula*	
Noyau vine *	*Merremia cissoides*	
Shade mudflower	*Micranthemum umbrosum*	
Climbing hempweed; Climbing hempvine	*Mikania scandens*	
Little-leaf sensitive-bean; Sensitive briar	*Mimosa quadrivalvis* var. *angustata*	
Bashful sensitive briar	*Mimosa quadrivalvis* var. *floridana*	
American partridge berry; Twinberry	*Mitchella repens*	
Miterwort; Swamp hornpod	*Mitreola sessilifolia*	
Indian chickweed; Green carpetweed *	*Mollugo verticillata*	
Balsam-pear *	*Momordica charantia*	
One-flower Indian pipe	*Monotropa uniflora*	
Red mulberry	*Morus rubra*	
Bractless dewflower *	*Murdannia nudiflora*	
Wax myrtle	*Myrica cerifera*	
Twoleaf watermilfoil	*Myriophyllum heterophylla*	
Cutleaf watermilfoil	*Myriophyllum pinnatum*	
Giant sword fern	*Nephrolepis biserrata*	37
Tuberous sword fern *	*Nephrolepis cordifolia*	
Boston sword fern	*Nephrolepis exaltata*	
Asian sword fern *	*Nephrolepis multiflora*	
Florida beargrass	*Nolina atopocarpa*	
Scrub beargrass; Britton's beargrass	*Nolina brittoniana*	15

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Spatterdock	*Nuphar advena* subsp. *advena*	
Fragrant white waterlily	*Nymphaea odorata*	
Swamp black gum; Swamp tupelo	*Nyssa sylvatica* var.*biflora*	
Pinebarren whitetop aster	*Oclemena reticulata*	
Lancewood	*Ocotea coriacea*	
Cut-leaved evening primrose	*Oenothera laciniata*	
Flat-top millegrain *	*Oldenlandia corymbosa*	
Woodsgrass	*Oplismenus setarius*	
Prickly-pear cactus	*Opuntia humifusa*	
Golden club	*Orontium aquaticum*	
Cinnamon fern	*Osmunda cinnamomea*	26,27,37,39
Royal fern	*Osmunda regalis* var. *spectabilis*	26,27,32,39
Yellow wood-sorrel	*Oxalis corniculata*	
Pink wood-sorrel	*Oxalis debilis* var. *corymbosa*	
Water cowbane	*Oxypolis filiformis*	
Feay's palafoxia	*Palafoxia feayi*	
Coastal plain palafoxia	*Palafoxia integrifolia*	
Cutthroatgrass	*Panicum abscissum*	8,39
Beaked panicum	*Panicum anceps*	
Maidencane	*Panicum hemitomon*	
Panicum	*Panicum longifolium*	
Redtop panicum	*Panicum rigidulum*	
Warty panicum	*Panicum verrucosum*	
Switch grass	*Panicum virgatum*	
Florida pellitory-of-the-wall	*Parietaria floridana*	
American nailwort	*Paronychia americana*	
Paper-like nailwort	*Paronychia chartacea*	15
Pineland nailwort	*Paronychia patula*	
Rugel's nailwort	*Paronychia rugelii*	
Virginia creeper	*Parthenocissus quinquefolia*	
Bull crowngrass	*Paspalum boscianum*	
Florida paspalum	*Paspalum floridanum*	
Bahiagrass *	*Paspalum notatum* var. *saurae*	
Brownseed paspalum	*Paspalum plicatulum*	
Early paspalum	*Paspalum praecox*	
Water paspalum	*Paspalum repens*	
Thin paspalum	*Paspalum setaceum*	
Vaseygrass *	*Paspalum urvillei*	
Purple passionflower	*Passiflora incarnata*	
Barb-fruit swamp-mallow	*Pavonia spiniflex*	37
Comb polypody; Comb fern	*Pecluma ptilodon* var. *caespitosa*	37
Buckroot	*Pediomelum canescens*	
Spoonflower	*Peltandra sagittifolia*	
Green arrow arum	*Peltandra virginica*	
Many-flower beardtongue	*Penstemon multiflorus*	
Red bay	*Persea borbonia* var. *borbonia*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Scrub bay; Silkbay	*Persea borbonia* var. *humilis*	15
Swamp bay	*Persea palustris*	
Savannah panicum	*Phanopyrum gymnocarpon*	
Sandhill bean	*Phaseolus polystachios* var. *sinuatus*	
Golden polypody	*Phlebodium aureum*	
Florida false sunflower	*Phoebanthus grandiflora*	
Senegal date palm *	*Phoenix reclinata*	
Oak mistletoe	*Phoradendron leucarpum*	
Cut-leaf ground-cherry	*Physalis angulata*	
Cypress-head ground-cherry	*Physalis arenicola*	
Starry-hair ground-cherry	*Physalis walteri*	
American pokeweed; Pokeberry	*Phytolacca americana*	
Artillery plant	*Pilea microphylla*	
Wild pennyroyal	*Piloblephis rigida*	
Blue flowered butterwort	*Pinguicula caerulea*	39
Yellow flowered butterwort	*Pinguicula lutea*	39
Small butterwort	*Pinguicula pumila*	
Sand pine	*Pinus clausa*	
Slash pine	*Pinus elliottii*	
Longleaf pine	*Pinus palustris*	
Blackseed needlegrass	*Piptochaetium avenaceum*	
Carolina stripeseed; Piriqueta	*Piriqueta cistoides* subsp. *caroliniana*	
Water-lettuce	*Pistia stratiotes*	
Narrowleaf goldenaster	*Pityopsis graminifolia*	
White fringed orchid	*Platanthera blephariglottis var. conspicua*	39
Yellow fringed orchid	*Platanthera ciliaris*	39
Crested fringed orchid	*Platanthera cristata*	39
Jug orchid	*Platythelys latifolia*	
Resurrection fern	*Pleopeltis polypodioides var. michauxiana*	
Stinking camphorweed	*Pluchea foetida*	
Saltmarsh fleabane	*Pluchea odorata*	
Rose pogonia	*Pogonia ophioglossoides*	8,39
Paintedleaf	*Poinsettia cyathophora*	
Drumheads	*Polygala cruciata*	
Tall pine-barren milkwort	*Polygala cymosa*	
Candyroot	*Polygala grandiflora*	
Procession flower	*Polygala incarnata*	
Lewton's milkwort	*Polygala lewtonii*	8,39
Orange milkwort	*Polygala lutea*	
Dwarf milkwort	*Polygala nana*	
Low pine-barren milkwort	*Polygala ramosa*	
Yellow bachelor's button	*Polygala rugelii*	
Coastal plain milkwort	*Polygala setacea*	
Florida jointweed	*Polygonella basiramia*	15
Tall jointweed	*Polygonella gracilis*	
Small's jointweed	*Polygonella myriophylla*	15

