WEKIVA RIVER BASIN STATE PARKS

MULTI—UNIT MANAGEMENT PLAN

APPROVED PLAN

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks

April 22, 2005

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard, MS 140
Tallahassee, Florida 32399-3000
Phone: (850) 245-2784 Fax: (850) 245-2786

Colleen Castille
Secretary

August 8, 2005

Ms. BryAnne White
Office of Park Planning
Division of Recreation and Parks
3900 Commonwealth Blvd.; M.S. 525
Tallahassee, Florida 32399

Re: Wekiva River Basin State Parks and Reserve Management Plan
Wekiwa Springs State Park, Lease number 2950
Rock Springs Run State Reserve, Lease number 3571
Lower Wekiva River Preserve State Park, Lease number 2386

Dear Ms. White:

On **April 22, 2005**, the Acquisition and Restoration Council recommended approval of the **Wekiva River Basin State Parks and Reserve** management plan. Therefore, the Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, approved the management plan for the **Wekiva River Basin State Parks and Reserve**. Pursuant to Sections 253.034 and 259.032, Florida Statutes, and Chapter 18-2, Florida Administrative Code this plan's ten-year update will be due on **April 22, 2015**.

Approval of this land management plan does not waive the authority or jurisdiction of any governmental entity that may have an interest in this project. Implementation of any upland activities proposed by this management plan may require a permit or other authorization from federal and state agencies having regulatory jurisdiction over those particular activities. Pursuant to the conditions of your lease, please forward copies of all permits to this office upon issuance.

Sincerely,

Paula L. Allen
Office of Environmental Services
Division of State Lands
Department of Environmental Protection

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INTRODUCTION

This management plan encompasses the following three contiguous parks within Florida's state park system: Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. These units of the Wekiva River Basin State Parks are located in Lake, Orange, and Seminole Counties, approximately 20 miles northwest of Orlando (see Vicinity Map). Because the parks are contiguous, with natural and cultural resources connected, the Wekiwa Springs State Park staff has management responsibility for these units. Park staff manages these properties as one operational unit; therefore, all three parks are addressed within this management plan (see Reference Map). This approach serves to acknowledge the presence of ecological and cultural units within the Wekiva Basin that extend beyond the boundary of any individual park. Each park will be discussed in order of its geographic location, from south to north, beginning with Wekiwa Springs State Park. The vicinity map also reflects significant land and water resources that exist near the parks.

These parks collectively contain 39,278 acres. Wekiwa Springs State Park contains 7,723 acres, Rock Springs Run State Reserve has 14,150 acres and Lower Wekiva River Preserve State Park contains 17,405 acres. For this plan, park acreage has been calculated based on the composition of natural communities, in addition to ruderal and developed areas.

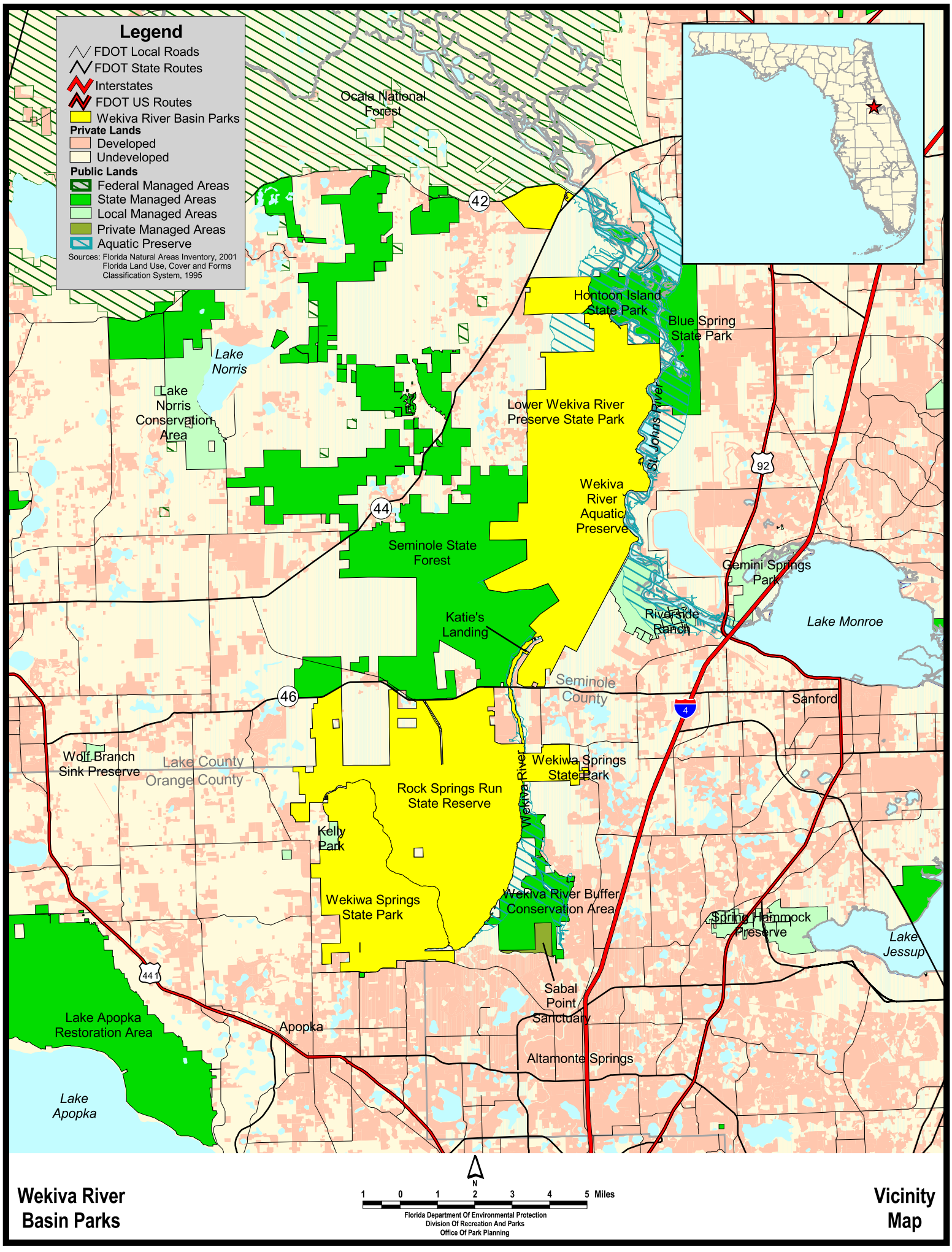
On April 30, 1969, the Board of Trustees of the Internal Improvement Trust Fund obtained title to the property that later became Wekiwa Springs State Park. The park is located primarily in northwest Orange County with a small portion occurring in western Seminole County. The park can be accessed by heading west on State Road 434 from Interstate 4 (Exit 94). Heading north on Wekiva Springs Road from State Road 434, the park entrance is on the right.

On March 10, 1983, The Board of Trustees of the Internal Improvement Trust Fund obtained title to the property, which later became Rock Springs Run State Reserve. The reserve occurs to the north of Wekiwa Springs State Park in Orange, Seminole and Lake Counties. The reserve can be accessed by exiting Interstate 4 at State Road 46 (Exit 101C) and proceeding west seven miles. The park entrance is on the south side of State Road 46.

On August 19, 1976, the Board of Trustees of the Internal Improvement Trust Fund obtained title to the property that later became the Lower Wekiva River Preserve State Park. The park is located northeast of Rock Springs Run State Reserve and is located within Seminole and Lake Counties. The eastern entrance can be reached by exiting Interstate 4 at State Road 46, Exit 101C and proceeding west 4.2 miles. The entrance is on the north side of State Road 46. The northern entrance is off State Road 44 in Pine Lakes.

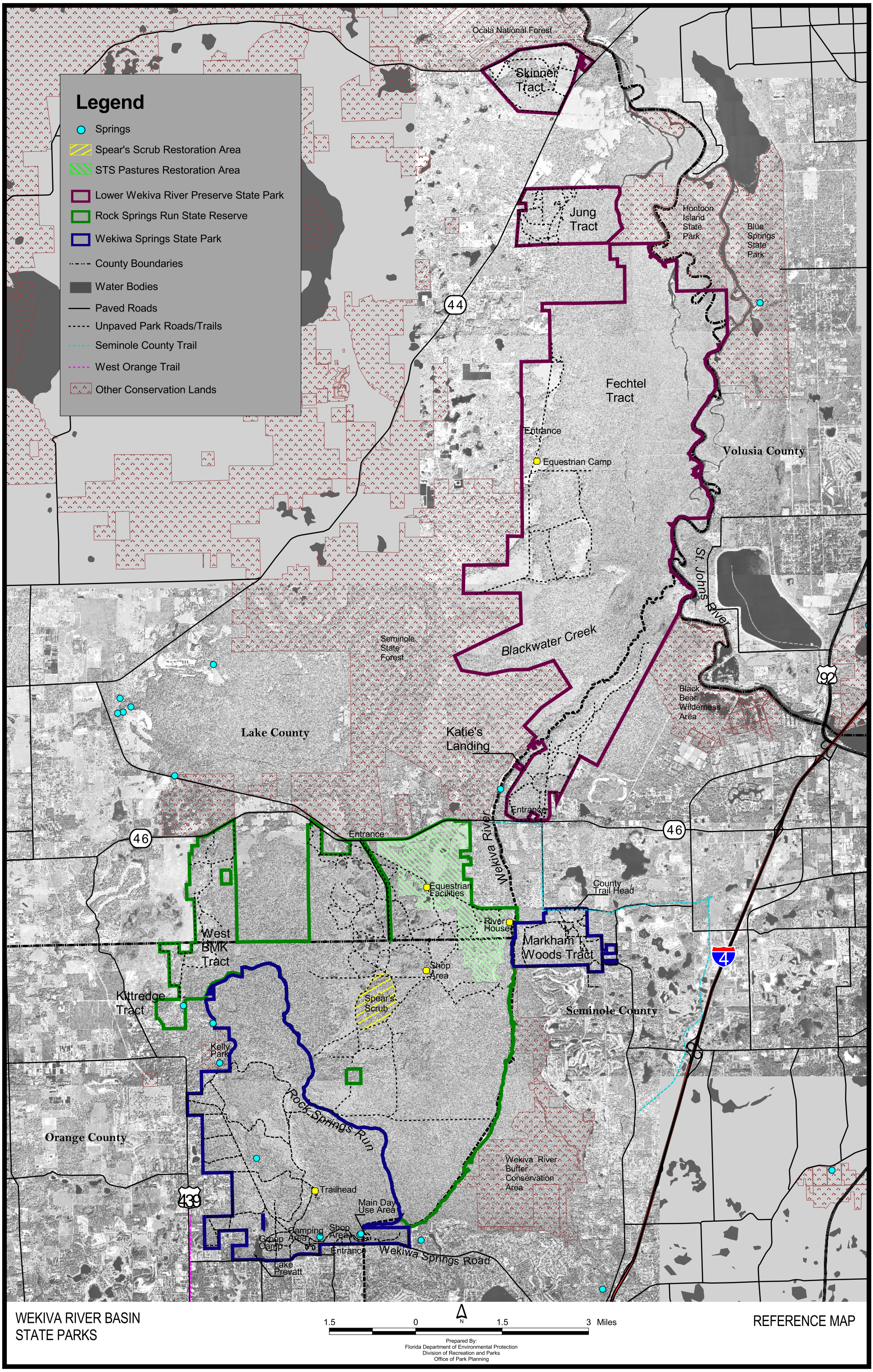
PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of the Wekiva River Basin State Parks as a unit of Florida's state park system. It identifies the objectives, criteria and standards that guide each aspect of the park's 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 November 10, 1998 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.



Wekiva River Basin Parks

Vicinity Map


Legend
Springs
Spear's Scrub Restoration Area
STS Pastures Restoration Area
Lower Wekiva River Preserve State Park
Rock Springs Run State Reserve
Wekiwa Springs State Park
County Boundaries
Water Bodies
Paved Roads
Unpaved Park Roads/Trails
Seminole County Trail
West Orange Trail
Other Conservation Lands
Ocala National Forest
Skinner Tract
Jung Tract
Hontoon Island State Park
Blue Springs State Park
Fechtel Tract
Entrance
Equestrian Camp
Volusia County
St. Johns River
Blackwater Creek
Seminole State Forest
Lake County
Katie's Landing
Entrance
Black Bear Wilderness Area
Entrance
Equestrian Facilities
Wekiva River
County Trail Head
River House
West BMK Tract
Markham Woods Tract
Shop Area
Kittredge Tract
Spear's Scrub
Seminole County
Kelly Park
Rock Springs Run
Orange County
Wekiva River Buffer Conservation Area
Trailhead
Main Day Use Area
Camping Area
Shop Area
Group Camp
Entrance
Lake Prevatt
Wekiwa Springs Road
44
46
46
92
4
417
439
WEKIVA RIVER BASIN
STATE PARKS
1.5 0 1.5 3 Miles
N
Prepared By:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning
REFERENCE MAP

The plan consists of two interrelated components. Each component corresponds to a particular aspect of the administration of these parks. The resource management component provides a detailed inventory and assessment of the natural and cultural resources of these parks. 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 parks are 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 these parks 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 these parks. This analysis considered these parks' natural and cultural resources, management needs, aesthetic values, visitation, and visitor experiences. For these parks, it was determined that no secondary purposes could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation. Uses such as, water resource development projects, water supply projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities and cattle grazing specifically identified in this plan) are not consistent with this plan or the management purposes of these parks and should be discouraged. Certain uses, including cattle grazing and restoration-based forestry practices, may be appropriate for specific parcels and not contrary to the goals and objectives of the Park. These must be considered on a case by case scenario.

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by these parks. It was determined that multiple-use management activities would not be appropriate as a means of generating revenues for land management. Instead, techniques such as entrance fees, concessions, and similar measures will be employed on a case-by-case basis as a means of supplementing park management funding.

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 Operations Manual (OM) and cover 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 the Wekiva River Basin State Parks, each park has a slightly different emphasis that must be considered.

Wekiwa Springs State Park. In the management of Wekiwa Springs State Park a balance is sought between the goals of preserving natural conditions 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 of the park's natural, aesthetic, and educational attributes.

Rock Springs Run State Reserve. Management of Rock Springs Run State Reserve is based on a Multiple Agency Management Lease granting management responsibilities to the Division of Recreation and Parks, Division of Forestry, Florida Fish and Wildlife Conservation Commission and the St. Johns River Water Management District. Management responsibilities are as follows:

1. Recreation and Parks shall be the primary managing agency. As such, it shall coordinate and oversee all activities on the property.
2. Division of Forestry shall provide advice and on-site assistance to Recreation and Parks in implementing a prescribed burning program; respond to and take charge of any wildfire and, oversee any timber planting and harvesting activities based on a consensus reached by all participating managing agencies.
3. The Florida Fish and Wildlife Conservation Commission shall in coordination with Recreation and Parks, provide specific management recommendations and protection for all wildlife, including threatened and endangered species; establish, implement and control such hunting activities as may be desired; assist Recreation and Parks in providing required law enforcement to prevent poaching to protect threatened and endangered species, and to protect archaeological and historic sites from looting and other unauthorized activities.

4. The Water Management District shall develop, implement and participate in funding a plan to accomplish defined water management activities.

Lower Wekiva River Preserve State Park. In the management of the Lower Wekiva River Preserve State Park, preservation and enhancement of natural conditions is the priority issue. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring its protection and maintenance, access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily related to the aesthetic, educational and recreational enjoyment of the preserve, although other compatible resource-based recreational uses are permitted. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

In addition to the management actions proposed in this plan, the parks will also be managed in accordance with the strategies outlined in the Wekiva River Basin Interagency Strategic Plan (WRBISP). The WRBISP was finalized in May 1996, and is incorporated, by reference, as part of this management plan. The WRBISP covers the entire Wekiva River Basin and was developed by the Department of Environmental Protection through the coordinated efforts of the managing agencies, local governments, local, state and regional agencies, interested organizations, private landowners and the general public.

Park Goals and Objectives

The following park goals and objectives express the Division's long-term intent in managing these state parks. 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 developed 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 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.

Natural and Cultural Resources

1. Enhance and maintain an effective prescribed fire program.
- **A.** Attempt to burn at least 6,000 acres of the Wekiva River Basin State Parks each year.
- **B.** Attempt to burn at least 26 days per year.
- **C.** Continue to host the Prescribed Fire Training Center crews.
- **D.** Continue to offer prescribed fire training to be taught at Wekiwa Springs State Park.
- **E.** Continue to develop strong inter- and intra-agency partnerships to accomplish burning objectives.
- **F.** Require that every certified burner on staff conducts a minimum of 2 burns per year.

2. Protect, restore and maintain natural plant communities.
- **A.** Restore overgrown sandhill and reintroduce an appropriate fire regime.
- **B.** Continue scrub restoration activities (logging and prescribed burning) as appropriate.
- **C.** Reintroduce cypress trees into appropriate hydric plant communities.

D. Develop and implement strategies for restoring pasturelands to a more natural, fire maintained ecosystem.
E. Pursue cattle grazing leases that ensure appropriate carrying capacity.
F. Develop and implement strategies to minimize erosion problems.

3. Document, protect, maintain and restore native animal diversity and populations.
A. Conduct detailed inventories for rare and endangered animal species to develop and implement strategies to enhance populations.
B. Maximize habitat diversity to promote rare and listed species.
C. Contact various entities that may have collected macroinvertebrates in the parks in order to add other species to the list.

4. Document, protect, maintain and restore native plant diversity and populations.
A. Contact the herbaria of the various State Universities in Florida to determine if any possess records of non-vascular plants collected in the park.
B. Conduct detailed inventories for rare and endangered plants. Monitor the populations, as needed.
C. Incorporate the findings and recommendations from "Pitcherplants and Their Habitats in the Florida State Park System" (Johnson 2001) including:
1) Conduct detailed surveys of the pitcherplant population on the southwest boundary of the Skinner Tract.
2) Utilize prescribed burning and/or selective herbicides to enhance the Skinner population of pitcher plants.
3) Avoid construction firebreaks in areas where the erosion/disturbance may have an impact on pitcher plant populations.
4) In the vicinity of appropriate pitcher plant habitats, determine if the hydrology has been altered and if that alteration has an effect on pitcher plant populations.

5. Maintain exotic plant and animal species control programs.
A. Actively pursue sources to fund exotic plant control projects to be conducted by a contractor.
B. Pursue an education program on the impacts feral animals have on natural lands for park visitors as well as park neighbors.
C. Continue to remove feral cats, hogs and other damaging species from the park.

6. Protect, maintain and restore the natural hydrology and water quality.
A. Encourage and support inter-agency efforts to define the limits of the Wekiva springshed area.
B. Encourage and support inter-agency efforts to acquire important recharge areas.
C. Determine if additional tram roads should be removed from wetland and upland areas.
D. Cap the artesian well at Sand Lake and monitor the resulting hydrologic condition.
E. Prepare a plan to fill the drainage ditches and "sump" holes through mitigation projects.
F. Install low water crossings or appropriately sized culverts on roads in wetlands to rectify impeded natural drainage patterns.
G. The park and county entities will coordinate on the water quality-sampling program.

7. Protect Park Boundaries to improve resource management and avoid encroachments.
A. Park staff will work with coordinating agencies to determine, minimize, mitigate, and monitor any negative effects of Wekiva Parkway during its planning, construction and maintenance.

8. Identify, preserve, interpret and actively manage cultural resources.
A. Take steps to interpret and protect the midden at Katie's Landing.
B. Ensure that steps are taken to protect all cultural resources from natural and man-made threats.

C. Seek grant funding for research projects to document the prehistory and history of the three parks and the surrounding Wekiva River basin.
D. Develop and implement a written plan to protect and preserve the recorded archaeological sites from erosion, slumpage, animal burrowing, root damage, tree fall and vandalism.
E. Establish monitoring measures to monitor recorded archaeological sites for erosion, vegetation intrusion, animal burrowing and human disturbance.
F. Complete archaeological reconnaissance surveys of the three parks, marking the site locations with GPS technology.
G. Improve public awareness and encourage protection and stewardship of the cultural resources of the three parks through education, interpretation and enforcement of agency rules and regulations.
H. Recruit a volunteer to survey cultural sites.

Recreational Goals

9. Continue to provide quality resource-based outdoor recreational and interpretive programs and facilities that are appropriate to local resource conditions at the parks.
A. Maintain existing picnicking, swimming, camping, boating, wildlife observation, hiking, biking, equestrian and interpretive opportunities.
B. Maintain youth camp and primitive youth camp facilities for the educational and recreational benefit of area youth groups.

10. Seek funding to expand interpretive opportunities through the improvement of programs and the development of new use areas and facilities, as outlined in this management plan.
A. Develop an interpretive master plan using the 2000 Statement of Interpretation and research compiled since that time.
B. Using the interpretive master plan for direction, establish a location and construct a Visitor/Interpretive Center convenient to the three parks.

11. Seek funding to expand recreational opportunities through the development of new use areas and facilities, as outlined in this management plan.
A. Develop Katie's Landing, in the Lower Wekiva River Preserve SP, as a day use and a canoe/kayak rental and launch area.
1) Continue efforts to remove invasive, exotic plant species.
2) Restore the bulkhead area to a more natural shoreline.
3) Enhance buffer plantings using native plant species.
4) Develop facilities for canoe/ kayak launching, concession, picnicking and nature observation.
5) Interpret natural and cultural resources through static displays, brochures and programs.
6) Ensure that both state and local interests are pursued through continued close partnership with Seminole County and the DEP.
B. Expand and upgrade the trails and facilities.
1) Develop off-road bicycle trails in Markham Woods in partnership with local bicycle groups.
2) Work in partnership with Orange County and the environmental community in developing the extension of the West Orange Trail along the western perimeter of Wekiwa Springs State Park.
3) Work in partnership with the USDA Forest Service and the Florida Trail Association in maintaining the Florida National Scenic Trail in Lower Wekiva River Preserve State Park.
C. Supplement overnight facilities with a concessionaire run room rental at the River House in Rock Springs Run State Reserve.

Park Administration/Operations

12. Provide efficient and effective management of park resources and facilities while maintaining a high level of visitor service.

- **A.** Enhance personnel resources for more adequate management of the extensive park lands.
- **B.** Upgrade and/or establish necessary support facilities.
  - **1)** Construct six permanent ranger residences to replace existing mobile homes.
  - **2)** Replace the Wekiwa Springs entrance/ranger station and reconfigure the entrance road to have multiple lanes.
- **C.** Place the day use portion and residences of Wekiwa Springs State Park on the county sewer system. Remove sprayfield and treatment plant.
- **D.** Assure appropriate training is provided to all staff in visitor services, park information and emergency procedures.
- **E.** Conduct regular inspections of all parks to provide clean, safe and well-maintained facilities and equipment.
- **F.** Recruit and maintain volunteer support to assist park staff with the maintenance of facilities, protection of park resources, and implementation of park programs.
  - **1)** Provide four additional campsites for volunteers.
  - **2)** Increase the use of volunteers in park interpretive and educational programs.
  - **3)** Develop a volunteer project list and position descriptions.
- **G.** Continue to work in close partnership with co-managing agencies in the management of Rock Springs Run State Reserve.

Management Coordination

These parks are 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), is a co-manager of Rock Springs Run State Reserve. The two agencies assist each other conducting prescribed fire on DOF and Basin properties. DOF also conducts timber assessments, assists with logging contracts on park property, wildfire suppression, and with training park staff in fire activities. The Florida Fish and Wildlife Conservation Commission (FFWCC), a co-manager of Rock Spring Run State Reserve all hunts on the property. They also assist 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) conducts archaeological surveys and assists in preservation of cultural resources.

The Department of Environmental Protection (DEP), Office of Coastal and Aquatic Managed Areas (CAMA) co-manage the river (part Aquatic Preserve). They conduct exotic removal on the river as well as assist with snag management and other river resource management activities. The Wekiva Basin State Parks also cooperates with the following agencies:

- Division of Law Enforcement (Florida Park Patrol) patrols the park properties and the river, investigate crimes and assist park personnel and visitors.
- Bureau of Invasive Plant Management assists with grants to aid in exotic removal and provide contractors to aid in exotic removal.
- St. John's River Water Management District co-manages Rock Springs Run State Reserve and conducts water tests on some springs in the basin as well as on the river.
- Orange County - Park staff work with various agencies (Sheriff's Dept. Fire Dept, Parks

and Rec.) within the county government for training, management activities and assistance.

- City of Apopka – Park staff work closely with City Parks Dept. on training, management activities and operational activities.
- Seminole County – Park staff work with the Natural Lands Program in management activities on the park's natural resources. They also assist with prescribed fire program.
- Lake County assists with wildfire suppression.
- Florida Natural Areas Inventory provides species lists, cultural sites lists and GPS locations for exotic plant species.
- DEP Central District Office – Local Springs Initiative representative provides maps for park use.
- The Nature Conservancy (TNC) provides fire training for park staff and assists with prescribed fire program at Park.

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 July 28, 2004. The purpose of this meeting was to present this draft management plan to the public. A DEP Advisory Group meeting was held on July 29, 2004. The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss this draft management plan.

Other Designations

The Wekiva River Basin State Parks are not within an Area of Critical State Concern as defined in section 380.05, Florida Statutes. Currently it is not under study for such designation. The parks are a component of the Florida Greenways and Trails System.

All waters within the units have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code. Surface waters in these units are also classified as Class III waters by DEP. The Wekiva River and portions of Blackwater Creek and the Wekiwa Springs Run are an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes). On October 13, 2000, the Wekiva River, Rock Springs Run, and Seminole Creek were designated as a National Wild and Scenic River by the U.S. Department of the Interior.

Rock Springs Run State Reserve is established as a Type I Wildlife Management Area by 39-14.002, Florida Administrative Code. This wildlife management area is governed by 39-15.004 and 39-15.065, Florida Administrative Code.

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, conditions and occurrences beyond park boundaries often affect their proper management. 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 Wekiva River Basin State Parks (WRBSP) are located in the Central Lake District (Brooks 1981a). This district is described with uplifted limestone of the Floridan Aquifer that lies unconformably below the surficial sands. This region contains some of the most effective recharge areas for the Floridan Aquifer. The southern portions of the Lower Wekiva River Preserve State Park (LWRPSP) lie within the Casselberry-Oviedo-Geneva-Chuluota Hills subdistrict that is described with hills of elevations of less than 95 feet that are separated by terraced flatwoods and river swamps (Brooks 1981a). Portions of Wekiwa Springs State Park (WSSP) and of Rock Springs Run State Reserve (RSRSR) are included in Apopka Hills subdistrict with residual sandhills modified by karst processes and seaward deposits of the Mt. Dora Ridge (Brooks 1981a). The Mount Dora Ridge is nearly level to rolling, with slopes between 0 and 8 percent, except in areas near sinkholes where the soils have slopes of almost 25 percent. This ridge may represent an erosional remnant of the Hawthorn Delta and a relatively mature karst surface (Soil Conservation Service 1989a). The Mount Dora Ridge is apparently an area of thick unconsolidated sediments overlying limestone (Scott and Hajishafie 1980) and areas of high groundwater recharge (25-31 cm/year, Wilson 1988).

Portions of all units are within the St. Johns Offset subdistrict. This subdistrict is an ancient

portion of the St. Johns River Valley partially filled with Pleistocene estuarine deposits. Eocene limestone is near the surface and solution has contributed to the development of the broad valley (Brooks 1981a). A small area within the northern areas of LWRPSP lies within the Ocala Scrub subdistrict that is primarily a paleo sand dune field. The eastern portion typically has elevations below 85 feet (Brooks 1981a).

Wekiwa Springs State Park lies within the central or mid-peninsular geomorphic zone (White 1970). This zone is characterized by discontinuous highlands forming subparallel ridges. The ridges roughly parallel the present coastline and are separated by broad valleys or plains (Soil Conservation Service 1989b, 1990).

The Wekiva Plain is a flat river valley lowland associated with the Wekiva River and its tributaries. Elevations throughout this area range from five to 35 feet above National Geodetic Vertical Datum (NGVD). The limestone is generally close to the land surface beneath the Wekiva River and is exposed in Wekiwa Springs. Recharge in the river valley lowland is poor to negative, and discharge occurs over much of the area (Wilson 1988).

The general topography of Wekiwa River Basin State Park varies from high sandy hills to low-flooded areas along Rock Springs Run, Wekiwa Springs Run, and the Wekiva River. Elevations within the unit vary from approximately 15 feet above NGVD along the Wekiva River to 99 feet above NGVD in the unit's sandhill community.

The topographic condition is generally undisturbed with the exception of three small borrow pits, two man-made lakes, and many raised tram beds derived from a narrow-gauge railroad system and logging activities. The large borrow pit that used to be in WS-1 1 at Wekiwa Springs State Park has been filled.

Geology

The unit is underlain by three different geological formations (Cooke 1945). In order from youngest to oldest, these deposits are Pleistocene, Miocene, and Eocene. The Pleistocene deposits are sand and shell with silty sand, silt and clay representing lagoonal and estuarine facies. The Miocene deposits are Hawthorn formation, Statenville type consisting of sand, silty sand and clay with phosphorite pebbles, granules, clast concentrations and replacements. The Eocene deposits are Ocala Limestone and are made up of skeletons of fossils in silt to sand size matrix where skeletons which were originally as aragonite are now molds (Brooks 1981b).

Soils

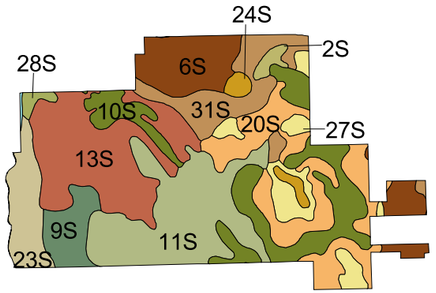
There are many different soil types occurring in WRBSP (see Soils Maps). The U. S. Department of Agriculture, Soil Conservation Service (SCS), compiled this soil survey. Addendum 3 contains complete descriptions of the unit's soil types. Management activities will follow generally accepted best management practices to prevent soil erosion and conserve soil and water resources on site.

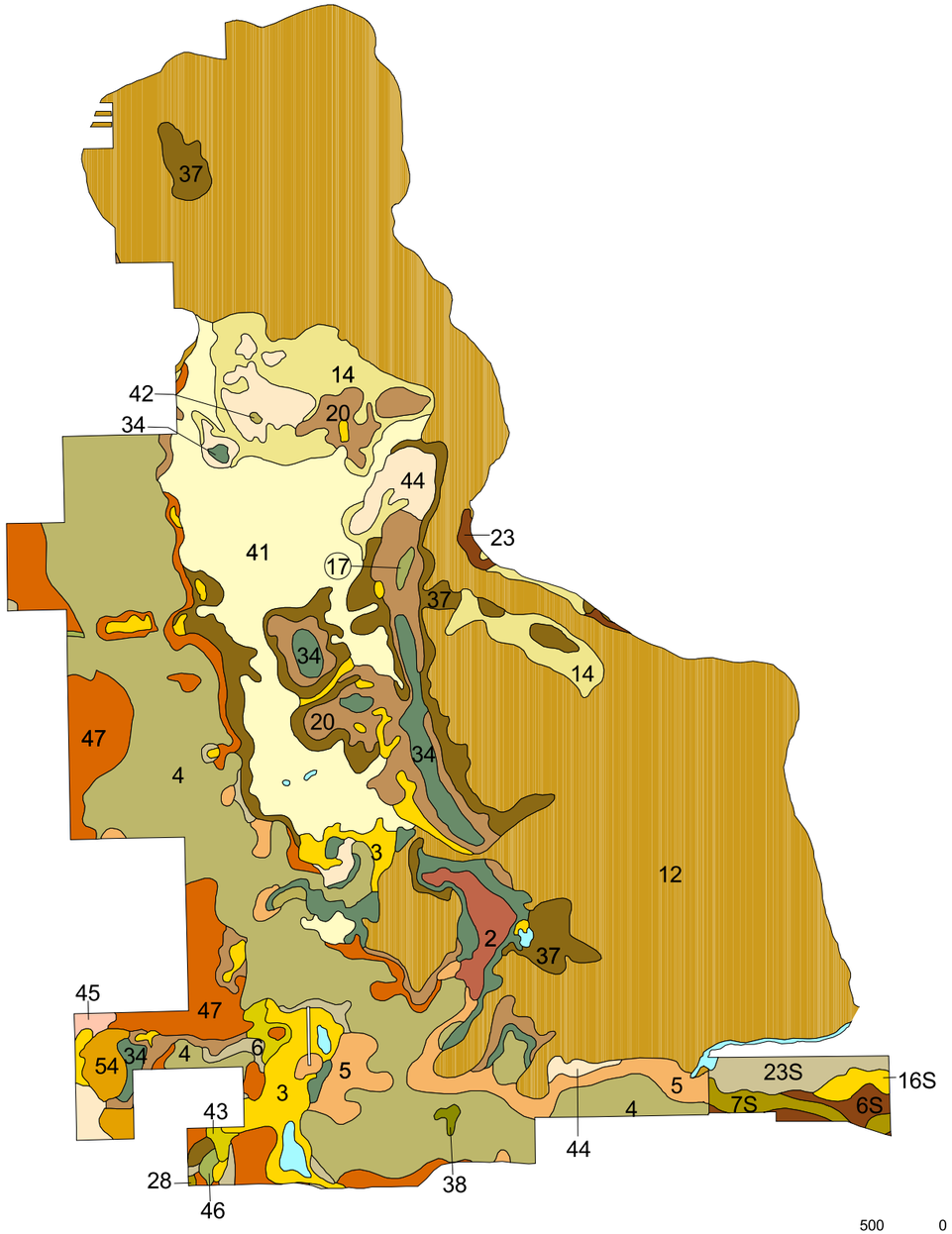
Minerals

With the exception of sand fill material, there are no known minerals of commercial value within the Wekiva River Basin State Parks.

Hydrology

The variety in topography and soil types within each unit contributes to the diverse assemblage of hydrologic regimes. Best known, but possibly the least understood, are the numerous flowing springs within these parks. Other hydrologic features include rainwater sheet flows across





LEGEND

- 2 - Archbold fine sand, 0 to 5 percent slopes
- 3 - Basinger fine sand, depressional
- 4 - Candler fine sand, 0 to 5 percent slopes
- 5 - Candler fine sand, 5 to 12 percent slopes
- 6 - Candler-Apopka fine sands, 5 to 12 percent slopes
- 12 - Emeralda and Holopaw fine sands, freqently flooded
- 14 - Felda fine sand, occasionally flooded
- 17 - Floridana mucky fine sand, depressional
- 20 - Immokalee fine sand
- 23 - Malabar fine sand
- 28 - Florahome fine sand, 0 to 5 percent slopes
- 34 - Pomello fine sand, 0 to 5 percent slopes
- 37 - St. Johns fine sand
- 38 - St. Lucie fine sand, 0 to 5 percent slopes
- 41 - Samsula-Hontoon-Basinger association, depressional
- 42 - Sanibel muck
- 43 - Seffner fine sand
- 44 - Smyrna fine sand
- 45 - Smyrna-Urban land complex
- 46 - Tavares fine sand, 0 to 5 percent slopes
- 47 - Tavares-Millhopper fine sands, 0 to 5 percent slopes
- 54 - Zolfo fine sand
- 2S - Adamsville-Sparr fine sands
- 6S - Astatula-Apopka fine sands, 0 to 5 percent slopes
- 7S - Astatula- Apopka fine sands, 5 to 8 percent slopes
- 9S - Basinger and Delray fine sands
- 10S - Basinger, Samsula and Hontoon soils, depressional
- 11S - Basinger and Smyrna fine sands, depressional
- 13S - EauGallie and Immokalee fine sand
- 16S - Immokalee sand
- 20S - Myakka and EauGallie fine sands
- 23S - Nittaw, Okeelanta and Basinger soils, frequently flooded
- 24S - Paola-St. Lucie sands, 0 to 5 percent slopes
- 27S - Pomello fine sand, occasionally flooded
- 28S - Pompano fine sand, occasionally flooded
- 31S - Tavares-Millhopper fine sands, 0 to 5 percent slopes
- Water

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WEKIWA SPRINGS STATE PARK

SOILS MAP

LEGEND

LAKE COUNTY

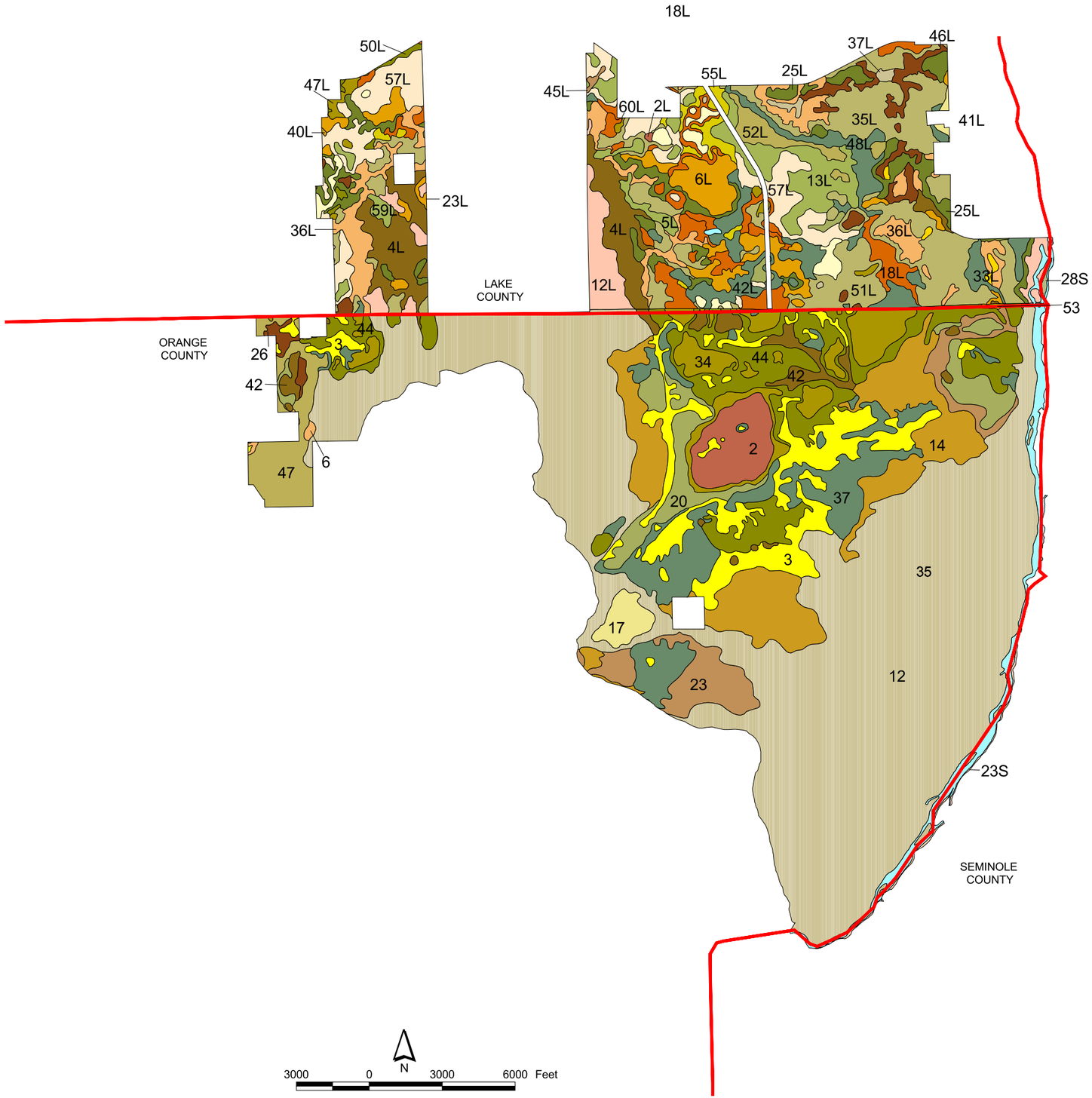
- 2L - Arents
- 4L - Arents-Urban land complex
- 5L - Anclote, Myakka and Felda soils, depressional
- 6L - Anclote, Delray and Hontoon soils
- 12L - Bluff and Manatee soils, frequently flooded
- 13L - Candler sand, 0 to 5 percent slopes
- 18L - Cassia sand
- 23L - Felda fine sand
- 25L - Imokkalee sand
- 33L - Manatee fine sand, depressional
- 35L - Myakka sand
- 36L - Myakka and Placid sand, 0 to 8 percent slopes
- 37L - Ocoee mucky peat, frequently flooded
- 40L - Orlando fine sand, 0 to 5 percent slopes
- 41L - Orsino sand
- 42L - Paola sand 5 to 12 percent slopes
- 45L - Pits water complex
- 46L - Placid sand, depressional
- 47L - Placid and Myakka sands, depressional
- 48L - Pomello sand, 0 to 5 percent slopes
- 50L - Pompano sand
- 51L - Pompano, Felda and Oklawaha soils, depressional
- 52L - St. Lucie sand, 0 to 5 percent slopes
- 55L - Sparr sand, 0 to 5 percent slopes
- 57L - Tavares sand, 0 to 5 percent slopes
- 59L - Wabasso sand
- 60L - Wauchula sand

ORANGE COUNTY

- 2 - Archbold fine sand, 0 to 5 percent slopes
- 3 - Basinger fine sand, depressional
- 4 - Candler fine sand, 0 to 5 percent slopes
- 6 - Candler-Apopka fine sand, 5 to 12 percent slopes
- 12 - Emeralda and Holopaw fine sands, frequently flooded
- 14 - Felda fine sand, occasionally flooded
- 17 - Floridian mucky fine sand, depressional
- 20 - Immokalee fine sand
- 23 - Malabar fine sand
- 26 - Ona fine sand
- 34 - Pomello fine sand, 0 to 5 percent slopes
- 37 - St. Johns fine sand
- 42 - Sanibel muck
- 44 - Smyrna fine sand
- 46 - Tavares fine sand, 0 to 5 percent slopes
- 47 - Tavares-Millhopper fine sand, 0 to 5 percent slopes
- 53 - Wauberg fine sand

SEMINOLE COUNTY

- 23S - Nittaw, Okeelanta and Basinger soils, frequently flooded
- 28S - Pompano fine sand, occasionally flooded
- Water



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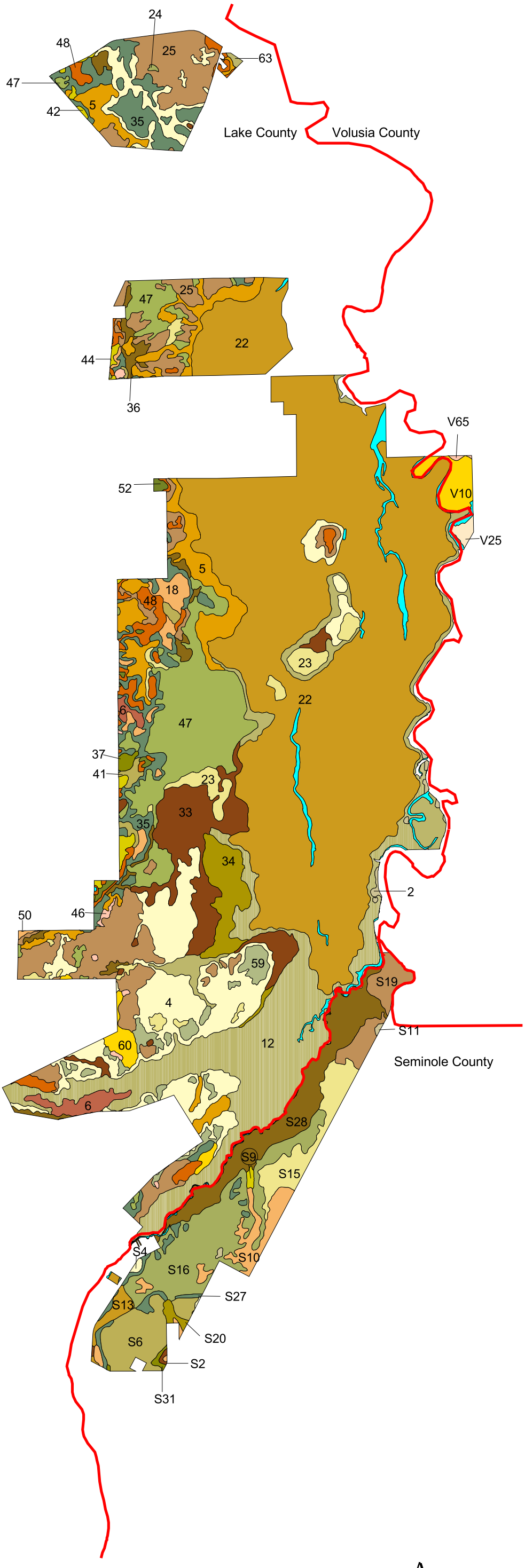
ROCK SPRINGS RUN
STATE RESERVE

SOILS MAP



LEGEND

Lake County
- 2 - Arents
- 4 - Anclote fine sand
- 5 - Anclote, Myakka and Felda soils, depressional
- 6 - Anclote, Delray and Hontoon soils
- 12 - Bluff and Manatee soils, frequently flooded
- 18 - Cassia sand
- 22 - Everglades muck, frequently flooded
- 23 - Felda fine sand
- 24 - Fellowship fine sandy loam, depressional
- 25 - Immokalee sand
- 33 - Manatee fine sand, depressional
- 34 - Martel sandy clay loam, depressional
- 35 - Myakka sand
- 36 - Myakka and Placid sands, 0 to 8 percent slopes
- 37 - Ocoee mucky peat, frequently flooded
- 41 - Orsino sand
- 42 - Paola sand, 0 to 5 percent slopes
- 44 - Paola sand, 5 to 12 percent slopes
- 46 - Placid sand, depressional
- 47 - Placid and Myakka sands, depressional
- 48 - Pomello sand, 0 to 5 percent slopes
- 50 - Popano sand
- 52 - St. Lucie sand, 0 to 5 percent slopes
- 59 - Wabasso sand
- 60 - Wauchula sand
- 63 - Terra Ceia muck, frequently flooded

Seminole County
- S2 - Adamville-Sparr fine sands
- S4 - Astatula fine sand, 0 to 5 percent slopes
- S6 - Astatula-Apopka fine sands, 0 to 5 percent slopes
- S9 - Basinger and Delray fine sands
- S10 - Basinger, Samsula and Hontoon soils, deprisional
- S11 - Basinger and Smyrna fine sands, depressional
- S13 - EauGallie and Immokalee fine sands
- S15 - Felda and Manatee mucky fine sands, depressional
- S16 - Immokalee sand
- S19 - Manatee, Floridana and Holopaw soils, frequently flooded
- S20 - Myakka and EauGallie fine sands
- S27 - Pomello fine sand, 0 to 5 percent slopes
- S28 - Pompano fine sand, occasionally flooded
- S31 - Tavares-Millhopper fine sands, 0 to 5 percent slopes

Volusia County
- V10 - Buff sandy clay loam
- V25 - Gator muck
- V65 - Terra Ceia muck
- Water

N

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LOWER WEKIVA RIVER PRESERVE STATE PARK

SOILS MAP

flatwoods, tannic stained blackwaters of riverine floodplains and hydric hammocks, seepage streams, semi-permanent ponds and lakes, and ephemeral wetlands. The following discussion includes primarily those systems that are notable for their natural conditions or for the restoration work conducted or needed.

Wekiwa Springs State Park. This unit has many influent and effluent water sources as well that lie within park boundaries (Lichtler *et al.* 1968).

Lake Prevatt is perhaps the largest hydrologic feature of Wekiwa Springs State Park. This natural lake is located on the southwestern edge of WSSP, and a small outcove of the lake lies outside the park boundary. Current information suggests it is not a spring-fed system, but instead is closely tied to precipitation and runoff. In fact, the vast majority of its watershed is classified as urban runoff. The lake receives most of its flow from surface water runoff from developed areas located to the west and south of the park. The effect this influent has on this system is unknown. More research could determine the utility of stormwater ponds in those significant areas of urban input. Currently, a paucity of water quality data is available for Lake Prevatt, including water levels.

It is quite apparent that increased impervious surfaces outside of WSSP have resulted in altered hydroperiods in Lake Prevatt as well as other wetland systems. Surface water now, as opposed to historic levels, enters the park in larger quantities and much more quickly following storm events. For example, Lake Prevatt contained virtually no surface water in early 2002 due to the extended drought. However, by September of 2002, surface water levels approached the maximum. These type of anthropogenic hydrologic alterations will undoubtedly have an immense impact to many ecosystems throughout the Wekiva Basin.

Historically a large stormwater culvert, which drained surface runoff from Wekiwa Springs Road and surrounding residential developments (the historic natural drainage area), has discharged into the southeast corner of WSSP (WS-1). Trash, lawn chemicals, road runoff and exotic plant propogules typically entered the unit through this culvert. The result of the culvert, therefore, was heavy erosion problems for this area. In 2004, St. Johns River Water Management District funded, designed and allowed construction of a stormwater pond to address these inherent problems. Seminole County supervised the project.

Several other notable ephemeral streams enter the natural systems of this unit. Three are unnamed creeks, which discharge from adjacent subdivisions into the park. One small creek discharges from the Wekiva Glen subdivision directly into Lake Prevatt. This forested wetland is highly over-run with exotic plants and is a target restoration site for a future hydrologic project.

Another unnamed creek that originates as a marsh lies just east of Rock Springs Road (State Road 435). This creek flows mostly on state lands. Upon entering the park, it passes through bayheads and pine flatwoods before exiting the park briefly into Wekiva Glen subdivision. The creek continues its track north and east back into the park, passing through sandhills and upland mixed forest before discharging into Lake Prevatt. The quality of this water is fully dependent on inputs from immediately outside the unit where it originates as a marsh. A road-widening project along Rock Springs Road is in place in which will bring additional stormwater ponds. Water quality monitoring plans should follow this progress as it occurs.

A third contributing influent originates in Lake McCoy, a local area lake in Apopka. Water tracks from Lake McCoy to Lake Coroni, and under extremely high water conditions, Lake Coroni discharges through a culvert under Welch Road and into a small-unnamed pond on the

state-owned McCall Tract. This pond discharges through an artificially created ditch to Lake Prevatt under very high water conditions.

Although mapped on the USGS Quad sheet as a tributary from Lake Prevatt, Carpenter Branch is an on-site water source that receives large portions of its drainage from the sandhill area of the park and drains northeasterly to Mill Creek. Mill Creek drains in a southeasterly direction from its headwaters, Witherington Spring, one of several springs found on the unit. Witherington Spring is a third magnitude spring with more than one pool. Its largest boil is about 60 feet in diameter and has an average discharge of 3.81 cubic feet per second (cfs) (Rosenau *et al.* 1977). Mill Creek then bisects the park interior and empties into a lagoon below Wekiwa Springs, the unit's largest spring. Since January 2004, physicochemical data and surface water levels have been recorded on a weekly basis by the Cambrian Foundation on this and approximately 15 other springs in the Wekiva River Basin. Data are available from Gary Maddox and from the Cambrian Foundation.

Several other known springs exist within Wekiwa Springs State Park: Sulfur Spring, Island Spring, and Nova Spring. Sulfur Spring is located on the Kitteridge Tract. Some hydrological restoration was done on this spring in 2001 to restore the spring to its original condition and prevent further erosion at the site. The pool is oval in shape (20 feet by 40 feet) with clean, clear water flowing out from a sand boil about five feet in diameter (Osburn and Toth 2002). Depth in the spring ranges from several inches at the outflow to approximately 12 feet deep at the boil (Tysall 2004). The water is clean and clear with a strong sulfurous odor present.

Based on details outlined in the lease, the Wekiva River and its associated springs (Island, Nova, and several unnamed) belong to Wekiwa Springs State Park. Island Spring is a submerged spring located in the middle of the Wekiva River just north of the State Route 46 bridge. This spring vent has been surveyed to a depth of 65 feet upon which the system is no longer penetrable to divers. The main vent slopes down from the river bottom through sand, silt, and clay layers to a depth of 30 feet where a vertical shaft then continues through the fossilized dolostone to the bottom (Karst Environmental Services, Inc. 2004). Flow in this system is coming from two areas: vertical flow emanates from the bottom and lateral flow enters from a side vent located at 30 feet of depth (Karst Environmental Services, Inc. 2004). Quarterly measurements of discharge and survey data are provided by Karst Environmental Services, Inc. Average discharge from this system is 9 cubic feet per second (Karst Environmental Services, Inc. 2004). Water flowing out of this spring has a very high salt concentration (presumably from an ancient connate deposit), and populations of mullet (*Mugill cephalus*) and blue crab (*Callinectes sapidus*) are seen frequenting the vent.

Nova Spring is a submerged spring located in a slough to the eastern side of the main channel just north of the State Route 46 bridge. This system is characterized by a large sand boil with clear flowing water emerging at about 15 feet of depth (Tysall 2004). Measurements of discharge have not yet occurred, but are on the planned sampling agenda for 2005 by the St. Johns River Water Management District. Anecdotal accounts suggest that this spring is likely man-made, but that has not yet been verified.

Located just north of the main park drive in a low seepage area approximately 0.75 miles west of Wekiwa Springs, (Rosenau *et al.* 1977) is a seep historically known as Barrel Spring. Recent repeated attempts have failed to locate a boil for Barrel Spring. Although named Barrel Spring, it is actually a seep.

Wekiwa Springs forms the largest spring pool in the unit. At an elevation of approximately 25 feet above sea level, the springs form the headwaters of the 17-mile long Wekiva River, a tributary of the St. John's River. The springs are located at the base of a grassy hillside used by park visitors for picnicking and recreation. The spring pool is kidney-shaped, and it measures 105 feet in diameter (Scott *et al.* 2004). The main vent/fissure is situated in an east-west orientation in the southeastern portion of the pool (Scott *et al.* 2004). It is a 35 foot long fissure in exposed limestone. Average depth over this vent is 13.7 feet (Scott *et al.* 2004). The secondary vent is located 100 feet to the east-northeast of the main vent, and it is approximately two feet high and 15 feet wide. Combined average discharge from these two boils is approximately 45 million gallons per day (mgd), or 68.5 cubic feet per second (cfs) (Scott *et al.* 2004). The spring responds to rainfall with relatively small and delayed increases in discharge (Wilson 1988). The spring bottom is sandy and averages 5 feet deep. A sidewalk and small retaining wall with access steps for swimmers encompass the springs, and a wooden footbridge is located 200 feet downstream from the main pool. Although the Wekiva River supports a diverse plant community, the diversity of aquatic vegetation in the springs is limited and biomass fluctuates seasonally.

From the spring pool, water flows northeast in a run approximately 60 feet wide (Rosenau *et al.* 1977). Floodplain swamp and hydric hammock border the run. The spring-run flows for approximately one-half mile before it intersects with Rock Springs Run, and these two spring-runs form the Wekiva River.

The Wekiva River runs in a northeasterly direction for 14.9 miles and discharges into the St. Johns River. The Wekiva River is a major route of surface water drainage and its flow is comprised of artesian spring flow, small creeks, and surface drainage and stormwater runoff.

Sand Lake, a borrow pit constructed in the mid-1960s, also occurs at Wekiwa Springs State Park. The pit was flooded when an artesian spring was uncovered. Inflow to the lake is primarily through the artesian spring and surface runoff. Sand Lake drains into the Wekiwa lagoon through an unnamed creek just below the bridge across the main springs. Park staff has proposed capping the artesian well and monitoring how the surface water levels respond over time.

Limited aquatic biological surveys have been conducted at all of the units' springs with the exception of Wekiwa, and consequentially very little is known about them. Physicochemical surveys were also nearly absent from these smaller, but important springs (Lobinske 1995); but, weekly monitoring of these data in all of these springs began in January 2004 (Giannotti 2004). As of 2004, weekly water level monitoring is being recorded at Wekiwa, Witherington, and Sulfur Springs (Tysall 2004).

In general, water quality remains good in the unit. This fact is reflected in biological and chemical water sampling on the Wekiva River by FDEP. The Stream Condition Index (SCI) regularly rates between "Good" and "Excellent". However, in a recent study it was stated:

> In conclusion, nitrate-nitrite nutrient enrichment in Wekiwa Springs appeared to be the main stressor, as indicated by the moderately low quality of algal community present.

Because of their unique ability to assimilate nutrients rapidly, macroalgae serve as excellent indicators of nutrient pollution in aquatic systems. Accumulations of macroalgal biomass prevent sunlight from reaching submerged aquatic vegetation, and respiration associated with macroalgal decay consumes all oxygen from the water column. Given adequate light and nutrient conditions, blooms of opportunistic macroalgae quickly decimate native faunal assemblages in aquatic

systems, particularly those that are slow-moving or immobile. This can happen within a matter of hours or days. Surveys for algal distribution and biomass began in December of 2004 as part of the study for the new roadway around the western side of Orlando (Giannotti 2004).

Generally, nitrate-nitrogen concentrations in groundwater are generally below 0.20 mg/L (Toth 1999). However, springs within the Wekiva River Basin far exceed this concentration (Toth 1999). From this St. Johns River Water Management District study, the following measurements were reported:

- Wekiwa Springs: 1.92 mg/L as nitrogen
- Rock Spring:1.62 mg/L as nitrogen
- Seminole Springs:1.41 mg/L as nitrogen
- Sanlando Springs:0.782 mg/L as nitrogen
- Palm Springs:0.793 mg/L as nitrogen
- Starbuck Spring:0.447 mg/L as nitrogen

The source of nitrate differs by location. The elevated nitrate levels in Sanlando, Starbuck and Wekiwa springs are probably due to contamination by animal waste and/or sewage and the elevated nitrate levels in Rock and Seminole Springs are probably due to contamination by fertilizers (Toth 1999). Nitrate can also end up in aquatic systems via leaching of irrigated soils (Hem 1989), a common practice in urban areas of central Florida. More detailed information on the source of these nutrients is needed.

Previous documentation in Weeki Wachee and other springs have shown that lawn fertilizers (440 tons applied annually in the springshed) have caused water column nitrate levels to increase fivefold over a 30-year period (Florida Springs Task Force 2000).

Eutrophication, the process of nutrient enrichment, can have significant detrimental impacts on natural systems and their associated food webs. Wakulla Springs is among those documented populations where a decline in limpkin numbers has been detected and is presumed to be the result of increased nutrient input to the system (Bryan 1992; Savery 2004). Apple snails, the limpkins' main food source, are sensitive to elevated nutrients and have declined precipitously in Wakulla Springs Run. The limpkin population has similarly declined.

Another indicator of ecological change is the amount of dissolved salts in the water. The mineral content of the spring water is primarily calcium carbonate with minor amounts of magnesium, sodium, sulfate, and chloride (Wilson 1988). Recent data indicates an increased amount of dissolved salts in springwaters, which can be related to saltwater intrusion from excessive groundwater withdrawals. This is also heavily dependent on the type of bedrock being dissolved. Since Florida was once covered by the ocean, high mineral content is expected in these types of limestone. Therefore, further studies are needed to determine the types of limestone present in the caves and their respective rates of dissolution.

Due to urban development and increased groundwater withdrawals throughout the springshed, springflows in the Wekiva River Basin have declined in recent years. These declines are strongly correlated with increased groundwater withdrawals (McGurk 2000; McGurk and Presley 2000; McGurk unpublished manuscript; O'Reilly *et al.* 2002). Trendline analyses demonstrate a decline in springflow of over 19 cubic feet per second for Wekiwa Springs and 13 cubic feet per second for Rock Springs from 1969 to1982 (Friends of the Wekiwa River 1985).

The St. Johns River Water Management District (SJRWMD) established Florida's first Minimum Flows and Levels (MFL) in 1994, and it was for the Wekiva River Basin (Hupalo *et al.* 1994). Agency-level establishment of a MFL at Wekiwa was put in place to ensure adequate aquifer flow rates to prevent significant harm to the natural systems (Florida Water Resources Act, Chapter 373, FS; Hupalo, *et al.* 1994; Vergara 2000). It has become apparent to some officials that springflow rates within the Wekiva River Basin will decrease (McGurk 2000). Although the MFL may have not yet been violated, recent model projections conducted by the SJRWMD indicate that flows will drop below the MFL by the year 2020 (Rao and Clapp 1996; McGurk 2000). If the MFL is below or is expected to fall below the established level, SJWMD is required by Florida statute to implement a recovery or prevention strategy (Vergara 2000).

Catchment basins, or watersheds, have been determined for surface waters, groundwater, and springshed regions in the Basin. The SJRWMD has estimated the boundaries for each of these inputs, but further research is needed to refine these data as urbanization and development continue to encroach on Park boundaries. Increased construction in these areas means increased groundwater withdrawals for potable water supplies, which in turn leads to expansion of impervious surfaces, and the subsequent reduction of groundwater recharge.

Impacts to these watersheds are likely to contribute to significant changes in the natural systems throughout the entire Wekiva River Basin. The sustainable future for the natural systems is dependent upon numerous factors including responsible growth and the development of alternative water supplies. Growth management decisions are currently being made which will ultimately determine if the ecosystems, both aquatic and terrestrial, will remain ecologically viable in the future.

Rock Springs Run State Reserve. Rock Springs Run is the most distinctive hydrologic feature within RSRSR. The headwaters for Rock Springs Run is Rock Springs, located within Kelly Park, an Orange County recreation Park that is adjacent to Wekiwa Springs State Park. The average flow for Rock Springs is approximately 60 cfs, which equates to approximately 39 mgd (Friends of the Wekiva River 1992).

From Kelly Park, the Run flows along a somewhat meandering 8.0-mile course before it joins Wekiwa Springs Run to form the Wekiva River. Rock Springs Run forms a boundary between WSSP to the south and RSRSR to the north.

The Wekiva River and private residences delineate the east border of RSRSR. Although the upper reaches of the Wekiva River are bounded by floodplain swamp, uplands occur just past the banks of the Wekiva River in the area just south of State Road 46. This has led to these areas being developed before State acquisition.

Several small-unnamed springs drain from the RSRSR south into Rock Springs Run. Within the unit north of Shell Mound Road, an old borrow pit now acts as an ephemeral wetland holding water during wetter periods. Aquatic vegetation has become established here as well as several species of fish. There are no plans to restore this pit.

Rock Springs Run State Reserve is the most hydrologically diverse unit within the WRBSP with its springs and over 200 acres of depression marsh communities. These isolated wetlands range from small (less than three acres) round ponds (which resemble sinkhole lakes) to large marshy systems. During the droughts, many of the ponds dry completely

Together, hydric hammock and floodplain swamp account for over 6,000 acres in the unit. Recent tram road removal projects are expected to significantly enhance the hydrology of many of these areas. A hydrologic study is needed to determine the impact of the remaining tram roads left at RSRSR and to prioritize future tram road removals in this Basin.

Lower Wekiva River Preserve State Park. Over 75 percent of the Lower Wekiva River Preserve State Park (LWRPSP) is mapped as wetland natural communities, primarily floodplain swamp and hydric hammock. These community types are dependent upon the seasonal flood stages of the Wekiva and St. Johns Rivers. Other hydrologic features are found here including marshes, blackwater streams, and flatwoods lakes.

In the early to mid 1900s, several large tram roads were constructed within the northern sections of the LWRPSP to facilitate the harvest of large cypress trees. In areas, these earthen roads are over ten feet high and well over 20 feet wide. The tram roads are actually spoil piles, and adjacent to the roads are large ditches that are usually submerged. These tram roads have significantly altered the hydrology of the areas around them. In 2002, approximately one mile of large tram roads was removed (a funded mitigation project), and another one and one-half miles were removed from April to December of 2004. In addition, culvert work was completed in 2004 at LW-30 and 31.

Ditch blocks have been placed in areas where it is not feasible to remove the tram roads. The ditch blocks prevent the wetlands from draining at an unnaturally fast rate. However, several ditch blocks failed (blown out) within weeks of their installation and are being re-engineered. Ditch blocks have only been shown to be effective in very low flow situations.

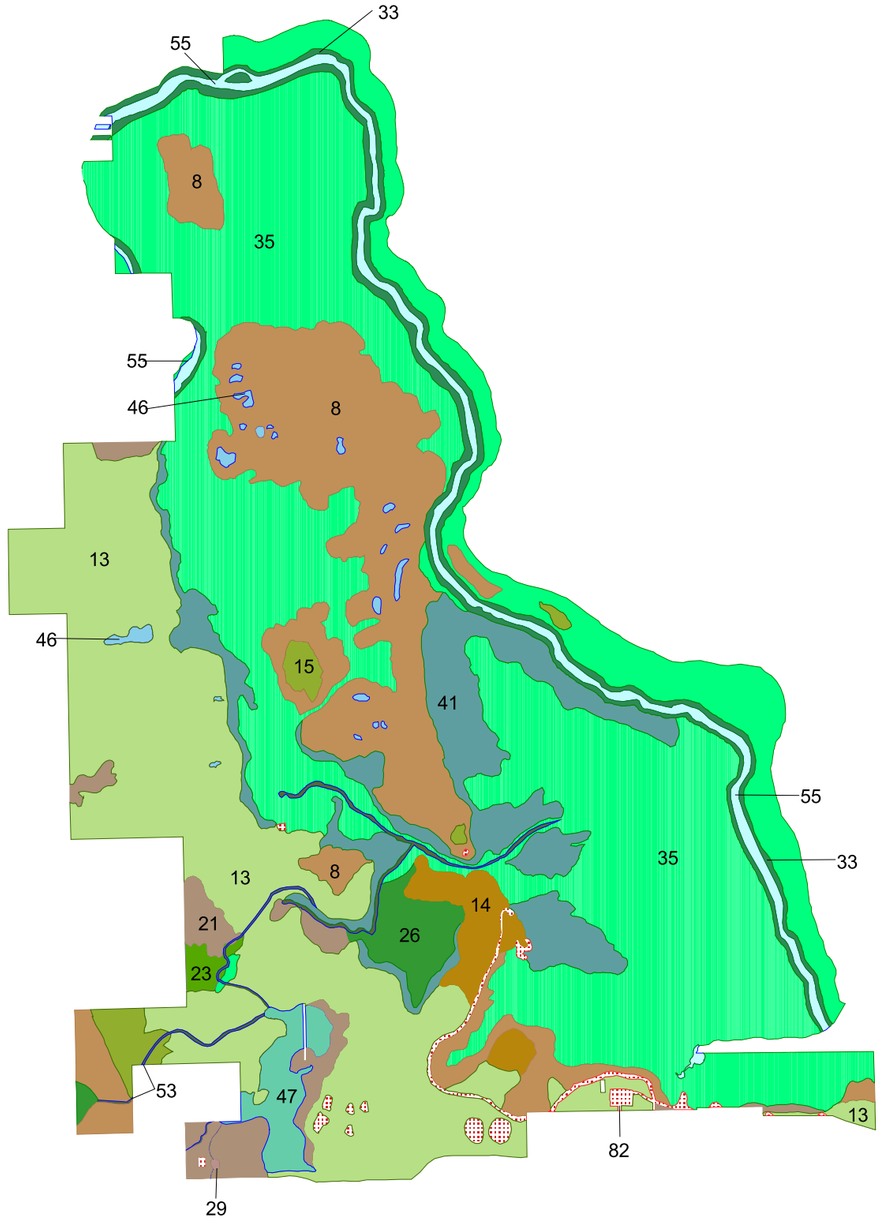
Also, the north end of the Fecthal Tract has extensive areas of flatwoods, scrubby flatwoods, and scrub which are inaccessible at this time due to damaged culverts at several low water crossings (Burn Zones LW-30 and LW-31). New culverts are badly needed to restore passage and improve access for managing these sites properly.

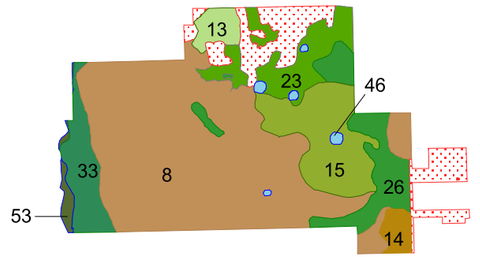
Natural Communities

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. Natural areas, which are similar with respect to these several factors, tend to have 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, two communities with similar species compositions -- coastal strand and scrub -- generally have quite different climatic environments, and these necessitate different management programs.

Wekiva River Basin State Parks contain 19 distinct natural communities (see Natural Communities Maps) in addition to ruderal and developed areas (Florida Natural Areas Inventory 1990). Descriptions and details are discussed below for each of these natural community types. A list of plants (Wunderlin 2003) and animals occurring in the unit is contained in Addendum 4.

- **Mesic flatwoods.** Mesic flatwoods typically have an open canopy of slash pine with a dense ground cover of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*) and rusty lyonia *(Lyonia ferruginea*). Much of this community type was logged in the





LEGEND

- 8 - Mesic Flatwoods-1449.09 ac.
- 13 - Sandhill-1459.68 ac.
- 14 - Scrub-63.03 ac.
- 15 - Scrubby Flatwoods-171.95 ac.
- 21 - Upland Mixed Forest-167.77 ac.
- 23 - Xeric Hammock-88.96 ac.
- 26 - Baygall-168.87 ac.
- 29 - Depression Marsh-1.12 ac.
- 33 - Floodplain Swamp-256.13 ac.
- 35 - Hydric Hammock-2948.58 ac.
- 41 - Wet Flatwoods-495.97 ac.
- 46 - Flatwood / Prairie Lake-31.78 ac.
- 47 - Marsh Lake-92.26 ac.
- 53 - Blackwater Stream-41.57 ac.
- 55 - Spring-Run Stream-163.25 ac.
- 81 - Ruderal-84.80 ac.
- 82 - Developed-52.50 ac.

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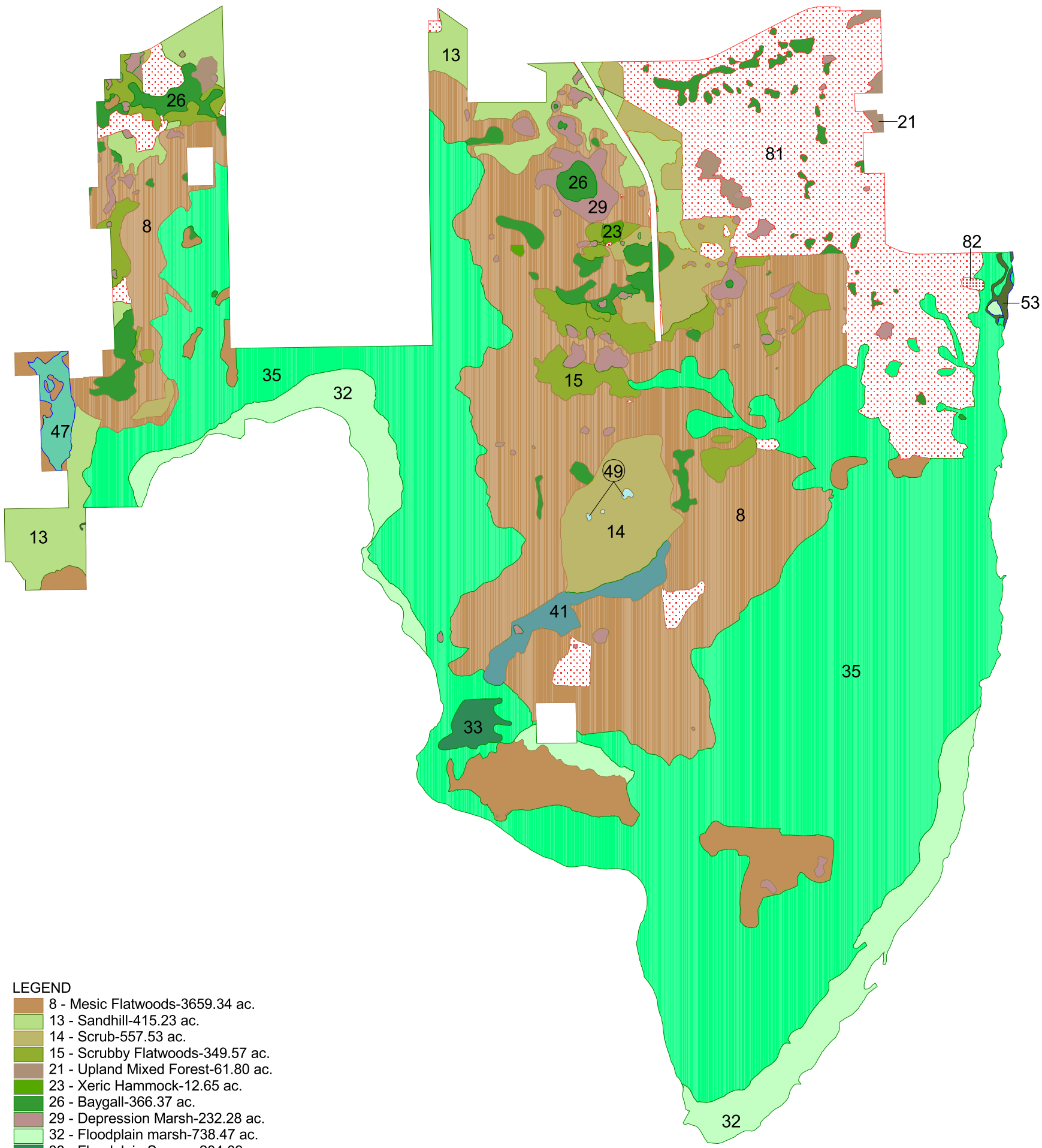
Office of Park Planning

WEKIWA SPRINGS STATE PARK

NATURAL COMMUNITIES MAP



LEGEND

- 8 - Mesic Flatwoods-3659.34 ac.
- 13 - Sandhill-415.23 ac.
- 14 - Scrub-557.53 ac.
- 15 - Scrubby Flatwoods-349.57 ac.
- 21 - Upland Mixed Forest-61.80 ac.
- 23 - Xeric Hammock-12.65 ac.
- 26 - Baygall-366.37 ac.
- 29 - Depression Marsh-232.28 ac.
- 32 - Floodplain marsh-738.47 ac.
- 33 - Floodplain Swamp-204.09 ac.
- 35 - Hydric Hammock-5658.61 ac.
- 41 - Wet Flatwoods-118.11 ac.
- 47 - Marsh Lake-70.56 ac.
- 49 - Sandhill Upland Lake-3.45 ac.
- 53 - Blackwater Stream-16.58 ac.
- 81 - Ruderal-1678.85 ac.
- 82 - Developed-6.21 ac.

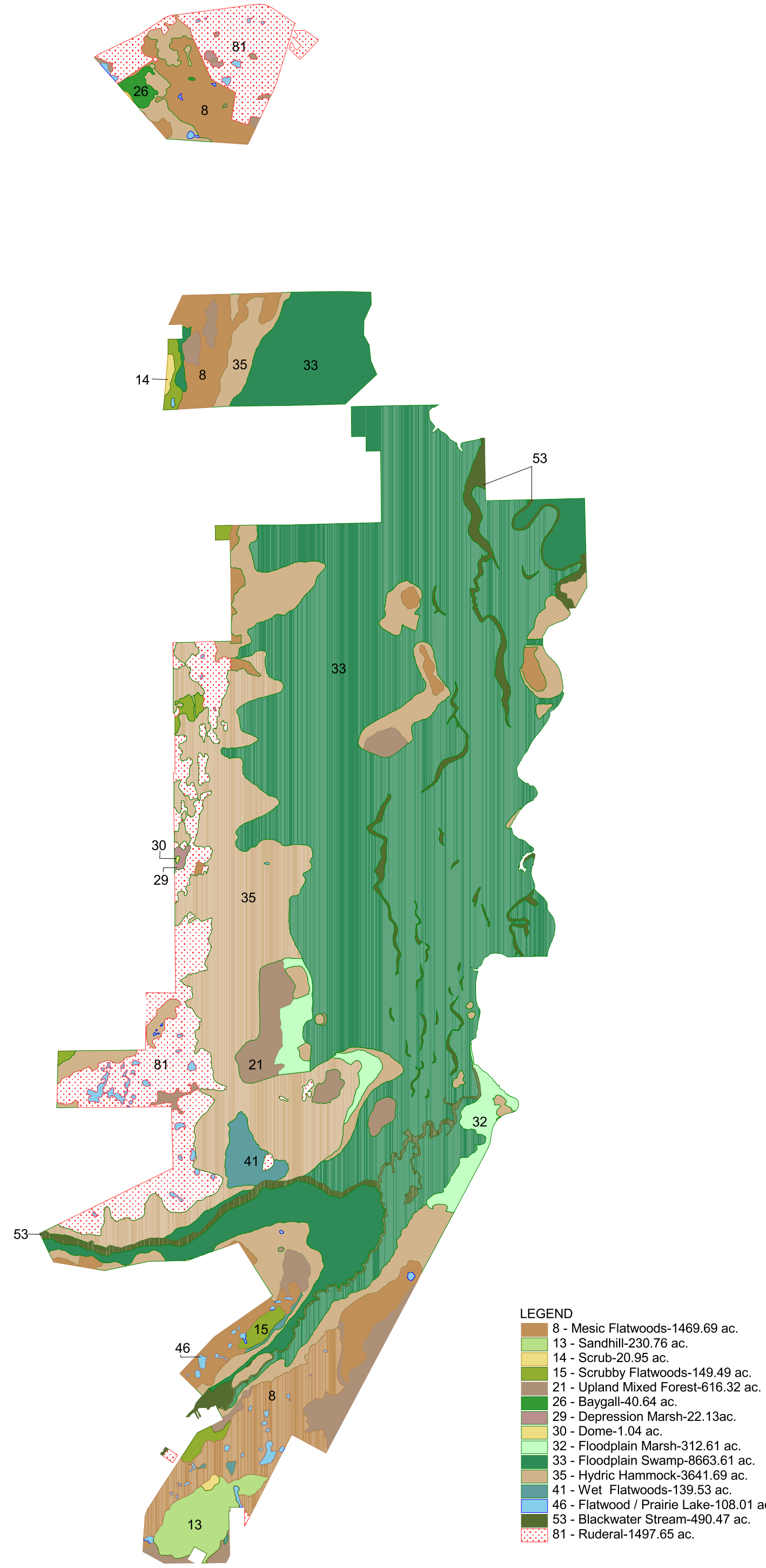
ROCK SPRINGS RUN
STATE RESERVE

N

2000 0 2000 4000 Feet

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

NATURAL COMMUNITIES
MAP



Prepared by:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planninng

LOWER WEKIVA RIVER PRESERVE STATE PARK

NATURAL COMMUNITIES MAP

1930s and 1940s; accordingly, there are few, if any, old growth pines. The mesic flatwoods have experienced several wildfires in the past, and fire plow lines were cut throughout the area for wildfire suppression. The plow lines are being allowed to fill in naturally. In total, these state parks contain over 6,500 acres of mesic flatwoods. The habitat condition varies greatly primarily due to the burn history of each burn unit.

Wekiwa Springs State Park. Mesic flatwoods occur in a relatively continuous block in the central portion of WSSP and extend into RSRSR and LWRPSP. In addition to the extensive logging, other disturbances are evident. At some time in the past, probably in the 1930s or 1940s, a ditch was dug in burn zone WS-34 near Camp Cozy. The ditch, which is approximately 500 feet long and up to eight feet deep, historically was dug to facilitate draining of the flatwoods for timber harvest. In order to improve the topographic and hydrologic integrity of the community, a method for filling the ditch while minimizing surrounding site disturbance needs to be devised.

All of the mesic flatwoods in WSSP have been burned numerous times since 1980. There is considerable variation in the mesic flatwoods related to burn frequency and intensity. The large mesic flatwoods area in the center of WSSP, is variable in fuel concentrations. Low saw palmettos and gallberry, with widely scattered pines and a ground cover of grasses characterize the southern portion. The northern areas have a much denser pine and saw palmetto component and fewer grasses.

Burn zone WS-20 also has several exotic plants, namely wax begonias (*Begonia semperflorens*) and camphor-trees (*Cinnamomum camphora*) which need to be removed. The mesic flatwoods at Markham Woods have very high fuel loads with saw palmetto reaching up to eight feet in some areas. Due to the high fuel loads, caution must be exercised during prescribed fires. Old plow lines are evidence of past wildfires.

Rock Springs Run State Reserve. The central portion of RSRSR contains a north-south "band" of mesic flatwoods. Prescribed fire has been used within a majority of these flatwoods, and as a result, they are considered to be in very good condition. Most of these flatwoods are dominated by pond pine (*Pinus serotina*). Their dominance is a function of historic selective logging activities (hygraded right before purchase). Longleaf pine planting is periodically done in these zones to restore the pine overstory.

Cogongrass (*Imperata cylindrica*) occurs in several places within the mesic flatwoods community at RSRSR.

Lower Wekiva River Preserve State Park. Mesic flatwoods occur mainly in the southern portions of LWRPSP, east of the Wekiva River, and in the northern parcels – the Jung and Skinner tracts. These flatwoods are also considered to be in very good condition.

- **Sandhill.** Sandhill occupies the unit's higher elevations. The longleaf pine trees in the sandhills were logged and turpentined in the 1930s and 1940s. Aerial photographs from 1947 show very few remaining longleaf pines. However, sufficient numbers of pines were left to facilitate adequate pine regeneration throughout the sandhills. Before acquisition by the State, it appears that hunt club members used fire at WSSP on a limited basis. However, it seems that the fire return interval was too long or time of year the burn was conducted was inappropriate. Therefore, off-site oaks became dominant in many areas. An active lightning season burn program has restored many sandhill areas, but several areas still require several restoration burns or other techniques to reach a restored status.

Wekiwa Springs State Park. Historically, off-site oaks dominated burn zone WS-1 in the southeastern corner. As an alternative restoration technique, an herbicide (Velpar) was applied in addition to fire to restore the area. Progress is evident but additional spring burns may be necessary to knock back growing oaks.

Several types of sandhill restoration projects are currently being conducted and evaluated at WSSP. Considerable oak girdling was conducted in burn zone WS-3 in 2003 in addition to a prescribed fire. The canopy has been significantly reduced and the understory grasses and herbs have responded well. However, most of the volunteering understory species are weedy species and little wiregrass has appeared. In view of the fact that burn zone WS-3 was bahiagrass pasture when the park was acquired, it has shown very good response. In 2002, approximately 60 acres of Velpar treatments were applied (WS-23b andWS-17/18). An additional 40 acres were treated in 2004 in WS-47. Due to a dosing error by the contractor, the treatment killed numerous non-target species including mature longleaf pines, wiregrass, and other shrubs and herbs.