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
October flower	*Polygonella polygama*	
Large-flower jointweed	*Polygonella robusta*	
Dense-flower smartweed	*Polygonum densiflorum*	
Mild water pepper; Swamp smartweed	*Polygonum hydropiperoides*	
Dotted smartweed	*Polygonum punctatum*	
Bog smartweed	*Polygonum setaceum*	
Rustweed	*Polypremum procumbens*	
Pickerelweed	*Pontederia cordata*	
Hairy shadow witch	*Ponthieva racemosa*	
Purslane	*Portulaca oleracea*	
Pink purslane	*Portulaca pilosa*	
Marsh mermaidweed	*Proserpinaca palustris*	
Carolina laurel cherry;Cherry laurel	*Prunus caroliniana*	
Hog plum	*Prunus umbellata*	
Sweet everlasting	*Pseudognaphalium obtusifolium*	
Arrow bamboo *	*Pseudosasa japonica*	
Strawberry guava *	*Psidium cattleianum*	
Whisk fern	*Psilotum nudum*	
Wild coffee	*Psychotria nervosa*	
Shortleaf wild coffee	*Psychotria sulzneri*	
Bracken fern	*Pteridium aquilinum* var. *caudatum*	
Giant brake	*Pteris tripartida*	
Coastal blackroot	*Pterocaulon pycnostachyum*	
Giant orchid; False coco	*Pteroglossapsis ecristata*	8,16
Hairlike mock bishop's-weed	*Ptilimnium capillaceum*	
Carolina false dandelion	*Pyrrhopappus carolinianus*	
Red chokeberry	*Pyrus arbutifolia*	
Chapman's oak	*Quercus chapmanii*	
Running oak	*Quercus elliottii*	
Sand live oak; Scrub live oak	*Quercus geminata*	
Bluejack oak	*Quercus incana*	
Scrub oak	*Quercus inopina*	
Turkey oak	*Quercus laevis*	
Laurel oak; Diamond oak	*Quercus laurifolia*	
Dwarf live oak	*Quercus minima*	
Myrtle oak	*Quercus myrtifolia*	
Water oak	*Quercus nigra*	
Virginia live oak	*Quercus virginiana*	
Myrsine	*Rapanea punctata*	
Needle palm	*Rhapidophyllum hystrix*	37
Maryland meadow beauty	*Rhexia mariana*	
Nash's meadow beauty	*Rhexia nashii*	
Nuttall's meadow beauty	*Rhexia nuttallii*	
Fringed meadow beauty	*Rhexia petiolata*	
Swamp azalea	*Rhododendron viscosum*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Downy rose myrtle *	*Rhodomyrtus tomentosus*	
Winged sumac	*Rhus copallina*	
Red Natalgrass *	*Rhynchelytrum repens*	
Michaux's snout-bean	*Rhynchosia michauxii*	
Twining snout-bean	*Rhynchosia tomentosa*	
Falling beaksedge	*Rhynchospora caduca*	
Bunched beaksedge	*Rhynchospora cephalantha*	
Fringed beaksedge	*Rhynchospora ciliaris*	
Starrush whitetop	*Rhynchospora colorata*	
Shortbristle horned beaksedge	*Rhynchospora corniculata*	
Fasciculated beaksedge	*Rhynchospora fascicularis*	
Sandswamp whitetop; Star rush	*Rhynchospora latifolia*	
Sandyfield beaksedge	*Rhynchospora megalocarpa*	
Southern beaksedge	*Rhynchospora microcarpa*	
Bunched beaksedge	*Rhynchospora microcephala*	
Millet beaksedge	*Rhynchospora miliacea*	
Plumed beaksedge	*Rhynchospora plumosa*	
Tracy's beaksedge	*Rhynchospora tracyi*	
Wright’s beaksedge	*Rhynchospora wrightiana*	
Rough Mexican-clover *	*Richardia scabra*	
Castorbean *	*Ricinus communis*	
Rouge plant; Bloodberry	*Rivina humilis*	
Swamp rose	*Rosa palustris*	
Highbush blackberry	*Rubus argutus*	
Southern dewberry	*Rubus trivialis*	
Blackeyed Susan	*Rudbeckia hirta*	
Carolina wild petunia	*Ruellia caroliniensis*	
Heart-wing dock	*Rumex hastatulus*	
Scrub palmetto	*Sabal etonia*	
Dwarf palmetto	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
Bartram's marsh pink	*Sabatia bartramii*	
Short-leaf marsh pink	*Sabatia brevifolia*	
Lanceleaf rose-gentian	*Sabatia difformis*	
Largeflower marsh pink	*Sabatia grandiflora*	
Sugarcane plumegrass	*Saccharum giganteum*	
India cupscale *	*Sacciolepis indica*	
American cupscale	*Sacciolepis striata*	
Leafless beaked ladies' tresses	*Sacoila lanceolata*	
Smallflower mock buckthorn	*Sageretia minutiflora*	
Grassleaf arrowhead	*Sagittaria graminea*	
Chapman's arrowhead	*Sagittaria graminea* var. *chapmanii*	
Bull-tongue arrowhead	*Sagittaria lancifolia*	
Awlleaf arrowhead	*Sagittaria subulata*	
Carolina willow	*Salix caroliniana*	
Lyreleaf sage	*Salvia lyrata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Water spangles *	*Salvinia minima*	
Elderberry	*Sambucus nigra subsp. canadensis*	
Pineland pimpernel	*Samolus valerandi* subsp. *parviflorus*	
Southern soapberry	*Sapindus saponaria*	
Hooded pitcherplant	*Sarracenia minor*	8,39
Lizard's-tail	*Saururus cernuus*	
Brazilian pepper*	*Schinus terebinthifolius*	
Pinescrub bluestem	*Schizachyrium niveum*	15
Little false bluestem	*Schizachyrium scoparium*	
Netted nutrush	*Scleria reticularis*	
Tall nutgrass	*Scleria triglomerata*	
Sweet broom	*Scoparia dulcis*	
Florida scrub skullcap	*Scutellaria arenicola*	
Helmet skullcap	*Scutellaria integrifolia*	
Sand spikemoss	*Selaginella arenicola*	
Bahama wild sensitive-plant	*Senna ligustrina*	
Coffeeweed *	*Senna obtusifolia*	
Septic weed	*Senna occidentalis*	
Saw palmetto	*Serenoa repens*	
Whitetop aster	*Seriocarpus tortifolius*	
Giant bristlegrass	*Setaria magna*	
Knotroot foxtail	*Setaria parviflora*	
Piedmont seymeria	*Seymeria pectinata*	
Common wireweed	*Sida acuta*	
Pantropical fanpetal *	*Sida cordifolia*	
Indian hemp	*Sida rhombifolia*	
Florida bully	*Sideroxylon reclinatum*	
Scrub-buckthorn	*Sideroxylon tenax*	
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*	
Jeweled blue-eyed grass	*Sisyrinchium xerophyllum*	
Ear-leaf greenbrier	*Smilax auriculata*	
Saw greenbrier	*Smilax bona-nox*	
Laurel-leaf greenbrier	*Smilax laurifolia*	
Sarsaparilla vine	*Smilax pumila*	
Coral greenbrier	*Smilax walteri*	
Carolina horse-nettle	*Solanum carolinense*	
Black nightshade	*Solanum chenopodioides*	
Pine-barren goldenrod	*Solidago fistulosa*	
Chapman's goldenrod	*Solidago odora* var.*chapmanii*	
Twist-leaf goldenrod	*Solidago tortifolia*	
Bur-reed	*Sparganium americanum*	
Sand cordgrass	*Spartina bakeri*	
Woodland false-buttonweed	*Spermacoce assurgens*	
Cranchis ladies'-tresses	*Spiranthes cranichoides*	
Long-lip ladies'-tresses	*Spiranthes longilabris*	8,39
Green-vein ladies'-tresses	*Spiranthes praecox*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Common duckweed	*Spirodela polyrhiza*	
Smutgrass *	*Sporobolus indicus*	
Pineywoods dropseed	*Sporobolus junceus*	
Osceola's plume	*Stenanthium densum*	
St. Augustinegrass *	*Stenotaphrum scundatum*	
Queen's delight	*Stillingia sylvatica*	
Pineland scaly-pink	*Stipulicida setacea*	
Coastal plain dawnflower	*Stylisma patens*	
Hairy dawnflower	*Stylisma villosa*	
Carolina false vervain	*Stylodon carneus*	
Scaleleaf aster	*Symphyotrichum adnatum*	
Climbing aster	*Symphyotrichum carolinianum*	
Eastern silver aster	*Symphyotrichum concolor*	
Rice button aster	*Symphyotrichum dumosum*	
Elliott's aster	*Symphyotrichum elliottii*	
Annual saltmarsh aster	*Symphyotrichum subulatum*	
Yellow hatpins	*Syngonanthus flavidulus*	
Pond-cypress	*Taxodium ascendens*	
Bald-cypress	*Taxodium distichum*	
Scurf hoary-pea	*Tephrosia chrysophylla*	
Spreading hoary-pea	*Tephrosia hispidula*	
Spiked hoary-pea	*Tephrosia spicata*	
Alligator-flag	*Thalia geniculata*	
Downy maiden fern *	*Thelypteris dentata*	
Willdenow's maiden fern	*Thelypteris interrupta*	
Widespread maiden fern	*Thelypteris kunthii*	
Eastern marsh fern	*Thelypteris palustris* var. *pubescens*	
Blackeyed Susan vine *	*Thunbergia alata*	
Medusahead airplant	*Tillandsia balbisiana*	15,32,8
Bartram's airplant	*Tillandsia bartramii*	
Cardinal airplant	*Tillandsia fasciculata*	32,8
Ball moss	*Tillandsia recurvata*	
Southern needleleaf airplant	*Tillandsia setacea*	
Airplant	*Tillandsia simulata*	
Spanish moss	*Tillandsia usneoides*	
Spreading airplant	*Tillandsia utriculata*	16,32,8
Poison ivy	*Toxicodendron radicans*	
Spiderwort	*Tradescantia roseolens*	
Wavy-leaf noseburn	*Tragia urens*	
Virginia marsh St. John's-wort	*Triadenum virginicum*	
Forked blue-curls	*Trichostema dichotomum*	
Coatbuttons *	*Tridax procumbens*	
Tall Redtop	*Tridens flavus*	
Three-bird's orchid	*Triphora trianthophorus*	37
Eastern gamagrass	*Tripsacum dactyloides*	
Broadleaf cattail	*Typha latifolia*	

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
American elm	*Ulmus americana*	
Caesarweed *	*Urena lobata*	
Paragrass *	*Urochloa mutica*	
Humped bladderwort	*Utricularia gibba*	
Floating bladderwort	*Utricularia inflata*	
Eastern purple bladderwort	*Utricularia purpurea*	
Zigzag bladderwort	*Utricularia subulata*	
Highbush blueberry	*Vaccinium corymbosum*	
Darrow's blueberry	*Vaccinium darrowii*	
Shiny blueberry	*Vaccinium myrsinites*	
Harsh verbena; Sandpaper vervain	*Verbena scabra*	
White crownbeard; Frostweed	*Verbesina virginica*	
Possum haw	*Viburnum nudum*	
Walter's viburnum	*Viburnum obovatum*	
Fourleaf vetch	*Vicia acutifolia*	
Long-leaf violet	*Viola lanceolata*	
Early blue violet	*Viola palmata*	
Primrose-leaved violet	*Viola primulifolia*	
Common blue violet	*Viola sororia*	
Summer grape	*Vitis aestivalis*	
Florida Grape	*Vitis cinerea* var. *floridana*	
Muscadine; Fox grape	*Vitis rotundifolia*	
Caloose grape	*Vitis shuttleworthii*	
Shoestring fern	*Vittaria lineata*	
Carter's warea; Carter's mustard	*Warea carteri*	15
Algae bulrush	*Websteria confervoides*	
Netted chain fern	*Woodwardia areolata*	
Virginia chain fern	*Woodwardia virginica*	
Tallowwood; Hog plum	*Ximenia americana*	
Coastal plain yellow-eyed grass	*Xyris ambigua*	
Baldwin's Yellow-eyed grass	*Xyris baldwiniana*	
Short-leaf yellow-eyed grass	*Xyris brevifolia*	
Carolina yellow-eyed grass	*Xyris caroliniana*	
Elliott's yellow-eyed grass	*Xyris elliottii*	
Fringed yellow-eyed grass	*Xyris fimbriata*	
Richard's yellow-eyed grass *	*Xyris jupicai*	
Tall yellow-eyed grass	*Xyris platylepis*	
Oriental hawk's-beard *	*Youngia japonica*	
Spanish bayonet; Spanish dagger *	*Yucca aloifolia*	
Adam's needle	*Yucca filimentosa*	
Hercules-club	*Zanthoxylum clava-herculis*	
Wild lime; Lime prickly-ash	*Zanthoxylum fagara*	
Atamasco lily	*Zephyranthes atamasca*	8,39
Rain lily	*Zephyranthes simpsonii*	8,39
Lawn orchid; Soldier's orchid *	*Zeuxine strateumatica*	
Viperina	*Zornia bracteata*	

Highlands Hammock State Park—Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
	FISH	
Walking catfish*	*Clarias batrachus*	84
	AMPHIBIANS	
Two-toed amphiuma	*Amphiuma means*	35,84
Southern toad	*Bufo terrestris*	8
Oak toad	*Bufo quercicus*	15,16
Squirrel treefrog	*Hyla squirella*	8
Green treefrog	*Hyla cinerea*	8
Cuban treefrog*	*Osteopilus septentrionalis*	85
Little grass frog	*Limnaoedus ocularis*	8,39
Florida cricket frog	*Acris gryllus dorsalis*	31
Bullfrog	*Rana catesbeiana*	31,55
Pig frog	*Rana grylio*	31,55
Southern leopard frog	*Rana sphenocephala*	31,55
Florida gopher frog	*Rana capito aesopus*	15,16
Eastern narrowmouth toad	*Gastrophryne carolinensis*	31
Eastern spadefoot toad	*Scaphiopus holbrookii*	31
	REPTILES	
American alligator	*Alligator mississippiensis*	25,26,35,55
Florida box turtle	*Terrapene carolina bauri*	8
Peninsula cooter	*Pseudemys floridana peninsularis*	55
Florida red-bellied turtle	*Pseudemys nelsoni*	55
Gopher tortoise	*Gopherus polyphemus*	14,15,16
Florida softshell	*Trionyx ferox*	55
Green anole	*Anolis carolinensis carolinensis*	8
Cuban brown anole*	*Anolis sagrei sagrei*	8,84
Florida scrub lizard	*Sceloporus woodi*	15,16
Eastern glass lizard	*Ophisaurus ventralis*	8
Six-lined racerunner	*Cnemidophorus sexlineatus sexlineatus*	15
Five-lined skink	*Eumeces fasciatus*	8
Bluetail mole skink	*Eumeces egregius lividus*	14,15
Sand skink	*Neoseps reynoldsi*	16
Striped crayfish snake	*Regina alleni*	26,35
Brown water snake	*Nerodia taxispilota*	26,55
Florida water snake	*Nerodia fasciata pictiventris*	26,55
Southern ringneck snake	*Diadophis punctatus punctatus*	8
Eastern mud snake	*Farancia abacura abacura*	26,35
Southern black racer	*Coluber constrictor priapus*	8
Eastern coachwhip	*Masticophis flagellum flagellum*	14,15,16
Eastern indigo snake	*Drymarchon corais couperi*	14,15,16
Corn snake	*Elaphe guttata guttata*	8

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Yellow rat snake	*Elaphe obsoleta quadrivittata*	8
Florida pine snake	*Pituophis melanoleucus mugitus*	14,16
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*	37
Southern hognose snake	*Heterodon simus*	16
Eastern coral snake	*Micrurus fulvius fulvius*	8
Florida cottonmouth	*Agkistrodon piscivorus conanti*	31,55
Dusky pigmy rattlesnake	*Sistrurus miliarius barbouri*	8
Eastern diamondback rattlesnake	*Crotalus adamanteus*	8,15,16
	BIRDS	
Pied-billed grebe	*Podilymbus podiceps*	51
Eastern brown pelican	*Pelecanus occidentalis carolinensis*	OF
Double-crested cormorant	*Phalacrocorax auritus*	OF
Anhinga	*Anhinga anhinga*	35
Magnificent frigatebird	*Fregata magnificens*	OF
Great white heron	*Ardea herodias occidentalis*	25,31
Great blue heron	*Ardea herodias*	25,31
Green heron	*Butorides virescens*	35,55
Cattle egret	*Bubulcus ibis*	84
Little blue heron	*Egretta caerulea*	31
Great egret	*Ardea alba*	31
Snowy egret	*Egretta thula*	31
Tricolored heron	*Egretta tricolor*	31
Black-crowned night heron	*Nycticorax nycticorax*	35
Yellow-crowned night heron	*Nycticorax violaceus*	35
Least bittern	*Ixobrychus exilis*	31
American bittern	*Botaurus lentiginosus*	31
Wood stork	*Mycteria americana*	OF
Glossy ibis	*Plegadis falcinellus*	31
White ibis	*Eudocimus albus*	35
Mallard	*Anas platyrhynchos*	51
Mottled duck	*Anas fulvigula*	51
Green-winged teal	*Anas crecca*	51
Wood duck	*Aix sponsa*	35
Lesser scaup	*Aythya affinis*	51
Northern pintail	*Anas acuta*	51
Turkey vulture	*Cathartes aura*	OF
Black vulture	*Coragyps atratus*	OF
White-tailed kite	*Elanus leucurus*	OF
Swallow-tailed kite	*Elanoides forficatus*	OF
Mississippi kite	*Ictinia mississippiensis*	OF
Snail kite	*Rostrhamus sociabilis*	OF
Sharp-shinned hawk	*Accipiter striatus*	OF
Cooper's hawk	*Accipiter cooperii*	OF
Red-tailed hawk	*Buteo jamaicensis*	8