A limited number of exotic plants, largely from adjacent private yards, have invaded the sandhills on the Wekiwa Springs perimeter. Cats (*Felis domesticus*) are another exotic problem in the sandhill community. Small mammal trapping within sandhill areas has resulted in very low capture rates possibly indicating small population sizes here. Cats have a very deleterious effect on these populations and prove very efficient predators (Churcher and Lawton 1989). House cats are often observed hunting in sandhill areas near the Wekiwa Springs' perimeter.

Rock Springs Run State Reserve. A majority of the sandhill plant community at RSRSR occurs adjacent to County Road 433. As part of a mitigation project in October and November of 2001, the roadsides that were historically planted with bahiagrass were recontoured and replanted with longleaf pine trees and wiregrass to mimic the adjacent sandhill community.

The state acquired the Kittredge Tract which borders the southern boundary of the West BMK portion of RSRSR. A majority of this parcel is historic sandhill but was cleared many years ago. Oak, persimmon, and other hardwoods now dominate. The groundcover is comprised of sparse grasses and herbs but wiregrass is all but extirpated. In 2002, a significant effort was made to replant longleaf pine trees (15,000 tubelings installed) and wiregrass (5,000 tubelings installed). Natal grass (*Rynchelytrum repens*) is an invasive exotic grass which has become established in many areas of this parcel. Dogs from the adjacent housing roam freely as well. Bears visit the parcel often, stealing garbage from these same homes and dragging it onto the park property to be picked through. An 8 to 10-foot fence has been proposed for this border to minimize these undesirable interactions, but as of 2004, it has not yet been installed.

Lower Wekiva River Preserve State Park. This park contains the least amount of sandhill plant community, but it is considered to be in very good condition. All of the sandhill occurs near the southern boundary, just north of State Road 46. Prescribed fires have burned all of the sandhill in LWRPSP in 2002-2003.

- **Scrub.** Dramatic changes to WRBSP scrub habitats have taken place since 1998. Pursuant to the 1998 Unit Management Plan, extensive scrub restoration was conducted throughout all three units (see Timber Management section). Fire had been restricted from these areas for many years and in several zones prescribed fire could not be conducted safely due to excessive fuel loads. After restoration efforts were completed, park staff has since been bringing prescribed fire back into a regular burn regime within most of these previously unburned zones. Currently much of the scrub is considered to be in fair to good condition.

However, recent restoration activities have made future management much easier and it is expected the scrub will improve in quality in the coming years.

Florida scrub-jays (*Aphelocoma coerulescens*) and Florida mice (*Podomys floridanus*), which are two rare Florida endemics, live only in scrub and scrubby flatwoods habitats. Florida scrub-jays will generally leave an area when vegetation height becomes too tall (Fitzpatrick *et al.*1991). Park staff has suggested this may be one plausible reason to explain the nearly complete disappearance of the Florida scrub-jays (FSJ) in all three units over the past 10 years (unpublished park data 1994-2004). Park staff expects that FSJ may eventually return to these recently treated scrub areas. However in many zones, additional overgrown oak removal still must be done to bring the scrub habitat to optimal conditions for the FSJ.

Wekiwa Springs State Park. The largest patch of scrub in this unit occurs west of Sand Lake, adjacent to Main Park Drive (WS-45). Restoration here began in 2002 after the Southern pine beetle outbreak. Another area of scrub is set in an isolated pocket in zone WS-12. This latter area still needs restoration work.

At the Markham Woods tract, there is an isolated section of scrub which is adjacent to a residential area in the SE corner of the property. There is no history of management activity in this zone which leaves it a dangerous wildfire potential. Steps need to be taken to minimize this situation. The zone is also not very accessible by park staff due to its isolation by the surrounding wetland communities. Consideration should be given to mowing, chopping, and subsequent prescribed burning.

Rock Springs Run State Reserve. This unit contains the largest acreage of scrub compared to WSSP and LWRPSP. This community is distributed in three disjunct areas two of which predominate the central portion of the park. One smaller portion of scrub (RS-118) is located in the western RSRSR known as West BMK (WBMK). The largest contiguous patch of scrub at RSRSR is known as Spear's Scrub (RS-26). Spear's Scrub, a 320-acre scrub has been an area of increased interest. Virtually all of Spear's Scrub had a restoration cut performed in 2002 (except for a 30-acre buffer around interior ponds). As of December 2004, approximately one-half of Spear's Scrub has been successfully burned under prescription.

Striped newts (*Notopthalmus perstriatus*) were discovered in 1994 in one of the small interior ponds at Spear's Scrub, which represents one of only 21 known active sites in Florida (Franz and Smith 1999).

Lower Wekiwa River Preserve State Park. Currently there is only a single mapped area which supports scrub habitat within this unit (LW-04). This entire area is overgrown with scrub oak and needs extreme mechanical treatment to restore its habitat suitability for Florida scrub-jays.

- **Scrubby flatwoods.** The distribution of this habitat throughout the three units generally follows closely to that of the scrub community, but differs in that it occurs as xeric oak islands within a mesic flatwoods matrix. Like scrub, RSRSR has the largest amount of acreage scrubby flatwoods of the three units. Also like scrub, many of the burn zones which have this habitat type are very difficult to burn because of the dense overgrown scrub oak species. Therefore, much of this community is highly degraded throughout the WRBSP. The severe consequence of this fact is that most FSJ have subsequently abandoned their previous territories that were once well established within these same scrub and scrubby flatwoods communities.

Another main concern of unburned scrubby flatwoods habitats are that high fuel accumulations create a significantly higher potential for wildfires. During 2002 and 2003, prescribed fire was used in conjunction with mechanical firebreaks and mechanical treatment at both WSSP and LWRPSP to further habitat restore for FSJ.

Wekiwa Springs State Park. Scrubby flatwoods occur in small pockets in a larger matrix of mesic flatwoods in WS-27, WS-32 and WS-33, north of the Mill Creek crossing. One small population of scrub-jays does occur within one of the pockets. Florida mice are also still present as of 2004 but their range at WSSP has not been established. A significant patch of scrubby flatwoods also occurs in the Markham tract of WSSP. Continued restoration needs to be a priority with increased management efforts at Markham Woods.

Rock Springs Run State Reserve. RSRSR contains the largest islands of scrubby flatwoods in these state parks occurring primarily in the central region of the reserve (RS-03, 04, 05, 11, 58, 77, and 81). However, the WBMK portion of RSRSR represents another significant FSJ territory that is considerably disjunct from the central region of RSRSR. A recent survey for the FSJ in 2005 confirmed its continued presence in WBMK.

Lower Wekiva River Preserve State Park. Lower Wekiva River Preserve State Park contains several small widely scattered islands of scrubby flatwoods either within or adjacent to mesic flatwoods.

- **Upland mixed forest.** These hardwood hammocks occur in scattered ecotonal areas grading toward the wetter regions of the park. The existence of upland mixed forests may be a function of a historic "fire shadow" effect from the adjacent wet habitat. This community is well established and maintains itself without any special management efforts other than exotic plant removal. Upland mixed forests can be difficult to distinguish from upland pine forests (sandhills) that have not burned for several years. Upland mixed forests tend to have a greater diversity of canopy and sub-canopy tree species compared to "overgrown" sandhill.

Wekiwa Springs State Park. A majority of the upland mixed forests in WSSP occurs adjacent to Lake Prevatt and other wetlands and water bodies. A careful analysis needs to be conducted to distinguish upland mixed forests and overgrown sandhill which often occurs adjacent to them. Restoration and management goals will be based on this analysis.

Rock Springs Run State Reserve. The reserve contains only 55 acres of upland mixed forest widely scattered in small patches.

Lower Wekiva River Preserve State Park. The preserve contains approximately 630 acres of upland mixed forest, more than any other state park in the basin. The largest areas are nested within floodplain forest and hydric hammock community types. The adjacent wet communities have allowed the community to succeed towards the existing hardwood system.

- **Xeric hammock.** These areas are self-maintaining communities that fluctuate in size in response to burning in the fire-type communities which surround them. The plant species composition within the xeric hammocks is quite variable due to surrounding communities and historic use. Although certain natural xeric oak hammocks should be maintained, xeric hammocks that result from poor land management should be restored, if possible. Differentiating between the two conditions will be done on a case-by-case scenario.

Wekiwa Springs State Park contains approximately 107 acres, RSRSR contains approximately 13 acres and the LWRPSP contains no mapped upland xeric hammock. Virtually all of the xeric hammocks appear to be overgrown sandhill plant community.

- **Baygall.** Baygalls are peat-filled seepage depressions dominated by evergreen hardwoods including sweetbay, swamp bay and loblolly bay trees with an understory of sphagnum mats and ferns. Baygalls are extremely dependent upon seepage flow and high groundwater levels. Hydrologic impacts due to the groundwater reductions may be observed first in baygalls.

Wekiwa Springs State Park. At Markham Woods, lowered water levels have allowed the invasion of slash pine (*Pinus elliottii*) into most baygall communities. Baygalls at Markham Woods are mixed with dense pond pine trees due to the exclusion of fire. Slash pine is beginning to close the canopy in many areas. Burning in these conditions will require special attention to increased fuel loads and the potential for muck fires.

The baygall community in burn zone WS-20 is half on state property. The creek that runs through it receives stormwater runoff from the surrounding developed areas. The baygall acts as a filter for this water as it enters the unit. This area functions naturally but depends on seepage flow from the higher elevations in the unit.

Continued quantities of water are necessary to maintain this community. Water quality is a concern for the baygall in WS-20, as its source is from offsite. Additionally, a drainage ditch in this area is probably responsible for the introduction of exotic house plants.

Rock Springs Run State Reserve. Baygall is most extensive in the Lake County regions of RSRSR. The baygall within the STS portion of RSRSR has been enhanced through hydrological restoration and expanded through native plantings. West of Old McDonald Road, several acres of baygall succumbed to wildfire and three feet or more of peat/muck was burned off in March, April, and May of 2002. Many of the trees were killed and the canopies were opened significantly.

Lower Wekiva River Preserve State Park. Only two baygalls are mapped within the LWRPSP. One is within the Jung Tract and one is within the Skinner Tract.

- **Depression marshes.** There are numerous small depression marshes scattered throughout the mesic flatwoods within the WRBSP. Many of these ponds often have no standing water during certain periods of time. It is important to remember that the integrity of this wetland community is highly dependent upon its ephemeral nature.

  Drought weather such as the most recent which was observed in 1998-1999, in combination with any artificially lowered groundwater level, may result in drastic vegetative changes to these wetland communities. What effect the basin-wide lowering of the water table has on these ponds is unknown, however, long-term community changes should be intensively monitored by park staff.

  In addition, an active burn program in the fire-type communities surrounding these small wetlands will also help maintain their integrity. Historically fire occasionally consumed the accumulated organic material in the bottom of these ponds, especially when they were dry. Fire will increasingly play an important role if water levels continue to decline. These wetlands are popular spots visitors can observe wading birds, including the Florida sandhill

crane (*Grus canadensis*), which uses these habitats to nest and reproduce.

Wekiwa Springs State Park. Several small depression marshes occur within WSSP, the largest being approximately six acres. Many of the ponds show signs of prolonged stress due to the drought and/or a reduction in the water table.

Rock Springs Run State Reserve. Approximately 210 acres of depression marshes occur within RSRSR. These lakes are small and widely scattered; however, they dominate several burn zones in the northwest corner of the unit.

Lower Wekiva River Preserve State Park. Approximately 112 acres of depression marshes occur within LWRPSP. As with RSRSR, these ponds are small, isolated and scattered, primarily within the southern reaches of the Preserve. One marsh system at LWRPSP remains somewhat unique because of its close association with the only dome swamp community found throughout the WRBSP. The integrity of this community and other hydric dominated communities is dependent upon the natural hydric fluctuations that are in jeopardy due to potential impacts from groundwater withdrawals.

- **Dome swamp.** One dome swamp occurs at Lower Wekiva River State Preserve along its western border with Seminole State Forest. Prescribed fire is a necessary element of the management of dome swamps.

- **Floodplain marsh.** Within the managed parks, floodplain marsh occurs primarily along the St. Johns River within the Lower Wekiva River Preserve State Park. Past fire suppression has allowed woody species such as wax myrtle to invade and become established. Recent efforts to burn this community have met with mixed results. The continued efforts to restore this community must emphasize prescribed fire. Mechanical treatments to remove the wax myrtle have been used with reasonable success on public and mitigation lands including the Skinner Tract of the LWRPSP.

- **Floodplain swamp.** Floodplain swamp is one of the most prevalent community types and occurs at all three parks adjacent to the primary rivers and creeks. At present, the spring runs and river rarely overflow their banks; accordingly, this community was not classified as a floodplain forest. In the past, the floodplain swamp and the hydric hammock communities flooded with much higher frequency. Loggers speak of harvesting hardwoods in standing water in what has now been classified as hydric hammock (Thomson). Area-wide declines in water levels have caused this shift from what was once an extensive floodplain forest to floodplain swamp and hydric hammock. Logging was extensive throughout both of these communities. While wetland hardwoods regenerated, bald cypress (*Taxodium distichum*) did not. Reforestation of bald cypress needs to be considered for the unit possibly as a mitigation project. While hydrological changes have made the hydric hammock unsuitable for bald cypress reintroduction, the floodplain swamp community may still provide appropriate hydrology for bald cypress although the established canopy may not allow sufficient light for small trees.

Wekiwa Springs State Park. Floodplain swamp occurs only as a narrow band on the southern shore of Rock Springs Run. Approximately 3,000 bald cypress trees were planted along the south side of Rock Springs Run, primarily west of Big Buck campsite in 2001.

Rock Springs Run State Reserve. Due to topography, floodplain swamp is a significantly wider

band on the north shore of Rock Springs Run and on much of the west shore of the Wekiva River. All of the tram roads north of Rock Springs Run have been restored and planted with cypress saplings as of 2002.

Lower Wekiva River Preserve State Park. Floodplain swamp is extremely prevalent along the west shore of the Wekiva River and the St. Johns River. Recent mitigation/restoration work has removed large tram roads, deep within the swamps, enhancing the hydrologic regime. Approximately 2,000 bald cypress seedlings (bareroot) were installed in the footprint of the tram roads in 2002.

- **Hydric hammock.** Hydric hammock is another of the most extensive communities within the Wekiva River Basin State Parks. Hydric hammock is distributed throughout the unit in low, flat areas. This community contains large hardwood trees and numerous cabbage palms (*Sabal palmetto*). As mentioned previously, the process of plant community succession due to water level declines appears to be evident in this community. Logging for cypress and wetland hardwoods in the 1930s and 1940s was extensive in the hydric hammock and floodplain swamp communities. Although the hardwoods have regenerated, the bald cypress regeneration has been extremely limited throughout the entire Wekiva Basin. Management considerations include using prescribed fire along the edges to maintain the ecotone. In addition, agencies and municipalities are becoming more aware of the importance of groundwater levels and the effects on natural lands.

Wekiwa Springs State Park. Over 2800 acres of hydric hammock occurs in WSSP. Minimal faunal and floristic surveys have been conducted in this vast ecosystem. Approximately 300 cypress trees were planted along Mill Creek in 2002. Southern pine beetles affected much of this area from May to September of 2001 due to the predominance of old loblolly pine trees (*Pinus taeda*).

Rock Springs Run State Reserve. Over 5,780 acres of hydric hammock occur within RSRSR. Fortunately, minimal land management activities are required in this extensive plant community. Hand ferns (*Ophioglossum palmatum*), a rare species, are known to occur epiphytically on cabbage palms in the southern portions of RSRSR. Recent population surveys have not been conducted.

Lower Wekiva River Preserve State Park. Similar to the other two parcels, hydric hammock is extensive within LWRPSP (over 3,600 acres). Minimal biological surveys have been conducted in these areas.

- **Wet flatwoods.** There is a great deal of variation between different areas of wet flatwoods. Pond pine is the dominant pine throughout the community; but, slash, loblolly, and longleaf pines also occur in varying amounts. Some areas mapped as wet flatwoods have a cabbage palm component. The understory is variable with some areas dominated by gallberry (*Ilex glabra*), shiny lyonia (*Lyonia lucida*), saw palmetto and grasses while others are clearly dominated by saw palmetto. Pine density also varies greatly throughout the river basin. Areas near Rock Springs Run have dense stockings of small diameter pines, while areas towards the center of the unit have more widely spaced, larger diameter pines. Many of these vegetative differences are probably related to differences in burn histories and logging practices.

  If ground water levels decline, the use of prescribed fire becomes much more difficult. A

decline in ground water levels affects the moisture in the upper organic layers of the soil. As these layers dry out, the potential for them to support fire increases. When the organic layers burn two problems arise. First the roots of the vegetation will also burn causing plant mortality. Second, smoke management becomes a critical issue. When organic soil combusts, large amounts of smoke are produced. The smoke presents a hazard to surrounding housing developments.

Wekiwa Springs State Park. Due to long-term fire exclusion from wet flatwoods in Markham Woods, fuel levels are very high. Restoration will be a slow meticulous process, beginning with fuel reduction burns and progressing towards restoration burns.

Rock Springs Run State Reserve. Pond pine trees dominate much of the wet flatwoods at RSRSR. However, pond pines may dominate only because of historical selective harvesting of more desirable pine trees leaving the pond pines to reproduce. Anecdotal conversations with retired loggers indicate that longleaf pine trees dominated this area but were clear-cut. Specifically, EK Ranch was logged just prior to State acquisition. This site, therefore, would be an excellent candidate for a longleaf pine reintroduction. Some mechanical treatment of saw palmetto may be needed to enhance survivorship of longleaf pines and to encourage growth of grasses

Lower Wekiva River Preserve State Park. Wet flatwoods is a minor component of the LWRPSP comprising only 141 acres. It occurs as an isolated island within the hydric hammock community. Little effort has been made to manage this small community.

- **Marsh lake.** Two currently recognized marsh lake systems occur within the WRBSP. This wetland community is a naturally occurring shallow lake with a broad zone of emergent plants. Water levels may fluctuate widely, and the lake may even completely dry up at times. Both systems within the park have certain anthropogenic challenges to overcome as will be defined below.

Wekiwa Springs State Park. Lake Prevatt occurs in the southernmost portion of this unit. In 1990 and again in 2002, the lake dried due to local drought conditions. Over time and specifically during drier time periods, shrubs such as willow (*Salix caroliniana*), buttonbush *(Cephalanthus occidentalis)*, saltbush (*Baccharis halimifolia*), and dog fennel *(Eupatorium capillifolium)* can invade the edges of Lake Prevatt. In order to reduce these shrubs, mowing and burning should be considered.

Currently, surface water runoff from Welch and Thompson Roads is directly entering Lake Prevatt on its south side. This water receives no treatment before it enters the lake; accordingly, road pollutants and silt are being transported into the lake. This situation is unacceptable due to the Outstanding Florida Water status of Lake Prevatt. When grant money becomes available, a feasibility study needs to be conducted to determine what type of stormwater system is appropriate to treat off-site stormwater.

A study conducted by Orange County, City of Apopka and the St. Johns River Water Management District examining the water quantity and quality of the Lake McCoy-Coronia-Prevatt system failed to adequately address stormwater issues for Lake Prevatt. As residential and commercial development has increased and will continue to increase in the uphill areas in this three lake system, the increased impervious surfaces in developed areas results in unnaturally rapid water level changes in Lake Prevatt. Prior to 1994 Lake Prevatt has had water

levels high enough to discharge only 3 times (Musser 1995). With the increased runoff from uphill areas, Lake Prevatt discharged almost continuously from the fall of 1994 until January of 1997.

Rock Springs Run State Reserve. Lake Bartho is one in a series of four associated lakes located in the western area of RSRSR (RS-112). During 2004-05, this wetland community was in a dry period, with several small isolated ponds scattered throughout its basin. This dry condition, however, may be the result of some extreme ditching on its east boundary. Hydrological restoration of this disturbed area of the wetland is needed.

- **Sandhill upland lake.** Sandhill upland lakes can be located within the RSRSR. These small water bodies play an important role of providing amphibians with a fish-free area to reproduce. Both the striped newt and the Florida gopher frog (*Rana capito aesopus*) have been documented in this community.

  Recent researchers have confirmed that gopher frogs utilize many of the sandhill lakes and ponds along County Road 433 for breeding (Blihovde 2000). Unfortunately, recent drought conditions have prevented gopher frogs, and many other species of amphibians, from successfully breeding. It is assumed that the striped newt may have occurred in these areas and that habitat alteration and low water level may have eliminated them. Although amphibian populations appear to be stable, it is very important for managers to burn frequently. Recent studies have suggested burn intervals for prescribed fires be carefully considered by managers due to potential negative affects on certain amphibian populations (Means and Campbell 1981; Schurbon and Fauth 2003). It is important for land managers to consider burning through ephemeral ponds during seasonal droughts in order to consume the accumulated organic matter.

- **Blackwater stream.** Blackwater streams and creeks differ from spring-run streams significantly. Whereas spring-run creeks are comprised primarily of groundwater discharge, blackwater streams are comprised primarily of surface water runoff. The Wekiva and Rock Springs Runs mix with surface water runoff, resulting in the tannic conditions of blackwater streams.

Wekiwa Springs State Park. Within WSSP blackwater stream pertains to the unnamed streams that flow into Lake Prevatt and to Carpenter Branch. Input to the Lake Prevatt streams is from surface runoff and nursery irrigation.

Rock Springs Run State Reserve. No blackwater streams are mapped within this unit.

Lower Wekiva River Preserve State Park. Over 500 acres of blackwater streams are mapped within this unit. The entire lower reach of the Wekiva River (below Rock Springs Run) is mapped as blackwater stream and all portions of the St. Johns River within the park boundaries are similarly labeled. Also, the lower reaches of Blackwater Creek flow through the Lower Wekiva River Preserve State Park.

- **Spring-run streams.** The flow of spring-run streams is comprised primarily of groundwater and is therefore clear and cool with a neutral to basic pH. Several factors can affect this ecosystem including spring flow reductions, water quality degradation and heavy recreational use.

The stream from Wekiwa Springs to the concrete bridge just west of the Wekiwa Marina and the upper end of Rock Springs Run receives a high amount of recreational use. Accordingly, swimmers and canoeists disturb the bottom vegetation. This disturbance is probably more of a problem in Rock Springs Run because it is much shallower than Wekiwa Springs Run. Bank disturbance due to people climbing out of canoes is also a problem in very localized areas near the mouth of Rock Springs Run. Most of the recreational use of the spring-run is generated from marinas outside of the unit. Accordingly, the unit has little control over the number of people on the spring-run. Motorboats are prohibited from Wekiwa Springs Run and Rock Springs Run.

Exotic plants, mostly wild taro (*Colocasia esculentum*), are a major problem along Rock Springs Run and the Wekiva River. The run is infested and serves as a source of infection for the entire Wekiva River. Control measures, hand pulling and herbicide, are regularly implemented. The Wekiva River Aquatic Preserve employs one Park Service Specialist for exotic plant control on the Wekiva River, Rock Springs Run, and the Little Wekiva River. Control measures include hand removal and herbicide spraying. The lagoon area of Wekiwa Springs has concentrations of hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*). This concentration serves as a source of infestation to the entire Wekiva River. The staff of the Wekiva River Aquatic Preserve implemented a herbicide treatment program in 2003 for hydrilla removal in the Wekiwa Lagoon, and this was repeated in 2004. This treatment should be effective for three to five years.

The Army Corps of Engineers has historically been responsible for control of water hyacinths on the Wekiva River. However, ACOE has transferred responsibility for control of water hyacinths and water lettuce to FDEP Bureau of Invasive Plant Control (BIPM), Orlando District. The Aquatic Preserve Park Service Specialist will serve as the field coordinator for exotic plant inspections and herbicide monitoring and reporting to BIPM.

Park staff is considering de-mucking the bottom of the Wekiwa Lagoon. Up to, and perhaps exceeding, eight feet of organic floc have accumulated on the lagoon bottom. This build-up is primarily due to the seasonal abundance and decay of hydrilla and algae. During summer months, a tremendous amount of hydrilla can virtually fill the lagoon. Over the years, it has been appropriately treated with herbicides. However, dead biomass falls to the bottom and accumulates, ultimately reducing oxygen levels in the water column as this biomass is decomposed.

- **Aquatic cave.** The only known aquatic caves are located within the WSSP unit. The aquatic cave community is not well understood due to the technical difficulties associated with conducting research in this environment. There are two cave entrances in Wekiwa Springs - the main vertical fissure and a horizontal vent on the southeastern corner of the basin. The main vent has had little exploration due to the extreme amount of flow emanating from it. However, the Orlando cave crayfish (*Procambarus acherontis*) and several unknown species of cave isopods have been documented here (Morris 2005). The other vent, which resembles a horizontal bedding plane, has less flow and approximately 600 feet of passage was surveyed in 1999 (Tysall 2004). The interior of this conduit is covered by several different species of bacteria, and several fossils have been documented inside. Both passages harbor armored catfish (*Pterygoplicththys disjunctivus)* populations. Nothing is known about the system beneath Witherington Spring. Extensive cave survey work is scheduled for January 2005 by the Cambrian Foundation. This survey will include the mapping of cave passages at

several of the springs within the Wekiva River Basin including Wekiwa Springs, Island Springs, and Witherington Springs, biogeochemical analyses, nutrient analyses, bedrock delineation, bacterial growth rate studies, and identification of and quantification of cave fauna.

- **Ruderal.** Ruderal areas can be found across all units in areas where past human uses have impacted the natural state of the land.

Wekiwa Springs State Park. These ruderal locations include three borrow pits at Wekiwa Springs State Park. The borrow pit in sandhill burn zone WS-43 is small and only about ten feet deep. It may be possible to bulldoze its sides in and recontour it without having to haul much or any fill to the site. The borrow pit in wet flatwoods burn zone WS-42 is also small and only needs to have the berms around its sides pulled in and the spoil evenly spread. The last borrow pit located in sandhill burn zone WS-1 was filled in 2004. This pit has several discarded metal culvert pipes and a small amount of wooden construction debris piled in it. The pit is approximately fifteen feet deep at its rear, but only about five feet at the front. Off-site fill will be required to fill the pit. It can then be recontoured to match the surrounding topography. Some revegetation will be required.

Wekiwa Springs State Park also contains two man-made lakes that are in good condition. The small pond that is found in burn zone WS-32 requires no restoration. The pond is generally a year-round water source and is vegetated with native aquatic species. The second lake, Sand Lake, is in relatively good condition. However, there is an erosion problem on some of its banks. The erosion problem is primarily due to visitors standing on the edge of the water to fish. At Sand Lake, a re-vegetation project at the edge of the water would correct this erosion problem. Sand Lake has limited circulation because input is from one small artesian spring. In warm weather, the lake reflects a greenish cast from alga buildup. Park staff is currently considering capping the well casing in order to determine if the lake will maintain itself from other, as of yet unknown, groundwater sources.

Ruderal areas at Markham Woods are more extensive than at Wekiwa Springs and consist of mainly old cattle pastures.

Rock Springs Run State Reserve. The St. Johns River Water Management District, with assistance from The Nature Conservancy, has been restoring a large section of land (STS Pastures) at RSRSR as part of a mitigation project. However, the emphasis has been on wetland restoration and minimal restoration has been conducted in the upland pastures. FDEP Central District recently deemed the restoration/mitigation project a success. Therefore, in 2003, the land was turned over to the staff of the WRBSP for management and any future restoration activities. In the future, the Division may consider cattle grazing and/or hay leases as a means of managing improved pasture areas until restoration is possible. A restoration plan and timeline has been proposed for consideration.

Lower Wekiva River Preserve State Park. The ruderal areas of the LWRPSP consist of improved pasture. As of January 2005, a draft cattle lease is being reviewed for specific parcels within the LWRPSP. For all areas not appropriate for grazing cattle, a restoration/revegetation plan should be developed.

- **Developed.** Most of the developed areas within the units are either adjacent to or lie among a variety of natural community types. Management of these developed sites can pose

significant obstacles to overcome and can sometimes take quite ingenious methods to prohibit community degradation in adjacent natural areas.

Erosion is a significant problem at many of the developed sites. Erosion and sedimentation can have a significant detrimental effect on receiving water bodies.

Wekiwa Springs State Park. Erosion of the roadways around the shop at Wekiwa Springs is repaired on a regular basis. Erosion continues to be a problem in the picnic area at the main use area.

Erosion is a continuous problem along Main Park Drive. The edges of the paved road usually get washed away in certain sloped areas, leaving gullies. Park staff has filled in these gullies with crushed concrete and sand in the past. It is recommended that the park staff continue to explore better options to control erosion such as web fabric and plastic webbing that may help hold soil and allow plants to take hold.

Many of the main use areas have exotic plant and animal species that are continually monitored and removed.

Rock Springs Run State Reserve. There are several service roads at RSRSR, most notably Shell Mound Road that need continual erosion repair work.

Lower Wekiva River Preserve State Park. Katie's Landing, the most recent property acquisition, has the most significant problems with regards to erosion and sedimentation. However, a park plan is being developed which will greatly enhance the aesthetics and quality of the site.

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.

There are currently 73 designated plant (23) and animal (50) species found in the WRBSP. This high number of species is a reflection of the biologically diverse nature of the Basin. The following discussion highlights some of these species and their management concerns.

Plants. There are 23 designated plants within the units. Discussion will be limited to one endangered species: star anise (*Illicium parviflorum*), and three other sensitive species: hand fern (*Ophioglossum palmatum*), the butterfly orchid (*Encyclia tampensis*) and the hooded pitcher plant (*Sarracenia minor*). In addition, the Wekiva River Basin State Parks has a number of plants species considered distinctive. None are currently listed as designated species, nor are they rare or on the decline, but their presence in the Wekiva Basin is considered unusual. Many of these plants have distributions, which are more closely tied to the Appalachian Mountains than to Central Florida. Some of the occurrences represent southern or near southern range limits while others are disjunct populations. These distinctive species include red buckeye (*Aesculus pavia*), Florida leucothoe (*Agarista populifolia*), hornbeam (*Carpinus carolineana*), chinquapin (*Castanea alnifolia*), flowering dogwood (*Cornus florida*), witch hazel (*Hamamelis virginiana*), tulip poplar (*Liriodendron tulipifera*), wafer ash (*Ptelea trifoliata*), Carolina basswood (*Tilia*

caroliniana), and poison sumac (*Toxicodendron vernix*).

- **Star anise** (*Illicium parviflorum*). Wekiwa Springs State Park has the distinction of having the State's largest recognized population of star anise. Star anise occurs throughout the hydric hammock/floodplain swamp communities along Rock Springs Run. The plant was particularly abundant along the hiking trail that runs from Sand Lake to Camp Cozy. The Nature Conservancy has registered the park in their habitat conservation program, recognizing the park's significance to this rare plant species. However, at least one large population of star anise was secondarily impacted by logging activities that occurred to ameliorate the affects of the Southern pine beetles. This population needs to be remapped, subsequently monitored, and the recovery noted.

- **Hand fern** (*Ophioglossum palmatum*). Hand ferns are known only to grow in the bootjacks of cabbage palm petioles. The fern prefers areas near streams with high humidity and heavy shading. While a few ferns have been located on private property in Seminole Springs, the closest known large population of hand ferns occurs at Tosohatchee State Reserve, over 25 miles away in Christmas. Hand ferns are very sensitive to fire, since the community in which they live rarely experiences fire. They are also very sensitive to changes in canopy cover resulting in a lowering of the relative humidity and an increase in exposure to sunlight. Frequently, fire-type communities are found adjacent to the wetter areas preferred by hand ferns. Prescribed burning plans for adjacent fire-type communities need to take into account how far the fire will penetrate into areas colonized by hand ferns. Areas with hand ferns should not be exposed to regular fires under drought conditions if they are known to be present at a site. A study could be initiated relating fire frequency, intensity and the distance to hand ferns to hand fern survivorship.

Rock Springs Run State Reserve. Hand ferns have only been found in several places in the southern portions of RSRSR. These locations need to be mapped with a GPS unit. In addition, a search should be undertaken to survey for additional plants.

Lower Wekiva River Preserve State Park. Park staff has recently observed hand ferns at the Fechtel Tract in the hydric hammock areas.

- **Butterfly orchid** (*Encyclia tampensis*). Over the past several years, volunteers have been regularly monitoring several populations of butterfly orchids. Several of these orchids were transplanted from Tosohatchee State Reserve to Wekiwa Springs State Park. The transplanted specimens were recovered from trees downed at Tosohatchee during intense storms. The success of these transplanted individuals will continue to be monitored.

- **Hooded pitcher plant** (*Sarracenia minor*). A number of small isolated populations are known throughout the Wekiva River Basin State Parks; however, as of 2004, no record currently exists for Wekiwa Springs State Park. A 2001 Resource Management Evaluation provided information on status and management criteria for several species of pitcher plants (Johnson 2001). Park staff should develop a management plan for Wekiva Basin populations in order to understand which habitat requirements will enhance this species survival.

Rock Springs Runs State Reserve. Rock Springs Runs State Reserve contains numerous populations of hooded pitcher plants. Systematic surveys are required to estimate the current population size. Numerous populations can often be seen along ditches adjacent to service roads. It is not known if these populations occur there because of the modified hydrology, sparse

canopy adjacent to the road, or some other factor.

Lower Wekiva River Preserve State Park. Pitcher plants also occur along the southwest border of the Skinner tract (SK-02) and the Jung tract (JG-07). Both populations occupy habitat at the ecotonal boundary between a baygall and the adjacent upland flatwoods.

Animals. There are 50 designated animals within the units. Discussion here will be limited to three endemic invertebrates: Wekiwa hydrobe (*Aphaostracon monas*), Wekiwa siltsnail (*Cincinnatia wekiwae*), blue purse-web spider (*Sphodros abboti*) and Orlando cave crayfish (*Procambarus acherontis*); three threatened species: Florida black bear **(***Ursus americanus floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), and Florida mouse (*Podomys floridanus*); two species of special concern: gopher tortoise (*Gopherus polyphemus*) and Florida gopher frog (*Rana capito aesopus*); and two other sensitive species: American swallow-tailed kite (*Elanoides forficatus*) and the striped newt (*Notophthalmus perstriatus*).

- **Wekiwa hydrobe (***Aphaostracon monas*) / **Wekiwa siltsnail** (*Cincinnatia wekiwae*). These two invertebrates were discovered in and near the WSSP main spring area in the 1970s (Thompson and Auffenberg 1994). They were found on vegetation and in sand in the spring boil and in the very upper reaches of the spring-run. Vegetation is seasonally limited in the spring boil; however, there is still some year-round vegetation near the bridge area where the boil enters the lagoon area. During a survey of crustaceans on May 30, 2002, Dick Franz collected and forwarded samples of hydrobiid snails to Dr. Fred Thompson for identification. It was determined that both species of aquatic snails are present in Wekiwa Springs. Another survey is scheduled for March 2005. Collections and identification will be made by. Dr. Fred Thompson of the Florida Museum of Natural History (Thompson 2005). Information is needed regarding successful resource management over the long-term for these species.

- **Orlando cave crayfish** (*Procambarus acherontis*). This invertebrate is restricted to groundwater sites associated with six or seven spring cave systems of the lower Wekiva River Basin (Hobbs 1942; Franz *et al.* 1994). Within the Wekiva River Basin State Parks, this species has only been recorded from WSSP. It is periodically seen in the spring boil at the mouth of the underwater cavern. Dr. Franz did not find *P. acherontis* during the May 2002 surveys. This species is a candidate for listing by the United States Fish and Wildlife Service (Wood 1991). Another survey is scheduled for January 2005 in which data will be collected via direct observation and by using traps placed in both the cave systems and in groundwater monitoring wells (Tysall 2005).

- **Blue purse-web spider** (*Sphodros abboti*). This rare species is characterized by the bizarre tube-like web that they spin at the base of trees in mesic woods (Wallace and Edwards 1994). It was discovered in WSSP by park staff and confirmed by a Florida Fish and Wildlife Conservation Commission employee in 2002. This population constitutes the southernmost range limit for this species, extending its currently recognized distribution from the Ocala National Forest into the Wekiva Basin. As of 2005, this unique spider was only known from one location in the park (WS-12). Surveys throughout the basin are needed.

- **Florida gopher frog** (*Rana capito aesopus*). The gopher frog is one of many species that are closely aligned to burrows created by the gopher tortoise (Breininger *et al.* 1988; Dodd *et al.* 1990). This amphibian is also considered state listed, with most reasons for it endangerment related to loss of habitat (Fogerty 1978; Cox and Kautz 2000). Baseline surveys of breeding ponds used by this and other ephemeral pond-breeding amphibians such as striped newts are

needed in order to understand distribution and abundance throughout the basin.

- **Striped newt** (*Notophthalmus perstriatus*). A unique southern population of striped newt occurs within one known wetland of RSRSR. This species as well as gopher frogs were first documented in 1994 after many years of sampling by various biologists. Of special interest is the fact that this population is currently one of two extant populations known within the southern range limits for this species (Franz and Smith 1999; Johnson and Owen, in preparation). The past southernmost range limit was on the campus of the University of Central Florida (UCF) (Owen 2004). This site has since been encroached by development, and the wetland encircled by a highly traveled paved road. The UCF population is presumed to be extinct for these reasons.

  Striped newts are xeric-adapted amphibians principally inhabiting upland communities represented by former shoreline ridges of past geologic times (Franz and Smith 1999; Johnson 2002). Striped newt reproduction occurs only in "fishless" temporary ponds found adjacent to their upland habitats (Moler and Franz 1988; Johnson 2002). Very little is known regarding the biology of striped newts.

Rock Springs Run State Reserve. Its presence within only one known pond at RSRSR highlights the importance of the historic ephemeral nature of upland marsh communities throughout the entire basin. Surveys for this species since its last confirmed observation in 1999 have failed to document the striped newt.

- **Gopher tortoise** (*Gopherus polyphemus*). The gopher tortoise is a known "keystone" species and is located in all units throughout the WRBSP. As a keystone species, many other species, including a number of listed species, depend on the gopher tortoise's burrow (Breininger *et al.* 1988; Dodd *et al.* 1990). It is apparent from recent genetic work on tortoises in the southeastern United States that five distinct groups are known throughout its range in Florida (Schwartz and Karl 2000). Gopher tortoises utilize upland communities and have been subjected to relatively extensive survey efforts (Breininger *et al.* 1994). The tortoise population is often used indirectly as a gauge of management success in upland fire-type communities.

  Tortoise burrows surveys and occupancy rates are a standard monitoring procedures used by biologists to understand population size (Breininger *et al.* 1991). Burrow surveys were implemented in 1989 at LWRPSP, in 1990 at WSSP, and 1992 at RSRSR. Continued surveys have been sporadic at each of the units from past to present. Burrow measurements were also used to extrapolate size and age structure of the populations (unpublished data). Currently the data from these early park surveys is unanalyzed.

  Upper respiratory tract disease (URTD) is now known to be problematic throughout several public lands in Florida (Deimer-Berish *et al.* 2000). The staff should expand its public education of URTD problems through interpretation and outreach and continue to discourage drop-off of tortoises from outside of the park.

Wekiwa Springs State Park. In 1997, URTD was confirmed in tortoises at WSSP (Deimer-Berish *et al.* 2000). Animals tested were in conjunction with an on-going Florida Fish and Wildlife Conservation Commission (FWC) project. This study will be continuing as more information is sought on the extent of this disease.

Rock Springs Runs State Reserve. In August 2001, 125 dead tortoises were discovered in burn zones RS-68, 69, and 75 at RSRSR (Rabatsky and Blihovde 2002). It has been speculated by park staff that the die-off did not occur simply because the habitat was in poor condition. Park staff has put forth the following plausible factors that led to the multiple deaths:

1. Severe drought from 1998-2001.
2. Tortoise drop-offs documented by FFWCC staff.
3. Inability to burn frequently due to drought and smoke management concerns.
4. Tortoise handling by park visitors and other stresses.

Currently the park staff is cooperating with the University of Florida Veterinary College in a Basin-wide analysis of the tortoise population. The objectives of this study are primarily to determine the prevalence and distribution of the URTD. The research will be ongoing and the results communicated to the appropriate agencies and interested parties.

Lower Wekiva River Preserve State Park. In 2001 gopher tortoises were relocated on-site due to the Florida Gas Pipeline going through part of the LWRPSP near State Road 46. These relocated tortoises appear to have acclimated since the relocation. Before relocation, these tortoises went through URTD testing and none were positive. In fact, none of the tortoises tested so far at LWRPSP have shown signs of URTD. This is very positive news and park staff will do everything possible to keep the disease out of this property.

- **American swallow-tailed kite** (*Elanoides forficatus*). This species occurs throughout three units of the Wekiva River Basin State Parks. Park staff should encourage researchers to conduct behavioral and ecological research projects on this species throughout the basin.

Wekiwa Springs State Park. The swallow-tailed kite was a very common inhabitant of the Sand Lake area before Southern pine beetle logging. During infected pine harvesting activities, park staff located several active nests near the lake. Weekly surveys of the nests were conducted, interesting natural history observations were made (Blihovde 2002), and this group of birds became part of intensive staff efforts to fully protect them.

- **Florida scrub-jay.** Another designated species of great interest at the park is the Florida scrub-jay (FSJ). It has historic populations in all three units of the Wekiva River Basin State Parks (Cox *et al.* 1994). Currently it appears that the RSRSR population is declining rapidly and significantly (McMurtray 1992; Small 1997; Owen 2004). The FSJ is endemic to Florida and exclusively uses oak scrub and scrubby flatwoods communities throughout their life history. Their closest relatives (Western scrub-jay, *A. californica*) are located in the western United States. Both species have adapted to similar harsh dry natural communities, developing a complex social structure to benefit its survival in these communities (Woolfenden and Fitzpatrick 1984). The FSJ are cooperative breeding birds, occupying a single territory with all siblings acting as a family unit. The FSJ has a relatively narrow tolerance of scrub oak height and density (Woolfenden and Fitzpatrick 1984). Successful nest building only occurs within a relatively narrow height range. Once the vegetation height and density becomes unsuitable, the jay's reproductive success declines but the birds rarely completely abandon even unsuitable sites.