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Red-shouldered hawk	*Buteo lineatus*	25,31
Broad-winged hawk	*Buteo platypterus*	OF
Short-tailed hawk	*Buteo brachyurus*	OF
Southern bald eagle	*Haliaeetus leucocephalus*	8,OF
Northern harrier	*Circus cyaneus*	31,OF
Osprey	*Pandion haliaetus*	OF
Crested caracara	*Caracara plancus*	84
Merlin	*Falco columbarius*	OF
American kestrel	*Falco sparverius*	84
Peregrine falcon	*Falco peregrinus*	OF
Northern bobwhite	*Colinus virginianus*	8
Wild turkey	*Meleagris gallopavo*	24
Ring-necked pheasant*	*Phasianus colchicus*	84
Sandhill crane	*Grus canadensis*	31,OF
Limpkin	*Aramus guarauna*	35
King rail	*Rallus elegans*	31
Virginia rail	*Rallus limicola*	31
Sora	*Porzana carolina*	25,31
Black rail	*Laterallus jamaicensis*	31
Purple gallinule	*Porphyrula martinica*	25
Common moorhen	*Gallinula chloropus*	25,31
Killdeer	*Charadrius vociferus*	84
American woodcock	*Scolopax minor*	27,35
Common snipe	*Gallinago gallinago*	31
Upland sandpiper	*Bartramia longicauda*	31
Spotted sandpiper	*Actitis macularia*	25
Solitary sandpiper	*Tringa solitaria*	25
Lesser yellowlegs	*Tringa flavipes*	25,31
Greater yellowlegs	*Tringa melanoleuca*	25,31
Herring gull	*Larus argentatus*	OF
Black tern	*Chlidonias niger*	OF
Mourning dove	*Zenaida macroura*	8,16,84
Eurasian collared dove	*Streptopelia decaocto*	84
Common ground-dove	*Columbina passerina*	8,16
White-winged dove	*Zenaida asiatica*	84
Yellow-billed cuckoo	*Coccyzus americanus*	35
Black-billed cuckoo	*Coccyzus erythropthalmus*	27
Smooth-billed ani	*Crotophaga ani*	84
Barn owl	*Tyto alba*	37
Eastern screech-owl	*Otus asio*	37
Great horned owl	*Bubo virginianus*	8
Barred owl	*Strix varia*	8,37
Chuck-will's-widow	*Caprimulgus carolinensis*	24,27
Whip-poor-will	*Caprimulgus vociferus*	24
Common nighthawk	*Chordeiles minor*	OF
Chimney swift	*Chaetura pelagica*	OF

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Ruby-throated hummingbird	*Archilochus colubris*	84
Belted kingfisher	*Ceryle alcyon*	OF
Northern flicker	*Colaptes auratus*	8
Pileated woodpecker	*Dryocopus pileatus*	37
Red-bellied woodpecker	*Melanerpes carolinus*	8
Red-headed woodpecker	*Melanerpes erythrocephalus*	8
Yellow-bellied sapsucker	*Sphyrapicus varius*	37
Southern hairy woodpecker	*Picoides villosus audubonii*	8
Downy woodpecker	*Picoides pubescens*	8
Red-cockaded woodpecker	*Picoides borealis*	8
Ivory-billed woodpecker	*Campephilus principalis*	35,37
Eastern kingbird	*Tyrannus tyrannus*	84
Western kingbird	*Tyrannus verticalis*	84
Great crested flycatcher	*Myiarchus crinitus*	8
Eastern phoebe	*Sayornis phoebe*	8
Acadian flycatcher	*Empidonax virescens*	8
Eastern wood-pewee	*Contopus virens*	8
Tree swallow	*Tachycineta bicolor*	OF
Bank swallow	*Riparia riparia*	OF
Northern rough-winged swallow	*Stelgidopteryx serripennis*	OF
Barn swallow	*Hirundo rustica*	OF
Purple martin	*Progne subis*	OF
Blue jay	*Cyanocitta cristata*	8,24
Florida scrub-jay	*Aphelocoma coerulescens*	16
American crow	*Corvus brachyrhynchos*	OF
Fish crow	*Corvus ossifragus*	OF
Carolina chickadee	*Parus carolinensis*	27
Tufted titmouse	*Parus bicolor*	27
Brown-headed nuthatch	*Sitta pusilla*	37
Brown creeper	*Certhia americana*	37
House wren	*Troglodytes aedon*	27
Winter wren	*Troglodytes troglodytes*	27
Bewick's wren	*Thryomanes bewickii*	84
Carolina wren	*Thryothorus ludovicianus*	8,84
Marsh wren	*Cistothorus palustris*	31
Sedge wren	*Cistothorus platensis*	31
Northern mockingbird	*Mimus polyglottos*	8,84
Gray catbird	*Dumetella carolinensis*	8,27
Brown thrasher	*Toxostoma rufum*	8,16,27
American robin	*Turdus migratorius*	37
Wood thrush	*Hylocichla mustelina*	35
Hermit thrush	*Catharus guttatus*	35
Swainson's thrush	*Catharus ustulatus*	35
Gray-cheeked thrush	*Catharus minimus*	37
Veery	*Catharus fuscescens*	35
Eastern bluebird	*Sialia sialis*	8

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Blue-gray gnatcatcher	*Polioptila caerulea*	27
Golden-crowned kinglet	*Regulus satrapa*	8
Ruby-crowned kinglet	*Regulus calendula*	37
American pipit	*Anthus rubescens*	84
Cedar waxwing	*Bombycilla cedrorum*	27
Loggerhead shrike	*Lanius ludovicianus*	84
European starling*	*Sturnus vulgaris*	8
White-eyed vireo	*Vireo griseus*	8,16
Yellow-throated vireo	*Vireo flavifrons*	37
Blue-headed vireo	*Vireo solitarius*	37
Red-eyed vireo	*Vireo olivaceus*	37
Warbling vireo	*Vireo gilvus*	37
Black and white warbler	*Mniotilta varia*	37
Prothonotary warbler	*Protonotaria citrea*	35,37
Worm-eating warbler	*Helmitheros vermivorus*	37
Blue-winged warbler	*Vermivora pinus*	37
Golden-winged warbler	*Vermivora chrysoptera*	37
Tennessee warbler	*Vermivora peregrina*	37
Orange-crowned warbler	*Vermivora celata*	37
Nashville warbler	*Vermivora ruficapilla*	35,37
Northern parula	*Parula americana*	8,37
Magnolia warbler	*Dendroica magnolia*	37
Cape May warbler	*Dendroica tigrina*	37
Black-throated blue warbler	*Dendroica caerulescens*	37
Yellow-rumped warbler	*Dendroica coronata*	8,27
Black-throated green warbler	*Dendroica virens*	37
Blackburnian warbler	*Dendroica fusca*	37
Yellow-throated warbler	*Dendroica dominica*	37
Chestnut-sided warbler	*Dendroica pensylvanica*	27
Bay-breasted warbler	*Dendroica castanea*	37
Blackpoll warbler	*Dendroica striata*	37
Cerulean warbler	*Dendroica cerulea*	35
Pine warbler	*Dendroica pinus*	8
Prairie warbler	*Dendroica discolor*	8
Palm warbler	*Dendroica palmarum*	8
Yellow warbler	*Dendroica petechia*	37
Ovenbird	*Seiurus aurocapillus*	35
Northern waterthrush	*Seiurus noveboracensis*	35
Louisiana waterthrush	*Seiurus motacilla*	35
Connecticut warbler	*Oporornis agilis*	27
Common yellowthroat	*Geothlypis trichas*	27
Hooded warbler	*Wilsonia citrina*	37
American redstart	*Setophaga ruticilla ruticilla*	37
Bobolink	*Dolichonyx oryzivorus*	84
Eastern meadowlark	*Sturnella magna*	8,84
Red-winged blackbird	*Agelaius phoeniceus*	31

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Orchard oriole	*Icterus spurius*	37
Baltimore oriole	*Icterus galbula*	37
Rusty blackbird	*Euphagus carolinus*	84
Boat-tailed grackle	*Quiscalus major*	31
Common grackle	*Quiscalus quiscula*	31
Brown-headed cowbird	*Molothrus ater*	84
Scarlet tanager	*Piranga olivace*	8
Summer tanager	*Piranga rubra*	8
Northern cardinal	*Cardinalis cardinalis*	8
Rose-breasted grosbeak	*Pheucticus ludovicianus*	84
Blue grosbeak	*Guiraca caerulea*	84
Indigo bunting	*Passerina cyanea*	8
Painted bunting	*Passerina ciris*	84
Eastern towhee	*Pipilo erythrophthalmus*	8
Savannah sparrow	*Passerculus sandwichensis*	84
Grasshopper sparrow	*Ammodramus savannarum*	84
Henslow's sparrow	*Ammodramus henslowii*	84
Vesper sparrow	*Pooecetes gramineus*	84
Bachman's sparrow	*Aimophila aestivalis*	8
Chipping sparrow	*Spizella passerina*	8
Field sparrow	*Spizella pusilla*	84
Fox sparrow	*Passerella iliaca*	27
Swamp sparrow	*Melospiza georgiana*	25,31
Song sparrow	*Melospiza melodia*	25,26
American goldfinch	*Carduelis tristis*	84
House sparrow*	*Passer domesticu*	85
	MAMMALS	
Virginia opossum	*Didelphis virginiana*	8
Nine-banded armadillo*	*Dasypus novemcinctus*	8,16
Marsh rabbit	*Sylvilagus palustris*	31
Eastern cottontail	*Sylvilagus floridanus*	8,16
Gray squirrel	*Sciurus carolinensis*	8,16
Sherman's fox squirrel	*Sciurus niger shermani*	8
Southern flying squirrel	*Glaucomys volans*	8
Cotton mouse	*Peromyscus gossypinus gossypinus*	8
Florida mouse	*Podomys floridanus*	15,16
Red fox*	*Vulpes vulpes*	MTC
Gray fox	*Urocyon cinereoargenteus*	MTC
Florida black bear	*Ursus americanus floridanus*	MTC
Raccoon	*Procyon lotor*	MTC
River otter	*Lutra canadensis*	55
Florida long-tailed weasel	*Mustela frenata peninsulae*	MTC
Striped skunk	*Mephitis mephitis*	8
Florida panther	*Felis concolor coryi*	MTC

*** Non-native Species**

Highlands Hammock State Park—Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Bobcat	*Felis rufus*	MTC
Wild pig*	*Sus scrofa*	8,31,37
White-tailed deer	*Odocoileus virginianus*	8,37

*** Non-native Species**

Highlands Hammock State Park—Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)

Habitat Codes

Terrestrial
1. Beach Dune
2. Bluff
3. Coastal Berm
4. Coastal Rock Barren
5. Coastal Strand
6. Dry Prairie
7. Maritime Hammock
8. Mesic Flatwoods
9. Mesic Hammock
10. Coastal Grasslands
11. Pine Rockland
12. Prairie Hammock
13. Rockland Hammock
14. Sandhill
15. Scrub
16. Scrubby Flatwoods
17. Shell Mound
18. Sinkhole
19. Slope Forest
20. Upland Glade
21. Upland Hardwood Forest
22. Upland Mixed Forest
23. Upland Pine Forest
24. Xeric Hammock

Palustrine
25. Basin Marsh
26. Basin Swamp
27. Baygall
28. Bog
29. Bottomland Forest
30. Coastal Interdunal Swale
31. Depression Marsh
32. Dome
33. Floodplain Forest
34. Floodplain Marsh
35. Floodplain Swamp
36. Freshwater Tidal Swamp
37. Hydric Hammock
38. Marl Prairie
39. Seepage Slope
40. Slough
41. Strand Swamp
42. Swale
43. Wet Flatwoods
44. Wet Prairie

Lacustrine
45. Clastic Upland Lake
46. Coastal Dune Lake
47. Coastal Rockland Lake
48. Flatwood/Prairie Lake
49. Marsh Lake
50. River Floodplain Lake
51. Sandhill Upland Lake
52. Sinkhole Lake
53. Swamp Lake

Riverine
54. Alluvial Stream
55. Blackwater Stream
56. Seepage Stream
57. Spring-Run Stream

Estuarine
58. Estuarine Algal Bed
59. Estuarine Composite Substrate
60. Estuarine Consolidated Substrate
61. Estuarine Coral Reef
62. Estuarine Grass Bed
63. Estuarine Mollusk Reef
64. Estuarine Octocoral Bed
65. Estuarine Sponge Bed
66. Estuarine Tidal Marsh
67. Estuarine Tidal Swamp
68. Estuarine Unconsolidated Substrate
69. Estuarine Worm Reef

Marine
70. Marine Algal Bed
71. Marine Composite Substrate
72. Marine Consolidated Substrate
73. Marine Coral Reef
74. Marine Grass Bed
75. Marine Mollusk Reef
76. Marine Octocoral Bed
77. Marine Sponge Bed
78. Marine Tidal Marsh
79. Marine Tidal Swamp
80. Marine Unconsolidated Substrate
81. Marine Worm Reef

Subterranean
82. Aquatic Cave
83. Terrestral Cave

Miscellaneous
84. Ruderal
85. Developed

MTC Many Types of Communities
OF Over Flying

Addendum 5—Designated Species List

Rank Explanations For FNAI Global Rank, FNAI State Rank, Federal Status, And State Status

The Nature Conservancy and the Natural Heritage Program Network (of which FNAI is a part) define an element as any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks to each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

Federal and State status information is from the U.S. Fish and Wildlife Service; and the Florida Game and Freshwater Fish Commission (animals), and the Florida Department of Agriculture and Consumer Services (plants), respectively.

FNAI GLOBAL RANK DEFINITIONS

G1	=	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2	=	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3	=	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
G4	=	apparently secure globally (may be rare in parts of range)
G5	=	demonstrably secure globally
GH	=	of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GX	=	believed to be extinct throughout range
GXC	=	extirpated from the wild but still known from captivity or cultivation
G#?	=	tentative rank (e.g.,G2?)
G#G#	=	range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	=	rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
G#Q	=	rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	=	same as above, but validity as subspecies or variety is questioned.
GU	=	due to lack of information, no rank or range can be assigned (e.g., GUT2).
G?	=	not yet ranked (temporary)
S1	=	Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2	=	Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3	=	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
S4	=	apparently secure in Florida (may be rare in parts of range)
S5	=	demonstrably secure in Florida
SH	=	of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
SX	=	believed to be extinct throughout range
SA	=	accidental in Florida, i.e., not part of the established biota
SE	=	an exotic species established in Florida may be native elsewhere in North America
SN	=	regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine
SU	=	due to lack of information, no rank or range can be assigned (e.g., SUT2).
S?	=	not yet ranked (temporary)

LEGAL STATUS

N = Not currently listed, nor currently being considered for listing, by state or federal agencies.

FEDERAL (Listed by the U. S. Fish and Wildlife Service - USFWS)

LE = Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.

PE = Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.

LT = Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.

PT = Proposed for listing as Threatened Species.

C = Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A) = Endangered due to similarity of appearance.

T(S/A) = Threatened due to similarity of appearance.

STATE

Animals (Listed by the Florida Fish and Wildlife Conservation Commission - FFWCC)

LE = Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

LT = Listed as Threatened Species by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

LS = Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

Plants (Listed by the Florida Department of Agriculture and Consumer Services - FDACS)

LE = Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973,as amended.

LT = Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

Highlands Hammock State Park Designated Species—Plants

Common Name/ *Scientific Name*	Designated Species Status FDACS	USFWS	FNAI
Curtiss' milkweed			
Asclepias curtissii	LE		
Many-flower grass-pink			
Calopogon multiflorus	LE	MC	G2/G3,S2/S3
Longleaf fingergrass			
Digitaria gracillima		MC	G1, S1
Narrow-leaved sundew; Water sundew			
Drosera intermedia	LT		G5, S3
Spurred neottia			
Eltroplectris calcarata	LE		G3, S1
Tampa butterfly orchid			
Encyclia tampensis	CE		
Dingy-flowered epidendrum			
Epidendrum anceps	LE		
Green fly orchid			
Epidendrum conopseum	CE		
Night-scent orchid			
Epidendrum nocturnum	LE		G4/G5, S2
Garberia			
Garberia heterophylla	LT		
Rein orchid			
Habenaria distans	LE		G5, S1
Threadroot orchid; Jinglebells orchid			
Harrisella filiformis	LT		
Florida hartwrightia			
Hartwrightia floridana	LT		G2, S2
Nodding pinweed			
Lechea cernua	LT		G3, S3
Florida blazing star			
Liatris ohlingerae	LE	LE	G3, S3
Pine lily; Catesby's lily			
Lilium catesbaei	LT		
Nodding clubmoss			
Lycopodiella cernua	CE		
Boston fern; Giant sword fern			
Nephrolepis biserrata	LT		
Scrub beargrass; Britton's beargrass			
Nolina brittoniana	LE	LE	G3, S3
Cinnamon fern			
Osmunda cinnamomea	CE		
Royal fern			
Osmunda regalis var. *spectabilis*	CE		
Cutthroatgrass			
Panicum abscissum	LE	MC	G3, S3
Paper-like nailwort; Papery whitlow-wort			
Paronychia chartacea	LE	LT	G3T3, S3
Gingerbush			
Pavonia spiniflex			G4G5, S2

Highlands Hammock State Park Designated Species—Plants

Common Name/ *Scientific Name*	Designated Species Status FDACS	USFWS	FNAI
Swamp plume polypody			
Pecluma ptilodon var. *caespitosa*	LE		G5?, S2
Blue-flowered butterwort			
Pinguicula caerulea	LT		
Yellow-flowered butterwort			
Pinguicula lutea	LT		
White fringed orchid			
Platanthera blephariglottis var. *conspicua*	LT		
Yellow fringed orchid			
Platanthera ciliaris	LT		
Crested fringed orchid			
Platanthera cristata	LT		
Rose pogonia			
Pogonia ophioglossoides	LT		
Lewton's milkwort			
Polygala lewtonii	LE	LE	G3, S3
Tufted wireweed; Hairy jointweed			
Polygonella basiramia	LE	LE	G3, S3
Small's jointweed			
Polygonella myriophylla	LE	LE	G3, S3
Giant orchid; False coco			
Pteroglossapsis ecristata	LT	MC	G2, S2
Needle palm			
Rhapidophyllum hystrix	CE		
Hooded pitcher plant			
Sarracenia minor	LT		
Scrub bluestem			
Schizachyrium niveum	LE	MC	G1, S1
Long-lip ladies'-tresses			
Spiranthes longilabris	LT		
Medusahead airplant			
Tillandsia balbisiana	LT		
Common airplant			
Tillandsia fasciculata	LE		
Spreading airplant			
Tillandsia utriculata	LE		
Three-bird's orchid			
Triphora trianthophoros	LT		
Carter's warea			
Warea carteri	LE	LE	G3, S3
Rainlily			
Zephyranthes atamasca	LT		
Simpson’s zephyrlily			
Zephyranthes simpsonii	LT		G2G3/S2S3

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI
AMPHIBIANS			
Florida gopher frog *Rana capito*	LS		G4, S3
REPTILES			
American alligator *Alligator mississippiensis*	LS	T(S/A)	G5, S4
Gopher tortoise *Gopherus polyphemus*	LS		G3, S3
Florida scrub lizard *Sceloporus woodi*			G3, S3
Bluetail mole skink *Eumeces egregius*	LT	LT	G4T2, S2
Sand skink *Neoseps reynoldsi*	LT	LT	G2, S2
Eastern indigo snake *Drymarchon corais*	LT	LT	G4T3, S3
Florida pine snake *Pituophis melanoleucus*	LS		G5T3?, S3
BIRDS			
Eastern brown pelican *Pelecanus occidentalis*	LS		G4, S3
Magnificent frigatebird *Fregata magnificens*			G5, S1
Great white heron *Ardea herodias*			G5T2, S2
Little blue heron *Egretta caerulea*	LS		G5, S4
Great egret *Ardea alba*			G5, S4
Snowy egret *Egretta thula*	LS		G5, S4
Tricolored heron *Egretta tricolor*	LS		G5, S4
Black-crowned night heron *Nycticorax nycticorax*			G5, S3?
Yellow-crowned night heron *Nycticorax violaceus*			G5, S3?
Least bittern *Ixobrychus exilis*			G5, S4
Wood stork *Mycteria americana*	LE	LE	G4, S2
Glossy ibis *Plegadis falcinellus*			G5, S2

Common Name/ *Scientific Name*	**Designated Species Status** FFWCC	USFWS	FNAI
White ibis			
Eudocimus albus	LS		G5, S4
White-tailed kite			
Elanus leucurus			G5, S1S3
Swallow-tailed kite			
Elanoides forficatus			G4, S2S3
Snail kite			
Rostrhamus sociabilis	LE	LE	G4G5T1, S1
Cooper's hawk			
Accipiter cooperii			G4, S3?
Short-tailed hawk			
Buteo brachyurus			G4?, S3
Southern bald eagle			
Haliaeetus leucocephalus	LT	LT	G4, S3
Osprey			
Pandion haliaetus			G5, S3S4
Crested caracara			
Caracara plancus	LT	LT	G5, S2
Merlin			
Falco columbarius			G4, SU
Peregrine falcon			
Falco peregrinus	LE	LE	G4, S2
Limpkin			
Aramus guarauna	LS		G5, S3
Black rail			
Laterallus jamaicensis			G4, S3?
Southern hairy woodpecker			
Picoides villosus			G5, S3?
Red-cockaded woodpecker			
Picoides borealis	LT	LE	G3, S2
Ivory-billed woodpecker			
Campephilus principalis	LE	LE	GX, SX
Florida scrub-jay			
Aphelocoma coerulescens	LT	LT	G5, S3
Worm-eating warbler			
Helmitheros vermivorus			G5, S1
Louisiana waterthrush			
Seiurus motacilla			G5, S3
American redstart			
Setophaga ruticilla			G5, S3
Bachman's sparrow			
Aimophila aestivalis			G3, S3
MAMMALS			
Sherman's fox squirrel			
Sciurus niger	LS		G5T2, S2
Florida mouse			
Podomys floridanus	LS		G3, S3