  One of the first surveys for the FSJ in WRBSP was in 1983; however, some consistency in data collection began in 1992 (McMurtray 1992). One study in the basin found that jays are not sedentary within the individual park units, and it appears there is some movement of the

birds between units (Small 1997). A brief analysis of the trends in overall family numbers (territories) from past to present suggests drastic decline from 1992- 2004 (Owen 2004). One important consideration from past research is that all known territories throughout the basin probably represent a single metapopulation (Stith 1999; Breininger *et al.* 2002). Conservation of this group within the entire Wekiva Basin, therefore, is inherently important to understand the specific FSJ status within the WRBSP. That being stated, any decline in FSJ territories such as we are currently experiencing should not be taken lightly by park management.

Since FSJ depend on fire-dependent communities, it is important for park staff to maintain suitable habitat conditions for this species using prescribed fire and/or habitat restoration techniques following current research and allowing for adaptive management. It is essential to finalize and implement a WRBSP FSJ habitat management plan in order to consider priorities for future management decisions of this species in the parks. Continued study of scrub-jay populations within the basin should further expand multi-agency efforts in order to understand future conservation of this species. Monitoring of FSJ should include surveys targeting all suitable scrub and scrubby flatwoods habitats throughout the WRBSP, especially those undergoing extensive restoration efforts.

Wekiwa Springs State Park. Scrub-jay monitoring at this park has been variable since the initial 1977 surveys by the Orange Audubon Society. However, the fact is that there is a single territory that has been occupied by a small number of FSJ individuals continuously since this first survey. Monitoring from the period of 1998- 2005 has continued to confirm the presence of this small family. In 2004 blood samples were taken animals were banded from most of the birds at this park. This work was conducted for future genetic analyses in cooperation with Reed Bowman from Archbold Biological Station.

Rock Springs Run State Reserve. Intensive scrub-jay monitoring (including reproductive success) has taken place from 2002 through 2005. As of 2004, RSRSR processed the largest number of occupied FSJ territories when compared to the other two units. Data collected in 2004 has confirmed at least two FSJ that had territories at RSRSR dispersed to Seminole State Forest, taking up residency in new territories there (Lyon 2004). This fact highlights the need for direct multi-agency coordination concerning conservation of this species in the basin. To the surprise of park staff, recent surveys in 2005 confirmed the continuing presence of FSJ at the WBMK parcel of RSRSR. The importance of this highlights the urgency of continued habitat restoration of scrub and scrubby flatwoods in WBMK.

Lower Wekiva River Preserve State Park. The area to the east of the Wekiva River has supported up to three families of FSJ in the past (Small 1997). In addition, it is thought that foraging activities of FSJ from adjacent populations (State Forest and Yankee Lake treatment facility) may occur in this unit. As of January 2005, scrub-jays have not been observed in this unit during the 2002-2005 survey periods.

- **Bald eagle** (*Haliaectus leucocephalus*). Bald eagles nests are known from two of the three units in the WRBSP. These nests have been monitored by park staff during infrequent time periods. FWC staff also annually survey bald eagle nests throughout the state. Their records for the WRBSP nests have been documented since 1998 and are part of an online database posted from their website. Given the vast amount of acreage between the known WSSP and LWRPSP bald eagle sites it is very curious to think that they haven't nested in RSRSR. This may need to be investigated further.

Wekiwa Springs State Park. There is a known eagle nest located in WS-33 (OR016). Aerial flights by FWC since 1998 and staff records since 1987 have confirmed its nearly continuous use and reproductive success at this site.

Lower Wekiva River Preserve State Park. There is a known eagle nest located in LW-08 (SE052) and LW-16 (SE009). Aerial flights by FWC since 1998 have confirmed their nearly continuous use and reproductive success at these sites.

- **Florida mouse** (*Podomys floridanus*). Like the Florida gopher frog, the Florida mouse is a highly specialized Florida endemic closely allied with tortoise burrows (Layne and Ehrhart 1970). It has one of the narrowest habitat ranges of any Florida mammal (Layne 1992). It has historic populations in all three units (Roberts 1993). Small mammal surveys should be conducted throughout the WRBSP for this species in order to determine the status of this species. Recent surveys in 2004 have confirmed its presence at WSSP and LWRPSP. Monitoring of Florida mice should continue to target scrub and scrubby flatwoods communities throughout the WRBSP.

Wekiwa Springs State Park. Surveys for Florida mice were conducted at the historic site of WS-32 in 2004, and their presence was noted.

Rock Springs Run State Reserve. As of 2004, no surveys for Florida mice have been conducted.

Lower Wekiva River Preserve State Park. Surveys for Florida mice were conducted at the historic site of LW-08 in 2004, and their presence was noted.

- **Florida black bear (***Ursus americanus floridanus***)**. Beyond any doubt, the Florida black bear is the most prominent of the designated species occurring in the Wekiva Basin. Black bears occur throughout the unit. The black bear, a flagship species, has led the charge for multi-agency land acquisition programs in the basin in an attempt to secure its connectivity to source populations in the Ocala National Forest. Wekiva bears uniquely occur within the southern range limits of the Ocala /St. Johns metapopulation, one of six remaining strongholds for the species throughout Florida. Significant multi-agency efforts have been conducted to assure that the Wekiva bear population does not become isolated from its northern source populations (Roof and Wooding 1996; Eason 2003; Walker and Baber 2003). Previous radio tracking work conducted within the Wekiva Basin has suggested that bear densities are higher in this region than in any other parts of the State (Siebert 1993; Wooding and Hardisky 1994; Seibert *et al.* 2003). Unfortunately, the roads cutting through the Wekiva Basin also have the distinction of having the highest rate of vehicle mortality on bear populations in the State (Roof and Wooding 1996).

Rock Springs Run State Reserve. In December 1994, the Department of Transportation completed a wildlife underpass at the north boundary of RSRSR and beneath S. R. 46 to facilitate safe bear crossings between RSRSR and Seminole State Forest. Bears continue to use the underpass, but because bears cross S. R. 46 in numerous locations, bears continue to be killed on the road, as well as on S.R. 44 and S.R. 42. No bears have been killed within the wildlife fencing area associated with the underpass. Due to its success, a second S.R 46 underpass was constructed in the western portion of RSRSR, just west of Old McDonald Road. This second project began in June 2003 and finalized in February 2004. Continued restoration of the habitat adjacent to the fence will aid in funneling animals towards the underpass at this site.

Special Natural Features

Wekiwa Springs is a special natural feature. It is a second magnitude spring (Rosenau *et al.* 1977) with exposed limestone from the Hawthorn Formation just below the surface of the water. Wekiwa Springs Run and the Rock Springs Run combine to form the Wekiva River. Before its confluence with the St. Johns River, two additional major tributaries, the Little Wekiva River and Blackwater Creek, join the Wekiva River. Along with the section of the St. Johns River (from its confluence with the Wekiva River north to Hontoon Island State Park) the waterways of the Wekiva Basin flow for over 30 miles and are a special natural feature.

The sandhills at WSSP are also a special natural feature. Comprising approximately 1,500 acres, these are one of the largest holdings of sandhills in the state park system. Through a frequent summer burn schedule, much of this sandhill acreage has been restored to very good condition. The sandhills at Wekiwa Springs are acknowledged statewide as an example of sandhill restoration and maintenance. Protection of this community's integrity should be given the highest priority.

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 describe 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.

Central Florida has a rich cultural prehistory and history. The WRBSP fall within the East and Central Lake Archaeological Region, as defined by Drs. Jerald Milanich and Charles Fairbanks (1980). The area around Wekiwa Springs, Rock Springs Run and the Wekiva River was occupied and utilized by native Americans during the full sequence of Precolumbian cultural periods, beginning with the Paleo Indian, and continuing through the Archaic, Mount Taylor, Orange, Transitional, and St. Johns Periods (Blackman 1973; Barton 1981). Technological changes observed in the archaeological record, and evidence of increasing populations, marked each progressive period. The list of native American cultures also includes the Seminole, although they are primarily descended from Lower Creeks who fled from Georgia and Alabama to north Florida in the 18th century (Tebeau 1971; Milanich and Fairbanks 1980; Milanich 1994 Milanich 1995; Milanich 1996; Stanton 2001).

There are 50 known recorded archaeological sites within the boundaries of the Wekiva River Basin State Parks.

Wekiwa Springs State Park. 8LA2127, Wekiva Ferryboat, is an underwater site consisting of subsurface features from the shipwreck of a mid to late 19th century ferryboat which served as a transit across the Wekiva River (Coumes *et al*. 1997; Florida Department of State: 8LA2127). The condition assessment is poor.

8OR447, Rock Springs Run #1, is an Orange Culture midden mound located on the northern end of Rock Springs Run. Part of the midden has been damaged by bulldozer work (Florida

Department of State: 8OR447; Stewart 1982). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8OR449, Rock Springs Run #3, Haystack Midden, is a dome shaped St. Johns midden located on the north side of Rock Springs Run. There is evidence of extensive, but shallow digging (Florida Department of State: 8OR449; Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8OR452, Rollins Island, Wekiva #5, is a large St. Johns I shell midden located along the eastern shore of the Wekiva River. Vandalism, looting and past archaeological excavations have damaged the site (Florida Department of State: 8OR452; Stewart 1982). The condition assessment is poor.

8OR454, Love's Cabin, is a shell midden of an undetermined age located along the north end of Rock Springs Run (Florida Department of State: 8OR454; Stewart 1982). The site is often inaccessible due to high water conditions. The condition assessment is unknown.

8OR455, Rock Springs Run #6, is a shell midden of undetermined age located on the southern end of Rock Springs Run (Florida Department of State: 8OR455; Stewart 1982). The site is often inaccessible due to high water conditions. The condition assessment is unknown.

8OR456, Wekiwa Springs #2, is a midden of undetermined age. Vandalism and deterioration threaten the site (Florida Department of State: 8OR456; Stewart 1982). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8OR2220, Big Buck Hunting Camp #1, is a St. Johns shell midden located on the south side of Rock Springs Run. Vandal holes have been reported at the site (Florida Department of State: 8OR2220; Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8OR2221, Big Buck Hunting Camp #2, is a shell midden of undetermined age located along the south side of Rock Springs Run near 8OR2220. Vandal holes were not present in 1990 (Florida Department of State: 8OR2221; Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is good.

8OR2222, Cozy Camp Middens, is a group of two shell middens of undetermined age located along the south side of Rock Springs Run, north of 8OR2221. Vandal holes have been reported in the larger of the two middens (Florida Department of State: 8OR222;, Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8SE27, Wekiwa Springs, is a prehistoric village site with undetermined midden activity located near the Wekiwa Springs main boil (Florida Department of State: 8SE27). The condition assessment is poor.

8SE74, Wekiva #2, is a shell midden of undetermined age located at the confluence of the Wekiva River and Rock Springs Run. The site has been vandalized (Florida Department of State: 8SE74; Stewart 1982). The condition assessment is fair.

8SE75, Wekiva #3, is a shell midden of undetermined age located at the confluence of the

Wekiva River and Rock Springs Run, adjacent to 8SE74. The site has suffered vandalism (Florida Department of State: 8SE75; Stewart 1982). The condition assessment is fair.

8SE564, Plantation Indian Midden Mound, is a St. Johns shell midden located along the north end of the Wekiva River in the Markham Woods property. Part of the midden has been bulldozed, severely disturbing the site (Florida Department of State: 8SE564). The site is relatively inaccessible due to overgrowth and high water conditions. The condition assessment is poor.

8SE565, Plantation Lithic Scatter, is a preceramic lithic waste scatter site located in the northern end of the Wekiva River in the Markham Woods property (Florida Department of State: 8SE565). The site is relatively inaccessible due to overgrowth and high water conditions. The condition assessment is unknown.

8SE566, Plantation Hotel and Mitchell Farm House, is an African-American historic site consisting of agricultural building remains and a refuse pile, located south of Lake Markham in the Markham Woods property. The area was once part of the town of Markham, which operated from approximately 1880 to 1945 (Estabrook and Weant 1991; Florida Department of State: 8SE566). The condition assessment is poor.

8SE567, Pinnie Ridge Cemetery, a.k.a. Pinnie Grove Cemetery, is an historic African-American cemetery located south of Lake Markham near site 8SE566 in the Markham Woods property. The cemetery may contain 24 to 75 burials, but no headstones or cemetery markers are still standing (Estabrook and Weant 1991; Florida Department of State: 8SE567). The condition assessment is fair.

8SE568, Oak Grove Missionary Baptist Church, is the site of an historic African-American Church, located south of Lake Markham near 8SE567 in the Markham Woods property. Built in the mid-1880s, the church was reported to have burned down in 1928 (Estabrook and Weant 1991; Florida Department of State: 8SE568). Condition assessment is destroyed.

8SE582, Overstreet Midden, is a St. Johns I shell midden and mound located along the northern end of the Wekiva River in the Markham Woods property (Florida Department of State: 8SE582). The site is relatively inaccessible due to overgrowth and high water conditions. The condition assessment is unknown.

8SE1095, Markham Pond Site, is a St. Johns artifact scatter located about one mile east of the Wekiva River in the Markham Woods property (Estabrook and Weant 1991; Florida Department of State: 8SE1095). The site is relatively inaccessible due to overgrowth and high water conditions. The condition assessment is unknown.

8SE1096, the Wekiva Scatter Site, is a preceramic lithic waste scatter site located south of the Atlantic Coastline Railroad in the Markham Woods property (Estabrook and Weant 1991; Florida Department of State: 8SE1096). The site is currently inaccessible due to overgrowth and high water conditions. The condition assessment is unknown.

8SE1177, Katie's Landing, is a large St. Johns shell mound located along the north end of the Wekiva River, past State Road 46. The mound has been heavily damaged due to residential and recreational land use (Florida Department of State: 8SE1177). Condition assessment is poor.

8SE??, Unnamed, is a group of three shell middens of undetermined age located along the north end of Rock Springs Run (Florida Department of State: 8SE??). The site is often inaccessible due to high water conditions. Once the site receives a Florida Master Site File number and name, that information will be included in the next update of the park's unit management plan (Florida Department of Environmental Protection 1998). The condition assessment is unknown.

Rock Springs Run State Reserve. 8LA532, Bear Crossing, is an isolated find with the artifact, one pottery shard, having been collected (Florida Department of State: 8LA532). The condition assessment is not applicable.

8LA538, Bear Crossing 2, is a preceramic lithic waste scatter site located 3000' from State Road 46 south on County Road 433, along the roadway. The site was recorded as a campsite (Florida Department of State: 8LA538). Condition assessment is fair.

8LA539, Bear Crossing 3, is a small preceramic lithic waste scatter site located between State Road 46 and County Road-433 at the reserve entrance (Florida Department of State: 8LA539). The condition assessment is fair.

8LA540, Bear Crossing 4, is an isolated find with the artifact, one lithic waste flake, having been collected (Florida Department of State: 8LA540). The condition assessment is not applicable.

8LA541, Bear Crossing 5, is an isolated find with the artifact, one lithic waste flake, having been collected (Florida Department of State: 8LA541). The condition assessment is not applicable.

8LA542, Bear Crossing 6, is an isolated find with the artifact, one lithic waste flake, having been collected (Florida Department of State: 8LA542). The condition assessment is not applicable.

8LA1135, Ethel, is an historic cemetery reported to have originated as the community cemetery for the town of Ethel. It is currently the oldest known cemetery in Lake County. The site is located east of County Road 433. Four grave markers remain intact today. It was reported that several additional grave markers were removed and placed in the woods (Florida Department of State: 8LA1135; Weisman and Newman 1993). The condition assessment is fair.

8OR448, Rock Springs Run #2, is a large St. Johns shell midden located on the north side of Rock Springs Run. The midden has been vandalized by pothunters (Florida Department of State: 8OR448; Weisman and Newman 1990). The condition assessment is fair.

8OR450, Rock Springs Run #4, is a St. Johns shell midden located along the south side of Rock Springs Run. Mining and vandalism (Florida Department of State: 8OR450; Stewart 1982) have heavily disturbed the midden. The condition assessment is poor.

8OR451, Wekiva #4, is a group of two shell middens of undetermined date located along the southern end of the Wekiva River. The site shows evidence of vandalism (Florida Department of State: 8OR451; Stewart 1982). The condition assessment is fair.

8OR453, Wekiva #6, (DNR Cabin #7), is a St. Johns shell midden located along the western side of the Wekiva River. The cabin and accessories to the cabin, now removed, did substantial damage to the midden (Florida Department of State: 8OR453; Weisman and Newman 1990). The condition assessment is poor.

8OR458, Rock Springs Burial Mound, is a destroyed group of mounds of undetermined age located near Rock Springs at the end of Rock Springs Road (Florida Department of State: 8OR458; Stewart 1982). The site assessment is destroyed.

8OR2089, Rock Springs Mound, is a shell mound of undetermined age located along Rock Springs Run. The site is not listed on a map (Florida Department of State: 8OR2089; Stewart 1982). The site is often inaccessible due to high water conditions. The condition assessment is unknown.

8OR2226, Cypress Stump Midden, is a small St. Johns shell midden located on an island north of Buffalo Landing, along a slough with a large cypress stump (Florida Department of State: 8OR2226; Weisman and Newman 1990). The condition assessment is good.

8OR2227, Pennel's Cabin, is a St. Johns shell midden located on the south shore of the junction of the Wekiva River and the Little Wekiva River. A cabin, now removed, once stood on top of the midden, causing major disturbances to the site (Florida Department of State: 8OR2227; Weisman and Newman 1990). The condition assessment is poor.

8OR2228, Pappy's Cabin, is a small St. Johns shell midden located on an island east of Twin Mounds. The cabin that once was located on the midden has been removed. The cabin and its subsequent removal caused substantial disturbance to the site (Florida Department of State: 8OR2228; Weisman and Newman 1990). The condition assessment is poor.

8OR3230, Twin Mounds Archaeological District, is the National Register combination of two sites: 8OR457 Wekiva #7 and 8OR459 Wekiva #8, both named Twin Mounds. These two adjacent shell and snail middens are located on the west bank of the Wekiva River, seven miles south of its confluence with the St. Johns River (Florida Department of State: 8OR3230). The condition assessment is fair.

Lower Wekiva River Preserve State Park. 8LA193, Banana River Mound, is a moderately sized shell mound of an undetermined age located just west of the Banana River on Live Oak Island in the Fecthal property (Florida Department of State: 8LA193). The site is often inaccessible due to high water conditions. The condition assessment is fair.

8LA510, Wekiva River, is a shell midden of undetermined date located in the northern end of the preserve (Florida Department of State: 8LA510; Weisman and Newman 1993). The site is believed to be relatively undisturbed but is currently inaccessible due to high water conditions. Staff will visit the site when access improves. The condition assessment is good.

8LA2022, Otter Mound, is a St. Johns unspecified circular shell mound located in the St. Johns River floodplain in the Fecthal property. Shell mining has reduced the mound to a central basin and outer apron of midden (Florida Department of State: 8LA2022). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8LA2023, Bush Island, is a St. Johns shell midden located just east of Otter Mound in the Fecthal property. The midden appears relatively intact with little disturbance (Florida Department of State: 8LA2023). The condition assessment is good.

8LA2024, the Logging Trail, is one of several east-west logging trails built in the St. Johns River flood plain cypress swamp in the early 1940s. The road segment can be followed across Banana

River and out to Bush Island in the Fecthal property. The site consists of a series of pilings constructed from local woods with some retaining metal spikes (Florida Department of State: 8LA2024). The site is often inaccessible due to high water conditions. The condition assessment is fair.

8SE81, the Windmill Site, is a historic refuse site consisting of the remains of a windmill. Located centrally in the preserve, the site was listed as having suffered moderate destruction (Florida Department of State: 8SE81). The site is often inaccessible due to high water conditions. The condition assessment is poor.

8SE83, DNR Mound, is a St. Johns shell mound located on the north end of the Wekiva River (Florida Department of State: 8SE83). Staff was unable to locate the site for reassessment due to insufficient map and heavy vegetation. The condition assessment is unknown.

8SE577, Orange Tree, is a very compact shell midden located east of the Wekiva River in the preserve. Due to the presence of orange and grapefruit trees, a homestead may be in the immediate vicinity (Florida Department of State: 8SE 577, Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is fair.

8SE578, Hollow Tree, is a St. Johns culture shell midden located east of the Wekiva River. A large hollow live oak is located on the crushed shell midden (Florida Department of State: 8SE578; Weisman and Newman 1990). The site is often inaccessible due to high water conditions. The condition assessment is fair.

8SE1686, Burch, is a small St. Johns II shell midden located 1.5 miles from the preserve entrance situated on the riverbank. The site has not been looted (Florida Department of State: 8SE1686). The site is often inaccessible due to high water conditions. The condition assessment is good.

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.

Timber harvesting is expressly used with habitat restoration objectives in mind, and is not primarily a revenue-generating mechanism. Since the 1998 UMP, a number of timber harvest techniques have been implemented throughout the Wekiva River Basin State Parks.

- **Southern Pine Beetle Harvests.** Although the Southern pine beetle is native to Florida, many foresters believe that the expansion of loblolly pines has allowed the SPB to become more prevalent in Florida. It is also thought that the 2001 SPB infestation was an indirect

result of the prolonged drought in Central Florida. Pine trees were under stress from the dry environmental conditions and more susceptible to beetle attacks. Because SPBs can be destructive to virtually all species of pines in Florida, park managers and biologists ultimately decided to clear-cut 200-foot buffers around each active beetle spot. In 2001 an outbreak of the Southern pine beetle (SPB, *Dendroctonus frontalis*) forced park management to clear-cut areas that were affected, throughout the Basin. As a result, land use proceeds were acquired and will be used to help further assist in the park's resource management program.

Wekiwa Springs State Park. In February of 2001 a hiker at WSSP found the first sign of Southern pine beetle infestation in the Basin. By May of 2001 park management (in conjunction with the DOF, had a contracted timber crew working in the vicinity of Sand Lake (WS-42 and 45). Cutting for the SPB continued for ca. 12 months, however most of the harvest was done in the first 4 months. During that time park staff was forced to contract with three different logging companies before finding a company that could remove enough trees quickly enough to prevent the beetles from spreading. The timber crews clear-cut approximately 490 acres at WSSP. The SPB eradication cutting took place in burn zones WS-24, 25, 27, 28, 30, 33, 34, and 42.

Rock Springs Run State Reserve. Despite the high levels of Southern pine beetles at WSSP, RSRSR was almost unaffected by the insects. The only beetle spot that required mechanical treatment was in zone RS-18 just north of Buffalo Tram. The spot was approximately 25 acres in size. Other than the spot in RS-18, only individual trees were found with beetles and therefore timber crews were not needed.

Timber located on approximately 150 acres was also removed on the West BMK portion of RSRSR. After a reburn/wildfire in April, 2002, a timber crew was sent into zones RS- 97, 98, 99, and 102 to remove the stressed pines that were being infested with Southern pine beetles. Primarily pond pines and loblolly pines were removed and the work was successful in saving almost all of the longleaf pines.

Lower Wekiva River Preserve State Park. In the fall of 2002, a timber harvest was initiated on the Fecthal tract of LWRPSP. This timbering was a clear-cut operation to remove Southern pine beetles. The beetles had been in the area for over a year, and despite a wet summer, the beetles were still infesting new trees. Unit staff made the decision to harvest the remote area so the beetles would not infest the Seminole State Forest. Cooperation between the DOF and DEP allowed the timber crew to gain quick access to the beetle trees. The project took approximately three months to complete. In the end approximately 150 acres were clear-cut and approximately 100 acres were thinned (to prevent future pine beetle outbreaks) all in burn zones LW-21 and 23.

- **Upland Community Restoration.** While working to stop pine beetle infestations, park management strategically utilized the same timber crews (Southern pine beetle harvests) to assist in the removal of several overgrown sand pine and hardwood areas to help restore degraded and overgrown sandhill and scrub communities. All of this mechanical harvest occurred at areas within WRBSP where scrub restoration for the FSJ was badly needed.

Wekiwa Springs State Park. Burn zones in which sand pines were harvested in 2001 at Wekiwa included WS-4, 14, 42, 44, and 45. The acreage of sand pine scrub that was mechanically restored totaled approximately 60 acres from 2001 to 2003. To date all the areas that were harvested at Wekiwa have been burned. There is further work needed to reduce the canopy height of live oaks and other hardwoods in the zones around the Sand Lake recreation

area. Park staff and volunteers should continue to girdle and/or fell live oaks in these zones that are more than 10 feet in height to provide appropriate scrub-jay habitat.

During the pine beetle infestations, burn zone WS-30 was timbered for pine beetle trees and hardwoods. Very little work has been done to restore these hardwood harvest sites. In 2001 crews were hired to burn piles, however much more timber slash is present and needs to be reduced once fuel reduction burns have been completed. Unit staff should develop restoration plans for these areas. This plan should include topographic/soils restoration, native species plantings, and further oak thinning. Additional zones of WSSP may be possible targets for future hardwood harvests to release overcrowded longleaf pines and understory species due to the success of these methods.

In August 2003, another large hardwood and sand pine harvest was implemented at the Markham Woods Tract of WSSP. This site was historically a sandhill community, and continued restoration will target native plantings and control burns in order to enhance this 70-acre site. As of 2005, this site still needs to be burned and planted with natives.

Additionally, another round of mechanical treatments (Franklin Tractor) was completed in 2003 in the northern portion of zone WS-23. This area had been described as 'xeric hammock' in previous management plans, however it was later decided that it was more likely just overgrown scrub habitat. Burning in this zone is still needed. Another area of scrub is set in an isolated pocket in zone WS-12. This still needs restoration work.

Rock Springs Run State Reserve. A tremendous amount of sand pine was mechanically treated to mimic the catastrophic effects of fire on scrub. Timber harvest projects were initiated at RSRSR when RS-26 (Spear's Scrub = 320 acres) was timbered starting in August of 2001. When the logging of RS-26 was completed, the timber crew was sent to other scrub zones within RSRSR. Portions of RS-67, 68, 69, and 79 were also harvested. Many of these same zones still need extensive oak removal as of early 2005.

Due to a history of fire suppression, several sandhill burn zones at RSRSR were also overgrown with hardwood species that did not allow longleaf pines and understory species to regenerate. For this reason, while timber crews were at RSRSR to remove sand pines from the scrub communities the unit staff allowed them to harvest unwanted hardwoods (RS-55).

Of significant biological importance during this restoration were the series of small upland ponds within the interior of Spear's Scrub. These isolated ephemeral wetlands are used during reproduction by both gopher frogs and striped newts. A U. S. Fish and Wildlife Service biologist and a University of Florida striped newt specialist (both have visited the site) both suggested the need for open understory and early succession vegetation. However, it should be noted that very little research has been conducted on striped newts in scrub communities such as those at RSRSR. Most research on this species has been conducted on populations in sandhill habitats (Johnson 2002). It was further suggested that not all the area around the ponds be mechanically harvested and that not all of the area be protected from harvest. This methodology creates a mosaic of conditions which should leave/create more suitable habitat for newts and gopher frogs.

Another important restoration project which deserves mention is the Florida Gas Pipeline project conducted in 2001. During this project, park staff required this company to restore the Sandhill community along the right-of-way of County Road 433. This road was partly overgrown with sand pines and bahiagrass (*Paspalum notatum*). Sand pines were harvested; wiregrass and

longleaf pine were then planted. Approximately 20 acres were restored in 2001.

Much of the scrubby flatwoods in WBMK (RS-97, 98, 99, 102, 105, 107, 111, 112, and 118) needs major restoration work. In addition, RS-01, 02, 03, 51, 52, 58, 80, 81 and 89 all need major restoration work prior to being burned.

Lower Wekiva River Preserve State Park. This unit contains several small widely scattered islands of scrubby flatwoods either within or adjacent to mesic flatwoods. As of 2005, there are a few islands that are being maintained in good condition scrubby flatwoods (LW-08, 12), however, these are no longer active territories for the FSJ. This zone should be kept in maintenance phase burns. There are also several areas of scrub and scrubby flatwoods which need complete restoration in the LWRPSP (LW-04, 07, J-09, J-06, SK-02).

Additional Considerations

Resource management in an urban environment. The region surrounding the WRBSP has become increasingly urban, especially towards the south. This urbanization is creating a variety of management challenges, many of which are outside the purview of park management. Due to the increased numbers of adjacent landowners, prescribed fire and smoke management have become increasingly difficult.

Currently, an expressway is being considered through the basin that would not only be a significant smoke sensitive area, it may also stimulate greater growth. Potential adverse effects on park management include habitat fragmentation, stormwater runoff pollution, esthetic intrusion, light pollution, and prescribed burning difficulties. Additionally, an expressway adjacent to the parks should not create barriers to wildlife corridors and should be elevated across sensitive areas such as wetlands and water bodies. In January 2003, the Wekiva Basin Area Task Force submitted recommendations to Governor Jeb Bush on a plan to implement a regional transportation plan that would not significantly affect the natural resources of the basin (Seibert *et al.* 2003). In 2004 the Florida Legislature adopted the *Wekiva Parkway and Protection Act.* Park staff has been and will continue to work with the coordinating agencies to identify any adverse effects of the expressway and find ways to minimize, mitigate and monitor them.

The most important factor associated with urbanization (other than smoke management concerns during prescribed burns) is the decline of spring flows in the basin. Due to increased impervious surfaces and increased consumptive uses, spring flows have been declining for decades. However, the current rate of development in the watershed basin has caused renewed concerns. Current projections by the St. Johns River Water Management District indicate that by 2010 spring flows will decline to levels that will cause irreparable harm. The Wekiva Basin Area Task Force has made recommendations to control growth and maintain the rural character within the springshed.

Hydrological Management and Tram Road Restoration. Historical activities have had significant impacts on the natural hydrologic regime of the unit. Particularly, the construction of tram roads in the early 1900s to facilitate logging has altered the natural flow of water. Although several tram roads have been removed as mitigation projects, many more exist. Although tram roads can have negative impacts on the hydrology, they are often excellent recreational trails. A detailed study is needed to determine which tram roads need to be removed and which need to be culverted. This study would allow the park management to maximize recreation while restoring the natural hydrologic regime to the maximum amount practical. This type of study is needed in all three parks. Many existing service roads were constructed for logging purposes. Often, these

roads are mounded and impede the natural flow of surface waters. This impediment alters the natural hydrology of the surrounding area, potentially affecting the natural plant community and the animals dependant upon them. Of primary concern is the main north-south service road within the Fecthal Tract. There are several wet crossings and elevated roads that need attention including the slough areas just north and south of burn zone LW-27. Each area needs to be evaluated and addressed, as appropriate. Potential solutions include, but are not limited to, low water crossings or the installation of culverts.

Prescribed burning. Numerous factors have contributed to the historic trend of not meeting the annual burn objectives. These factors include additional landholdings, limited staff, adjacent smoke sensitive areas (homes, schools, etc.), and heavy fuel loads on parcels with a fire exclusion history. Every effort needs to be made to put new acquisitions into a burn rotation. Out-sourcing mechanical treatments may be an effective and efficient way of manipulating fuel loads. When necessary, burn zones will be subdivided through the use of mechanical means to facilitate management of safer burning.

Pasture restoration. The WRBSP have a number of improved pastures. These pastures were part of larger land acquisitions. A restoration plan for the pastures needs to be developed and implemented. Cattle leases may be a suitable interim management tool.

Hunting. A total of 24 days of hunting are allowed on portions of the RSRSR. There are 18 days of deer and hog hunting and 6 days of small game hunting (gray squirrel, quail and rabbit). These opportunities will continue to be provided both for public recreation and as a management tool. During periods open to hunting, all other recreational uses (except horseback riding) are permitted. Information is posted at entrance points to advise users that hunts are in progress. In addition, a portion of the park is permanently closed to hunting.

Public lands in the Wekiva Basin are in heavy demand from all recreational user groups. In response to these demands, the hunts on the RSRSR have been fine-tuned over time to reduce conflict with other users (and biological surveys). The proximity of other public lands in the basin has allowed both spatial and temporal separation of user groups. The only other public land in the basin that is hunted is Seminole State Forest. Although some overlaps occur, an attempt is made to schedule hunts on the two areas on alternate dates. On dates when both areas are hunted, LWRPSP and WSSP are available to other recreational users.

Surveys of selected game species should be conducted annually by the Florida Fish and Wildlife Conservation Commission, or at greater intervals when appropriate, to ensure that wildlife populations remain within desired ranges. White-tailed deer should be surveyed annually to determine the harvest pressure that is appropriate. Density and herd structure will be maintained at levels that ensure a healthy and viable population that does not negatively impact natural systems and vegetation.

Regulations regarding hunting within RSRSR should be reviewed each year with the managing agencies making recommendations as needed. Public input will be evaluated and any appropriate modifications in the structure or operations of public hunts will be made.

Management Objectives

The resources administered by the Division are divided into two principal categories: natural resources and cultural resources. The Division's 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.

The management objectives at the WRBSP focus on providing non-consumptive recreational opportunities while preserving the natural and cultural resources of the unit. Based upon the needs of this unit, and as a guide for what specific actions may achieve the unit's objectives, the following statements are presented as necessary steps and as a means of evaluating management effectiveness:

Natural Resources

Erosion. Develop and implement strategies to remedy erosion problems for Sand Lake, Thompson Road, the head springs, picnic areas, service roads, existing tram roads, and elsewhere, as necessary.

Borrow Pits. Fill, if necessary, with appropriate material all the borrow pits and recontour them to match surrounding elevations. If necessary, revegetate with appropriate native vegetation.

Water Quantity. Establish staff gauges to monitor water levels of surface waters entering the unit and to monitor levels in Lake Prevatt and Sand Lake. Develop plan to remove or breech unneeded tram roads in hydric communities. This activity must be balanced between the ecological benefit and the loss of recreational trails.

Water Quality. Maintain water quality monitoring at Sand Lake, Wekiwa Springs and Lake Prevatt and add additional monitoring sites where needed.

1. Investigate funding sources to remedy the stormwater runoff problem on Wekiwa Springs Road and on Welch/Thompson Roads.
2. Continue inter-agency, cooperative efforts to collect water quality and biological data for the spring and associated spring-run.
3. Investigate funding sources to hook up existing park septic systems to county sewer lines.
4. Initiate an aquatic invertebrate sampling program which is an excellent indicator of water quality changes.
5. Implement river studies to determine potential visitor use and carrying capacity. This will be a necessary component of the Wild and Scenic River Management Plan.
6. Investigate the possibility of monitoring groundwater more closely, perhaps including
7. consultation with a hydrogeologist.
8. Continue inter-agency, cooperative efforts to collect water quality and biological data for the spring and associated spring run.

Surveys and Records of Designated Species. Implement survey strategies for all designated species and manage potential impacts. Formal, organized surveys should concentrate on herpetofauna, invertebrates and plants. Update park species list as needed.

1. Incorporate applicable pitcherplant RME (Johnson 2001) recommendations into park management.
2. Develop a database for organization and retrieval of past and future plant records.
3. Utilize wildlife database program being developed by the District 3 biological staff to organize and retrieve past and future wildlife observations.
4. Maintain and update GPS maps of designated species locations at the unit.
5. Maintain and update unit's black bear observation database.
6. Organize continued surveys of Wekiwa Springs for Wekiwa hydrobe and Wekiwa siltsnail.

7. Organize surveys of cave fauna of Wekiwa Springs and Witherington Spring cave systems.
8. Continue to monitor FSJ within the unit.
9. Develop habitat management plan for the unit's FSJ population.
10. Conduct post-burn gopher tortoise burrow surveys to measure the effectiveness of burning program.

Cultural Resources

1. Conduct ground disturbing activities in accordance with DHR guidelines.
2. Conduct an archaeological reconnaissance survey of the Wekiva River Basin State Parks.
3. Improve public awareness and encourage protection and stewardship of cultural and natural resources through education and enforcement of agency rules and regulations.

Management Measures for Natural Resources

Hydrology

The management measures related to the unit's hydrology involve monitoring water quality and quantity which are affected by factors outside the parks. Water quality needs to be monitored for all waters in the unit. Beginning in January 2004, biogeochemical measurements of all spring waters were monitored weekly in a coordinated effort by park biologists and the Cambrian Foundation. In addition, samples are collected quarterly from Wekiwa Springs for bacterial analyses. Extensive exploration of and data collection in the cave systems will take place in January 2005. Staff gauges need to be installed at Sand Lake, Lake Prevatt, and the streams flowing into Lake Prevatt. Readings need to be continued on the staff gauge at Wekiwa Springs and the recently (2004) installed gauges at Witherington Springs and Sulfur Springs. Stormwater runoff is degrading water quality in the Wekiva River and Lake Prevatt. In addition to revisiting the Minimum Flows and Levels, comprehensive, long-term strategies for assuring the maintenance of spring flows should be formulated and implemented. These issues need to be addressed above the park level. All involved permitting agencies are aware of the problems and have been on-site for several visits. Funds need to be allocated to deal with these two problem areas.

A stormwater pond has been constructed to treat water from Wekiva Springs Road that enters the park at WS-1. Water quality should be monitored to determine if this structure will be effective at removing pollutants. It is expected that at a minimum the pond will act as a filter, removing trash and exotic plant propogules. Water also enters the park from the Sweetwater Subdivision.

Funding provided by the Springs Initiative in 2004 provided for weekly water quality analysis, biological surveys, and secured the design and permits necessary for placing the day-use portion of WSSP on the county sewer system. In addition, several projects related to water quality, algal distribution, and pollution load reduction goals (PLRGs) in the Wekiva River began in 2004 as part of the studies preceding construction of the Wekiva Parkway (Giannotti 2004). The information is vital to the management of the spring and the watershed in general. Park and district staff will assist the DEP with data collection and maintain monitoring records at the park and district offices.

Prescribed Burning

In order to completely restore a natural community which may have been previously overgrown due to a history of fire suppression, land management must include prescribed burning. Any natural community that reaches complete restoration should then be held at that state in what land managers call a ‘maintenance phase”. Most upland ecosystems in Florida require fire to keep them in this phase, with the difference among them related to the temporal timing of the fire

event (Ahlgren 1974). For example, scrub is maintained by high intensity fires which naturally would only occur once in the lifetime of the sand pine stand which is about every 30-60 years (Harper 1915, Webber 1935, and Laessle 1958). 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 (see Burn Zones Maps). 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.

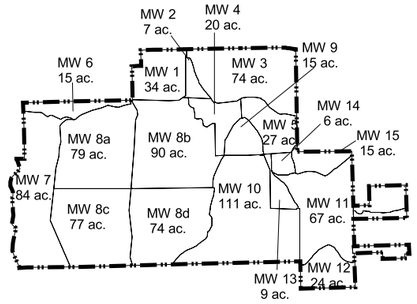
Overall, the Wekiva River Basin has a very successful prescribed burning program. The staff includes some of the best trained burners in the State. Unfortunately, with the addition of many mores acres of fire-type communities and with limited staff, it is becoming more difficult to accomplish the burn objective acreage. A determined effort is being made to prevent burn units in maintenance condition from deteriorating. Even with a conscious effort, the interfire interval of these restored areas has been lengthened. In addition, new properties are not put into the burn rotation as quickly as they should be.