Highlands Hammock State Park Designated Species—Animals

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI
Florida black bear *Ursus americanus*	LT		G5T2, S2
Florida long-tailed weasel *Mustela frenata*			G5T3, S3?
Florida panther *Felis concolor*	LE	LE	G5T1, S1

Highlands Hammock State Park Designated Species—Animals

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI

Addendum 6—Priority Schedule And Cost Estimates

Estimates are developed for the funding and staff resources needed to implement the management plan based on goals, objectives and priority management activities. Funding priorities for all state park management and development activities are reviewed each year as part of the Division's legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also aggressively pursues a wide range of other funds and staffing resources, such as grants, volunteers, and partnerships with agencies, local governments and the private sector for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Resource Management

Natural Resources

1. Mechanical roller chopping of flatwoods to reduce dense saw palmettos. Costs to include annual operation costs of $4,200.00. Estimated Cost: $42,000.
2. Mechanical treatment of overgrown palmettos and brush along burn plots. Costs include some contracted cutting at $300.00 per acre for 50 acres, and OPS costs totaling $4000.00. Estimated Cost: $190,000.00
3. Ecological burning of heavy fuels for newly acquired properties. Burning 600 acres the first year and 100 acres per year for next four years. Cost includes contracted burning at $10.00 per acre for the first 50 acres and $6.00 per acre for remaining acres, per DOF estimate. Estimated Costs: $22,000.00.
4. Removal of exotic plants throughout all the properties to include, but not limited to air potato, coral ardesia, cogongrass, Dianella lily, tropical soda apple, bamboo, and water hyacinth. Reduce exotic plant problem to maintenance levels for all invasive species within 3 years. Costs include two OPS employees for 3 years and $6,208.00 per year for chemicals (Roundup, Garlon, and Rodeo) and other supplies including safety equipment. Estimated Costs: $220,000.00
5. Water quality testing and monitoring of water flow in South Canal, Little Charlie Bowlegs Creek, and Haw Branch. Costs include quarterly testing for water quality and other chemical tests ($1000.00 per year), removal of grasses that impede water flow (in 100 foot sections; completed once in five year period at a cost of $15,000.00) Estimated Costs: $40,000.00.
6. An objective-based Vegetation Management (OBVM) project would consist of an initial inventory, followed by an assessment of historical conditions for mesic flatwoods, sandhills, seepage slopes, and basin marsh. Estimated cost: $5,000.

Cultural Resources

1. Cultural Landscape Plan for the original park property that encompasses all areas that were planned by the CCC. Estimated cost: $89,000.00
2. An appropriate survey of cultural resources at sites in the park that are targeted for development. Costs include services of a qualified archaeological investigator(s) and historian(s), and compilation of a survey report. Grants in aid are available and could defray as much as 50 percent of costs. Estimated Costs: $40,000.00.

*** Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.**

3. A routine, regular program of monitoring cultural resources to record their condition should be instituted. Associated costs include digital camera and accessories, $500.00; computer equipment $2,000.00; and database software, $500.00. Estimated Costs: $3,000.00
4. Development of a program of cyclical maintenance of cultural resources. Consultant fee for development of cyclical maintenance plan. Estimated Costs: $15,000.00
5. Funds for use in maintaining the historic integrity of structural cultural resources and for regular use in conserving museum collection objects, including natural history specimens @ $4,000.00/year. Includes storage facility. Estimated Costs: $40,000.00

Estimated Cost: **$706,000.00**

*** Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.**

Capital Improvements

Development Area or Facilities	Estimated Cost
Equestrian Facilities	$306,250.00
Original Park	$1,343,750.00
Primitive Group Camps	$237,500.00
Wilderness Camping Area	$8,750.00
Seven-Lakes Day Use Area	$722,100.00
Standard Campground	$1,000,000.00
Support Facilities	$923,750.00

Total Cost with Contingency: $5,450,520.00

Visitor Services/Recreation

Operations	Estimated Cost
Museum Program Specialist	$28,214 x 10 years = $282,140.00
Park Biologist	$37,231 x 10 years = $372,210.00
Park Ranger	$28,408 x 10 years = $284,080.00

Total Cost: ……..$938,430.00

*** Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.**

ADDITIONAL INFORMATION

FNAI Descriptions

DHR Cultural Management Statement

2000 Land Management Review Final Report

Descriptions Of Natural Communities Developed By FNAI

This summary presents the hierarchical classification and brief descriptions of 82 Natural Communities developed by Florida Natural Areas Inventory and identified as collectively constituting the original, natural biological associations of Florida.

A Natural Community is defined as a distinct and recurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other and their physical environment. For more complete descriptions, see Guide to the Natural Communities of Florida, available from Florida Department of Natural Resources.

The levels of the hierarchy are:

Natural Community Category - defined by hydrology and vegetation.

Natural Community Groups - defined by landform, substrate, and vegetation.

Natural Community Type - defined by landform and substrate; soil moisture condition; climate; fire; and characteristic vegetation.

TERRESTRIAL - Upland habitats dominated by plants which are not adapted to anaerobic soil conditions imposed by saturation or inundation for more than 10% of the growing season.

XERIC UPLANDS - very dry, deep, well-drained hills of sand with xeric-adapted vegetation.

Sandhill - upland with deep sand substrate; xeric; temperate; frequent fire (2-5 years); longleaf pine and/or turkey oak with wiregrass understory.

Scrub - old dune with deep fine sand substrate; xeric; temperate or subtropical; occasional or rare fire (20 - 80 years); sand pine and/or scrub oaks and/or rosemary and lichens.

Xeric Hammock - upland with deep sand substrate; xeric-mesic; temperate or subtropical; rare or no fire; live oak and/or sand live oak and/or laurel oak and/or other oaks, sparkleberry, saw palmetto.

COASTAL UPLANDS - substrate and vegetation influenced primarily by such coastal (maritime) processes as erosion, deposition, salt spray, and storms.

Beach Dune - active coastal dune with sand substrate; xeric; temperate or subtropical; occasional or rare fire; sea oats and/or mixed salt-spray tolerant grasses and herbs.

Coastal Berm - old bar or storm debris with sand/shell substrate; xeric-mesic; subtropical or temperate; rare or no fire; buttonwood, mangroves, and/or mixed halophytic herbs and/or shrubs and trees.

Coastal Grassland - coastal flatland with sand substrate; xeric-mesic; subtropical or temperate;

occasional fire; grasses, herbs, and shrubs with or without slash pine and/or cabbage palm.

Coastal Rock Barren - flatland with exposed limestone substrate; xeric; subtropical; no fire; algae, mixed halophytic herbs and grasses, and/or cacti and stunted shrubs and trees.

Coastal Strand - stabilized coastal dune with sand substrate; xeric; subtropical or temperate; occasional or rare fire; dense saw palmetto and/or seagrape and/or mixed stunted shrubs, yucca, and cacti.

Maritime Hammock - stabilized coastal dune with sand substrate; xeric-mesic; subtropical or temperate; rare or no fire; mixed hardwoods and/or live oak.

Shell Mound - Indian midden with shell substrate; xeric-mesic; subtropical or temperate; rare or no fire; mixed hardwoods.

MESIC UPLANDS - dry to moist hills of sand with varying amounts of clay, silt or organic material; diverse mixture of broadleaved and needleleaved temperate woody species.

Bluff - steep slope with rock, sand, and/or clay substrate; hydric-xeric; temperate; sparse grasses, herbs and shrubs.

Slope Forest - steep slope on bluff or in sheltered ravine; sand/clay substrate; mesic-hydric; temperate; rare or no fire; magnolia, beech, spruce pine, Shumard oak, Florida maple, mixed hardwoods.

Upland Glade - upland with calcareous rock and/or clay substrate; hydric-xeric; temperate; sparse mixed grasses and herbs with occasional stunted trees and shrubs, e.g., eastern red cedar.

Upland Hardwood Forest - upland with sand/clay and/or calcareous substrate; mesic; temperate; rare or no fire; spruce pine, magnolia, beech, pignut hickory, white oak, and mixed hardwoods.

Upland Mixed Forest - upland with sand/clay substrate; mesic; temperate; rare or no fire; loblolly pine and/or shortleaf pine and/or laurel oak and/or magnolia and spruce pine and/or mixed hardwoods.

Upland Pine Forest - upland with sand/clay substrate; mesic-xeric; temperate; frequent or occasional fire; longleaf pine and/or loblolly pine and/or shortleaf pine, southern red oak, wiregrass.

ROCKLANDS - low, generally flat limestone outcrops with tropical vegetation; or limestone exposed through karst activities with tropical or temperate vegetation.

Pine Rockland - flatland with exposed limestone substrate; mesic-xeric; subtropical; frequent fire; south Florida slash pine, palms and/or hardwoods, and mixed grasses and herbs.

Rockland Hammock - flatland with limestone substrate; mesic; subtropical; rare or no fire; mixed tropical hardwoods, often with live oak.

Sinkhole - karst feature with steep limestone walls; mesic-hydric; subtropical or temperate; no fire; ferns, herbs, shrubs, and hardwoods.

MESIC FLATLANDS - flat, moderately well-drained sandy substrates with admixture of organic material, often with a hard pan.

Dry Prairie - flatland with sand substrate; mesic-xeric; subtropical or temperate; annual or frequent fire; wiregrass, saw palmetto, and mixed grasses and herbs.

Mesic Flatwoods - flatland with sand substrate; mesic; subtropical or temperate; frequent fire; slash pine and/or longleaf pine with saw palmetto, gallberry and/or wiregrass or cutthroat grass understory.

Prairie Hammock - flatland with sand/organic soil over marl or limestone substrate; mesic; subtropical; occasional or rare fire; live oak and/or cabbage palm.

Scrubby Flatwoods - flatland with sand substrate; xeric-mesic; subtropical or temperate; occasional fire; longleaf pine or slash pine with scrub oaks and wiregrass understory.

PALUSTRINE - Wetlands dominated by plants adapted to anaerobic substrate conditions imposed by substrate saturation or inundation during 10% or more of the growing season. Includes non-tidal wetlands; tidal wetlands with ocean derived salinities less than 0.5 ppt and dominance by salt-intolerant species; small (less than 8 ha), shallow (less than 2 m deep at low water) water bodies without wave-formed or bedrock shoreline; and inland brackish or saline wetlands.

WET FLATLANDS - flat, poorly drained sand, marl or limestone substrates.

Hydric Hammock - lowland with sand/clay/organic soil, often over limestone; mesic-hydric; subtropical or temperate; rare or no fire; water oak, cabbage palm, red cedar, red maple, bays, hackberry, hornbeam, blackgum, needle palm, and mixed hardwoods.

Marl Prairie - flatland with marl over limestone substrate; seasonally inundated; tropical; frequent to no fire; sawgrass, spikerush, and/or mixed grasses, sometimes with dwarf cypress.

Wet Flatwoods - flatland with sand substrate; seasonally inundated; subtropical or temperate; frequent fire; vegetation characterized by slash pine or pond pine and/or cabbage palm with mixed grasses and herbs.

Wet Prairie - flatland with sand substrate; seasonally inundated; subtropical or temperate; annual or frequent fire; maidencane, beakrush, spikerush, wiregrass, pitcher plants, St. John's wort, mixed herbs.

SEEPAGE WETLANDS - sloped or flat sands or peat with high moisture levels maintained by downslope seepage; wetland and mesic woody and/or herbaceous vegetation.

Baygall - wetland with peat substrate at base of slope; maintained by downslope seepage, usually saturated and occasionally inundated; subtropical or temperate; rare or no fire; bays and/or dahoon holly and/or red maple and/or mixed hardwoods.

Seepage Slope - wetland on or at base of slope with organic/sand substrate; maintained by downslope seepage, usually saturated but rarely inundated; subtropical or temperate; frequent or occasional fire; sphagnum moss, mixed grasses and herbs or mixed hydrophytic shrubs.