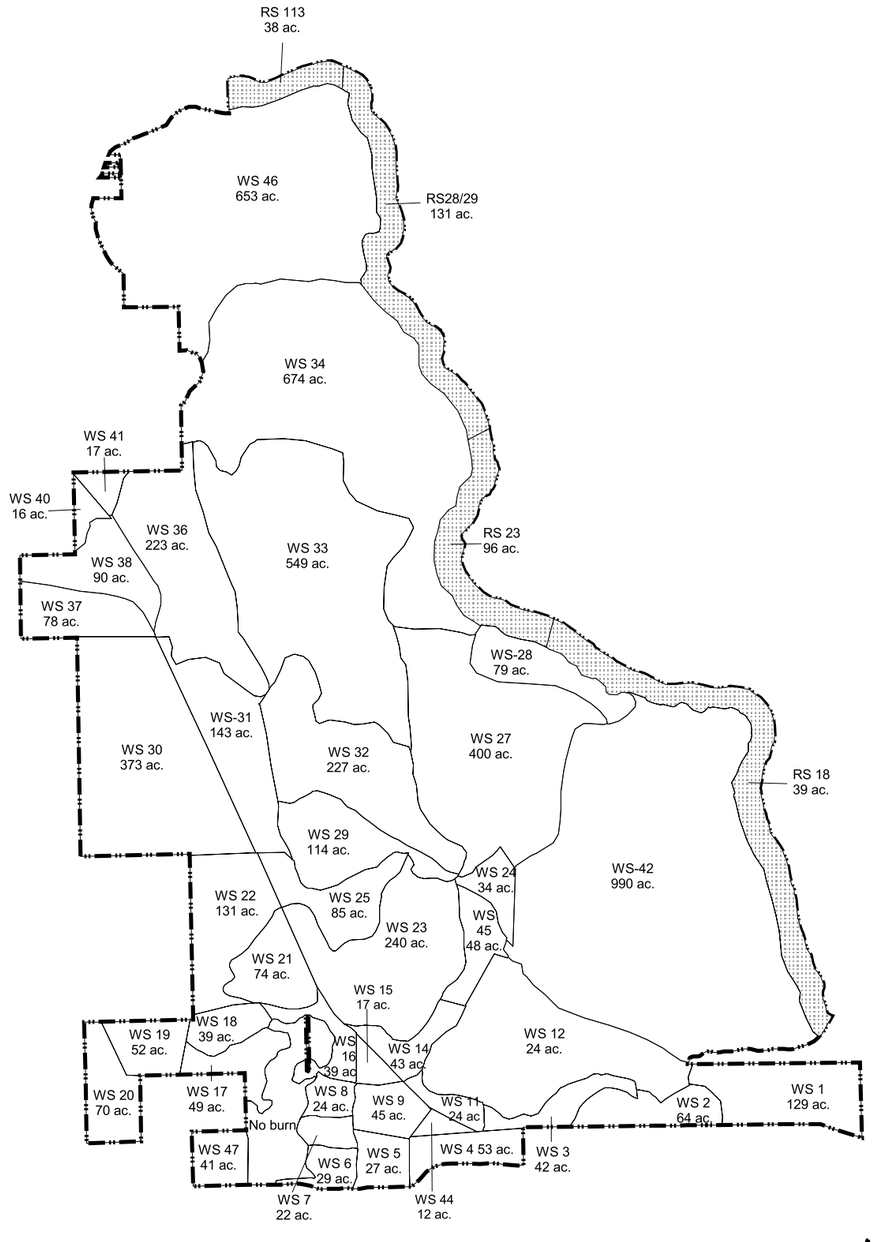
There is no immediate solution to this problem; but the park staff needs to be released from some of their current responsibilities if effective burning is going to take place. The park already uses aerial ignition to burn large acreage, and more of this needs to be done. In 2001, the National Interagency Prescribed Fire Training Center (PFTC) was used on 30 out of 33 prescribed burns. This saved some of the park staff to complete other tasks. This relationship with PFTC has continued each year since 2001. The park utilizes staff from other parks as well as providing its staff and equipment to burn in other units. The park also uses OPS funds to hire labor to prepare firelines. All of these practices need to be further expanded. Although staff is limited, contract burning is not a viable option for this unit, as the quality of burning may be seriously compromised. It would be unwise to substitute contract burners for the highly experienced Wekiva Basin burn crew.

A 2002 survey of the burn zone histories showed that most of the properties within the Wekiva River Basin were overdue for burning; however, this was remedied toward the end of 2002 through 2004, with the burning of over 9,000 acres. Since the last Unit Management Plan (1998), over 15,000 acres have been burned using prescribed fire. Although the park is a leader in prescribed burning in the state, the recent droughts and loss/transfer of staff has made prescribed burning more difficult to accomplish. Additionally, the wildfire seasons of 1998-2001 drastically hampered the amount of growing season burns. Therefore, it is important that park staff institute an aggressive growing season burn program to catch up.

So far, discussion has concentrated on the frequency of burns and not on the actual timing of burns. Obviously, since fires were historically tied to lightning strikes, it is reasonable to assume that natural fire events are related to lightning frequency. Native Americans were also an important means of fire ignitions. However, since limited information is available on their burn regimes, only lightning frequency will be used as a basis for determining seasonal timing of prescribed fires.

Thunderstorms and the accompanying lightning strikes are not constant throughout the year. More storms occur in the summer. The mean number of thunderstorm days per month for the





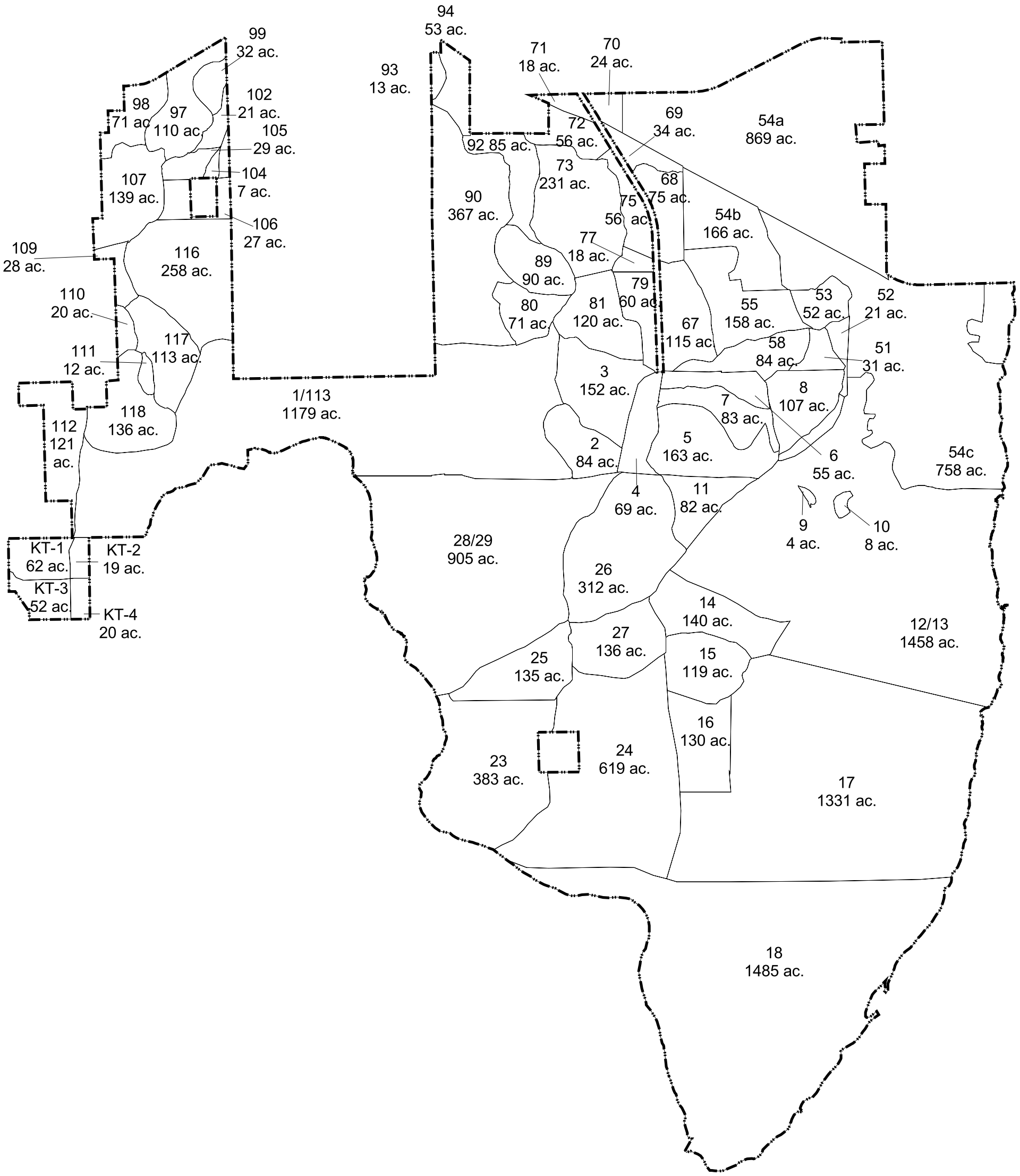
LEGEND
- Burn Zones
- Burn Zones Overlap
- Park Boundary

2000 0 N 2000 4000 Feet

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

WEKIWA SPRINGS
STATE PARK

BURN ZONES
MAP



LEGEND
Burn Zones
Park Boundary

2000 0 2000 4000 Feet

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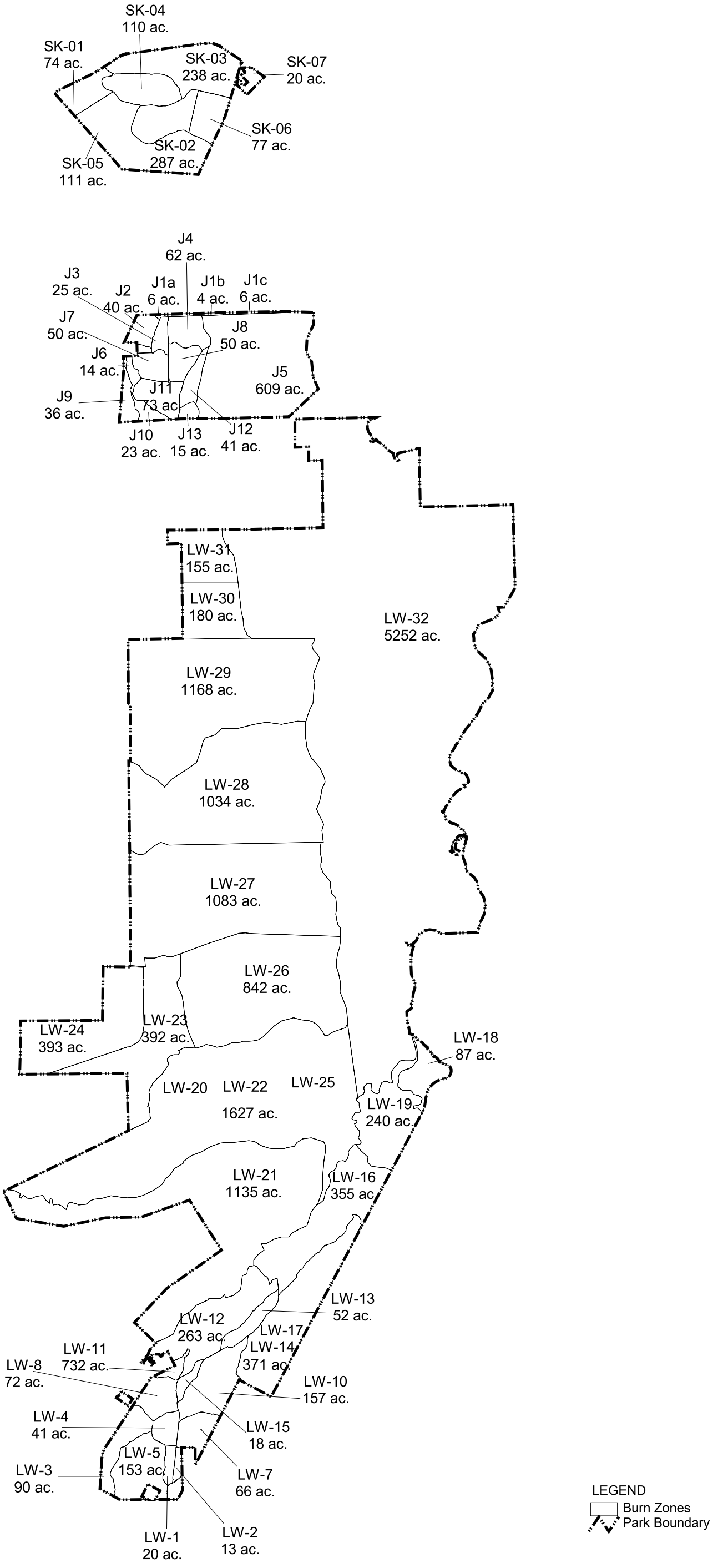
Prepared by:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

ROCK SPRINGS RUN STATE RESERVE

BURN ZONE MAP



LOWER WIKIVA RIVER
PRESERVE STATE PARK

BURN ZONE
MAP

entire state varies from 6.6 days in May to 12 in June to 17 in July to 16 in August to 10 in September (Davis and Sakamoto 1976). The probability of lightning starting a fire varies with the type and dryness of fuels. In north Florida, April and May are usually the driest, because they are between the winter and summer rainfall peaks. The winter rainfall peak declines as you go south in the state with south Florida having only two seasons, wet and dry, with most rain falling between May and October (Jordan 1984). Central Florida is intermediate between north and south Florida.

Based on this information, the unit uses two burn seasons: spring/summer and fall/winter. Spring/summer is defined as April-August and fall/winter as December-March. Very little burning is done under a pine tree canopy from September-November due to the greater potential for pine tree mortality.

- **Sandhill.** Research into sandhill ecology provides information on the frequency of burns in sandhills (Christensen 1981). Means and Grow (1985) suggested that the original sandhill forests burned every three to five years, sometimes more often, sometimes less and during low lightning incidence and wet summers as seldom as once in five years. Chapman (1932) found that it was extremely probable that even without the aid of humans, lightning caused fires might occur as frequently as every three to four years. Heyward (1939) concurred with Chapman, stating that up until 1939, longleaf pinelands burned once every 3-4 years. Due to the flammability of the wiregrass ground cover, fires can burn as frequently as every year. However, an annual fire frequency does not appear to be natural or beneficial for longleaf pine (Chapman 1932). If fires occur on an annual basis, they will kill almost every young pine that germinates so that the forest cannot regenerate itself (Means and Grow 1985). However, annual fires did naturally occur if conditions were right. Based on this information, the interfire interval for sandhills within the unit, in maintenance condition, is set at anywhere from one to five years. Three years is the longest interfire interval for any sandhill zone still in restoration status.

The desired ecological condition for sandhills in the Wekiva Basin is described as the following:

1. Having a nearly continuous groundcover of wiregrass (80% or greater coverage).
2. Widely spaced overstory of longleaf pines of mixed age classes (at least 3 age classes).
3. Scattered individual trees or small clumps of sandhill oaks (*Quercus laievis, Q. stellata, Q. incana, Q.geminata*).
4. Healthy population of Sherman's fox squirrels.
5. Healthy population of gopher tortoises.

Wekiwa Springs State Park. Wekiwa Springs State Park contains some of the best sandhill habitat in Florida. Although WSSP has many other plant communities, sandhill habitat dominates the uplands. If a zone is allowed to deteriorate out of maintenance condition it should be placed in the fall/winter burn cycle. Ideally, all of the sandhill zones at WSSP should be burned in the spring/summer cycle to help promote plant flowering and seeding.

Rock Springs Run State Reserve. The Kitteredge property is primarily sandhill habitat that has been severally disturbed by past human uses. The property was evidently clear-cut because there are very few mature longleaf pines left on the property. Park staff has worked hard to remove hardwoods, increase the wiregrass component, and restore the longleaf pine overstory. However, the desired results will likely take many years since the property is in such a disturbed state. The entire property has been burned in 2003 or 2004, and an aggressive burn regime will continue to

be necessary to restore the herbaceous ground fuels and reduce oaks. If possible a growing season burn rotation should be utilized as often as dormant season burns.

Lower Wekiva River Preserve State Park. The only sandhill habitat in this unit occurs in the southern portion of the unit just north of its south boundary along SR 46 (LW-01, 02, 04, 05, and LW-07). The entire sandhill habitat was burned during 2002-2003 and its condition is nearing maintenance condition throughout much of its distribution in this unit. The removal of sand pine and other hardwoods still needs to be done in LW-04, 05, and LW-07. Once again, the existing areas of sandhill in unit should be burned in the spring/summer cycle to help promote plant flowering and seeding.

- **Mesic and wet flatwoods.** Zones in restoration status may require one or several fall/winter fuel reduction burns or several spring/summer burns before they are placed on a more random restoration status schedule. The interfire interval for flatwoods differs from that of sandhills. In general, flatwoods do not burn as frequently as sandhills. However, fires are relatively frequent in flatwoods as described in early accounts by Harper (1915).

  The mesic flatwoods at WSSP are dominated by longleaf and pond pines, while pond pines dominate in the wet flatwoods. Edmisten (1963) found that longleaf pine was dominant in situations where frequent light fires occurred, while pond pine was dominant in areas with extremely acid soils in topographic positions conducive to less frequent but more intense fires. Edmisten's (1963) work implies that pond pine or wet flatwoods depend on intense fires at about 15-year intervals to prevent hardwood invasion.

  In south Florida flatwoods, which are roughly comparable to mesic flatwoods, it was found that very short burn rotations of every 1-3 years virtually eliminated pine seedlings and led to the conversion of flatwoods to palmetto prairies (Wade *et al.* 1980). Hilmon (1968) found that saw palmetto cover increased in flatwoods when fire was suppressed for 6-10 years. In another report, it was stated that natural fires probably occurred every 1-8 years in mesic flatwoods and every 3-10 years in wet flatwoods (Florida Natural Areas Inventory 1990). Based on this information, the interfire interval for mesic/wet flatwoods within the Basin is set at 3-5 years.

The desired ecological condition for mesic flatwoods in the Wekiva Basin is described as the following:

1. Canopy cover of mature pines (*Pinus palustris, P. serotina, P. elliottii*) of multiple age classes (at least 3 age classes)
2. Herbaceous groundcover covering at least 50% of the community.
3. Saw palmetto shrub component making up no more than half of the total shrub cover.
4. Variety of shrubs in addition to saw palmetto (including, not limited to *Lyonia lucida, L. ferruginea, Ilex glabra, Befaria racemosa, Vaccinieum myrsinites*).
5. Healthy population of gopher tortoises.

Wekiwa Springs State Park. The wet flatwoods that were timbered at WSSP in 2001 are littered with slash material. Those burn zones will be placed on a more aggressive burn schedule in order to eliminate piles of debris.

Rock Springs Run State Reserve. Combined, mesic and wet flatwoods are the most dominant communities on this unit. The mesic flatwoods is in good condition at RSRSR and can be burned

on a maintenance cycle. There are many flatwoods zones that have been invaded by pond pines and therefore park staff should use best management practices to knock back invading pond pine and encourage long leaf pine growth.

Lower Wekiva River Preserve State Park. Lower Wekiva River Preserve State Park includes the Skinner, Jung, and Fechtel Tracts, and Katie's Landing. LWRPSP is the largest unit within the Wekiva River Basin State Parks; however, park staff spends the least amount of time there. The most dominant communities within LWRPSP are mesic and wet flatwoods. These communities are set on a four to seven year fire return interval. This burn frequency has been increased in zones where Southern pine beetle trees have been harvested (zones LW-20, 22, and 23).

- **Scrub.** Webber (1935) described scrub as a fire-fighting association because fires which frequently burned in surrounding communities rarely penetrated into the scrub community. Sand pine has often been classified as being adapted to a fire periodicity of only once per generation of sand pine (Ahlgren 1974). Because scrub can be relatively resistant to fire under certain conditions, any burn in this community will need to be scheduled during drier times of the year. A burn does not need to crown into the sand pine overstory to be successful, but it must at least crown into the tops of the scrub oak and lyonia understory to attain sufficient intensity to kill the sand pine overstory.

  Before the aggressive timber management operations of 2001 the majority of scrub within the Basin had a mature overgrown canopy of sand pine with a dense understory of scrub oaks and little herbaceous or open ground cover. Now that most of the mature sand pine scrub communities have been clear-cut for restoration purposes (see Timber Management section) a great deal of effort needs to be put into restoration burns.

  Since the presence or absence of the FSJ is so closely tied to suitable habitat within only scrub and scrubby flatwoods communities, it is imperative that staff coordinate and prioritize management activities to achieve maximum results towards bringing all burn zones to complete restoration. In order to achieve optimal vegetative characteristics for these zones, the following targets (desired future condition) may provide park staff guidelines for the management of scrub and scrubby flatwoods (Woolfenden and Fitzpatrick 1984, Fitzpatrick *et al.* 1991).

  Concerning each continuous habitat island:

  1. A minimum of 10-15% of the area should be comprised of bare sand or other native herbaceous component following the foraging requirements of FSJ.
  2. Vegetation characteristics should not exceed 3m in height. Optimal vegetation height is between 1-2m.
  3. A forest is defined as an area with >65% tree cover.
  4. Scrub islands should be maintained with no more than 10% of an area covered by tall trees.
  1. Optimal islands are those which provide >130m distance to the forest edge from its center.

  Other guidelines include:

  1. If prescribed fire cannot successfully top kill at least 50% of any overgrown scrub oak

area, mechanical treatments should be considered followed thereafter with prescribed fire.

2. All zones in maintenance condition should be burned no more than every 15 years.
3. Although all scrub islands should be managed towards maintenance condition, any island 1 acre or greater has a better potential to become a suitable FSJ habitat.

Because of logistical concerns related to control of any prescribed burns set in the scrub community, the interfire interval is set at 7 to 15 years depending on the zone objectives. Zones in restoration phase, therefore, could be burned as often as every 7 years.
Following this idea, research has indicated that a patchy prescribed fire in which territories are not burned completely is optimal for scrub-jays (Fitzpatrick *et al.* 1991, Hipes *et al.* 2001).

Wekiwa Springs State Park. Zone WS-33 contains a small patch of scrub that is home to the only family of FSJ known in WSSP. That area should continue to be cut in half and kept on a rotation that always maintains a section of scrub in optimal condition. Until more scrub is restored at WSSP this entire scrub should not be burned in the same year. Scrub at the Sand Lake Area (WS-42 and 45) has been partially restored. This zone needs more fuel reduction burns and mechanical treatments before it is appropriate for Florida scrub-jays.

Rock Springs Run State Reserve. In 2001 Spear's Scrub was clear-cut and fuel reduction/restoration burns were initiated. Further work will be done to section Spear's Scrub into quarters, which will be burned on a rotation to promote Florida scrub-jay population growth. The staff will continue to cooperate with DOF in order to manage the sand pines that are likely to regenerate in the zone. The fire return interval at Spear's scrub is initially set at 10 years. If this frequency is found to be too disruptive to the scrub endemics, the fire interval will be adapted.

- **Scrubby Flatwoods.** The management of scrubby flatwoods overlaps closely with the discussion above relative to prescribed fire and restoration in scrub communities. However, since this community does occur throughout the WRBSP as scattered small islands it will be important to further discuss their management. In fact, these islands are integral territories used by the FSJ, especially those within RSRSR.

Wekiwa Springs State Park. The Markham Woods scrubby flatwoods are in poor condition and need to be burned or mechanically treated and then burned. Due to very heavy fuel loads at Markham Woods, burn zones MW-4 and MW-8 will be subdivided with mowed breaks to create smaller subzones of about 50 acres each. Once these subzones are in a maintenance phase, they could be managed as larger complete zones.

Rock Springs Run State Reserve. A very high percentage of the scrubby flatwoods all across the RSRSR need mechanical treatment prior to being burned.

Depression Marsh. The management of depression marsh overlaps closely with the discussion above relative to prescribed fire and restoration of pine communities. Depression marsh is imbedded in these other fire-type communities and is also dependent upon fire for its health.

The desired ecological condition for depression marshed in the Wekiva Basin is described as the following:

1. Continuous herbaceous cover (unless has a deep water center) of at least 80%.

2. Low or no woody component (shrub component) in the marsh.
3. Sparse shrub ecotone around the edge of the marsh.

- **Ruderal.** Large areas of old fallow pastures occur within two of the three units of WRBSP. A restoration plan for these areas needs to be developed in order to understand best management of returning them to their native natural communities. Despite the very frequent burning needs, the pastures will still require a great deal of mechanical work. Besides burning, unit staff will attempt to remove excess wax myrtle, blackberry, sweetgum, loblolly pine, and plant longleaf pine saplings. An even more difficult task will be keeping up with the exotic plant species that have traditionally been found in the pastures. All these problems will require heavy equipment and manpower.

Rock Springs Run State Reserve. As of 2002 the Florida Park Service is responsible for primary management of the STS pastures. Previous land use practices have maintained these three burn zones (RS-54a, b, c) in a depression marsh/pasture condition. The pastures will be maintained in an open flatwoods condition. Firebreaks need to be established and improved. The perimeter firebreaks are either overgrown or non-existent. The boundaries along the east side of RS-54a currently need the most perimeter work.

The interfire interval of RS-54 will be biannual (once in the fall/winter and once in the spring/summer). This will promote the native herbaceous plants and discourage the return of dogfennel (*Eupatorium compositifolium*). This will also reduce the amount of mechanical mowing needed to keep the bahiagrass at a manageable level.

There are several ruderal areas in south RSRSR that should be part of an overall natural community re-assessment (see Research Needs).

Lower Wekiva River Preserve State Park. There are many ruderal areas that occur along the west boundary of the Fechtel portion of this park which need complete restoration. All of these pastures are on a two year burn interval. A restoration plan needs to be created for the Fechtel and Skinner tracts.

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. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species.

Virtually all of the designated species of plants and animals within the WRBSP have gained designated status as a result of habitat destruction. Habitat maintenance is thus the most efficient means of providing protection and perpetuation.

Although the major resource management action for designated species is habitat management, additional actions are warranted for several species. All management actions taken are in accordance with approved USFWS recovery plans. The Staff will coordinate with the USFWS on any required permits related to management activities which affect designated species.

A number of projects directed at designated species are ongoing and should be continued.

Systematic surveys for designated plants need to be undertaken at all units. Of the numerous listed plants known to occur within the unit, few have been mapped. Surveys should be prioritized to search for the rarest species first. All locations should be recorded with GPS coordinates and mapped on USGS quad sheets. There are several people with knowledge on a number of these locations who could assist with initial surveys. The hand fern is an excellent species on which to begin such surveys.

Surveys for troglobitic fauna are scheduled for January 2005. Identifying and cataloging species of cave crayfish and other macrofauna will be useful in future management plans for protecting the cave environment.

- **Wekiwa siltsnail and Wekiwa hydrobe**. Surveys are planned in March of 2005 for the Wekiwa siltsnail and the Wekiwa hydrobe. Because there is limited vegetation in the spring boil itself, changes in the abundance and distribution of these animals and their dependent food sources is crucial to implementing successful management strategies necessary for their survival.

- **Florida Scrub-Jay.** The WRBSP Florida scrub-jays represent a distinct part of a broader metapopulation (NE Lake Unit) which includes territories ranging from southern Ocala National Forest south to Wekiwa Springs State Park (Stith 1999; Breininger *et al.* 2002). During this metapopulation analysis, it was recommended that if public land managers continue restoration efforts, the number of overall breeding pairs could substantially increase. Unfortunately, as of 2005 there are still two large and unprotected strategic FSJ areas needing public acquisition to secure a corridor throughout this highly vulnerable metapopulation (Stith 1999). For these reasons, understanding FSJ populations within the basin will need direct multi-agency participation with Seminole State Forest, Ocala National Forest and Blue Spring State Park.

  It is important to note that the Florida Scrub-jay Recovery Team is currently drafting plans for statewide FSJ priorities (Miller 2005). In 2001, a state-wide scrub-jay habitat evaluation was conducted by the Bureau of Natural and Cultural Resources (Johnson 2002). Recommendations from this work are also expected in the near future.

  Since FSJ depend on scrub and scrubby flatwoods communities, it is important to maintain suitable habitat conditions for this species using prescribed fire and/or habitat restoration techniques following current research and allowing for adaptive management. It is also essential to finalize and implement a WRBSP FSJ habitat management plan in order to coordinate priorities for future management decisions of this species in the WRBSP. A graduate student was hired in 2003-2005 to conduct a two-year study on the scrub-jay populations at RSRSR. Florida scrub-jay monitoring efforts in WRBSP need to be continued.

  The following FSJ targets are set for WRBSP:

Wekiwa Springs State Park. With the restoration of the large area of Sand Lake, WSSP has suitable habitat for at least two territories.

Rock Springs Run State Reserve. With the restoration of Spear's scrub, the scrub along CR 433, RS-05/RS-11, and RS-08, RSRSR has suitable habitat for historic 1992 levels of FSJ territories.

Lower Wekiva River Preserve State Park. The scrubby flatwoods area LW-08 should be able to support at least one territory for the FSJ since it has a long burn history and is near maintenance phase. This area should continue to be monitored carefully.

- **Florida Black Bear**. Research on black bears is primarily being handled by the FWC, but park staff plays an important supporting role. These research efforts need to be restarted by the FWC. Since the radio collaring project ended, only minimal monitoring has been done.

Rock Springs Run State Reserve. The park staff maintains the camera in the wildlife underpass and does track counts nearby. The previous study concentrated on bear movement patterns but provided limited information on population density and stability. The study was primarily focused on Rock Springs Run and did not look at the bears using the other units. Roads continue to have a large impact on bears in the Basin. Review of DOT road designs and plans needs to continue, and park staff must be very vigilant to assure that the perpetuation of the Wekiva bear population is not compromised by road widening projects.

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.

In general, the exotic plants within the WRBSP are not species which threaten to create monocultures (e.g. Brazilian pepper, melaleuca) but are instead persistent and widespread species which tend to encroach upon, but not exclude, native species. Most of the exotic plants are species which have escaped from cultivation. Some of the aquatic exotic plants are forming monocultures and out-competing native species in large areas. All the exotics are a threat to the integrity of the unit's natural communities and conflict with the Division of Recreation and Park's goal of preserving and maintaining examples of the natural Florida.

Plants. Hydrilla (*Hydrilla verticillata*) occurs only within Wekiwa Springs State Park. In the fall of 2002, the lagoon was severely choked with hydrilla. The noxious plant had topped off and covered approximately 90 percent of the lagoon's surface. The Aquatic Preserve staff has taken the responsibility of chemically treating this recent infestation. A portion of the lagoon was isolated from the rest of the lagoon using floating turbidity barriers. Once all of the seams had been secured, the area within the barrier was treated with liquid and pellet Sonar. This technique minimized the dilution of the herbicide by diverting the springflow outside of the treatment area. After the herbicide took effect within the isolated portion of the lagoon, the barrier was moved to isolate another portion and treatment continued. This technique took a great deal of time and effort but was extremely effective. The remaining mats of hydrilla were removed by hand using snorkeling gear. This procedure was repeated again in the summer of 2004 using Aquathol K.

Wild taro *(Colocasia esculenta)* is found within WSSP throughout Rock Springs Run and along the Wekiva River. It is a native of the Pacific Islands, and it is frequently sold as an ornamental because of its large leaves. The plant produces seeds, but reproduction also occurs by stolons. Because of its prolific growth, wild taro can become a problem along freshwater marshes and streams by shading out native species (Tarver *et al.* 1979).

Wild taro occurs through much of Rock Springs Run and is a significant exotic problem. It occurs as scattered plants, as dense floating mats and as dense rooted clumps. In 1983, hand

removal was a viable option. Currently, hand removal is only practical for the scattered individual plants. The dense infestations require chemical treatment.

Wild taro is a very serious problem. It spreads rapidly via plants which break off and float downstream. Rock Springs Run and the Little Wekiva River are serving as sources of infestation to the entire Wekiva River. Control efforts need to continue. At present, the best known chemical control method is a mix of 2,4-D, Glyphosphate, cuticle cutter, surfactant and water. This mix is sprayed directly on the leaves, from there it is translocated to the plant's storage organ. Treatment needs to take place throughout the year, but a major emphasis should be placed on the fall and winter months as this is the time when plants will translocate and store the maximum amount of chemical. Wekiva River Aquatic Preserve staff continue to monitor and control wild taro. Given the present staffing of the Park and Aquatic Preserve and equipment constraints, success will be difficult to achieve. If possible, this effort needs to be set up on a contract basis or through OPS funds.

Water hyacinth (*Eichhornia crassipes*) occurs within Wekiwa State Park in several places along Rock Springs Run and within the Wekiva River. It occurs in relatively low concentrations but forms very large mats which sometime block boat traffic along the river. This species is native to Central and South America (Tarver *et al.* 1979).

In areas where concentrations of water hyacinth are relatively low, the plants need to be removed by hand. Concentrations of hyacinth along Rock Springs Run and the Wekiva River may be too extensive for hand removal. Areas where hand removal is possible should be identified and manually cleared. Introduction of weevils, a biological control method, should be explored.

Water lettuce (*Pistia stratiotes*) occurs in the lagoon area within WSSP and along both Rock Springs Run and the Wekiva River. The lettuce forms dense mats in areas where water flow is minimal. Water lettuce is removed from the lagoon by hand. Once it and the water hyacinths are removed, canoe access should be restricted from the area currently populated by spatterdock (*Nuphar lutea*). This protection from disturbance, combined with the elimination of competition for light, should encourage this native species to spread into more of the lagoon area.

Water-cress (*Nasturtium* sp.) has escaped from cultivation and occurs in small amounts in Rock Springs Run. No control measures are proposed at present.

Several clumps of pampas grass (*Cortederia selloana*) have been found growing on the sandbars in the flats area by the river cabin on Rock Springs Run. These clumps need to be dug out by hand and removed or carefully treated with the appropriate chemicals.

Bamboo (*Bambusa* sp.) is native of China (Wunderlin 2003) and has been planted at the unit. There are two known remaining stands within Wekiva River Basin State Parks. The first is found at the McCall tract and has been chemically treated on two occasions. The second is in a small pond behind the Ranger Residence at LWRPSP. Bamboo is a persistent exotic, but it spreads very slowly. The clumps need to be cut low to the ground, and each stem needs to be immediately painted with full strength Garlon 3A to prevent resprouting.

Air-potato (*Dioscorea bulbifera*) occurs in disturbed woods and thickets in scattered locations at the unit. It is a native to tropical Asia and has escaped from cultivation (Wunderlin 2003). Under the right conditions, this vine is very prolific and becomes dense enough to shade out native species. Control of this exotic species will require a long-term effort.

To decrease the reproductive spread of air-potato, fallen potatoes should be collected each year. The potatoes fall from the vine in mid- to late-winter (January-March) and can be removed from the ground. To eliminate adult plants, the tubers need to be dug up out of the ground. In addition to removing the tuber, the entire vine (if there are potatoes on it) also needs to be pulled down and removed.

The camphor tree is native to Asia (Wunderlin 2003) and occurs widely within Wekiwa River Basin State Parks. To date, well over 2,500 trees have been treated. Trees are removed by cutting them down and immediately painting the cut stump with full strength Garlon 3A or with a 25 percent concentration of Garlon 4 used in a basal-bark application.

Chinese wisteria (*Wisteria sinensis*) has historically been found in the main spring head area of Wekiwa Springs State Park. As of 2004, several low vines were reported around the main spring during hurricane cleanup. Wisteria has also been treated at "the homestead" (RS-98) within the West BMK portion of RSRSR. As the name suggests, Chinese wisteria is native to China (Wunderlin 2003). These small vines need to be clipped and the stems immediately painted with full strength Garlon 3A to prevent resprouting.

Chinaberry (*Melia azedarach*) is another native of Asia which is often used as an ornamental and which has escaped from cultivation (Wunderlin 2003). It occurs throughout the unit. It can be treated by cutting the tree and immediately painting the trunk with full strength Garlon 3A to prevent resprouting. Alternatively, hack and squirt methods using 25 percent Garlon 4 is very effective.

Coral ardisia (*Ardisia crenata*), native to Japan and southern Asia (Wunderlin 2003) and garland-flower (*Hedychium coronarium*), native to tropical Asia were planted in the hydric hammock along the nature trail. Another significant patch of coral ardisia is at Sulfur Spring on the Kittridge Tract. It is also located at the south end of West BMK in the hydric hammock edge. It was treated by a contractor in 2000 and retreatments are an ongoing activity.

Coral ardisia and garland-flower can be removed by hand or treated with herbicides. Both species will take repeated removal efforts. Ardisia drops many berries that sprout into new plants. Garland-flowers have extensive roots that easily snap off underground when they are pulled out, and new plants sprout from these old roots.

Japanese climbing fern (*Lygodium japonicum*) is native to the Old World. Under the right conditions, it can spread rampantly and overtake native species. At present, only one area, along the creek at the Primitive Youth Camp, is being treated and monitored.

Sickel pod (*Cassia obtusifolia*), hairy indigo (*Indigofera hirsuta*), lantana (*Lantana* sp.), rattle box (*Crotolaria spectabilis*) and pasture bean (*Sesbania vesicaria*) occur in ruderal areas scattered across the unit. Sickle pod is from tropical America and hairy indigo is from Africa (Wunderlin 2003). Areas are treated sporadically with hand pulling and various herbicides.

Cogongrass occurs in multiple locations within the unit. Repeated treatments using Roundup have proven to be successful in reducing or eliminating cogongrass. In ruderal areas with little hardwood, pine, or overstory cover, low concentrations of Arsenal are mixed with Roundup for improved control. Recent logging activities appeared to have introduced cogongrass to several remote areas of the unit. Follow-up monitoring is ongoing to detect and treat these isolated patches.

Chinese tallow (*Sapium sebiterum*) was discovered in 2002 in great quantities on the Skinner parcel of the Lower Wekiva River Preserve State Park. Subsequently, all trees were cut down and the stumps treated with 25 percent Garlon 4. Monitoring will be ongoing for this invasive tree. It is native to China and Japan and is sought as an ornamental because the leaves turn bright red during the early winter season.

Tropical Soda Apple (*Solanum viarum*) has been located and is widespread in the STS pasture at RSRSR. Using FDEP grant funds, a contractor was hired to treat it in 2002. The results were mixed and significant efforts will be needed to monitor and treat the expansive pastures.

Park staff should continue to coordinate and work with the staff of the Wekiva River Aquatic Preserve in the control of aquatic exotics. The control of these plants depends largely on the resources available from the preserve. A routine method of rechecking treated areas needs to be developed and instituted. Such monitoring needs to involve all park staff.

Animals. Nine-banded armadillos (*Dasypus novemcinctus*) and wild hogs (*Sus scrofa*) occur within the unit but are rarely encountered. Recent control measures by a St. Johns River Water Management District contract have greatly reduced wild hog numbers within the RSRSR. Feral cats and dogs (*Canis domesticus*) are found throughout the unit. Cats tend to be more common around use areas and near fencelines which adjoin private residences. Cats and dogs should be removed immediately. Black rats (*Rattus rattus*) are found in the shop area and are treated with rat poison when necessary. Rhesus monkeys (*Macaca mulatta*), which are native to India, are occasionally seen along Wekiwa Springs Run. They are suspected to be descendants of a colony that used to be housed at DeLeon Springs when it was a zoo.

European starlings (*Sturnus vulgaris*) occur throughout the park in small numbers. There are no control methods used on them. Greenhouse frogs (*Eleutherodactylus planirestris*) are found throughout the unit. Brown anoles (*Anolis sagrei*) are common in areas adjoining private residences and in the main use area. Incidental control of brown anoles is taking place.

Recently, armored catfish (*Pterygoplichthys disjunctivus*) have been seen in large numbers in Wekiwa Springs, Witherington Springs, and Sulfur Springs. As of December 2004, over 600 individuals have been removed by hand. Although their numbers are reduced in the spring and lagoon, populations are established throughout the St. Johns River. The fish congregate at the side spring, especially during cold weather, and can take advantage of the low oxygen conditions in the caves. They feed on small crustaceans, carrion, and occasionally algae. Their powerful burrowing habits have weakened the retaining wall around the main spring. Little is known about their ecology and physiology, other than they have an extremely high rate of fecundity. The winter season is the most effective time to remove these fish by using hand gigs. Another introduced fish moving into central Florida water bodies and now found in two localities of WSSP is brown hopolo (*Hoplosternum littorale*). It was confirmed present in Sulfur Springs (Kitteridge Tract) in 2001, in Mill Creek in 2003, and in Rock Springs Run in 2005. Its distribution should be watched carefully by park staff.

A recent exotic arrival to the Central Florida area and to the WRBSP is the cuban treefrog (*Osteopilus septentrionalis*) (Meshaka 2001). Staff in the WSSP is currently studying this species. A removal project began in 2004 and will be used to assess the distribution and abundance of the species at this unit.

Fire ants (*Solenopsis invicta*) occur throughout the unit. Fire ants, which occur in public use

areas, are treated with Amdro or other chemical approved for use by FDEP.

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.

Gray squirrels (*Sciurus carolinensis*) and raccoons (*Procyon lotor*) are common problem species within the unit. Squirrels are a persistent problem while raccoons are an intermittent problem related to population levels. All of the trash pails are in new "bear proof" containers with sealed lids. Neither squirrels nor raccoons can get into these containers. Park visitors are the major source of food and encouragement to these animals. Interpretation, both through labels and personal contacts, may reduce the feeding of these animals but will not eliminate it. When populations of either species become so high that the species becomes a persistent nuisance, animals are removed from the area.

Florida black bears have also been a significant problem in past years. They have been effectively getting into trash dumpsters, primarily at Wekiwa Springs State Park. However, the park has received financial assistance from the Defenders of Wildlife to purchase and install bear-proof dumpsters and trashcans. The new dumpsters were installed in WSSP in April 2003, and staff is monitoring their effectiveness.

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 Statement).

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.

The general objective for the management of the cultural resources of the WRBSP is to protect, preserve, and interpret the prehistoric and historic resources. Because of the presence of recorded archaeological sites within the parks, management measures for cultural resources should include monitoring the recorded sites, and drafting a proposal for an archaeological reconnaissance survey to investigate areas of the parks which have not yet been covered in any archaeological investigation.

Any ground disturbing activities should be conducted in accordance with DHR guidelines, which specifies that all such activities be subjected to review according to the Division's Cultural Resources Matrix, and that appropriate activities be submitted for comment to the Division of Historical Resources in accordance with Chapter 267, Florida Statutes.

If the recommended archaeological reconnaissance survey locates and identifies any prehistoric and/or historic sites, management measures for cultural resources should develop a phased plan for managing the resources in the context of their surroundings. This should include developing a

workable written plan for the physical management of the identified resources. The plan should outline approved methodologies for executing the plan and training staff and volunteers to manage the cultural resources of the parks.

The park currently has a sufficient number of staff trained and certified as archaeological monitors. As staff changes over time, efforts should be made to insure that there are always at least two certified archaeological monitors for the Basin.

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.

Because of the large area associated with WRBSP and its unique ecological and biological diversity, numerous research needs have been identified for the Wekiva River Basin State Parks. Long-term monitoring protocols for all biota within WRBSP with emphasis on designated species is needed in order to track population changes that may take place because of the extreme wildlife-urban interface associated with the units.

A habitat management plan addressing the needs of the Florida scrub-jay should be updated, finalized and implemented.

Status surveys are needed for the Wekiwa hydrobe, Wekiwa siltsnail, Orlando cave crayfish, Florida mouse, striped newt, and limpkin.

General surveys and voucher collections are also needed for plants, herpetofauna, aquatic cave fauna, and paleontological sites. A feasibility study on the replanting of bald cypress is needed to determine whether it can be successfully replanted in the floodplain swamp community.

Research into pasture restoration is needed, and the development of a resource restoration plan is a must.

There needs to be a complete reassessment of existing natural communities throughout the Wekiva River Basin State Parks. Communities such as wet flatwoods, depression marshes, scrub and scrubby flatwoods need particular attention.

Research is needed on the impacts of exotic animals to native animal populations, namely cats, dogs, cuban treefrogs and brown anoles. Research into treatment techniques of wild taro is greatly needed. Along with research, interpretative outreach should continue to play a key strategic role in public education.

Research on the impact of recreational use throughout all units is sorely lacking. Many National Parks have long been investigating effects of how visitor impacts modify our ecosystems (Bratton *et al.* 1978). Current recreational use of WRBSP springs and spring-runs is only one example where research is needed to determine if use levels may be deleterious to this unique natural feature. Recreational influences such as these need to be studied.

Information indicates a decreased water flow in many of the springs in the basin over the past 50 years. Baseline data in both the surface and groundwater systems is needed for proper resource management and maintenance. A hydrological study exploring the springs' origin, water quality, and quantity would assist in management decisions. In particular, continued monitoring of macroinvertebrate populations (aka Stream Condition Index) is needed in order to determine potential causes for the "poor" scores currently on record (see Management Measures for Natural Resources).

Cultural Resources

While there have been a number of archaeological investigations in particular areas within the Wekiva River Basin State Parks, there has been no formal archaeological reconnaissance survey of LWRPSP, RSRSR, or WSSP. Staff should draft a proposal for an archaeological reconnaissance survey of areas not previously investigated.

Research is needed on environmental change and prehistoric adaptation, development of prehistoric settled communities and social complexity, and aboriginal cultural history. Research is needed on the Wekiwa Springs, Rock Springs Run, and Wekiva River Basin area during the First Spanish Period, the British Period, the Second Spanish Period, Territorial Period, the Second Seminole War, the Confederacy, and Reconstruction. Research is needed for possible evidence or documentation on the farming, timber, and turpentine industries, and on the development of the transportation industries which made them possible. Research is needed on the African-American community of Markham, and on the family genealogies of descendents who survive in the area. Research is needed on the history of both convalescent and recreational tourism in the Wekiva basin, the role of the Apopka Sportsmen's Club on land preservation, and on the history of the acquisition, development, and operation of the Wekiva River State Parks for resource management and recreational use.

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 for conducting priority management activities 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). The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required update of its management plan.

The WRBSP were subject to a land management review in July, 2004. The review team made the following determinations:

1. The land is being managed for the purpose for which it was acquired.
2. The actual management practices, including public access, complied with the management plan for this site.

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, 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.

The Wekiva River Basin State Parks consist of Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. They are located in the counties of Orange, Lake, and Seminole about 20 miles north of Orlando in the central part of the state. The population of these counties has grown 28.7 percent since 1990, and is projected to grow an additional 23.7 percent by 2010 (BEBR, University of Florida, 2000). As of 2000, 19.6 percent of residents in these counties were in the 0-14 age group, 43.1 percent in the 15-44 age group, 22.7 percent in the 45-64 age group, and 14.6 percent were aged 65 and over. These percentages indicate a larger proportion in the younger two age groups than the state average (BEBR, University of Florida, 2000). Nearly 2,836,000 people reside within 50 miles of the park, which includes the cities of Orlando, Daytona Beach, Ocala, and Titusville (U.S. Census, 2000).

In the FY 2003-2004, Wekiwa Springs State Park (WSSP) recorded 213,524 visitors, Rock Springs Run State Preserve (RSRSP) had 11,544 and Lower Wekiwa River Preserve State Park (LWRPSP) had 7,423 to make a total of 232,491 for the Wekiva River Basin State Parks. These visitation totals are a slight increase for WSSP over the last five years; an increase of 78 percent for RSRSP, and an 83 percent increase for LWRPSP. By DRP estimates, these visitors contributed $6,916,570 in direct economic impact and the equivalent of 138 jobs to the local economy (Florida Department of Environmental Protection, 2004).

Existing Use of Adjacent Lands

The Wekiva River Basin State Parks stretch along the Wekiva and St. Johns Rivers in an area of rapid growth, in north Orange, west Seminole, and southeast Lake Counties.

W**ekiwa Springs State Park** is the southern most of the three parks and is located in Orange and Seminole Counties. The main entrance is off Wekiwa Springs Road, the parks southern boundary. The western boundary is Rock Springs Road. The north side of Rock Springs Run forms the north and east park boundary. The major population center of Orlando lies about 10 miles to the south so the southern boundary of this park is heavily urbanized with residential subdivisions and commercial development. The western edge has the same as well as some agricultural uses and Kelly Park, managed by Orange County, which contains the headspring for Rock Springs Run. WSSP has a separate parcel to the east of the Wekiva River in Seminole County called the Markham Woods Property. It is surrounded by residential and institutional uses to the north, east and south and the western edge encompasses the Wekiva River. The sovereignty submerged lands of the Wekiva River are part of the park from the headwaters north to the abandoned Seaboard Coast Line Railroad just north of the Markham Woods property.

Rock Springs Run State Reserve is northeast of WSSP and the north side of Rock Springs Run forms the boundary between them. The Wekiva River is the eastern boundary up to the abandoned Seaboard Coast Line Railroad. The area just north of this has a privately run campground with RV sites and a canoe launch. The park entrance is on SR 46, which is the northern boundary. To the west is SR 435, agricultural and low-density residential uses. The agricultural uses are mainly grazing and plant nurseries with extensive greenhouses. The park is located in Orange and Lake Counties. Wilson's Landing is a Seminole County park on the east bank of the Wekiva River, south of SR 46. It will have mooring facilities but no boat launching.

Lower Wekiva River Preserve State Park is the northernmost of the three parks and lies primarily in Lake County, extending into Seminole County on the east. The southeastern boundary is SR 46 and adjacencies here are designated conservation, low density residential, and public uses. The western boundary is low density residential and the Seminole State Forest. The sovereignty submerged lands of the Wekiva River are part of the park from the confluence with the St. Johns River south to the section where privately owned property is adjacent to the east bank of the river. Access to the park is from SR 44 in the north and SR 46 in the south. Hontoon Island State Park and Blue Spring State Park are along the northeast boundary. Much of the park is part of the Wekiva River Aquatic Preserve. Two disjunct parcels, Skinner and Jung Tracts, lie to the north and connect to Hontoon Island and the Ocala National Forest. Camping is available in the state parks and national and state forests adjacent to LWRPSP.

Planned Use of Adjacent Lands

The future land uses for Orange County on property adjacent to WSSP and RSRSR are Rural Agriculture (1 DU per 10 acres), Low Density Residential (4 DU per acre), and Rural Settlement (1 DU per 5 acres) (Orange County Comprehensive Policy Plan, Future Land Use 2000-2020, 2000). In Lake County the LWRPSP and RSRSR adjacent future land uses allow 1 DU per 20 acres to 5.5 DU per acre on rural lands (Future Land Use Plan Map, Lake County – 2005, 1999). Seminole County has adjacencies to WSSP and LWRPSP and these are designated Rural-3 (1 DU per 3 acres), Conservation and a Planned Development that allows for mixed uses of residential, non-residential, recreation and educational (Seminole County

Vision 2020 Comprehensive Plan, 2003). The northwestern portion of LWRPSP is adjacent to Volusia County and the future land use here is Conservation (Volusia County Comprehensive Plan, 2000).

Vacant lands surrounding the parks, particularly following the corridors of SR 429 and I-4, are rapidly being developed for residential and commercial uses. Without provisions, development activity may adversely affect the visitor experience by increased noise and air pollution, vehicle and boat traffic, and visual intrusions. In addition, park resources can be impacted from changes in historic water flow patterns, predatory domestic animals, increases in water withdrawal, accidental road kills, difficulty in managing the prescribed burning program and unauthorized crossings of park boundaries. In order to maintain a quality visitor experience and protect the natural resources, the Division will continue to coordinate with adjacent landowners, transportation planners, local development officials, and regulatory agencies to provide appropriate land development and environmental regulations.

In 2004 the Florida Legislature adopted the *Wekiva Parkway and Protection Act*. This closely adheres to the recommendation of the Wekiva River Basin Coordinating Committee's Final Report (March 16, 2004) which delineates a corridor for the "Wekiva Parkway" connecting SR 429 and Interstate 4. This corridor follows SR 46 along the RSRSR northern boundary and LWRPSSP southern portion. Impacts will be felt by the flora and fauna in these two parks and Seminole State Forest. Recommended parkway design features include limited access with interchanges, natural buffers, maximum provisions for bridging through strategically important wetlands and wildlife corridors, non-intrusive and minimal lighting, and safety features to promote the continuation of prescribed burning. Other recommendations address water quality and quantity in the Wekiva Study Area and the necessity to coordinate local comprehensive and land use planning. The Division will continue to be involved and follow the Wekiva River Basin Coordinating Committee recommended actions.

The Wekiva River has been designated a Wild and Scenic River. Cooperation with the National Park Service in the development of the Wekiva River management plan is also important.

Greenways and Trails. With a larger percentage of the population in this area predicted to be in the younger (1-44 years) age groups, a higher demand for active resource based recreational opportunities is expected. Hiking, biking, equestrian and canoe trails will meet some of these needs.

There is an ongoing initiative by the Conservation and Recreation Lands (C.A.R.L.) program to purchase some of the remaining undeveloped land located between the northern edge of LWRPSP and the Ocala National Forest to provide a physical connection for wildlife movement and human recreation. The Wekiva-Ocala Greenway project incorporates most of the forested wetlands along the St. Johns and Wekiva Rivers between Orlando and the Ocala National Forest. The primary goals of management for this project are to conserve and protect environmentally unique lands that contain native and relatively unaltered flora and fauna, protect significant habitat for native and endangered species, and provide recreational trails and other natural resource based recreation. This initiative is strongly encouraged by the Division.

Orange County manages the West Orange Trail, a multi-purpose recreational trail, which currently runs from State Road 50, the Lake/Orange County line, to Rock Springs Road in

Apopka. The 14' wide asphalt trail serves pedestrians, skaters, bikers, and a natural surface equestrian trail, when complete, will parallel the paved trail west of the City of Apopka. Phase IV will extend the West Orange Trail from its current terminus to Kelly Park, located at the northwest corner of Wekiwa Springs State Park, and to the main park entrance on Wekiwa Springs Road. A section of this phase, north along Rock Springs Road, is complete.

Lake County and Seminole County are also working on greenway projects. The Seminole-Wekiva trail, a 14 mile multi-use rail-trail, extends from State Road 436 to Markham Road west of Orange Blvd. The county has built a trailhead off Markham Road on an 11-acre encumbrance from WSSP. The Seminole-Wekiva Trail connects to the Rinehart Rd./Crossings Trail via an overpass over I-4. The Seminole-Wekiva to Cross Seminole Connector is currently under research and master planning. This connection will create a 30-mile continuous paved trail connecting Altamonte Springs, Longwood, Lake Mary, Winter Springs, and Oviedo and with the Cady Way Trail and the Orange County Trails System. The existing Seminole-Wekiva Trail includes a portion of the Florida National Scenic Trail in southern LWRPSP.

Trails in the northern section of Lower Wekiva River Preserve SP connect to trails in Seminole State Forest and this connection will be maintained. Lake County future plans are to link Seminole County's Seminole-Wekiva with the Sorrento to Seminole County Line Trail. The Division of Recreation and Parks will continue cooperative efforts to plan and manage connections to state FTA trails and local greenway projects and to complete the Florida National Scenic Trail through the Wekiva River Basin State Parks.

Wekiwa Spring Run and the Wekiva River are part of the designated State Canoe Trail. Efforts should be made to connect with county blueways projects if applicable.

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 whose 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.

Natural Features

The Wekiva River is a common tie for these three parks. In the southern section Wekiwa Springs connects with Rock Springs Run to form the Wekiva River. The river, which is included in the parks' boundaries flows north, joining the St. Johns River. Much of the river corridor is hydric hammock, floodplain swamp and floodplain marsh. The combined palustrine, lacustrine and riverine communities within the parks accounts for approximately 62 percent of parklands. The majority of these wetlands are inaccessible for recreational purposes but provide important buffers for the river and spring-runs and extensive habitat protection.

The approximately 15 miles of the Wekiva River, the 8.5 miles of Rock Springs Run, and Wekiwa Springs provide the primary recreational attraction for the Wekiva River Basin State Parks. The National Park Service has designated the Wekiva River as a Wild and Scenic River. Recreational activities on these waters should be limited to canoeing, kayaking, fishing and nature study. Efforts should be made to balance these popular activities with the health of the resource.

The uplands of the three parks are comprised mainly of mesic flatwoods, sandhill and scrub communities. They support a variety of recreational opportunities in addition to diverse opportunities for nature observation, interpretive education, and nature photography. Ongoing restoration of the scrub and sandhill communities is successful. A number of designated plants are found within the park boundaries, three of which are endangered.

The springs, rivers, lakes, swamps and uplands of the Wekiva River Basin State Parks are considered significant wildlife habitat. They are an important refuge for the Florida black bear, bald eagle, swallow-tailed kite, Florida scrub-jay, large populations of wading birds, and two species of endemic snails. Over 40 listed species are documented. The area's significance for birding is evident by the inclusion of all three parks within the East Section of the Great Florida Birding Trail. Research and wildlife viewing opportunities abound.

Wekiwa Springs State Park. Wekiwa Springs is a second magnitude spring. People have been attracted to its waters since prehistoric times. It is an extremely popular destination for swimming and sunning in the hot summer months. Estimated peak use of the main spring area in the summer is between 1,200 and 1,500 persons per day. A bulkhead surrounds the shoreline of the springhead and a short portion of the spring-run, allowing visitors easy access from land.

The flatwood and sandhill communities found at WSSP support camping, hiking, horseback riding, and educational facilities. The WSSP sandhill community of 1,500 acres is one of the largest holdings of this community type in the state park system. An ongoing burn regime has made it a statewide example of restoration and maintenance.

Rock Springs Run State Reserve. The park is bordered on the south by Rock Springs Run and to the east the Wekiva River is within the boundary. However, these water bodies are not easily accessible by land so recreation opportunities focus on the uplands. An extensive trail system takes hikers and horseback riders through scrub and flatwoods communities, a habitat for numerous listed plants and animals. SR 46, on the parks northern boundary, has two wildlife underpasses to help reduce the vehicle-caused deaths of the Florida black bear.

Lower Wekiva River Preserve State Park. Approximately 74 percent of this park is floodplain swamp located largely along the Wekiva and St. Johns River basins. The water and land based recreational opportunities are focused on different areas of the park. Canoeing and kayaking are the best way to appreciate the magnificent views of the wetland communities, the rivers, and Blackwater Creek and associated wildlife. Katie's Landing, a recent addition to LWRPSP southeastern section, is the one area to offer access to the river. The access, along approximately 400 ft. of the Wekiva River's eastern shoreline, provides an area for canoe and kayak launching. There are also hiking trails from the SR 46 entrance north along the eastern side of the Wekiva River, including a soon to be certified segment of the Florida National Scenic Trail. In the ruderal areas on the northwestern side of LWRPSP hiking and equestrian activities are provided.

Archaeological and Historical Features

There are 50 known archaeological sites within the boundaries of the Wekiva River Basin State Parks. The areas around the springheads, spring-runs and rivers were occupied by native Americans during the full sequence of Precolumbian cultural periods through the historic periods.

Wekiwa Springs State Park. Numerous shell middens are located along the banks of the Wekiva River, Rock Springs Run, and Wekiwa Springs. Many of these sites have limited interpretive value due to the poor condition or inaccessibility. The Markham Woods property has some historic sites from past use by an African American community. Of these, the cemetery is in the best condition.

Rock Springs Run State Reserve. Shell middens along the banks of the river and spring-run and lithic waste scatter sites in the interior of the park make up the prehistoric archaeology. The former town of Ethel community cemetery has four intact grave markers.

Lower Wekiva River Preserve State Park. Of the 12 prehistoric sites in LWRPSP, 11 are often inaccessible due to high water and heavy vegetation. They consist largely of shell middens and shell mounds. The one historic site is a logging trail.

Assessment of Use

All legal boundaries, significant natural features, structures, facilities, roads, trails and easements existing in the unit are delineated on the base map (see Base Map). Specific uses made of the unit are briefly described in the following sections.

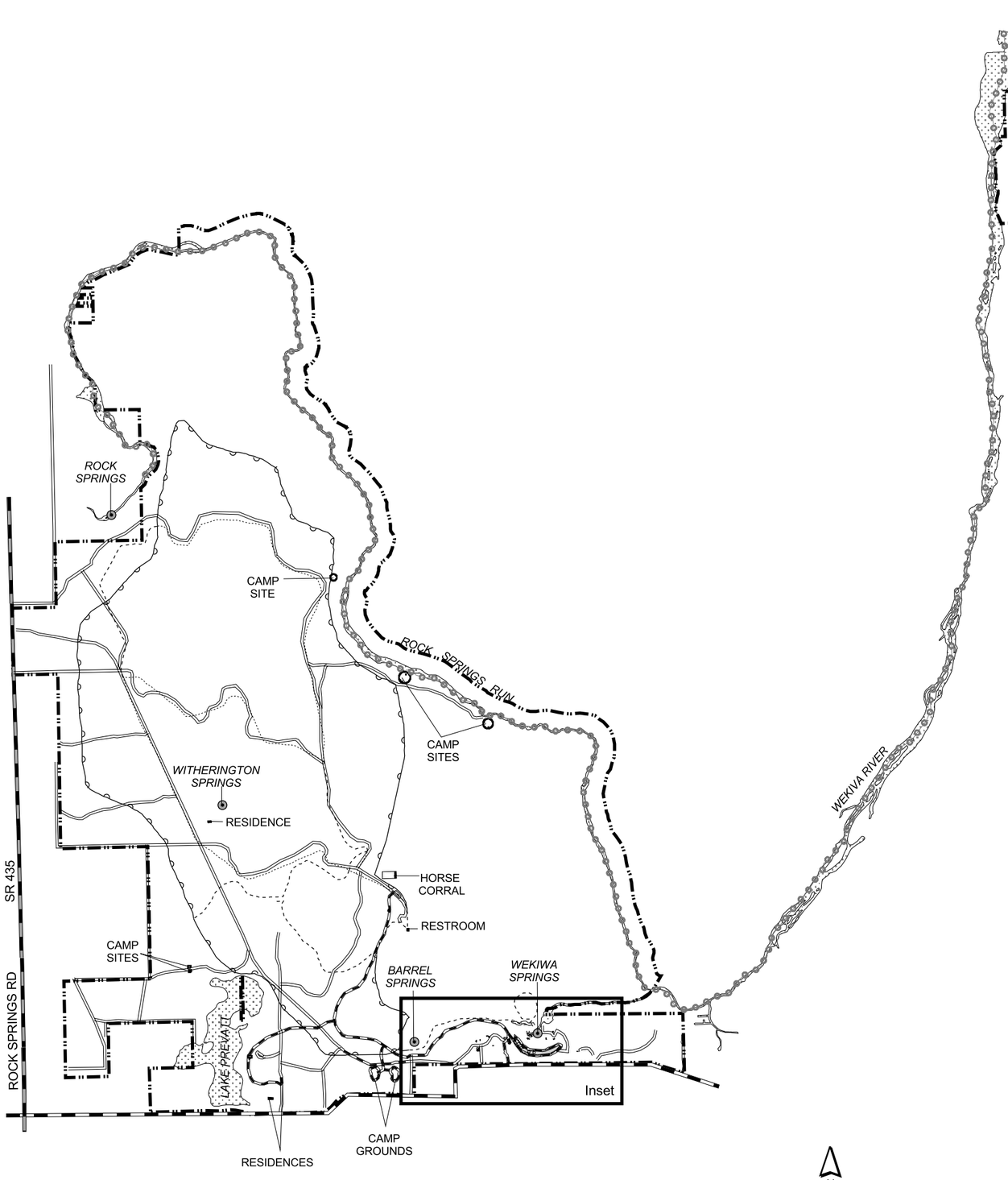
Past Uses

Native Americans, the Timucuans, used the streams and uplands of these parks for hunting and gathering food. The numerous middens and mounds along the Wekiva River and Rock Springs Run are the visible remains of the Timucuans' former presence. Historic uses of the property have included farming, ranching, small commercial milling operations, shipping, turpentine extraction, extensive logging of timber, hunting and other recreational activities. Logging occurred on all units of the Wekiva River Basin State Parks, removing what were probably the park's largest cypress, pine, and wetland hardwood trees. These activities left elevated tram beds and ditches that altered the natural hydrology.

Wekiwa Springs State Park. From the 1880s to 1890s, tourism facilities located at Wekiwa Springs included a hotel, sanitarium, cabins, bathhouse, boat docks, and a rail toboggan ride. The Markham Woods property was the site of a turpentine settlement around the 1880s. The Wekiwa Springs State Park property was used as a private hunting club from 1934 until the state purchased the property in 1969.

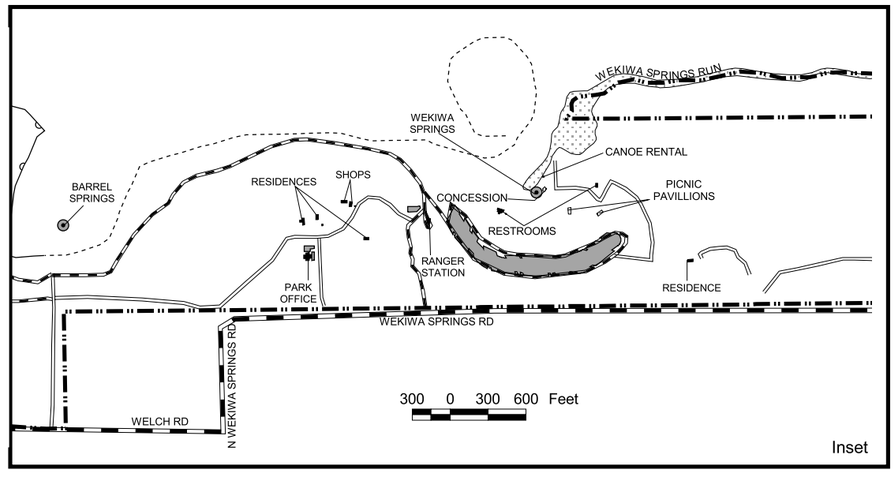
Rock Springs Run State Reserve. Parts of the park were used for ranching (EK Ranch) and as a hunt club prior to purchase by the state. The town of Ethel is reported to have been located east of County Road 433 on what is now park property. An historic cemetery remains as evidence of the settlement.

Lower Wekiva River Preserve State Park. Other than the historic uses of logging and agricultural mentioned above, a six-acre parcel along the Wekiva River operated as a fish camp. Katie’s Landing was privately owned and operated from the late 1940s until the time of joint purchase by the state and Seminole County on December 18, 2001.



LEGEND

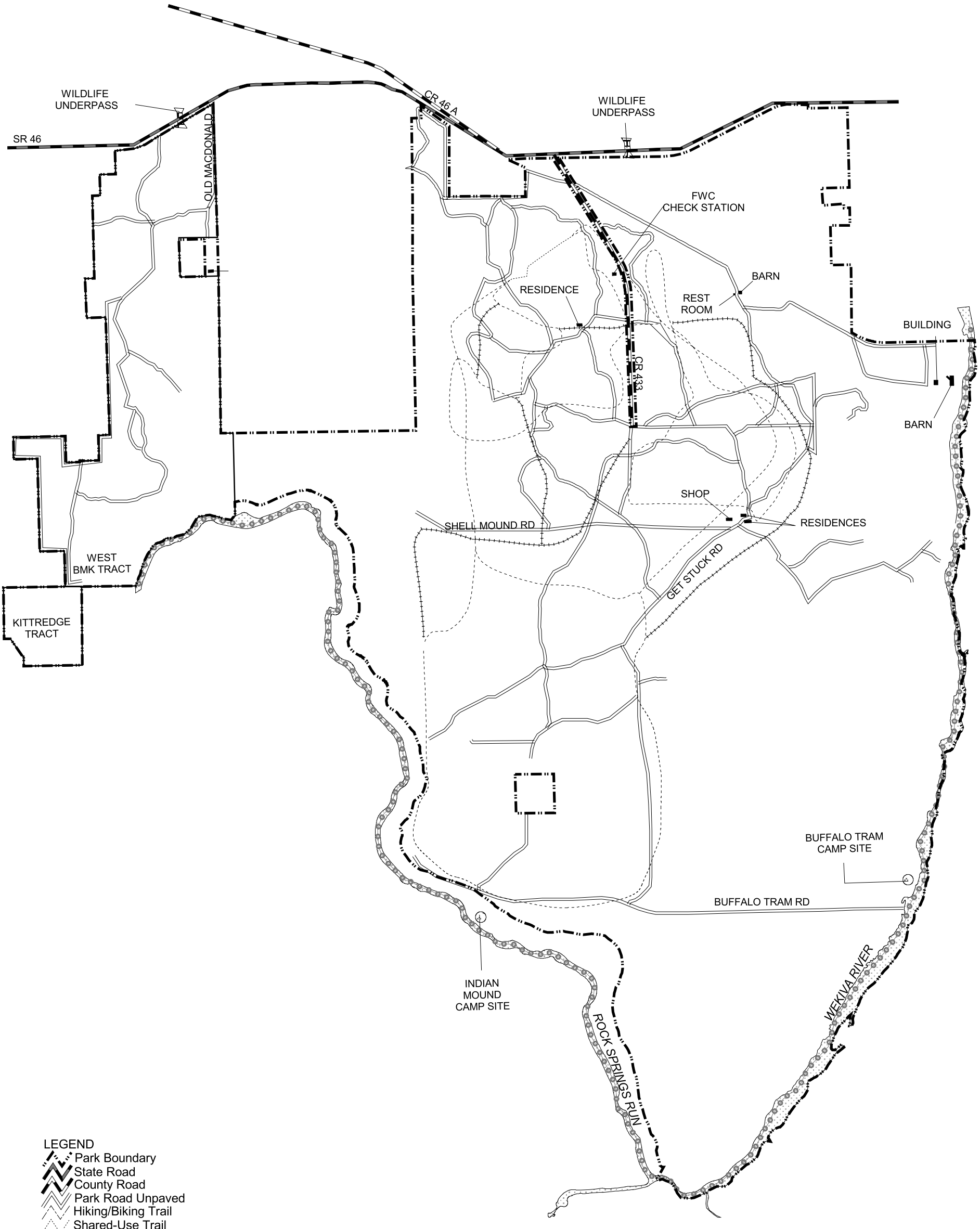
- Park Boundary
- State Road
- County Road
- Park Road Paved
- Park Road Unpaved
- Hiking Trail
- Shared-Use Trail
- FTA Trail
- Canoe/Kayak Trail
- Walkways
- Structure
- Parking Lots
- Special Use
- Camp Sites
- Springs
- Water Bodies



WEKIWA SPRINGS STATE PARK

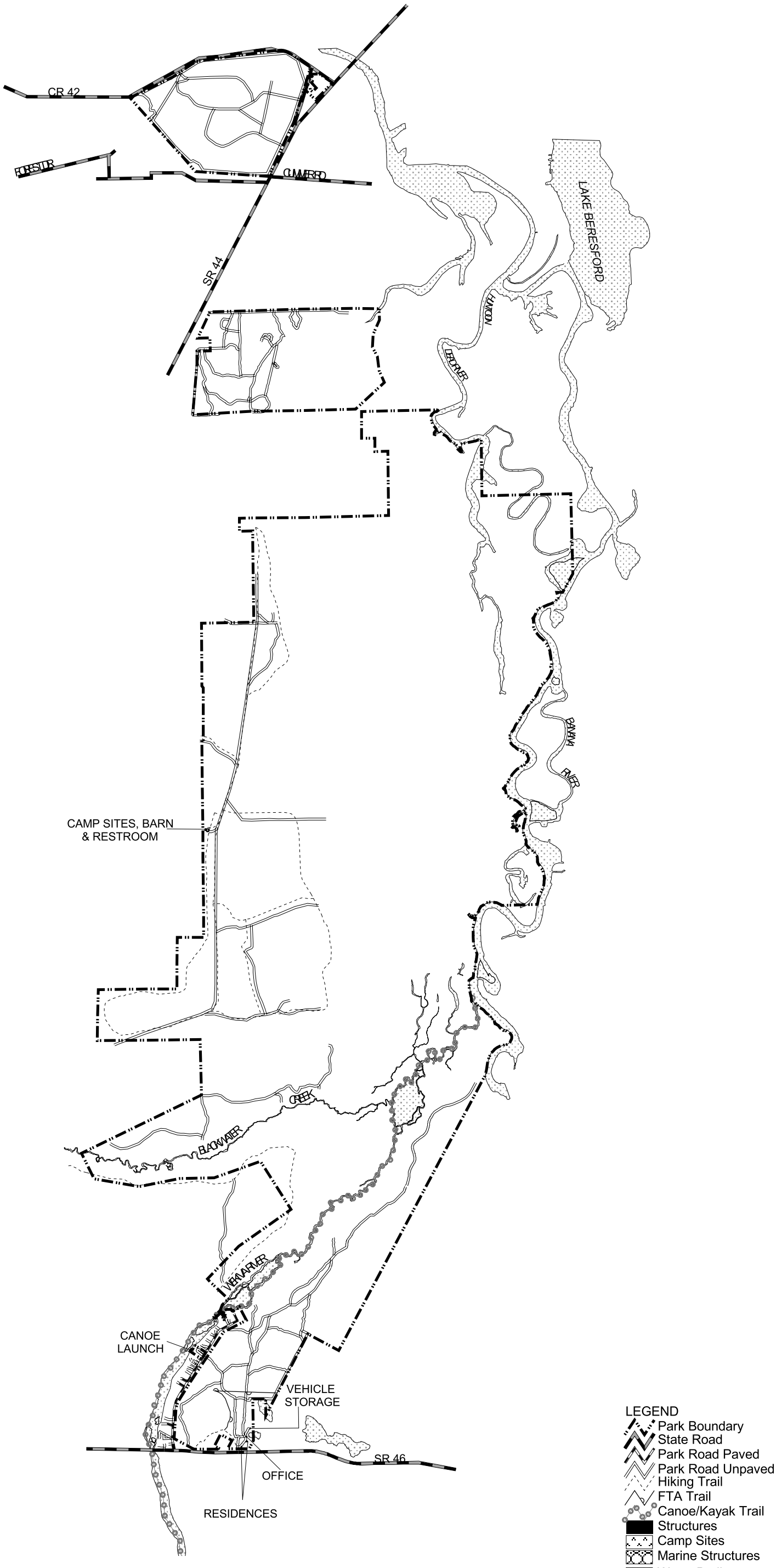
BASE MAP

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



ROCK SPRINGS RUN STATE RESERVE

BASE MAP



LEGEND

- Park Boundary
- State Road
- Park Road Paved
- Park Road Unpaved
- Hiking Trail
- FTA Trail
- Canoe/Kayak Trail
- Structures
- Camp Sites
- Marine Structures
- Water Bodies

N

3000 0 3000 6000 Feet

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

LOWER WEKIVA RIVER PERSERVE STATE PARK

BASE MAP

Recreational Uses

The Wekiva River Basin State Parks provide an important source for resource-based recreation within the highly urbanized Orange-Seminole area. In addition, the parks serve as an outstanding resource for environmental education tours, research and interpretation of natural systems restoration and management.

Wekiwa Springs State Park. Under the Division's management, facilities development has occurred primarily at the southern end of Wekiwa Springs State Park. These provide for swimming, fishing, cabin, standard and primitive camping, hiking, biking, horseback riding, canoeing, picnicking, and nature study. A canoe rental concession is located on the spring-run at WSSP and one-way trips with shuttle service available to Katie's Landing.

Three other private canoeing and tubing outfitters are located along Rock Springs Run and the Wekiva River. King's Landing is located on Rock Springs Run and has 150 canoes for rent, with approximately 60-70 canoes being rented on any given weekend day during the summer. They offer a shuttle service to canoeists, which has several designated drop off and pickup points along the Wekiva River. Wekiva Marina and Wekiva Falls are located along the Wekiva River and have 165 and 100 rental canoes, respectively. In addition to canoe rentals, Wekiva River Haven, located on the northern end of the Wekiva River, has ten eight-horsepower motorboats and two rowboats available for rent.

Also at Wekiwa Springs, on the Markham Woods property, an open-air environmental education center has been established on the eastern edge of the park property. It is a joint venture with the Heathrow Elementary School, located directly across Markham Woods Road.

Rock Springs Run State Reserve. Rock Springs Run State Reserve is managed jointly by the Division, the Florida Fish and Wildlife Conservation Commission (FWCC), the Division of Forestry, and the St. Johns River WMD. Recreational activities at the park are hiking, biking, horseback riding, and primitive equestrian camping. A concessionaire rents horses for use at the park. Seasonal hunting is allowed in Rock Springs Run State Reserve, as well as on the adjacent Seminole State Forest, west of the Lower Wekiva River Preserve State Park. The hunting in Rock Springs Run State Reserve is managed by the FWCC. Approximately 24 days between September and early January, are designated each year for archery, gun and small game hunts. No camping or horseback riding is permitted in the Reserve during these scheduled hunting days, and hunters must check in and out at designated check stations.

Lower Wekiva River Preserve State Park. The Lower Wekiva River Preserve State Park provides shared-use trails for hiking, biking, and horseback riding. Canoe and kayak launching is available at Katie's Landing. The Jung and Skinner parcels, located north of the main body of the state preserve, are separated from each other and the rest of the park. Public use facilities are not proposed for these properties until future land acquisitions make them contiguous with the rest of the state preserve.

Other Uses

Wekiwa Springs State Park. The Florida Park Service District 3 Headquarters is located at Wekiwa Springs State Park. Five office trailers, equipment storage buildings and parking facilities are situated just off Wekiwa Springs Road at the southern park boundary.

Camp Thunderbird is a facility developed and operated by the Florida Department of Children

and Family Services for outdoor recreation for physically and mentally challenged persons. The camp parcel, containing approximately 20 acres, is located near the southeast corner of Wekiwa Springs State Park. The Division subleased the property to HRS in 1971, for a term of 50 years.

Wekiwa Springs State Park Youth Camp, operated by the Division, has primitive cabins, leader cabins, bathhouses, a dining hall, a recreation building, an infirmary, and a swimming pool. This facility is available to groups whose main purpose is the provision of environmental education. It also serves as the main Florida Park Service training center.

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 the Wekiva River Basin State Parks the sandhill, scrub, baygall, depression marsh, dome, floodplain swamp, floodplain marsh, flatwood/prairie lake, sandhill upland lake, marsh lake, blackwater stream and spring-run stream communities have been designated as protected zones as delineated on the Conceptual Land Use Plan.

Existing Facilities

Wekiwa Springs State Park. Facility development within the three Wekiva River Basin State Parks has occurred primarily at the southern end of Wekiwa Springs State Park. This is in part due to the popularity of Wekiwa Spring, one of the primary use areas. Other popular use areas are the standard campground and the Youth Camp. Hiking trails have been established throughout the park. There is a canoe trail on Rock Springs Run and a canoe rental concession is located on the spring-run. Interpretive signs explaining the natural and historic resources found at the park have been placed in the Main Day Use Area around the spring and along the trails. On the Markham Woods property more facilities are being developed in cooperation with Heathrow Elementary School to facilitate environmental education. District offices are located near the main park entrance.

Recreation Facilities

Main Day Use Area
Swimming Area
Canoe Rental Area
Picnic Pavilion (2)
Restroom (3)

Camping Area
Standard (60 site)
Bathhouse (2)

Primitive Camping
Canoe access (2)
Hike-in access (1)
Equestrian access (1)
Youth (3)

Group Camp Area
Cabins (19)
Bathhouse (2)
Dining Hall
Recreation Building
Infirmary
Swimming Pool

Markham Woods
Benches
Interpretive Kiosks

Trails
Hiking/ Nature (13mi)
Equestrian (8mi)

Trails
Biking (9mi)
Multi-use (37mi)
Canoe (8mi)

Support Facilities

Main Day Use Area
Concession
Paved Parking (300 cars)

Camping Area
Campground Host Sites (2)

Shop Area
4 Bay Pole Barn
Shop Buildings (2)
Sheds

District 3 Headquarters
Office Trailers (7)
Parking (30 cars)

Ranger Residences (6)
Employee Owned Trailer Sites (2)

Rock Springs Run State Reserve. The recreational activities at this park focus on the trails. There are marked hiking, biking and equestrian trails and an additional 32 miles of multi-use trails on the existing unpaved roads. The reserve is closed to camping and horseback riding during the nine weekends of special hunts each fall. A trail head kiosk is located on the main paved entrance road. A barn and restroom are located at the horse camp area. The horse rental concession operates from this location. Shop support facilities are in the ranger residence area. A four bedroom house (referred to as the River House), part of the original land acquisition, is located near the Wekiva River in the northeastern part of the park. It is presently unoccupied.

Recreation Facilities

Trails
Hiking (14mi)
Equestrian (17mi)
Biking (15mi)
Multi-Use (32mi)

Primitive Camping
Canoe Access (2) - access from river only
Equestrian access (10)

Equestrian Facilities
Horse Barn
Restroom

Support Facilities

Ranger Residence (4)
Volunteer Residence Site (1)
Old Hunt Cabin
River House

Shop Area
4 Bay Shop
Office

Lower Wekiva River Preserve State Park. Much of this park is inaccessible due to the wetland conditions. Selected logging tram roads that interrupted the natural water flow are being removed to restore the natural communities. Western sections of the park have trails to accommodate horseback riders and hikers in addition to multi-use unpaved roads. A horse camp equipped with a barn, watering trough, and restroom is located near the north entrance. On the eastern section, Katie's Landing provides access to the Wekiva River with launch facilities for canoes and kayaks. There are hiking trails from the SR46 entrance. This entrance has an office used by the Aquatic Preserve, a ranger residence, and an RV site for a volunteer.

Recreation Facilities

Primitive Camping
Equestrian access (1)

Trails
Multi-Use (41mi)
Canoe (42mi)

Equestrian Facilities
Horse Barn
Restroom

Katie's Landing
Canoe/Kayak Launch

Support Facilities

South Entrance
Vehicle Storage (small)
Office (Aquatic Preserve)

Volunteer Residence Site (1)
Ranger Residence (1)

CONCEPTUAL LAND USE PLAN

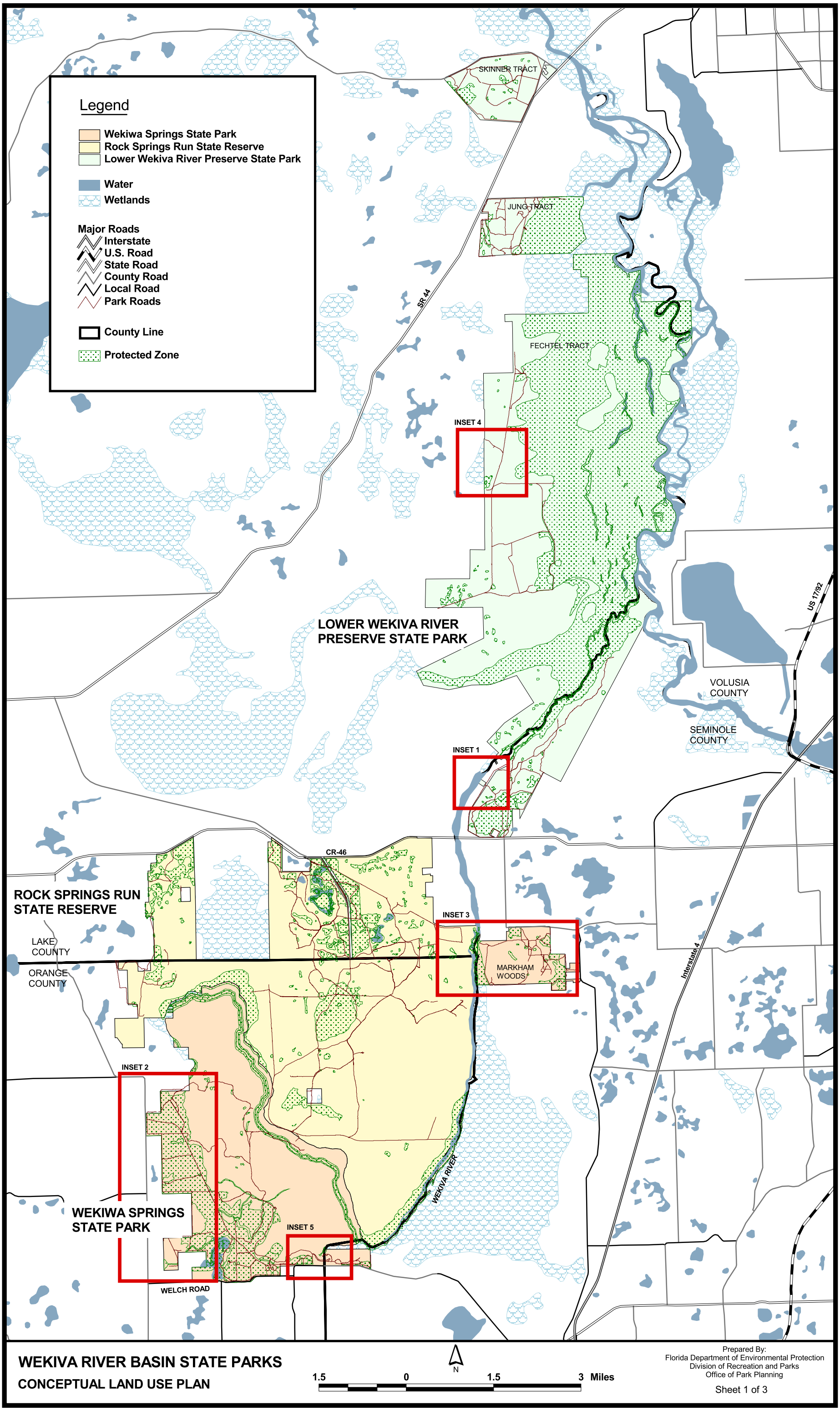
The following narrative represents the current conceptual land use proposal for this park. As new information is provided regarding the environment of the park, cultural resources, recreational use, and as new land is acquired, the conceptual land use plan may be amended to address the new conditions (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 existing recreational uses within all these parks are appropriate and should be continued. The park location, in an area of rapid urbanization, will place increasing importance on the preservation and interpretive value of the natural resources. Additional facilities include upgraded and expanded picnicking, hiking, bicycling, horseback riding, and canoe/kayak launching facilities. Proposed new facilities include a visitor center to serve the three parks.