FLOODPLAIN WETLANDS - flat, alluvial sand or peat substrates associated with flowing water courses and subjected to flooding but not permanent inundation; wetland or mesic woody and herbaceous vegetation.

Bottomland Forest - flatland with sand/clay/organic substrate; occasionally inundated; temperate; rare or no fire; water oak, red maple, beech, magnolia, tuliptree, sweetgum, bays, cabbage palm, and mixed hardwoods.

Floodplain Forest - floodplain with alluvial substrate of sand, silt, clay or organic soil; seasonally inundated; temperate; rare or no fire; diamondleaf oak, overcup oak, water oak, swamp chestnut oak, blue palmetto, cane, and mixed hardwoods.

Floodplain Marsh - floodplain with organic/sand/alluvial substrate; seasonally inundated; subtropical; frequent or occasional fire; maidencane, pickerelweed, sagittaria spp., buttonbush, and mixed emergents.

Floodplain Swamp - floodplain with organic/alluvial substrate; usually inundated; subtropical or temperate; rare or no fire; vegetation characterized by cypress, tupelo, black gum, and/or pop ash.

Freshwater Tidal Swamp - river mouth wetland, organic soil with extensive root mat; inundated with freshwater in response to tidal cycles; rare or no fire; cypress, bays, cabbage palm, gums and/or cedars.

Slough - broad, shallow channel with peat over mineral substrate; seasonally inundated, flowing water; subtropical; occasional or rare fire; pop ash and/or pond apple or water lily.

Strand Swamp - broad, shallow channel with peat over mineral substrate; seasonally inundated, flowing water; subtropical; occasional or rare fire; cypress and/or willow.

Swale - broad, shallow channel with sand/peat substrate; seasonally inundated, flowing water; subtropical or temperate; frequent or occasional fire; sawgrass, maidencane, pickerelweed, and/or mixed emergents.

BASIN WETLANDS - shallow, closed basin with outlet usually only in time of high water; peat or sand substrate, usually inundated; wetland woody and/or herbaceous vegetation.

Basin Marsh - large basin with peat substrate; seasonally inundated; temperate or subtropical; frequent fire; sawgrass and/or cattail and/or buttonbush and/or mixed emergents.

Basin Swamp - large basin with peat substrate; seasonally inundated, still water; subtropical or temperate; occasional or rare fire; vegetation characterized by cypress, blackgum, bays and/or mixed hardwoods.

Bog - wetland on deep peat substrate; moisture held by sphagnum mosses, soil usually saturated, occasionally inundated; subtropical or temperate; rare fire; sphagnum moss and titi and/or bays and/or dahoon holly, and/or mixed hydrophytic shrubs.

Coastal Interdunal Swale - long narrow depression wetlands in sand/peat-sand substrate; seasonally inundated, fresh to brackish, still water; temperate; rare fire; graminoids and mixed wetland forbs.

Depression Marsh - small rounded depression in sand substrate with peat accumulating toward center; seasonally inundated, still water; subtropical or temperate; frequent or occasional fire; maidencane, fire flag, pickerelweed, and mixed emergents, may be in concentric bands.

Dome Swamp - rounded depression in sand/limestone substrate with peat accumulating toward center; seasonally inundated, still water; subtropical or temperate; occasional or rare fire; cypress, blackgum, or bays, often tallest in center.

LACUSTRINE - Non-flowing wetlands of natural depressions lacking persistent emergent vegetation except around the perimeter.

Clastic Upland Lake - generally irregular basin in clay uplands; predominantly with inflows, frequently without surface outflow; clay or organic substrate; colored, acidic, soft water with low mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

Coastal Dune Lake - basin or lagoon influenced by recent coastal processes; predominantly sand substrate with some organic matter; salinity variable among and within lakes, and subject to saltwater intrusion and storm surges; slightly acidic, hard water with high mineral content (sodium, chloride).

Coastal Rockland Lake - shallow basin influence by recent coastal processes; predominantly barren oolitic or Miami limestone substrate; salinity variable among and within lakes, and subject to saltwater intrusion, storm surges and evaporation (because of shallowness); slightly alkaline, hard water with high mineral content (sodium, chloride).

Flatwoods/Prairie Lake - generally shallow basin in flatlands with high water table; frequently with a broad littoral zone; still water or flow-through; sand or peat substrate; variable water chemistry, but characteristically colored to clear, acidic to slightly alkaline, soft to moderately hard water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

Marsh lake - generally shallow, open water area within wide expanses of freshwater marsh; still water

or flow-through; peat, sand or clay substrate; occurs in most physiographic regions; variable water chemistry, but characteristically highly colored, acidic, soft water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

River Floodplain Lake - meander scar, backwater, or larger flow-through body within major river floodplains; sand, alluvial or organic substrate; colored, alkaline or slightly acidic, hard or moderately hard water with high mineral content (sulfate, sodium, chloride, calcium, magnesium); mesotrophic to eutrophic.

Sandhill Upland Lake - generally rounded solution depression in deep sandy uplands or sandy uplands shallowly underlain by limestone; predominantly without surface inflows/outflows; typically sand substrate with organic accumulations toward middle; clear, acidic moderately soft water with varying mineral content; ultra-oligotrophic to mesotrophic.

Sinkhole Lake - typically deep, funnel-shaped depression in limestone base; occurs in most physiographic regions; predominantly without surface inflows/outflows, but frequently with connection to the aquifer; clear, alkaline, hard water with high mineral content (calcium, bicarbonate, magnesium).

Swamp Lake - generally shallow, open water area within basin swamps; still water or flow-through; peat, sand or clay substrate; occurs in most physiographic regions; variable water chemistry, but characteristically highly colored, acidic, soft water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

RIVERINE - Natural, flowing waters from their source to the downstream limits of tidal influence and bounded by channel banks.

Alluvial Stream - lower perennial or intermittent/seasonal watercourse characterized by turbid water with suspended silt, clay, sand and small gravel; generally with a distinct, sediment-derived (alluvial) floodplain and a sandy, elevated natural levee just inland from the bank.

Blackwater Stream - perennial or intermittent/seasonal watercourse characterized by tea-colored water with a high content of particulate and dissolved organic matter derived from drainage through swamps and marshes; generally lacking an alluvial floodplain.

Seepage Stream - upper perennial or intermittent/seasonal watercourse characterized by clear to lightly colored water derived from shallow groundwater seepage.

Spring-run Stream - perennial watercourse with deep aquifer headwaters and characterized by clear water, circumneutral pH and, frequently, a solid limestone bottom.

SUBTERRANEAN - Twilight, middle and deep zones of natural chambers overlain by the earth's crust and characterized by climatic stability and assemblages of trogloxenic, troglophilic, and troglobitic organisms.

Aquatic Cave - cavernicolous area permanently or periodically submerged; often characterized by troglobitic crustaceans and salamanders; includes high energy systems which receive large quantities of organic detritus and low energy systems.

Terrestrial Cave - cavernicolous area lacking standing water; often characterized by bats, such as Myotis spp., and other terrestrial vertebrates and invertebrates; includes interstitial areas above standing water such as fissures in the ceiling of caves.

MARINE/ESTUARINE (The distinction between the Marine and Estuarine Natural Communities is often subtle, and the natural communities types found under these two community categories have the same

descriptions. For these reasons they have been grouped together.) - Subtidal, intertidal and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land.

Consolidated Substrate - expansive subtidal, intertidal and supratidal area composed primarily of nonliving compacted or coherent and relatively hard, naturally formed mass of mineral matter (e.g., coquina limerock and relic reefs); octocorals, sponges, stony corals, nondrift macrophytic algae, blue-green mat-forming algae and seagrasses sparse, if present.

Unconsolidated Substrate - expansive subtidal, intertidal and supratidal area composed primarily of loose mineral matter (e.g., coralgal, gravel, marl, mud, sand and shell); octocorals, sponges, stony corals, nondrift macrophytic algae, blue-green mat-forming algae and seagrasses sparse, if present.

Octocoral Bed - expansive subtidal area occupied primarily by living sessile organisms of the Class Anthozoa, Subclass Octocorallia (e.g., soft corals, horny corals, sea fans, sea whips, and sea pens); sponges, stony corals, nondrift macrophytic algae and seagrasses spares, if present.

Sponge Bed - expansive subtidal area occupied primarily by living sessile organisms of the Phylum Porifera (e.g., sheepswool sponge, Florida loggerhead sponge and branching candle sponge); octocorals, stony corals, nondrift macrophytic algae and seagrasses sparse, if present.

Coral Reef - expansive subtidal area with elevational gradient or relief and occupied primarily by living sessile organisms of the Class Hydrozoa (e.g., fire corals and hydrocorals) and Class Anthozoa, Subclass Zoantharia (e.g., stony corals and black corals); includes deepwater bank reefs, fringing barrier reefs, outer bank reefs and patch reefs, some of which may contain distinct zones of assorted macrophytes, octocorals, & sponges.

Mollusk Reef - substantial subtidal or intertidal area with relief from concentrations of sessile organisms of the Phylum Mollusca, Class Bivalvia (e.g., molluscs, oysters, & worm shells); octocorals, sponges, stony corals, macrophytic algae and seagrasses sparse, if present.

Worm Reef - substantial subtidal or intertidal area with relief from concentrations of sessile, tubicolous organisms of the Phylum Annelida, Class Polychaeta (e.g., chaetopterids and sabellarids); octocorals, sponges, stony corals, macrophytic algae and seagrasses sparse, if present.

Algal Bed - expansive subtidal, intertidal or supratidal area, occupied primarily by attached thallophytic or mat-forming prokaryotic algae (e.g, halimeda, blue-green algae); octocorals, sponges, stony corals and seagrasses sparse, if present.

Grass Bed - expansive subtidal or intertidal area, occupied primarily by rooted vascular macrophytes, (e.g., shoal grass, halophila, widgeon grass, manatee grass and turtle grass); may include various epiphytes and epifauna; octocorals, sponges, stony corals, and attached macrophytic algae sparse, if present.

Composite Substrate - expansive subtidal, intertidal, or supratidal area, occupied primarily by Natural Community elements from more than one Natural Community category (e.g., Grass Bed and Algal Bed species; Octocoral and Algal Bed species); includes both patchy and evenly distributed occurrences.

Tidal Marsh - expansive intertidal or supratidal area occupied primarily by rooted, emergent vascular macrophytes (e.g., cord grass, needlerush, saw grass, saltwort, saltgrass and glasswort); may include various epiphytes and epifauna.

Tidal Swamp - expansive intertidal and supratidal area occupied primarily by woody vascular macrophytes (e.g., black mangrove, buttonwood, red mangrove, and white mangrove); may include various epiphytes and epifauna.

DEFINITIONS OF TERMS Terrestrial and Palustrine Natural Communities

Physiography

Upland - high area in region with significant topographic relief; generally undulating
Lowland - low area in region with or without significant topographic relief; generally flat to gently sloping
Flatland - generally level area in region without significant topographic relief; flat to gently sloping
Basin - large, relatively level lowland with slopes confined to the perimeter or isolated interior locations
Depression - small depression with sloping sides, deepest in center and progressively shallower towards the perimeter
Floodplain - lowland adjacent to a stream; topography influenced by recent fluvial processes
Bottomland - lowland not on active floodplain; sand/clay/organic substrate

Hydrology

occasionally inundated - surface water present only after heavy rains and/or during flood stages
seasonally inundated - surface water present during wet season and flood periods
usually inundated - surface water present except during droughts

Climatic Affinity of the Flora

tropical - community generally occurs in practically frost-free areas
subtropical - community generally occurs in areas that experience occasional frost, but where freezing temperatures are not frequent enough to cause true winter dormancy
temperate - community generally occurs in areas that freeze often enough that vegetation goes into winter dormancy

Fire

annual fire - burns about every 1-2 years
frequent fire - burns about every 3-7 years
occasional fire - burns about every 8-25 years
rare fire - burns about every 26-100 years
no fire - community develops only when site goes more than 100 years without burning

LATIN NAMES OF PLANTS MENTIONED IN NATURAL COMMUNITY DESCRIPTIONS

anise - *Illicium floridanum*
bays:
- swamp bay -*Persea palustris*
- gordonia -*Gordonia lasianthus*
- sweetbay -*Magnolia virgiana*

beakrush - *Rhynchospora* spp.
beech - *Fagus grandifolia*
blackgum - *Nyssa biflora*
blue palmetto - *Sabal minor*
bluestem - *Andropogon* spp.
buttonbush - *Cephalanthus occidentalis*
cabbage palm - *Sabal palmetto*
cacti - *Opuntia* and *Harrisia* spp.,
- predominantly *stricta* and *pentagonus*

cane - *Arundinaria gigantea* or *A. tecta*
cattail - *Typha* spp.
cedars:
- red cedar - *Juniperus silicicola*
- white cedar - *Chamaecyparis thyoides* or *C. henryi*

cladonia - *Cladonia* spp.
cypress - *Taxodium distichum*
dahoon holly - *Ilex cassine*
diamondleaf oak - *Quercus laurifolia*
fire flag - *Thalia geniculata*
Florida maple - *Acer barbatum*
gallberry - *Ilex glabra*
gums:
- tupelo - *Nyssa aquatica*
- blackgum - *Nyssa biflora*
- Ogeechee gum - *Nyssa ogeche*

hackberry - *Celtis laevigata*
hornbeam - *Carpinus caroliniana*
laurel oak - *Quercus hemisphaerica*
live oak - *Quercus virginiana*
loblolly pine - *Pinus taeda*
longleaf pine - *Pinus palustris*
magnolia - *Magnolia grandiflora*
maidencane - *Panicum hemitomon*
needle palm - *Rhapidophyllum hystrix*
overcup oak - *Quercus lyrata*
pickerel weed - *Pontederia cordata* or *P. lanceolata*
pignut hickory - *Carya glabra*
pop ash - *Fraxinus caroliniana*
pond apple - *Annona glabra*
pond pine - *Pinus serotina*
pyramid magnolia - *Magnolia pyramidata*
railroad vine - *Ipomoea pes-caprae*
red cedar - *Juniperus silicicola*
red maple - *Acer rubrum*
red oak - *Quercus falcata*
rosemary - *Ceratiola ericoides*
sagittaria - *Sagittaria lancifolia*
sand pine - *Pinus clausa*
saw palmetto - *Serenoa repens*
sawgrass - *Cladium jamaicensis*
scrub oaks - *Quercus geminata, Q. chapmanii, Q. myrtifolia,Q. inopina*
sea oats - *Uniola paniculata*
seagrape - *Coccoloba uvifera*
shortleaf pine - *Pinus echinata*
Shumard oak - *Quercus shumardii*
slash pine - *Pinus elliottii*
sphagnum moss - *Sphagnum* spp.
spikerush - *Eleocharis* spp.
spruce pine - *Pinus glabra*
St. John's wort - *Hypericum* spp.
swamp chestnut oak - *Quercus prinus*
sweetgum - *Liquidambar styraciflua*
titi - *Cyrilla racemiflora*, and *Cliftonia monophylla*
tuliptree - *Liriodendron tulipfera*
tupelo - *Nyssa aquatica*
turkey oak - *Quercus laevis*
water oak - *Quercus nigra*
waterlily - *Nymphaea odorata*
white cedar - *Chamaecyparis thyoides*
white oak - *Quercus alba*
willow - *Salix caroliniana*
yucca - *Yucca aloifolia*

A. GENERAL DISCUSSION

Archaeological and historic sites are defined collectively in 267.021(3), F.S., as "historic properties" or "historic resources." They have several essential characteristics that must be recognized in a management program.

First of all, they are a finite and non-renewable resource. Once destroyed, presently existing resources, including buildings, other structures, shipwreck remains, archaeological sites and other objects of antiquity, cannot be renewed or revived. Today, sites in the State of Florida are being destroyed by all kinds of land development, inappropriate land management practices, erosion, looting, and to a minor extent even by well-intentioned professional scientific research (e.g., archaeological excavation). Measures must be taken to ensure that some of these resources will be preserved for future study and appreciation.

Secondly, sites are unique because individually they represent the tangible remains of events that occurred at a specific time and place.

Thirdly, while sites uniquely reflect localized events, these events and the origin of particular sites are related to conditions and events in other times and places. Sites can be understood properly only in relation to their natural surroundings and the activities of inhabitants of other sites. Managers must be aware of this "systemic" character of historic and archaeological sites. Also, it should be recognized that archaeological sites are time capsules for more than cultural history; they preserve traces of past biotic communities, climate, and other elements of the environment that may be of interest to other scientific disciplines.

Finally, the significance of sites, particularly archaeological ones, derives not only from the individual artifacts within them, but equally from the spatial arrangement of those artifacts in both horizontal and vertical planes. When archaeologists excavate, they recover, not merely objects, but also a record of the positions of these objects in relation to one another and their containing matrix (e.g., soil strata). Much information is sacrificed if the so-called "context" of archaeological objects is destroyed or not recovered, and this is what archaeologists are most concerned about when a site is threatened with destruction or damage. The artifacts themselves can be recovered even after a site is heavily disturbed, but the context -- the vertical and horizontal relationships -- cannot. Historic structures also contain a wealth of cultural (socio-economic) data that can be lost if historically sensitive maintenance, restoration or rehabilitation procedures are not implemented, or if they are demolished or extensively altered without appropriate documentation. Lastly, it should not be forgotten that historic structures often have associated potentially significant historic archaeological features that must be considered in land management decisions.

B. STATUTORY AUTHORITY

Chapter 253, Florida Statutes ("State Lands") directs the preparation of "single-use" or "multiple-use" land management plans for all state-owned lands and state-owned sovereignty submerged lands. In this document, 253.034(4), F.S., specifically requires that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites, as well as other fragile resources..."

Chapter 267, Florida Statutes is the primary historic preservation authority of the state. The importance of protecting and interpreting archaeological and historic sites is recognized in 267.061(1)(a), F.S.:The rich and unique heritage of historic properties in this state, representing more than 10,000 years of human presence, is an important legacy to be valued and conserved for present and future generations. The destruction of these nonrenewable historic resources will engender a significant loss to the state's quality of life, economy, and cultural environment. It is therefore declared to be state policy to:

1. Provide leadership in the preservation of the state's historic resources; [and]

2. Administer state-owned or state-controlled historic resources in a spirit of stewardship and trusteeship;...

Responsibilities of the Division of Historical Resources in the Department of State pursuant to 267.061(3), F.S., include the following:

1. Cooperate with federal and state agencies, local Governments, and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such responses.
2. Develop a comprehensive statewide historic preservation plan.
3. Identify and nominate eligible properties to the National Register of Historic Places and otherwise administer applications for listing properties in the National Register of Historic Places.
4. Cooperate with federal and state agencies, local governments, and organizations and individuals to ensure that historic resources are taken into consideration at all levels of planning and development.
5. Advise and assist, as appropriate, federal and state agencies and local governments in carrying out their historic preservation responsibilities and programs.
6. Carry out on behalf of the state the programs of the National Historic Preservation Act of 1966, as amended, and to establish, maintain, and administer a state historic preservation program meeting the requirements of an approved program and fulfilling the responsibilities of state historic preservation programs as provided in subsection 101(b) of that act.
7. Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture. Prior to the acquisition, preservation, interpretation, or operation of a historic property by a state agency, the Division shall be provided a reasonable opportunity to review and comment on the proposed undertaking and shall determine that there exists historic authenticity and a feasible means of providing for the preservation, interpretation and operation of such property.
8. Establish professional standards for the preservation, exclusive of acquisition, of historic resources in state ownership or control.
9. Establish guidelines for state agency responsibilities under subsection (2).

Responsibilities of other state agencies of the executive branch, pursuant to 267.061(2), F.S., include:

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.
2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way that adversely affects the character, form, integrity, or other qualities that contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.
3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.
4. Each state agency of the executive branch shall assume responsibility for the preservation of historic

resources that are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.

5. Each state agency of the executive branch, in seeking to acquire additional space through new construction or lease, shall give preference to the acquisition or use of historic properties when such acquisition or use is determined to be feasible and prudent compared with available alternatives. The acquisition or use of historic properties is considered feasible and prudent if the cost of purchase or lease, the cost of rehabilitation, remodeling, or altering the building to meet compliance standards and the agency's needs, and the projected costs of maintaining the building and providing utilities and other services is less than or equal to the same costs for available alternatives. The agency shall request the division to assist in determining if the acquisition or use of a historic property is feasible and prudent. Within 60 days after making a determination that additional space is needed, the agency shall request the division to assist in identifying buildings within the appropriate geographic area that are historic properties suitable for acquisition or lease by the agency, whether or not such properties are in need of repair, alteration, or addition.

6. Consistent with the agency's mission and authority, all state agencies of the executive branch shall carry out agency programs and projects, including those under which any state assistance is provided, in a manner which is generally sensitive to the preservation of historic properties and shall give consideration to programs and projects which will further the purposes of this section.

Section 267.12 authorizes the Division to establish procedures for the granting of research permits for archaeological and historic site survey or excavation on state-owned or controlled lands, while Section 267.13 establishes penalties for the conduct of such work without first obtaining written permission from the Division of Historical Resources. The Rules of the Department of State, Division of Historical Resources, for research permits for archaeological sites of significance are contained in Chapter 1A-32, F.A.C.

Another Florida Statute affecting land management decisions is Chapter 872, F.S. Section 872.02, F.S., pertains to marked grave sites, regardless of age. Many state-owned properties contain old family and other cemeteries with tombstones, crypts, etc. Section 872.05, F.S., pertains to unmarked human burial sites, including prehistoric and historic Indian burial sites. Unauthorized disturbance of both marked and unmarked human burial site is a felony.

C. MANAGEMENT POLICY

The choice of a management policy for archaeological and historic sites within state-owned or controlled land obviously depends upon a detailed evaluation of the characteristics and conditions of the individual sites and groups of sites within those tracts. This includes an interpretation of the significance (or potential significance) of these sites, in terms of social and political factors, as well as environmental factors. Furthermore, for historic structures architectural significance must be considered, as well as any associated historic landscapes.

Sites on privately owned lands are especially vulnerable to destruction, since often times the economic incentives for preservation are low compared to other uses of the land areas involved. Hence, sites in public ownership have a magnified importance, since they are the ones with the best chance of survival over the long run. This is particularly true of sites that are state-owned or controlled, where the basis of management is to provide for land uses that are minimally destructive of resource values.

It should be noted that while many archaeological and historical sites are already recorded within state--owned or controlled--lands, the majority of the uplands areas and nearly all of the inundated areas have not been surveyed to locate and assess the significance of such resources. The known sites are, thus,

only an incomplete sample of the actual resources - i.e., the number, density, distribution, age, character and condition of archaeological and historic sites - on these tracts. Unfortunately, the lack of specific knowledge of the actual resources prevents formulation of any sort of detailed management or use plan involving decisions about the relative historic value of individual sites. For this reason, a generalized policy of conservation is recommended until the resources have been better addressed.

The generalized management policy recommended by the Division of Historical Resources includes the following:

1. State land managers shall coordinate all planned activities involving known archaeological or historic sites or potential site areas closely with the Division of Historical Resources in order to prevent any kind of disturbance to significant archaeological or historic sites that may exist on the tract. Under 267.061(1)(b), F.S., the Division of Historical Resources is vested with title to archaeological and historic resources abandoned on state lands and is responsible for administration and protection of such resources. The Division will cooperate with the land manager in the management of these resources. Furthermore, provisions of 267.061(2) and 267.13, F.S., combined with those in 267.061(3) and 253.034(4), F.S., require that other managing (or permitting) agencies coordinate their plans with the Division of Historical Resources at a sufficiently early stage to preclude inadvertent damage or destruction to known or potentially occurring, presently unknown archaeological and historic sites. The provisions pertaining to human burial sites must also be followed by state land managers when such remains are known or suspected to be present (see 872.02 and 872.05, F.S., and 1A-44, F.A.C.)