Expanded opportunities are proposed to educate visitors on the importance of the watershed protection in water quantity and quality in the springs, rivers and drinking water, on the park's rich diversity of flora and fauna, on the role prescribed fire plays in the maintenance of the natural communities, and on the long history of human influence. The existing Statement of Interpretation, along with new research on the natural and cultural features, should bring together a rich source of information for an interpretive center, site specific interpretation, and


Legend
Wekiwa Springs State Park
Rock Springs Run State Reserve
Lower Wekiva River Preserve State Park
Water
Wetlands
Major Roads
Interstate
U.S. Road
State Road
County Road
Local Road
Park Roads
County Line
Protected Zone
SKINNER TRACT
JUNG TRACT
FECHTEL TRACT
SR 44
INSET 4
LOWER WEKIVA RIVER
PRESERVE STATE PARK
US 17/92
VOLUSIA
COUNTY
SEMINOLE
COUNTY
INSET 1
CR-46
ROCK SPRINGS RUN
STATE RESERVE
LAKE
COUNTY
ORANGE
COUNTY
INSET 3
MARKHAM
WOODS
Interstate 4
INSET 2
WEKIVA RIVER
WEKIWA SPRINGS
STATE PARK
INSET 5
WELCH ROAD
WEKIVA RIVER BASIN STATE PARKS
CONCEPTUAL LAND USE PLAN
N
1.5 0 1.5 3 Miles
Prepared By:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning
Sheet 1 of 3

BULKHEAD AND DOCK
TO BE REMOVED

WEKIVA RIVER

CANOE/KAYAK
LAUNCH AREA

DOCK/ BOAT LANDING

MIDDEN

PICNIC AREA DROP OFF

CONCESSION
& RESTROOM

PICNIC AREA

PARKING

SINGLE LANE
LOOP ROAD

VEHICULAR ACCESS
TO LAUNCH

PARKING

WEKIVA PARK DRIVE

Legend

- Park Boundary
- Vegetative Buffer
- Proposed Road
- Proposed Trail
- Proposed Development Area
- Proposed Facility

INSET 1

LOWER WEKIVA RIVER PRESERVE STATE PARK - KATIE'S LANDING

100 0 N 100 200 Feet

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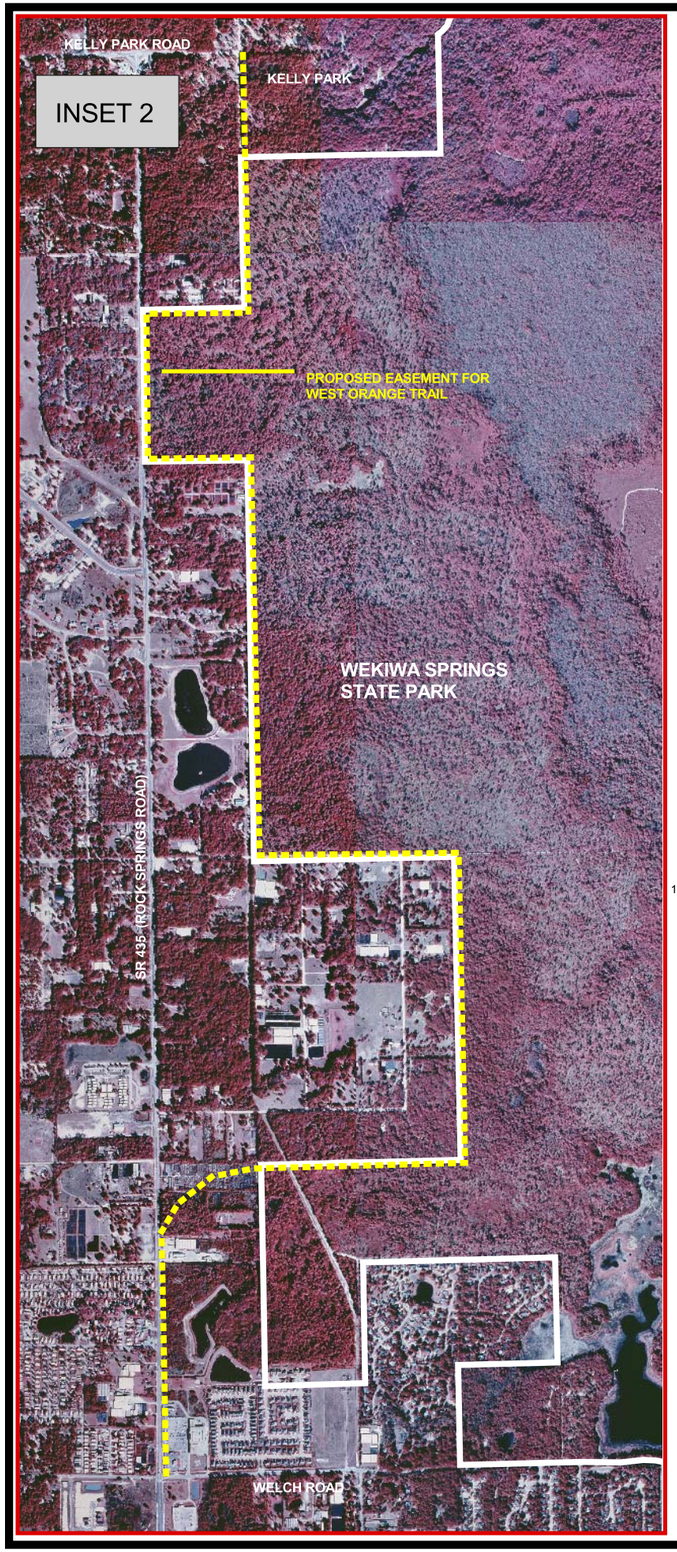
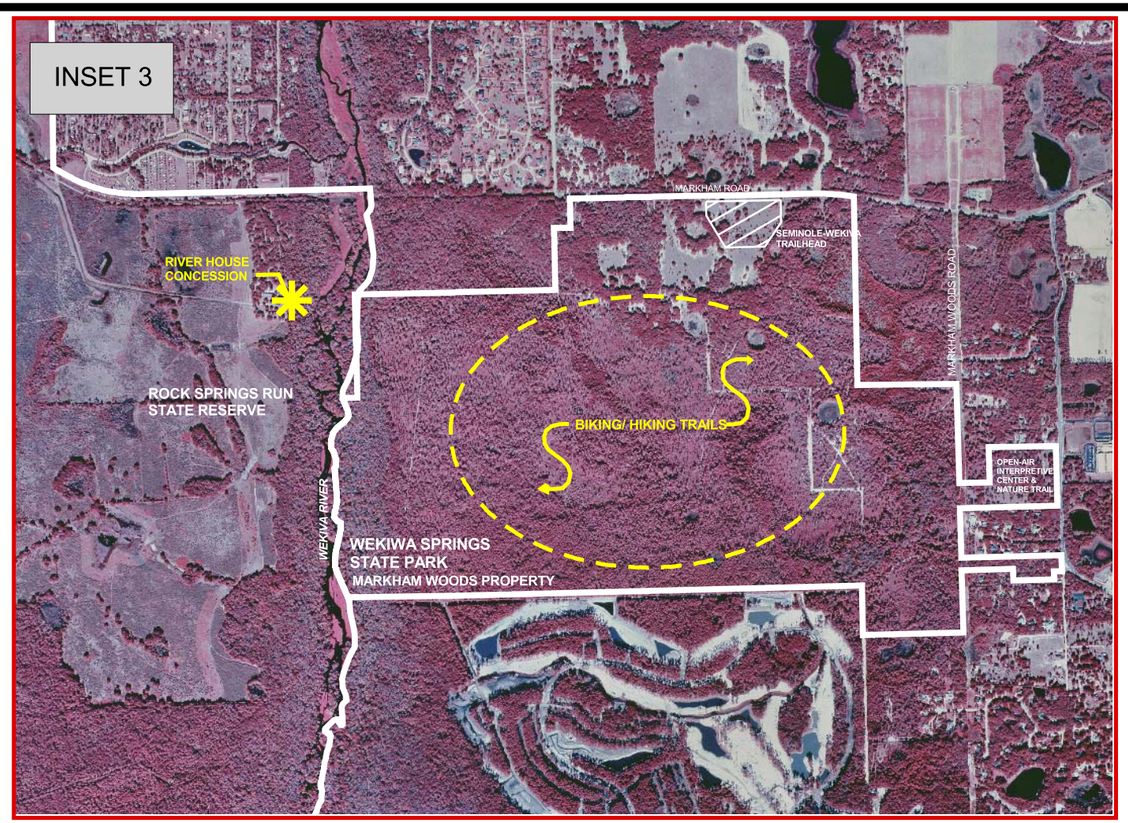
WEKIVA RIVER BASIN STATE PARKS
CONCEPTUAL LAND USE PLAN
SHEET 2 OF 3





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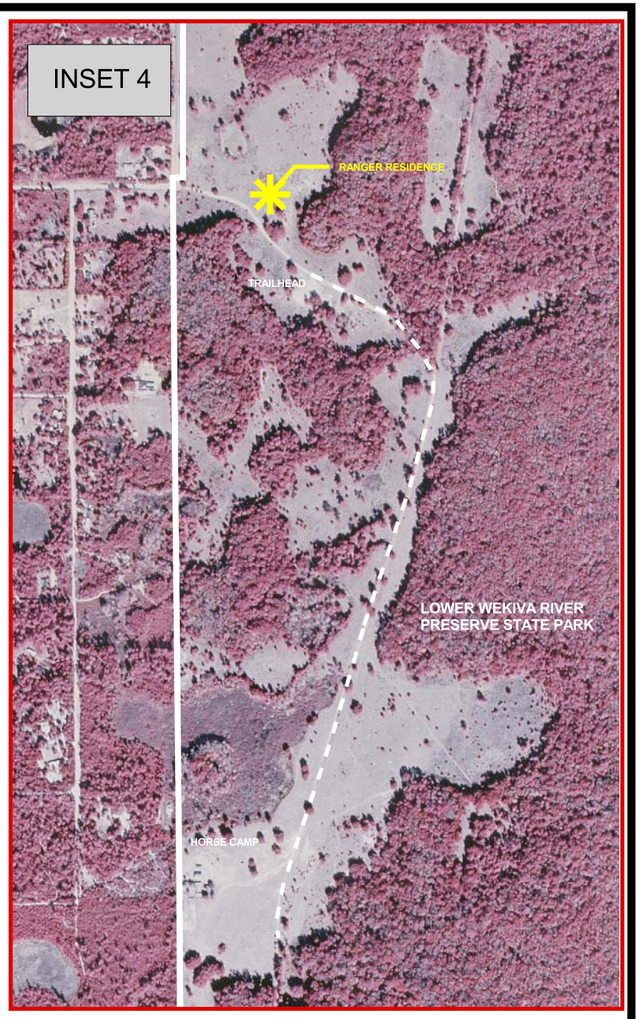

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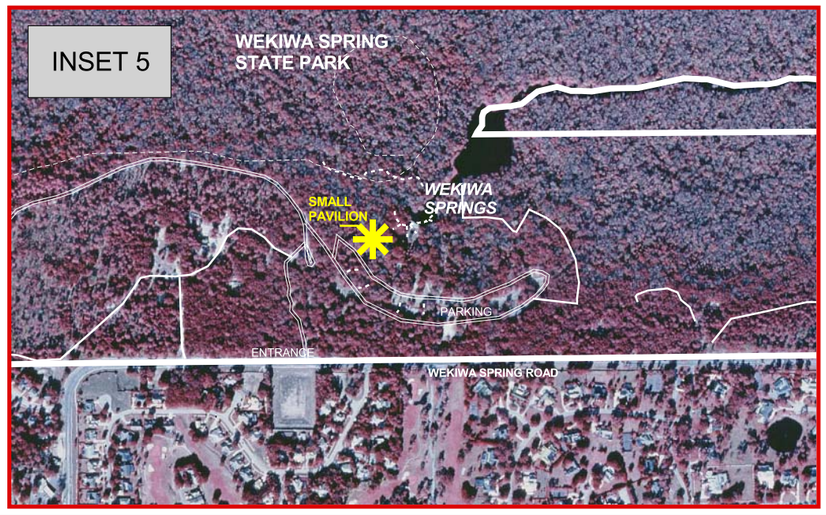


Legend

- Park Boundary
- Proposed Trail
- Proposed Development Area
- Proposed Facility

WEKIVA RIVER BASIN STATE PARKS

CONCEPTUAL LAND USE PLAN

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

kiosk displays for use by visitors, researchers and educators.

A proposed visitor center would function as an interpretive/educational headquarters for the three parks. It would serve the individual visitor and groups such as schools, tours, and Boy and Girl Scout troops. This would spread the use over times with less demand. Educational opportunities and cooperative ventures should determine the space allocation. Possibilities are an auditorium, small museum, reception and/or a lab. An appropriate location for the visitor center cannot be determined at this point. It will depend on future acquisitions, population growth, and road alignments, especially the Wekiva Parkway. Also taken into consideration are the elements being interpreted, educational goals, and staffing availability. Once these elements are resolved, district, park and planning staff will choose a suitable location.

The planning and design of new facilities will accommodate the use of prescribed fire as the primary resource management activity at the state parks. Site selection, site design, building orientation and selections of building materials will respond to the fact that many of the natural communities in the park will be burned periodically. If possible, permanent structures will not be planned or developed in fire dependent communities. When construction must occur in such areas, efforts will be made to minimize the impact to the fire dependent communities and appropriate fire breaks will be incorporated in the design of those sites. The area excluded from burning will be the minimum necessary to provide a safe, enjoyable and high-quality outdoor recreation and interpretive experience for park visitors.

Day Use Area Improvements

Trails. All three parks have extensive trail systems. Many of the trails in the three parks were built and are maintained by volunteers. The Florida Trail Association (FTA) has developed and designated a number of hiking trails as Florida Trail loop trails. Where practicable, changes in the use and routing of these trails will be done in consultation and cooperation with the FTA. The extensive trail system is in need of more amenities to support trail activity. Scattered picnic tables, composting toilets, and rain shelters are recommended at appropriate locations along the existing trails. Locations will be determined as funding becomes available for these improvements. There is a need for better trail maps at park entrances and trail entry points.

Lower Wekiva River Preserve State Park. Katie's Landing is located in Lower Wekiva River Preserve mid-way between Wekiwa Springs and Blue Spring State Parks along the Wekiva River. Proposed recreational uses for the site are picnicking and canoe and kayak launching. A concession largely for the rental of canoes and kayaks should be located on site. The preferred location is near the main entrance above the 550-ft. Riparian Habitat Protection Zone. This location, near the parking, would provide easy and visible access for picnickers and visitors arriving from Wekiva Park Drive. Additional concession services, if necessary will consist of the sale of snack food, picnic supplies, and various sundry items. Restroom facilities will be located in the same area as the concession building. The unimproved road along the southwest boundary should be improved for private vehicular access to the canoe ramp. This ramp is for launching non-motorized boats only. with the exception of the law enforcement and official agency activities on the river and canoes with small motors for mobility impaired persons. As a replacement for the existing dock, a dock should be constructed for temporary tie-up of boats approaching the site from the river. Car and some RV parking for 50-70 vehicles will be located near the entrance, beyond the 550-ft. Habitat Protection Zone setback. This will allow an area in the center of the site to be open for

picnicking.

Interpretation at Katie's Landing should focus on the significance of the Wild and Scenic River classification and the historical use by Native Americans. It should be accomplished through interpretive signs, brochures and park programs. Interpretive programs should feature visitor education on the sensitivity of riparian habitats and encourage a low impact use of the river.

A buffer on the northeastern and southwestern boundaries will be a visual and physical barrier to the neighboring residences. The buffer will consist of fencing and a mix of native plants with varying heights to provide a good visual block.

Wekiwa Springs State Park. Off-road bicycling has become an extremely popular outdoor recreation activity throughout Florida. As the area around the parks becomes more urbanized, there is an increasing demand for opportunities. The Division will continue to work with trail advocates to optimize the accessibility of the park for off-road bicyclists. The demand for single-use off-road bike trails would best be accommodated in the Markham Woods area of Wekiwa Springs State Park, since the soils there are more appropriately suited for bicycle use than in other areas of the parks. Seminole County has completed construction on the Seminole-Wekiva trailhead on the 11-acre encumbrance at the Markham Woods property. This will provide easy access to the property. A single-track bicycle trail up to seven miles in length is proposed. Partnerships between the Division and local off-road bicycle groups will be necessary for planning and design of the proposed trails and to provide volunteer labor for trail construction and maintenance. A shorter nature trail for hiking is proposed from the open-air environmental education area on the eastern edge of this property.

Phase IV of Orange County's West Orange Trail is funded for the fiscal year 2007-08. An easement not exceeding 50' will be conveyed to the County for the trail along the western perimeter of Wekiwa Springs State Park. The final width of the easement will be determined based on final site plan and design. The County is responsible for pre and post-construction monitoring studies evaluating impacts, management, user patterns and user satisfaction. A baseline biological study must be completed prior to any design and construction. The Division will work in partnership with the County and the environmental community to develop a trail that minimizes impacts on the park's resources while providing a high quality recreational experience. Final plans and designs for the West Orange Trail will be submitted to the Land Acquisition and Management Advisory Council (LAMAC) for approval prior to the issuance of an easement to Orange County. The Division and Orange County have also agreed to work cooperatively to develop a paved connection from the West Orange Trail on Rock Springs Road to the main park entrance on Wekiwa Springs Road.

A small kiosk for interpretive programs and as a starting point for tours should be added to the day use area. It should be out of the picnic area but convenient to parking, restrooms and the springs.

Overnight Facilities

Rock Springs Run State Reserve. The River House at Rock Springs Run State Reserve is a four-bedroom house situated in the north east part of the park on a bluff above the Wekiva River. It could be used for overnight accommodation for up to eight guests. The house is in close proximity to a range of existing recreational activities such as trails for hiking, biking,

and horseback riding as well as the Wekiva River. The concessionaire could manage the rental of the River House as a Bed and Breakfast along with providing the recreation facilities. Guests could arrive by horseback or car along the unimproved road or by canoe along the Wekiva River. The Wekiva River is a designated Wild and Scenic River and therefore the carrying capacity on the river is of concern. Public access is provided one-third of a mile down the river at Katie's Landing. Canoe or kayak rental from the River House will be strictly for registered guests and the area will not be used as a public canoe launch.

Support Facilities

Wekiwa Springs State Park. The existing entrance/ ranger station is inadequate. Traffic flow through the entrance on busy days is slow and backs up onto Wekiwa Springs Road requiring law enforcement to regulate traffic. A larger entrance station with multiple entrance lanes and a reconfigured road alignment is needed.

The Wekiwa Springs facilities and residences need to be connected to the county sewer system. The sensitivity of groundwater and proximity to a major spring system make the septic system presently in use a potential problem. $87,000 has already been secured through Springs Initiative Funding for the design and permitting necessary for the connection to the day use facilities at Wekiwa Springs.

Volunteers are providing a large work force for the park and the establishment of four additional volunteer campsites is recommended. These should be developed in the area between the district office and an existing ranger residence. The two existing mobile home residences used by rangers should be replaced with permanent homes.

Rock Springs Run State Reserve. The two existing mobile home residences used by rangers should be replaced with permanent homes.

Lower Wekiva River Preserve State Park. Because of the remote location of this part of the park, a ranger residence is needed on the Fechtel property. It should be near the entrance used by hikers and horseback riders, the major public use of the property. The existing mobile home used by a ranger in the southern part of this park should be replaced with a permanent residence.

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.

Recreation Facilities

Visitor Center
Parking

Wekiwa Springs State Park
Kiosks

Rock Springs Run State Reserve
Trail Amenities
Kiosks

Lower Wekiva River Preserve State Park
Katie's Landing
- Remove and relocate boat ramp
- Remove and relocate small boat dock
- Large concession building

Parking
Trail Amenities
Kiosks
- Large picnic shelters (2)
- Scattered picnic tables
- Interpretative kiosks (3)

Support Facilities

Wekiwa Springs State Park
Ranger Residences (2)
Entrance Station
Entrance Road improvements
Utilities (sewer hook-up)

Rock Springs Run State Reserve
Ranger Residences (2)

Lower Wekiva River Preserve State Park
Ranger Residences (2)

Existing Use and Optimum Carrying Capacity

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 optimum 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 carrying capacity as shown in Table 1.

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. At this time, no lands are considered surplus to the needs of the park.

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.

Table 1--Existing Use And Optimum Carrying Capacity

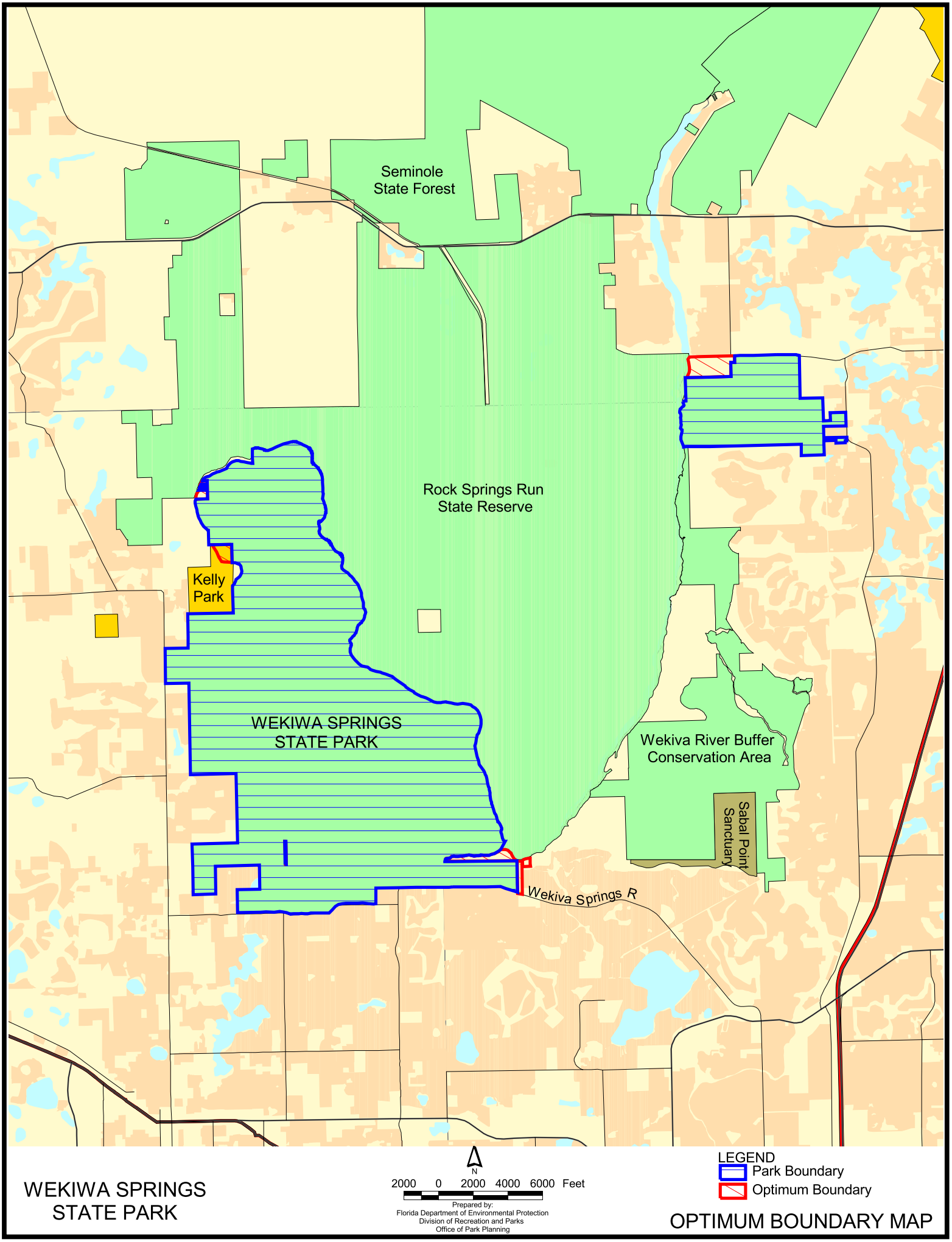
Wekiwa Springs State Park	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Trails						
Hiking	130	260			150	340
(Markham Woods)			20	80		
Biking	90	360			140	560
(Markham Woods)			50	200		
Equestrian	64	128			64	128
Canoe	128	256			128	256
Picnicking/Swimming	772	1,544			772	1,544
Camping						
Standard	240	240			240	240
Primitive	16	16			16	16
Primitive Youth	60	60			60	60
Group	150	150			150	150
TOTAL	**1,650**	**3,014**	**70**	**280**	**1,720**	**3,294**

Rock Springs Run State Reserve	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Trails						
Hiking	140	280			140	280
Biking	150	600			150	600
Equestrian	136	272			136	272
Canoe						
Camping						
Primitive	48	48			48	48
River House			8	8	8	8
TOTAL	**474**	**1,200**	**8**	**8**	**482**	**1,208**

Table 1--Existing Use And Optimum Carrying Capacity

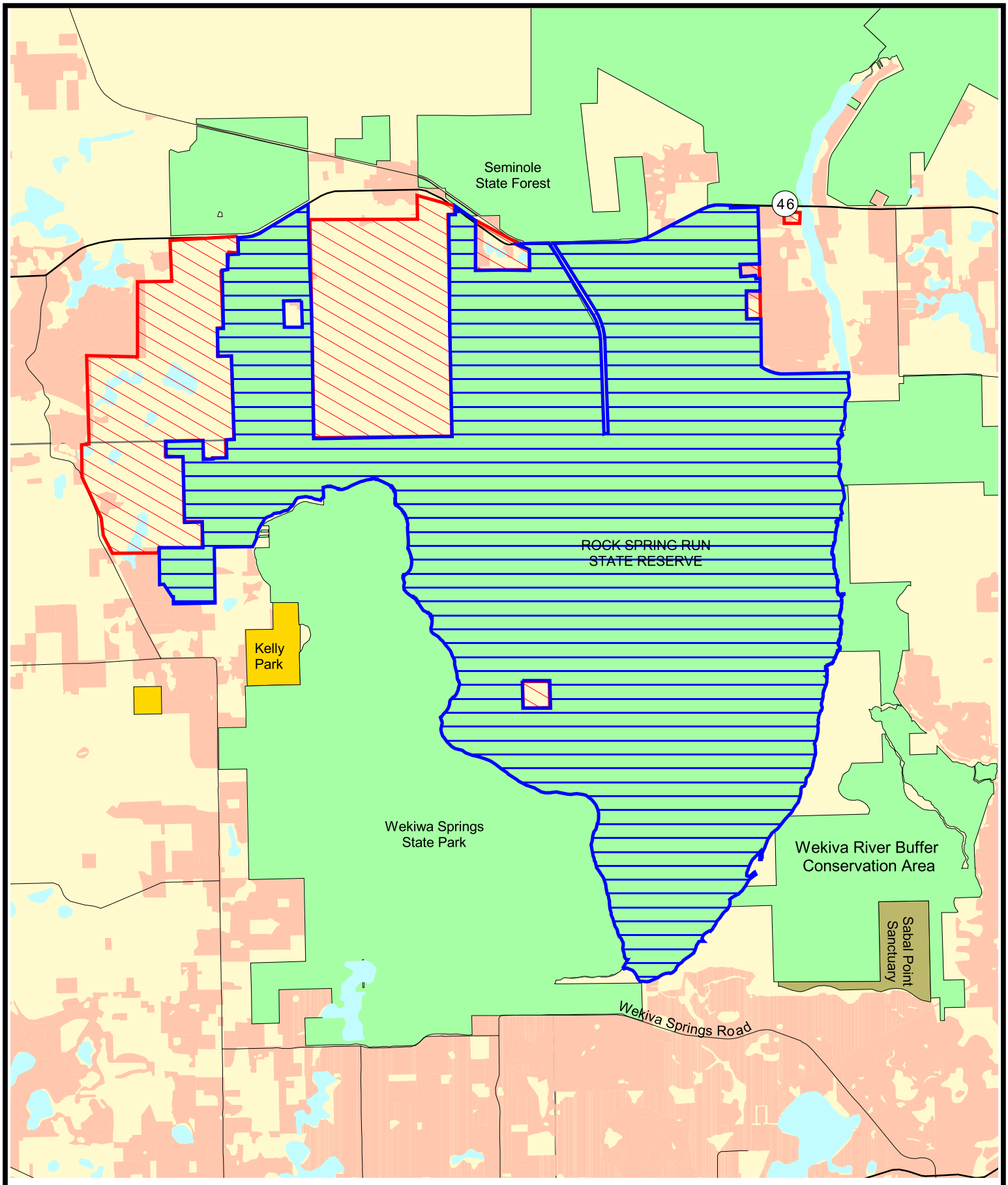
Lower Wekiva River Preserve State Park	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Trails						
Hiking						
Equestrian	328	656			328	656
Canoe			112	224	112	224
Picnicking			40	80	40	80
Camping						
Primitive	4	4			4	4
Primitive Group	20	20			20	20
TOTAL	**352**	**680**	**152**	**304**	**504**	**984**

Parcels identified adjacent to Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park would serve to enhance the natural, cultural, and recreational resource base of these units. Some of the parcels would eliminate inholdings or connect public lands for natural wildlife corridor and habitats, with particular emphasis on the Florida black bear. The parcels would also facilitate resource management, provide buffering from encroaching development, protect the watershed, rivers, and springs, and allow for future expansion of public access and recreational activities. The majority of the identified lands are listed as part of the Florida Forever Wekiva-Ocala Greenway “Group A, Full Fee” (Florida Forever FiveYear Plan 2003).



WEKIWA SPRINGS STATE PARK

OPTIMUM BOUNDARY MAP



ROCK SPRINGS RUN
STATE RESERVE

3000 0 3000 6000 Feet

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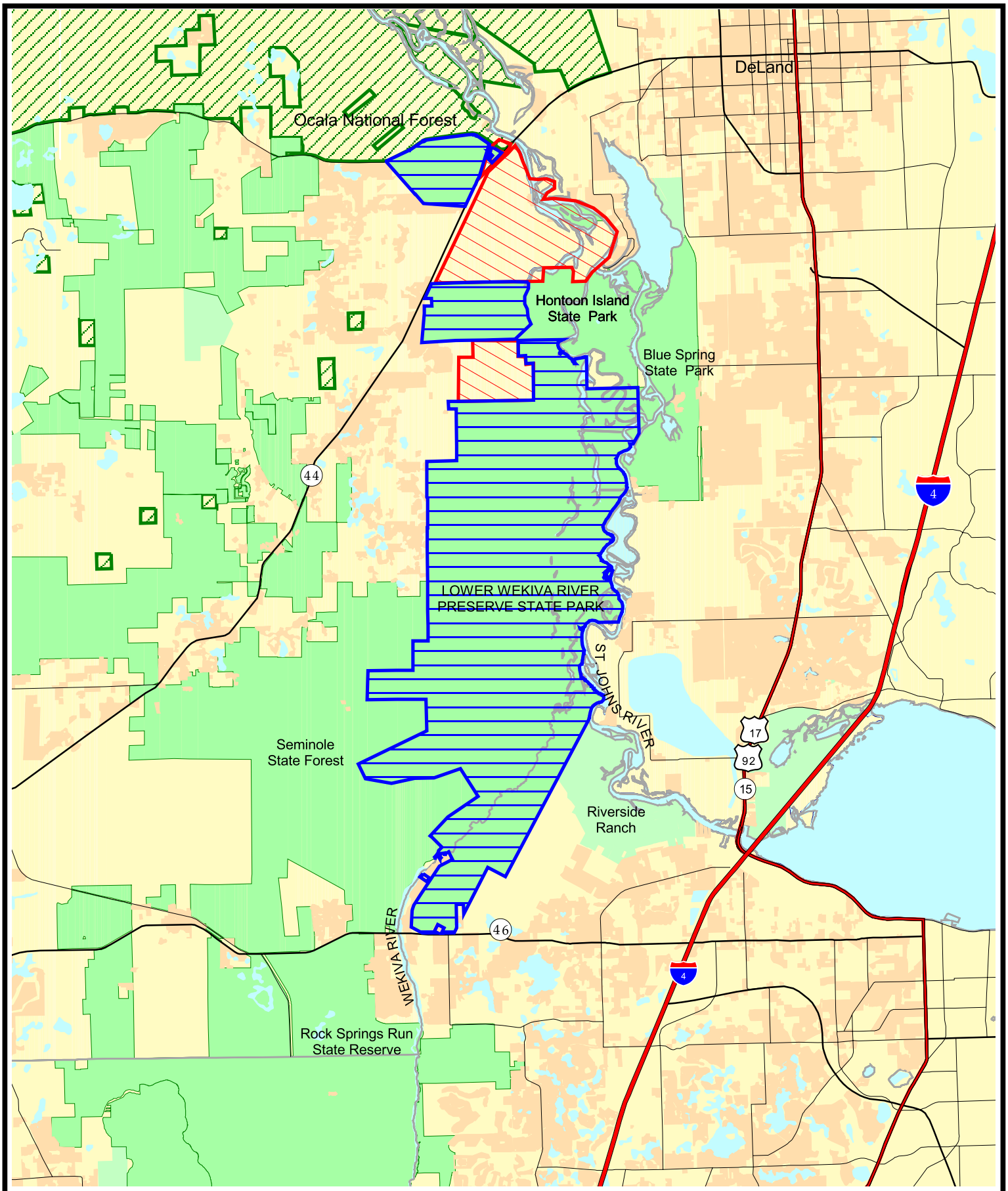
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

LEGEND
Park Boundary
Optimum Boundary

OPTIMUM BOUNDARY MAP



LOWER WEKIVA RIVER
PRESERVE STATE PARK

OPTIMUM BOUNDARY MAP

Addendum 1—Acquisition History and Advisory Group Report

Sequence of Acquisition

On August 19, 1976, the Board of Trustees of the Internal Improvement Trust Fund (Trustees) obtained title to the property that became the Lower Wekiva River Preserve State Park. The property was purchased using EEL Bonds and P2000/Carl funding sources. The Trustees conveyed management authority of the property to the Department of Environmental Protection, Division of Recreation and Parks (Division), under Lease No. 2950. This lease expires on April 4, 2076.

Title Interest

The Trustees hold fee simple title to Lower Wekiva River State Preserve.

Special Conditions on Use

In accordance with the Department's lease agreement with the Trustees, the property must be utilized for public outdoor recreation and related purposes and is designated single-use to provide resource-based public outdoor recreation and other related purposes. Uses such as water resource development projects, water supply projects, storm-water management projects, and linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan or the management purposes of the park.

Outstanding Reservations

There are no outstanding rights, reservations, and encumbrances on Lower Wekiva River State Preserve.

Sequence of Acquisition

On March 10, 1983, the Board of Trustees of the Internal Improvement Trust Fund (Trustees) title to the property that became Rock Springs Run State Reserve. The property was purchased using EEL Bonds, CARL and P2000/Carl funding sources. The Trustees conveyed management authority under the Multiple Agency Management No. 3571 (originally Lease No. 745-9008). The lead managing agency is the Department of Environmental Protection, Division of Recreation and Parks (Division). The other agencies included in the management of Rock Springs Run State Reserve are the Department of Agriculture and Consumer Services, Division of Forestry, the Florida Fish and Wildlife Conservation Commission and the St. Johns River Water Management District. The lease expires on August 28, 2004.

Title Interest

The Trustees hold fee simple title to Rock Springs Run State Reserve. On August 28, 1984, the Trustees leased the Reserve under Multiple Agency Management Lease No. 3571.

Special Conditions on Use

Rock Springs Run State Reserve must be managed in accordance with the Multiple Agency Management's lease agreement with the Trustees.

Outstanding Reservations:

Following is a listing of outstanding rights, reservations, and encumbrances that apply to Rock Springs Run State Reserve.

Instrument:	Quit-Claim Deed
Instrument Holder:	STS Land Associates, L. P.
Beginning Date:	October 24, 1991
Ending Date:	Indefinite
Outstanding Rights, Uses, Etc.:	

Exhibit "A":

1. Railroad right-of-way of a parcel of land lying in Sections 29, 30, 32, and 33, Township 19 South, Range 29 East, Lake County, Florida, being more particularly described in the quit-claim deed.
2. Right-of-way as shown on a Replate of Alexandrian Park as recorded in Plat Book 9, page 28, Public Records of lake County, Florida.

Exhibit "B":

1. Title to any part of the subject property lying below the ordinary water line of the Wekiva River is not warranted
2. Rights of upper and lower riparian owners in and to the natural flow and use of the waters of the Wekiva River
3. Rights of Way of Wekiva River Road 4-4298 and McDonald Road 4-4397
4. Riparian rights incident to the land.

5. Matters shown on the boundary survey of the land prepared by Donald W. Macintosh Associates, inc., Job Number 91091.0005, originally dated June 7, 1991, and last revised September 25, 1991, as follows:
- **a.** Fences do not coincide with the property lines.
- **b.** Utility lines, utility poles and guy wires.
- **c.** Possible burial sites.
- **d.** Road rights-of-way.

6. Non-exclusive utility easements granted to Florida Power Corporation by instruments recorded in Official Record Book 353, Page 766, Official l Record Book 387, page 165, Official Record Book 555, page 637,and Official Record Book 645, page 1666, Public Records of Lake County, Florida, and in Official Record Book 1862, page 303, Public Records of Orange County, Florida.

7. Existing cemetery or burial lots and rights applicable thereto as recited in Corrective Warranty Deed recorded in Official Record Book 931, page 1282, Public Records of Lake County, Florida, which cemetery or burial lots (headstones) are indicated on the boundary survey prepared by Donald W. Macintosh Associates, inc., Job Number 91091.0005, originally dated June 7, 1991, and last revised September 25, 1991, being located in the Northwest corner of the Northeast 1/4 of the Northeast 1/4 of Section 31, Township 19 South, Range 29 East, in Lake County, Florida.

8. Restriction limiting use of a portion of the land to streets contained in deeds recorded in the Public Records of Lake County, Florida, as follows: Deed Book 25, page 563, Deed Book 42, page 169, Deed Book 42, page 217, and Deed Book 47, page 250.

9. Terms, conditions, provisions and restrictions pertaining to development rights as imposed by Lake County Department of Planning and Development Certification of Granting of Vested Rights in the Wekiva River Protection Area dated December 5, 1990 and recorded in Official Record Book 1086, page 1550, Public Records of Lake County, Florida.

Sequence of Acquisition:
On April 30, 1969, the Board of Trustees of the Internal Improvement Trust Fund obtained title to the initial property that later became Wekwa Springs State Park. The property was purchased with Bond Proceeds, LATF funds and P2000/Acquisitions and Inholdings funds. The Trustees conveyed management authority to the Department of Environmental Protection, Division of Recreation and Parks (Division), under Lease No. 2386. This lease expires on January 22, 2067.

Title Interest

The Trustees hold fee simple title to Wekiwa Springs State Park. On September 15, 1969, the Trustees leased the park to the Division under Lease No. 2386.

Special Conditions on Use

In accordance with the Department's lease agreement with the Trustees, the property must be utilized for public outdoor recreation and related purposes and is designated single-use to provide resource-based public outdoor recreation and other related purposes. Uses such as water resource development projects, water supply projects, storm-water management projects, and linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) 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 Wekiwa Springs State Park.

Instrument:	Well Monitoring Use Agreement
Instrument Holder:	St. Johns River Water Management District
Beginning Date:	May 6, 1991
Ending Date:	May 5, 2021
Outstanding Rights, Uses, Etc.:	St. John's River Water Management District can construct, operate and maintain monitor wells.

Instrument:	Agreement
Instrument Holder:	Florida Federation of Garden Clubs, Inc.
Beginning Date:	February 6, 1984
Ending Date:	N/A
Outstanding Rights, Uses, Etc.:	The Florida Federation of Garden Clubs has the right to install and operate a swimming pool.