2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.

3. In the case of known significant sites, which may be affected by proposed project activities, the managing agency will generally be expected to alter proposed management or development plans, as necessary, or else make special provisions to minimize or mitigate damage to such sites.

4. If in the course of management activities, or as a result of development or the permitting of dredge activities (see 403.918(2)(6)a, F.S.), it is determined that valuable historic or archaeological sites will be damaged or destroyed, the Division reserves the right, pursuant to 267.061(1)(b), F.S., to require salvage measures to mitigate the destructive impact of such activities to such sites. Such salvage measures would be accomplished before the Division would grant permission for destruction of the affected site areas. The funding needed to implement salvage measures would be the responsibility of the managing agency planning the site destructive activity. Mitigation of historic structures at a minimum involves the preparation of measured drawings and documentary photographs. Mitigation of archaeological resources involves the excavation, analysis and reporting of the project findings and must be planned to occur sufficiently in advance to avoid project construction delays. If these services are to be contracted by the state agency, the selected consultant will need to obtain an Archaeological Research Permit from the Division of Historical Resources, Bureau of Archaeological Research (see 267.12, F.S. and Rules 1A-32 and 1A-46 F.A.C.).

5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological site is discouraged. There are many endangered sites in Florida (on

both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.

6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).

7. Any discovery of instances of looting or unauthorized destruction of sites must be reported to the agent for the Board of Trustees of the Internal Improvement Trust Fund and the Division so that appropriate action may be initiated. When human burial sites are involved, the provisions of 872.02 and 872.05, F. S. and Rule 1A-44, F.A.C., as applicable, must also be followed. Any state agent with law enforcement authority observing individuals or groups clearly and incontrovertibly vandalizing, looting or destroying archaeological or historic sites within state-owned or controlled lands without demonstrable permission from the Division will make arrests and detain those individuals or groups under the provisions of 267.13, 901.15, and 901.21, F.S., and related statutory authority pertaining to such illegal activities on state-owned or controlled lands. County Sheriffs' officers are urged to assist in efforts to stop and/or prevent site looting and destruction.

In addition to the above management policy for archaeological and historic sites on state-owned land, special attention shall be given to those properties listed in the National Register of Historic Places and other significant buildings. The Division recommends that the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (Revised 1990) be followed for such sites.

The following general standards apply to all treatments undertaken on historically significant properties.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy materials that

characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. (see Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings [Revised 1990]).

Divisions of Historical Resources staff are available for technical assistance for any of the above listed topics. It is encouraged that such assistance be sought as early as possible in the project planning.

D. MANAGEMENT IMPLEMENTATION

As noted earlier, 253.034(4), F.S., states that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites..." The following guidelines should help to fulfill that requirement.

1. All land managing agencies should contact the Division and send U.S.G.S. 7.5 minute quadrangle maps outlining the boundaries of their various properties.

2. The Division will in turn identify site locations on those maps and provide descriptions for known archaeological and historical sites to the managing agency.

3. Further, the Division may also identify on the maps areas of high archaeological and historic site location probability within the subject tract. These are only probability zones, and sites may be found outside of these areas. Therefore, actual ground inspections of project areas may still be necessary.

4. The Division will send archaeological field recording forms and historic structure field recording forms to representatives of the agency to facilitate the recording of information on such resources.

5. Land managers will update information on recorded sites and properties.

6. Land managers will supply the Division with new information as it becomes available on previously unrecorded sites that their staff locate. The following details the kind of information the Division wishes to obtain for any new sites or structures that the land managers may report:

A. Historic Sites

(1) Type of structure (dwelling, church, factory, etc.).
(2) Known or estimated age or construction date for each structure and addition.
(3) Location of building (identify location on a map of the property, and building placement, i.e., detached, row, etc.).
(4) General Characteristics: (include photographs if possible) overall shape of plan (rectangle, "L" "T" "H" "U", etc.); number of stories; number of vertical divisions of bays; construction materials (brick, frame, stone, etc.); wall finish (kind of bond, coursing, shingle, etc.); roof shape.
(5) Specific features including location, number and appearance of:
(a) Important decorative elements;
(b) Interior features contributing to the character of the building;
(c) Number, type, and location of outbuildings, as well as date(s) of construction;
(d) Notation if property has been moved;
(e) Notation of known alterations to building.

B. Archaeological Sites

(1) Site location (written narrative and mapped location).
(2) Cultural affiliation and period.
(3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).

(4) Threats to site (deterioration, vandalism, etc.).
(5) Site size (acreage, square meters, etc.).
(6) Artifacts observed on ground surface (pottery, bone, glass, etc.).
(7) Description of surrounding environment.

7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review by the Division early in the project planning.

8. Ground disturbing activities may proceed elsewhere but land managers should stop disturbance in the immediate vicinity of artifact finds and notifies the Division if previously unknown archaeological or historic remains are uncovered. The provisions of Chapter 872, F.S., must be followed when human remains are encountered.

9. Excavation and collection of archaeological and historic sites on state lands without a permit from the Division are a violation of state law and shall be reported to a law enforcement officer. The use of metal detectors to search for historic artifacts shall be prohibited on state lands except when authorized in a 1A-32, F.A.C., research permit from the Division.

10. Interpretation and visitation which will increase public understanding and enjoyment of archaeological and historic sites without site destruction or vandalism is strongly encouraged.

11. Development of interpretive programs including trails, signage, kiosks, and exhibits is encouraged and should be coordinated with the Division.

12. Artifacts found or collected on state lands are by law the property of the Division. Land managers shall contact the Division whenever such material is found so that arrangements may be made for recording and conservation. This material, if taken to Tallahassee, can be returned for public display on a long term loan.

E. ADMINISTERING AGENCY

Questions relating to the treatment of archaeological and historic resources on state lands may be directed to:

Compliance Review Section
Bureau of Historic Preservation
Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Contact Person

Susan M. Harp
Historic Preservation Planner
Telephone (850) 245-6333
Suncom 205-6333
FAX (850) 245-6437

Management Review Team Members

Agency Represented	Team member Appointed	Team member in attendance
Soil and water Conservation District	Mr. Greg Hartt	Mr. Greg Hartt
DEP/DRP	Mr. Ken Alvarez	Mr. Ken Alvarez
DEP South Florida District	Ms. Annette Nielsen	Ms. Annette Nielsen
DACS/DOF	Mr. Bill Korn	Mr. Bill Korn
FWCC	Mr. Dwight Myers	Mr. Dwight Myers
Highlands County	Mr. James Gose	Mr. James Gose
Private land manager	Ms. Jimmy Whol	Ms. Mary Sheppard
Private Conservation Organization	Ms. Tina Fleischer	

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

Chapter 259.036, F. S. was enacted in 1997 to determine whether conservation, preservation, and recreation lands owned by the state Board of Trustees of the Internal Improvement Trust Fund (Board) are being managed properly. It directs the Department of Environmental Protection (DEP) to establish land management review teams to evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions, and archaeological features. The teams also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan. If a land management plan has not been adopted, the review shall consider the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices are in compliance with the management policy statement and management prospectus for that property. If the land management review team determines that reviewed lands are not being managed for the purposes for which they were acquired or in compliance with the adopted land management plan, management policy statement, or management prospectus, DEP shall provide the review findings to the Board, and the managing agency must report to the Board its reasons for managing the lands as it has. A report of the review findings are given to the managing agency under review, the Land Acquisition and Management Advisory Council (LAMAC), and to the Division of State Lands. Also, DEP shall report the annual review findings of its land management review teams to the Board no later than the second board meeting in October of each year.

Review Site

The management review of the Highlands Hammock Area considered approximately 8,152.23 acres in Highlands County that are managed by the Division of Recreation and Parks (DRP). The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management plan. The Division of State Lands approved the management plan on May 29, 1997, and the management plan update May 29, 2002.

Review Team Determination

1. Is the land being managed for the purpose for which it was acquired? **All team members agreed that Highlands Hammock State Park is being managed for the purpose for which it was acquired.**

2. Are actual management practices, including public access, in compliance with the management plan? **All team members agreed that actual management practices, including public access, were in compliance with the management plan for this site.**

Commendations To The Managing Agency

The following commendation resulted from a discussion and vote of review team members.

1. The team commends the FPS for doing an excellent job in maintaining a variety of natural and cultural resources in HHSP under constrained conditions on staffing and funding.
2. The team commends the park staff for their use of volunteers in all facets of park management.
3. The team commends the park staff for their exotics removal program & initial scrub restoration work.

Exceptional Management Actions

The following items received high scores on the review team checklist which indicates that management actions exceeded expectations.

1. Natural communities protection and maintenance of Upland hardwood Forest, flood plain swamp, Baygall, Wet Flatwoods, Seasonal ponds, Cutthroat seeps, Blackwater Streams, and Scrubby flatwoods.
2. Protection and Preservation of animals and plants.
3. Surveying and identifying Archeological and Historical sites; and also protecting and preserving them.
4. Prescribed fire quality.
5. Restoration of disturbed communities; Ruderal
6. Non-native Invasive & Problem Species; Animals and Plants
7. Hydro-Alteration; Roads
8. Resource protection; boundary survey, gates and fencing, and signage
9. Inholdings and additions
10. Public access and education; roads and parking, recreational opportunities, interpretive facilities and signs and Environmental education and Outreach.
11. Management Resources ; waste disposal and Infrastucture

Recommendations and checklist findings

The management plan must include responses to the recommendations and checklist items that are identified below.

Recommendations

The following recommendations resulted from a discussion and vote of review team members.

1. The team recommends that efforts be made to move existing county road to perimeter of park.

DRP Response: Agree. This effort has been underway since the 1970s and is continuing. A big obstacle is that the county has not had the money. However, the park has been working with the county, and at present there is some hope for bringing this matter to a successful conclusion.

2. The team recommends that an emphasis be place on acquiring adjoining properties North and East of the park .

DRP Response: Agree. Negotiations with the owner to the East are underway. The owner to the North has been approached but thus far has not been interested in selling.

3. The team recommends that funding and staffing be brought in line to coincide with the increase in park size. (Park is twice as large now)

DRP Response: Agree. Additional staff and funds will be pursued. Staffing, and funding allocations are contingent on DRP and DEP budget resources and priorities and also on legislative action.

4. The team recommends that management readdress the need for collecting hydrological data to improve resource management.

DRP Response: Agree. This will be addressed in the next revision of the UMP.

5. The team recommends that funding should be adequate to maintain integrity of historical CCC buildings.

DRP Response: Agree. The needs of historic structures will be detailed in the next revision of the UMP. Funds that are needed to provide adequate maintenance will be pursued based on DRP and DEP budget resources and priorities and the ability to obtain grants or funds from other sources including the legislature.

Checklist Findings

The following items received low scores on the review team checklist which indicates that management actions were insufficient (f) or that the issue was not sufficiently addressed in the management plan (p). These items need to be addressed in the management plan update.

1. Groundwater Monitoring Quantity/Quality (p)

DRP Response: Agree. The park has more than doubled in size since the plan was written. As a result hydrological issues are not adequately covered in the existing plan. This matter will be addressed in the next updated UMP.

2. Adjacent Property Concerns; Inholdings /Additions (p)

DRP Response: Agree. Land added to the park in the last ten years is disjunct. This has created an interesting situation regarding inholdings and needed additions, which will be covered in the next updated UMP.