Instrument:	Easement No. 26412
Instrument Holder:	Florida Power Corporation
Beginning Date:	November 18, 1983
Ending Date:	November 17, 2033
Outstanding Rights, Uses, Etc.:	Florida Power Corp. has the right to install, operate and maintain electrical distribution facilities.

Instrument:	Easement
Instrument Holder:	Florida Power Corporation
Beginning Date:	October 23, 1975
Ending Date:	Upon abandonment of use
Outstanding Rights, Uses, Etc.:	The Florida Power Corp. has the right to construct, install, operate and maintaining an electrical distribution and transmission facility.

Instrument:	Agreement
Instrument Holder:	Florida Federation of Garden Clubs, Inc.
Beginning Date:	October 26, 1972
Ending Date:	October 25, 1997, with 25 year renewal option
Outstanding Rights, Uses, Etc.:	This agreement establishes a youth camp and gives the Grantee first priority for use of the camp for six continuous weeks each calendar year.

Instrument:	Sublease
Instrument Holder:	Florida Foundation for Special Children Inc.
Beginning Date:	June 10, 1971
Ending Date:	June 9, 2021
Outstanding Rights, Uses, Etc.:	The Florida Foundation for Special Children can operate and maintain a residential campground and outdoor recreation area for mentally retarded persons.

Instrument:	Sublease
Instrument Holder:	Florida Department of Health and Rehabilitation

	Services, Division of Retardation.
Beginning Date:	June 10, 1971
Ending Date:	June 9, 2021
Outstanding Rights, Uses, Etc.:	HRS has the right to operate an outdoor recreation area for the mentally retarded.
Instrument:	Easement
Instrument Holder:	Florida Gas Transmission Company
Beginning Date:	April 13, 1970
Ending Date:	January 1, 2020, unless renewal is requested.
Outstanding Rights, Uses, Etc.:	The Florida Gas Transmission Co. can construct, operate and maintain a pipeline. Within 90 days after termination, grantee shall remove all pipelines and other parapets placed on the land.
Instrument:	Easement No. 25008
Instrument Holder:	Florida Power Corporation
Beginning Date:	September 30, 1969
Ending Date:	Upon abandonment of use.
Outstanding Rights, Uses, Etc.:	Florida Power Corporation can operate a distribution system for the transmission electricity; right-of-way clearing is restricted to the easement areas and to the removal of danger timber adjacent to easement.

Wekiva River Basin State Parks

Advisory Group Members' List

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The Advisory Group appointed to review the proposed unit management plan for Wekiwa Springs State Park, Rock Springs Run Reserve and Lower Wekiva River Preserve State Park met at the Recreation Hall at Wekiwa Springs State Park in Apopka, Florida on July 29, 2004. Mr. Fred Harden represented Mrs. Pat Harden and Mr. Russ Moncrief; Mr. Ben Vizzi represented Ms. Kathy Weaver. Mr. Stephen Bowes, Mr. David Boehmer, and Ms Ruth Marwitz did not attend. Ms. Marwitz sent comments before the meeting. All other appointed Advisory Group members were present. Attending staff were Mr. Larry Fooks, Mr. John Fillyaw, Mr. Rick Owen, Mr. Morgan Tyrone, Ms Amy Giannotti, Ms. Dianne O'Shea, Mr. William Stanton and Ms. Carol Perfit. Six observers attended: Ms. Deb Blick, Mr. Neil D. McDonald, Ms Jackie Baker, Mr. Michael Barr, Ms. Blanche V. G. Hardy, and Mr. Terrance Tysall.

Ms. Perfit began the meeting by explaining the purpose of the advisory group, reviewing the meeting procedures and providing a brief overview of the Division's planning process. She then asked the Advisory Group members to comment on the plan.

Summary of Advisory Group Comments

Mr. Bob Michaels, representing Florida Freewheelers, said that the resource component was excellent. He offered the suggestions: to add a long-range plan for different levels of access and user experiences and to make a distinction between areas of motorized and non-motorized access. If the level of access is defined and clear in trail maps, users could seek and find the experience they wanted.

Mr. Eric Martin, representing the Orange Soil and Water Conservation District, inquired on the practical reasons to keep the tram roads in place. John Fillyaw explained that they provide for hiking, biking and equestrian trails. The park works with these user groups to maintain loop trails along the abandoned tram roads. He also reviewed the need to remove the tram roads that are blocking sheet flow necessary to the hydrology and natural communities.

Ms Sherry Scott, representing St. Johns River Water Management District, suggested prioritizing the goals and objectives. She inquired about the renewal of the multiple agency leases for Rock Springs Run. Carol Perfit said she would look into the renewal. Ms. Scott also requested a correction be made on the Vicinity and Optimum Boundary map, the Wekiva River Buffer Conservation Area is incorrectly labeled as Sabal Point Sanctuary.

Ms. Deborah Shelley, representing Wekiva River Aquatic Preserve, questioned if the Wekiva River Basin Interagency Strategic Plan is available on line. She felt it was important enough to be readily available. Carol Perfit explained that the document was developed in 1996, is not on line but is available in the Office of Park Planning and the Bureau of Natural and Cultural Resources. Ms. Shelley questioned if Goal 1, Objectives D and E were contradictory. These deal with restoring pastureland and cattle grazing leases. John Fillyaw explained that there is so much pasture; staff is trying to find different ways to manage it until funds are available for restoration. Cattle grazing keep the grass under control until such time. Ms. Shelley inquired if there was any hydrological connection between Lake Prevatt and Wekiwa Springs. She sees this as a good research area. John Fillyaw said the new park biologist, Amy Giannotti, specializes in hydrology and she will be looking for water connections such as this. Ms. Shelley thought the discussion on nitrate levels in springs (page 18) should reference the work by David Foss and the water management district spring water flow studies. The statement on page 32 says the hydrilla

treatment by the Wekiva River Aquatic Preserve is effective for 3-5 years. This should be changed to explain the ongoing need for treatment. She offered to provide language on the hydrilla treatment and its effectiveness. Ms. Shelley inquired about planting aquatic vegetation, eelgrass, in the spring boil. She suggested it be put in one area along with underwater interpretation on the test plot.

Ms. Shelley commented on the optimum boundary designation north of the Markham Woods property. The southern section is still available but the northern parcel has a conservation easement on it. John Fillyaw said the map would be corrected.

Mr. Jim Murrian, representing The Nature Conservancy, inquired if the detailed management process for the natural resource management such as prescribed burning is part of this document. Carol Perfit explained that the Operations Manual is linked to the plan and it details natural resource procedures. Mr. Murrian noted the fox squirrel is not mentioned in the plan and wondered if it is seen in the park. John Fillyaw said the fox squirrel is difficult to study and also noted that the species list is not complete and continually being updated. Rick Owen said that language mentioning the fox squirrel could be added to the plan. Mr. Murrian would like to see more discussion on the work of the Wekiva Basin Area Task Force. He inquired about the need for additional staff. He is certain it is needed but not mentioned in the plan. Carol Perfit explained that the need is identified in more general terms and dealt with at the district level. Mr. Murrian mentioned the need to purchase some of the outside canoe liveries to establish better control on the carrying capacity of the river and spring run. He also inquired about the interagency management strategies. There is a need to balance use of all the public lands in the area and an umbrella management plan needs to be established. John Fillyaw said he is part of a working group comprised of the different management agencies and balance is part of their discussion.

Ms. Michelle Thacher, representing Seminole Soil and Water Conservation District, questioned if the unnamed springs are to be named to give them significance. She would hope the process would bring focus and add to their protection. John Fillyaw reported that the Cambrian Foundation is mapping the springs now and Amy Giannotti will pull together their work and other research. Ms. Thacher suggested that all the spring references in the plan be put together under one spring heading. She also suggested an adopt-a-spring program. Amy Giannotti said those work well for clean up programs but monitoring needs to be done with scientific consistency. Volunteers could be trained to collect the data under controlled situations. Terrance Tysall, of the Cambrian Foundation, said that funding sources are the greatest need now. Many agencies have disparate information and it needs to be pulled together.

Mr. Fred Harden, representing adjacent landowners, noted that cost estimates for natural resources management are not in the plan. Staff will look into that omission. Mr. Harden reported that the nitrate source data studied by the water management district is different from the information in the plan. He also inquired about any plans for sediment sampling. Amy Giannotti is pulling together existing information before determining the need for further studies and sampling. She also replied to the question of apple snail and limpkin studies. These species are part of ongoing studies however; it is difficult to find effective methods of apple snail investigation. Deborah Shelley of the Aquatic Preserve said they are looking into ways of studying the apple snail.

Mr. Dick Ashby, representing adjacent landowners, requested clarification on the cost estimate. The years designation refers to the number of years to complete a project rather than the year it will take place.

Ms. Virginia Barton, representing the Florida Trail Association, mentioned the agreement between the state park system and the Florida Trail Association and requested that it be included as part of this plan, possibly as part of the agreement listings in Addendum 1. John Fillyaw explained that these are agreements with a singular park and the FTA agreement is statewide. Carol Perfit said it could be mentioned in the discussion of Greenway and Trails. Ms. Barton also requested more communication with trail volunteers. They should be made aware of work that needs to be done and would like more input into signage.

Ms. Susie Goldman, representing Seminole County, agrees with the recreational goals and objectives, in particular what is proposed for Katie's Landing. Seminole County has demands for off-road bicycling opportunities so she would like to see the Markham Woods trails developed. John Fillyaw explained that park staff do not have time to develop trails but if a volunteer bicycle group flags the proposed route, park rangers and biologists could approve them and volunteers could then clear the path. Ms. Goldman supports the objective to secure a volunteer coordinator position. John Fillyaw reported that Dianne O'Shea has recently been hired and is fulfilling that need.

Mr. Craig Petrie, representing Lake Soil and Water Conservation District, expressed concern that the cost estimates are too low to accomplish the goals and objectives. He inquired if optimum boundary parcels are shared with other agencies. It was explained that there is coordination between the state agencies and state lands overseas the whole process so a duplication on a map will not conflict in the purchase process. Mr. Petrie questioned how the removal of tram roads effects the recreational use on these roads. John Fillyaw explained that sheet flow, natural community functioning, and trail connectivity are researched before a decision is made. In some cases, ditch blocks are used. Mr. Petrie mentioned that the plan needs to be updated with the latest results from the Wekiva River Basin Coordination Committee. Staff agreed and will make those changes.

Mr. Ben Vizzi, representing Florida Trail Blazers, is concerned about the number and length of trails available to equestrians. Equestrians would like to continue to use an many of the trails as possible and would like culverts used if possible on tram roads. He inquired if there would be an increase in equestrian trails to replace those lost to tram road restoration on the Fectel property. John Fillyaw explained that trail development often depends on the assistance of volunteer groups. Users familiar with his/her trail needs can flag potential trails. Park staff approve the path before it is cleared. Clearing is also a joint effort between volunteers and staff. Markham Woods is open to equestrians but the smaller area has not been used. The new county trailhead will have parking for horse trailers. Mr. Vizzi also requested additional parking in the Lower Wekiva equestrian lot. John Fillyaw said he knows that people use the other side because it is shady and that disturbed area could be cleared more.

Mr. Keith Schue, representing Florida Sierra Club, agreed with Ms. Thacher's suggestion of pulling the springs discussion together in one section and including a map of the park's springs. He said The Nature Conservancy has a good map of spring locations. Mr. Schue suggested that old survey text is a good source for information on original vegetation as well as cultural

resources. He questioned why Seminole Woods is not on the optimum boundary. Mr. Fillyaw said it is not adjacent to our property. It is adjacent to Seminole State Forest and Mr. Bishop said it is on DOF optimum boundary. Mr. Schue had a number of suggestions and clarifications to the plan:

- Mention the SR 44 entrance to Lower Wekiva River Preserve on page 1.
- Will the program emphasis for LWRP change with the addition of Katie's Landing? Carol Perfit noted that this is the interpretive program emphasis and natural and cultural attributes will still be the emphasis.
- Goal 5H - wording change to "Park system and counties will coordinate on water quality sampling program."
- The proposed visitor center location be at one of the interchanges on SR 46 once it is completed. Carol Perfit explained that this is one of the locations being considered but since these interchanges are not yet known it was left open for now.
- The park atmosphere may be effected with multiple entrances into the park – Goal 11B 3). John Fillyaw explained that the need for multiple entrances is safety as the traffic now backs up on Wekiwa Springs Road. It will not increase the park capacity and hopefully not the visual impact at the entrance.
- Substitute the word "much" for "most" in the third line of page 19
- More clarification on the die-off of gopher tortoises in August 2001. Was upper respiratory disease another factor in the multiple deaths?
- Add discussion on the presence of scrub-jays outside the park property contributing to the park population.
- Add discussion on the impact of County Road 46A on black bear deaths
- Park visitors have questioned the timbering that occurred at Rock Springs Run. Was this due to the pine beetle harvest? Park staff clarified that the most visible timbering occurred because of scrub restoration. The section cleared for pine beetle harvest was a smaller area not visible from a trail.
- The statement on page 46 on the failure of state lawmakers is not true in light of recent developments. Carol Perfit replied that this would be removed.
- How regularly are the nesting surveys done? John Fillyaw said there is a graduate student working on a weekly survey.
- Is the bed and breakfast a new use that parks will be embracing? John Fillyaw replied to the negative. The house at Rock Springs is large and expensive to maintain and the concessionaire wanted to try this type of rental situation.

Ms. Loretta Satterthwaite, representing Orange Audubon Society, suggested adding reasons for rare and endangered plant inventory, Goal 3C. The details of this need are discussed in the RMC, page 56. Ms. Satterthwaite reiterated an opposition to the West Orange Trail easement in view of boundary protection.

Commissioner Catherine Hanson, representing Lake County, questioned the status of the Wekiva Falls property and felt it needs to be on Rock Springs Run optimum boundary. Lake County does not have a river access and would like this property available for public use. Carol Perfit explained that developed properties are generally not sought for acquisition. Commissioner Hanson would like to see the blueways designation mentioned in the plan where appropriate. She also thinks the cultural attributes of the property as detailed in the plan are good and need to be

shared with outside sources. Route 433, the entrance road to Rock Springs Run needs a better name. John Fillyaw explained that it is used by the utility company and is not part of park property (CR 433 Needs to be renamed. John Fillyaw explained that the utilities companies still use CR433 for the addresses, as does the County).

Mr. Bill Thomas, representing Orange County, explained the progress of the West Orange Trail. He noted that the Conceptual Plan does not have the spur trail to the Wekiwa Springs entrance. Carol Perfit explained that it is detailed in the text but is not on the map since we did not know if it would follow the road ROW. Mr. Thomas said the county plans to have it follow the ROW until it reaches the park boundary, then it would follow the park boundary.

Mr. Joe Bishop, representing Division of Forestry, requested clarification on Goal 6A discussing a property exchange. John Fillyaw explained the intent of this goal is to straighten the west boundary of Rock Springs Run for management purposes. Mr. Bishop questioned the status of the Florida scrub-jay habitat management plan. Rick Owens explained it has been drafted and needs finalization. Mr. Bishop suggested adding a sentence to the discussion on page 37 to confirm its continued coordination. He commended park staff on the successful burn program and would like the plan to mention the joint aerial burns conducted by park and forestry staff. Mr. Bishop asked if the park had an exotic control plan. The park does not. Another suggestion from Mr. Bishop was to mention the trails connecting Seminole State Forest and Lower Wekiva River Preserve. He noted that the base map has all trails identified as hiking.

Summary of Public Comment

Mr. Michael Barr, from the Seminole Soil and Water Conservation District, expressed general concerns on the carrying capacity of the waterways.

Ms. Deb Blick, of the Florida Trail Association, would like the Rock Springs Run base map to label the appropriate trails as part of the Florida National Scenic Trail system. She submitted suggested rewording to mention the cooperative work with park staff and FTA volunteers in building and maintaining trails and noting a section of the Lower Wekiva River Preserve trails soon to be certified as part of the Fl. National Scenic Trails. The FTA would like the soon to be certified Fl National Scenic Trail route and the Fl Trail loops be designated as pedestrian only. Ms. Blick questioned the use of cattle grazing in Rock Springs Run. John Fillyaw explained that cattle are used to keep down the grasses in areas that have not been restored.

Mr. Neil McDonald, from the Florida Trail Blazers, said he felt the plan was well written.

Ms. Jackie Baker, representing the Florida Trail Blazers, expressed her displeasure at the removal of some of the tram roads. She questioned if they were part of a mitigation project and felt the removal has taken away from the recreational aspect. She also mentioned that the roads might have historical value. John Fillyaw explained the balance in restoring stream flow to a greatly altered natural community and maintaining public access. Park staff is sensitive to both and is installing culverts where possible to preserve loop trails. Ms. Shelley sympathized with equestrians but agreed with the parks decision. Ms. Baker questioned the equestrian trail distance for Rock Springs Run on page 75 and John Fillyaw said that the trails are being digitized with GPS and corrected mileage will be available. Ms. Baker expressed concern that the Markham Woods was being shut off to equestrian use but John Fillyaw replied to the negative. Seminole

County is building a trailhead on the north side of the Markham Woods property and is including equestrian parking facilities.

Ms. Blanche Hardy, from the Lake County Environmental Protection, would like to have blueways references added to the plan. Blueways maps are being developed for this area and funding is available.

Ms. Perfit thanked everyone for participating and adjourned the meeting.

Summary of Submitted Comments

Ms. Ruth Marwitz, representing the Florida Sport Paddling Club, submitted two comments on access for paddlers. The Wekiwa Springs launch is difficult to access since the service road was closed last year. They would like to have an easier access for launching. At Katie's Landing, until a permanent facility is built, a portable toilet should be installed.

Mr. Kent Wimmer, of the Florida Trail Association, suggested an additional goal be added to note the partnership work with the USDA Forest Service and FTA in certifying and protecting designated trails. He also suggested more language be added to explain the certification of the Fl. National Scenic Trail at Lower Wekiva River Preserve.

Staff Recommendation

The Advisory Group recommends approval of the proposed Wekiva Basin State Parks Unit Management Plan as presented with the following recommendations:

Overall corrections and updates
Noted errors in grammar and map labels will be corrected.
Changes that have occurred since the drafting of this plan will be corrected.

Introduction
Add the SR 44 entrance to Lower Wekiva River Preserve
Change the wording on Goal 5H.
Correct the location of Objectives for pitcher plants.

Resource Management Component
Correct the statement on hydrilla treatment.
Add discussion on fox squirrel, scrub-jays outside the property, die-off of gopher tortoises. Add CR 46A to list of those impacting black bear mortality.
Reorganize springs discussion under one heading.

Land Use Component
Trails
Add discussion on the blueways connections, trail connections to Seminole State Forest, and trails at Lower Wekiva that will be certified as part of the Fl. National Scenic Trails.
Planned Use of Adjacent Lands
Add discussion on the results from the Wekiva River Basin Coordination Committee and potential impact to the park.

Optimum Boundary Map
Correct labeling error.
Remove parcel with conservation easement on Wekiwa Springs map.
Discuss addition of Wekiva Falls property.

Base Map
Label the certified Florida National Scenic Trails on Rock Springs Run base map.

Cost Estimate
Add cost estimates for Natural Resources.

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Addendum 3—Soils Descriptions

Adamsville-Sparr Fine Sands. These soils are level to nearly level and some- what poorly drained. They occur on low ridges on uplands and on low knolls on the flatwoods. Slopes are usually less than 2 percent. Both Adamsville and Sparr soils have a seasonal high water table within 12 ot 36 inches of the surface for up to 6 months. Adamsville soil has a rapid permeability. Sparr soil has a rapid permeability in the surface and subsurface latyers and a slow to moderately slow permeability in the subsoil. Water capacity availability is low to very low in Adamsville soil, and is low in the surface and subsurface layers and moderate in the subsoil of Sparr soil. Both Adamsville and Sparr soils have a low natural fertility.

Albany sand, 0 to 5 percent slopes. This low fertility soil is nearly level to sloping, and somewhat poorly drained sand. It has a sandy clay loam subsoil. For more than 6 months of the year this soil has a water table of 40 to 60 inches. During the wet season the water table is 15 to 40 inches beneath the surface. The surface and subsurface layers are rapidly permeable and are low in water capacity and organic matter. The subsoil is loamy and moderately permeable with a medium available water capacity.

Anclote fine sand. Poorly drained and nearly level, this soil has a thick dark colored surface layer. During the wet season the water table is at or near the surface. During the dry season it recedes to about 20 to 30 inches beneath the surface. Permeability is rapid and available water capacity is medium. Natural fertility and organic matter content are high in the surface layer.

Arents. Nearly level soil consists of material dug from several areas that have different kinds of soil. This fill material is the result of earth moving operations. The slopes are smooth to concave and range from 0 to 2 percent. In most years, a seasonal high water table is at a depth of 24 to 36 inches for 2 to 4 months. It recedes to about 60 inches or more during extended dry periods.

Archbold fine sand, 0 to 5 percent slopes. This is nearly level to gently sloping and moderately well drained soil. It is on low ridges and knolls in flatwoods. The slopes are smooth to convex. In most years, a seasonal high water table is at a depth of 42 to 60 inches for 6 months, and it recedes to 69 to 80 inches for the rest of the year. The permeability is very rapid throughout. The available water capacity is very low.

Anclote and Myakka soils. These soils are poorly drained to very poorly drained and nearly level. The water table is at the surface and often above it. This soil mixture is a combination of Felda, Anclote, and Myakka soils that are described in detail under their respective headings. This soil conglomerate is one of large wetland depressions and poorly defined drainages.

Astatula-Apopka fine sands, 0 to 5 percent slopes. They are nearly level to gently sloping and excessively drained and well drained soils. These soils occur on hillsides and ridges on uplands. Astatula soil is excessively drained, and Apopka soil is well drained. The slopes are smooth to convex. These soils have a seasonal high water table at a depth of more than 80 inches. The permeability of Astatula soil is very rapid. The permeability of Apopka soil is rapid to a depth of 64 inches and moderate between depths of 64 and 80 inches. The available water capacity is very low in Astatula soil. In Apopka soil, it is very low to a depth of about 64 inches and is moderate in the subsoil.

Astatula-Apopka fine sands, 5 to 8 percent slopes. They are sloping, excessively drained and well drained soils. Astatula soil is excessively drained, and Apopka soil is well drained. These soils occur on hillsides in uplands. The slopes are smooth to convex. These soils have a seasonal high water table at a depth of more than 80 inches. The permeability of Astatula soil is very rapid. The permeability of Apopka soil is rapid to a depth of 65 inches and moderate between depths of 65 and 80 inches. The available water capacity is very low in Astatula soil. In Apopka soil, it is very low to a depth of about 65 inches and is moderate below that depth.

Astatula fine sands, 0 to 5 percent slopes. This is an excessively drained soil that is level to gently sloping. It is an upland ridge and hillside soil. This soil has a very dark gray fine sand surface layer that is about 4 inches thick. The underlying material is very pale brown fine sand in the upper part and yellow fine sand in the lower part. This underlying material extends to about 80 inches below the surface. The seasonal high water table is usually more than 80 inches below the surface. Water permeability and available water capacity are very rapid and very low respectively. Organic matter and natural fertility are low.

Astatula sand, dark surface, 0 to 5 percent slopes. Nearly level to gently sloping, this soil is excessively drained sand with a very rapid permeability through the entire profile. It is a soil of hilly upland ridges. The water table is found beyond 120 inches. Organic matter and natural fertility are low.

Basinger and Delray fine sands. These soils are nearly level and poorly drained to very poorly drained. They occurr in sloughs and poorly defined drainageways. Slopes are less than 2 percent. During most years these soils have a seasonal high water table within 12 inches of the surface for a minimum of 6 months. Permeability of Basinger soil is rapid. Delray soil has a rapid permeability in the upper part and a moderate permeability in the lower part. Basinger soil has a low available water capacity. Available water capacity in Delray soil is moderate in the surface layer and subsoil and low in the subsurface layer. The surface layer of Basinger and Delray soils remains wet for long periods after heavy rains.

Basinger fine sand, depressional. This is a nearly level and very poorly drained soil. It is in shallow depressions and sloughs and along the edges of freshwater marshes and swamps. Undrained areas are ponded for 6 to 9 months or more each year. The slopes are concave and range from 0 to 2 percent. Under natural conditions, the water table is above the surface for 6 to 9 months or more each year and is within 12 inches of the surface for the rest of the year. The permeability is rapid throughout.

Bluff sandy clay loam. This poorly drained soul is nearly level and frequently flooded. The surface layer is about 14 inches of sandy clay loam. The first 8 inches of the surface layer is black, and the last 6 inches is dark gray. The subsoil, a gray sandy clay loam, is found to 68 inches below the surface. The subsoil often has brown and yellow mottles. Gray massive clay is found under the subsoil to a depth o 99 inches. Saturated to the surface for extended periods, this soil is easily flooded during the rainy season. Available water capacity is high, permeability is low, and natural fertility is high. Organic matter content is moderate.

Brighton soils. This is a nearly level, very poorly drained, organic soil. The surface layer is

about 9 inches of reddish-brown peat. Sometimes this surface layer is muck. The next layer, to 18 inches is dark yellowish-brown peat. Following this, is a layer of dark-brown peat about 22 inches thick. This layer is underlain by dark yellowish-brown peat to a depth of about 63 inches. Under all these peat layers is grayish-brown coarse sand to a depth of 75 inches. The water table is at the surface and often these soils are covered with shallow water. Permeability is rapid, available water capacity is very high, and organic matter content is very high. Natural fertility is moderate.

Candler fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping and excessively drained soil. It is on uplands. The slopes are nearly smooth to convex. A seasonal high water table is at a depth of more than 80 inches. The permeability is rapid in the surface and subsurface layers, and it is rapid to moderately rapid in the subsoil.

Candler fine sand, 5 to 12 percent slopes. This is a sloping and strongly sloping and excessively drained soil. It is on uplands. A seasonal high water table is at a depth of more than 80 inches. The permeability is rapid in the surface and subsurface layers, and it is rapid to moderately rapid in the subsoil.

Candler-Apopka fine sands, 5 to 12 percent slopes. They are sloping and strongly sloping and excessively drained and well drained soils. These soils are on uplands. They occur in a regular repeating pattern. Candler soil is sloping and excessively drained. It is on summits and lower side slopes. Apopka soil is strongly sloping and well drained. It is on the upper side of slopes. A seasonal high water table is at a depth of more than 72 inches in Apopka soil and at a depth of more than 80 inches in Candler soil. The permeability of Apopka soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity of Candler soil is very low in the surface and subsurface layers and low in the subsoil. The available water capacity of Apopka soil is very low in the surface and subsurface layers and medium to high in the subsoil.

Cassia sand. This soil is nearly level, somewhat poorly drained and has a layer that is stained by organic mater. The surface layer of this soil is gray sand of about 4 inches in thickness. The subsurface layer is light-gray sand to about 25 inches deep. The weakly cemented, 12 inch thick subsoil is dark reddish-brown sand coated with organic matter. Below this layer is a mottled very pale brown sand that reaches a depth of 80 inches This poorly drained, nearly level soil has the water table at a depth of 10 to 40 inches with the exception of extended dry periods where it may recede to a depth of 60 inches. Cassia sand has a very rapid permeability to 25 inches, a moderately rapid permeability in the weakly cemented layer, and a rapid permeability between 37 and 80 inches. There is a very low available water capacity and organic matter content with the exception of the layer at a depth of 25 to 37 inches where the available water capacity is moderate and the organic matter content is moderately high.

EauGallie and Immokalee fine sands. This soil is nearly level and poorly drained. They occurr on broad plains on the flatwoods. The slopes are generally less than 2 percent. During most years these soils have a seasonal high water table within 12 inches of the surface for 1 to 4 months. EauGallie soil has a permeability that is rapid in the surface and subsurface layers, moderate or moderately rapid in the sandy part of the subsoil, and moderately slow in the loamy part. Immokalee soil has a permeability that is rapid in the surface and subsurface layers and is moderate

in the subsoil. Organic matter content is low in Immokalee soil and moderate to moderately low in EauGalliie soil.

Emeralda and Holopaw fine sands. Frequently flooded are nearly level soils which are poorly drained. These soils are on the floodplains of the Wekiva River and its major tributaries. They do not occur in a regular repeating pattern. These soils are flooded for very long periods following prolonged, heavy, intense rains. Excess water ponds in low-lying areas for very long periods after heavy rains. The slopes are smooth to concave and range from 0 to 2 percent. In most years, these soils have a seasonal high water table within 10 inches of the surface for 2 to 6 months in Holopaw soil and 6 to 9 months in Emeralda soil. The permeability of Emeralda soil is rapid in the surface and subsurface layers and slow in the subsoil and substratum. The permeability of Holopaw soil is rapid in the surface, subsurface and substratum and moderate in the subsoil. The available water capacity of Emeralda soil is medium in the surface layer, low in the subsurface layer, and medium to high in the subsoil and substratum. The available water capacity of Holopaw soil is very low in the surface and subsurface layers, moderate in the subsoil, and low in the substratum.

Felda fine sand. Occasionally flooded is a nearly level and poorly drained soil found on the floodplain of the Wekiva River and its major tributaries. This soil is flooded for brief periods following prolonged, intense rains. The slopes are smooth to slightly concave and range from 0 to 2 percent. In most years, a seasonal high water table is within 10 inches of the surface for 2 to 6 months. Flooding is infrequent under normal weather conditions. Duration of flooding is about 2 to 7 days and is directly related to the intensity and duration of rain. The permeability is rapid in the surface and subsurface layers and in the substratum, and it is moderate to moderately rapid in the subsoil. The available water capacity is very low in the surface and subsurface layers and in the substratum, and it is medium in the subsoil.

Felda and Manatee mucky fine sands, depressional. These soils are almost level and very poorly drained with slopes mostly less than 2 percent. They are found in depressions and are ponded at least 6 months of the year if not drained. Felda soil has a rapid permeability in the surface, subsurface, and substratum and a moderate permeability in the subsoil. Manatee soil has a permeability that is moderately rapid in the surface and subsoil layers. Felda soil has an available water capacity that is low in all layers except the subsoil where it is moderate. Manatee soil's water capacity is high in the surface layer and moderate in the subsoil. The organic matter in Felda soil is moderate while that of Manatee is high.

Fellowship fine sandy loam, ponded. The fellowship soils are nearly level, poorly drained, and have a clayey subsoil. This soil has a 6 inch thick very dark grayish-brown fine sandy loam surface layer. There is a subsoil with three layers. The first 24 inches is mottled black sandy clay loam. The middle 28 inches is mottled dark-gray and gray clay. The last 4 inches is mottled dark-gray, gray, and very dark gray clay. This soil has a moderately permeable surface layer and a very slowly permeable subsoil. There is high organic matter content and natural fertility. The available water capacity is medium.

Fill land, loamy materials. This soil is an artifact of human disturbance. It consists of loamy soil materials that have been mixed, reworked, and shaped by earth-moving equipment. There are no sequential layers. The texture usually found is sandy loam to sandy clay loam. The water

table is found at a depth of 30 to more than 60 inches in higher areas and 10 to 30 inches in low-lying areas.

Floridana mucky fine sand, depressional. This is a nearly level and very poorly drained soil. It is in depressions and poorly defined drainageways. Undrained areas are ponded for 6 to 9 months or more each year. The slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, this soil is ponded for 6 to 9 months or more each year. In most years, seasonal high water table is within 10 inches of the surface for more than 9 months. The permeability is rapid in the surface and subsurface layers, and slow in the substratum and subsoil. The available water capacity is medium to high in the surface layer, subsoil and substratum and low in the subsurface layer.

Gater muck. This nearly level, poorly drained soil is found in freshwater swamps. The slopes are less than 1 percent and are smooth. This soil usually has a 28 inch thick black muck surface layer. The underlying material is dark olive gray fine sandy loam to a depth of about 37 inches and light gray sandy clay loam with light gray calcium carbonate accumulations to a depth of 80 inches or more. Except during extended dry periods, the water table is at or above the surface unless it has been artificially drained. Permeability is rapid in the surface layer and moderately slow to slow in the underlying material. The organic surface layer and underlying material have very high and medium available water capacities respectively.

Iberia sandy clay. This is a nearly level, poorly drained soil with a water table at the surface except during dry periods when it is found at a depth of about 26 inches. During very wet times, the surface is often submerged. This is a very slowly permeating soil that has a medium to high available water capacity and high organic matter content.

Iberia and Manatee soils. These soils are nearly level and poorly drained to very poorly drained. They are flooded in excess of two months most years. They are found in areas that are the first to flood and last to dry out. This is a conglomerate of Manatee fine sand, Anclote, Felda and Emeralda series which are described in more detail under their respective headings.

Immokalee fine sand. This is a nearly level and poorly drained soil. It is on broad flatwoods. The slopes are smooth and range from 0 to 2 percent. In most years, a seasonal high water table is within 10 inches of the surface for 1 to 3 months, and it recedes to a depth of 10 to 40 inches for more than 6 months. The permeability is rapid in the surface and subsurface layers and in the substratum, and it is moderate in the subsoil. The available water capacity is very low in the surface and subsurface layers and in the substratum and is medium in the subsoil.

Immokalee sand. This is a nearly level and poorly drained soil. It occurs on broad plains in flatwoods. The slopes are predominately less than 2 percent. This soil has a seasonal water table within 12 inches of the surface for 1 to 4 months of the year. The permeability is rapid in the surface and subsurface layers and in the substratum and is moderate in the subsoil. The available water capacity is low in the surface layer, very low in the subsurface layer and substratum and high in the subsoil.

Malabar fine sand. This is a nearly level and poorly drained soil. It is in narrow to broad sloughs

and poorly defined drainageways. The slopes are smooth to concave and range from 0 to 2 percent. In most years, a seasonal water table is within 10 inches of the surface 2 to 6 months and between depths of 10 and 40 inches for most of the year. The permeability is rapid in the surface and subsurface layers and in the upper part of the subsoil, slow to very slow in the loamy part of the subsoil and moderately rapid in the substratum. The available water capacity is low to very low in the surface and subsurface layers and in the upper part of the subsoil, moderate in the lower part of the subsoil and low in the substratum.

Manatee fine sand. Nearly level and poorly drained, Manatee fine sand is a flood plain soil that is often flooded for prolonged periods. The surface layer is black fine sand about 10 inches thick. The subsoil is very dark gray sandy loam on top and dark gray fine sandy clay loam below and extends to 52 inches deep. There is a substratum that is gray loamy fine sand reaching to approximately 80 inches.

Manatee, Floridana, and Holopaw soils, frequently flooded. These soils are nearly level and poorly to very poorly drained. They are found in flood plains that are often flooded for long periods after prolonged rains. These soils have a black surface layer that ranges from 6 to 18 inches thick. The subsoil is a gray sand or sandy loam and may reach to a depth of 80 inches. The seasonal high water table for these soils is within 12 inches of the surface for 6 to 9 months in most years. The permeability of these soils is moderately rapid to rapid in the surface and subsurface layers and very slow to moderate in the subsoil and substratum. The surface layers have a low to high available water capacity while the subsurface layer, subsoil, and substratum have a low to moderate available water capacity. Organic matter content is high in Manatee and Floridana soils and moderate in Holopaw soil.

Montverde muck. This nearly level, very poorly drained organic soil is covered with shallow water most of the year. The surface layer is 11 inches of black muck. Below the surface layer is peat up to 80 inches deep. This muck has a moderately rapid permeability in the surface layer and a rapid permeability in the peat layer. The natural fertility is high and the available water capacity and organic matter content are very high.

Myakka and EauGallie fine sands. These soils are nearly level and poorly drained. They occur on broad plains on the flatwoods. The slopes are generally less than 2 percent. These soils have a seasonal high water table within 12 inches of the surface for 1 to 4 months during most years. Myakka soil has a rapid permeability in the surface and subsurface layers and substratum. It has a moderate to moderately rapid permeability in the subsoil. EauGallie soil has a permeability that is rapid in the surface and subsurface layers, moderate to moderately rapid in the sandy part of the subsoil, and moderately slow in the loamy part of the subsoil. Available water capacity is very low in the surface and subsurface layers and substratum and moderate to high in the subsoil of both of these soils. Organic matter content is moderate to moderately low.

Myakka sand. This is a nearly level and poorly drained flatwoods soil. There is a slope that is dominantly less than 2 percent. There is a black fine sand surface layer that is about 5 inches thick. The subsurface later is light gray fine sand to about 28 inches. The subsoil is black fine sand to about 30 inches and dark brown fine sand to about 45 inches. The brown fine sand substratum is to a depth of about 80 inches. The surface, subsurface, and substratum are rapidly

permeable, while the subsoil is moderately to moderately rapidly permeable. Available water capacity is very low in the surface, subsurface, and substratum and moderate to high in the subsoil.

Myakka and Placid sands, 2 to 8 percent slopes. These are gently sloping to sloping poorly drained soils. Both of these sands are described separately in this document. The soils occur together without regular pattern and is quit variable. The water table is usually nearer the surface for more extended periods than in Myakka sand.

Nittaw, Okeelanta and Basinger soils. Frequently flooded are nearly level poorly drained and very poorly drained soils. These soils occur on floodplains and are frequently flooded following prolonged high intensity rains. Nittaw and Okeelanta soils are very poorly drained, and Basinger soils are poorly and very poorly drained. The slopes are predominantly less than 2 percent. These soils have a seasonal high water table within 12 inches of the surface. In most years, these soils are subject to frequent flooding during heavy rain periods. The duration and extent of flooding are variable and directly related to frequency and intensity of rainfall. The permeability of Nittaw soil is rapid in the surface layer and slow in the subsoil. The permeability of Okeelanta and Basinger soils is rapid. The available water capacity is moderate to high in Nittaw soil. The available water capacity is very low to moderate in Basinger soil. It is very low to moderate in the sandy part of Okeelanta soil and very high in the organic part. If these soils are drained, the organic material shrinks upon drying and then subsides as a result of compaction and oxidation. Losses are more rapid during the first 2 years. The organic material continues to subside at a rate of about 1 inch per year. The lower the water table, the more rapid the loss.

Ocoee peat. This organic soil is nearly level and very poorly drained. The water table is at the surface, and shallow water often covers the soil. Ocoee soils have a dark reddish-brown peat surface layer that is approximately 7 inches thick. The following layer is reddish-brown peat that is also about 7 inches thick. Below these two layers, to a depth of 38 inches are layers of dark reddish-brown peat. Grayish-brown sand underlies these peat layers to a depth of 75 inches. This soil is rapidly permeable in the peat layers and very rapidly permeable in the sandy later. There is a very high organic matter content in the peat while this component is very low in the sandy layer. Available water capacity is very high and natural fertility is moderate.

Ona fine sand. This is a flatwoods sand that is poorly drained and nearly level with a 0 to 2 percent slope. It has a black, fine, sandy surface layer that is approximately 6 inches thick. The subsoil is dark reddish brown fine sand to 15 inches. The seasonal high water table is within 10 inches of the surface during a 1-2 month wet period. It then recedes to 10 to 40 inches for six or more months. The water availability is medium in the surface and subsoil layers and low in the substratum. Permeability of Ona soils is rapid in the surface and subsurface layers and moderate in the subsoil layer.

Orlando fine sand. The water table in this nearly level to gently sloping , well drained soil is at a depth of more than 80 inches. The surface layer is about 8 inches of fine sand. Under this, is a very dark brown fine sand to a depth of 30 inches. This layer is followed by a layer of brown fine sand to a depth of 80 inches. This is a rapidly permeable soil throughout it's layers. In the first 30 inches the available water capacity is medium and the organic-matter content is moderate. These

two characteristics are both very low below 30 inches. Natural fertility is moderately low.

Paola sand, 0 to 5 percent slopes. This sand pine scrub soil is nearly level to gently sloping and excessively drained. There is a dark gray sand surface layer that is about 3 inches thick and a light gray sand subsurface layer to about 25 inches. The subsoil is yellowish brown sand and runs to a depth of about 47 inches. This last stratum has subsurface tongues and some weakly cemented very dark gray concretions. The substratum is composed of light yellowish brown sand and runs to a depth of about 80 inches. This soil has a very rapid permeability and a very low available water capacity.

Paola-St. Lucie sands 0-5 percent slopes. These soils are nearly level to gently sloping and are excessively drained. They occur on ridges in the uplands. Both of these soils have a seasonal high water table at a minimum depth of 80 inches. They share a rapid permeability as wellas a very low water capacity availability. Organic content and natural fertility are also very low.

Placid sand. This soil is nearly level and poorly drained. The water table, most of the year, is at or above the surface for much of the year. During extended dry periods the water table recedes as far as 15 inches from the surface. This is a rapidly permeable soil throughout it's layers. The available water capacity is medium and the organic matter content is moderately high. The surface layer is black in the first 12 inches and very dark gray mottled with very dark grayish brown and dark grayish brown in the last 6 inches. The next 20 inches is a layer of grayish brown sand and followed by a 42 inch layer that is light brownish gray sand. This is an extremely acidic soil in the first 12 inches and very strongly acid to a depth of 80 inches.

Placid and Myakka sands, 0 to 2 percent slopes. These marshy depressional soils are nearly level and poorly to very poorly drained. The profiles are described separately in their own categories. The water table is nearer the surface for longer periods than in Myakka sand with water covering the soil for 4 to 6 months of the year.

Pomello sand. This sandy soil is nearly level to gently sloping and is moderately well drained. In the surface and subsurface layers it has very rapid permeability and very low available water capacity and organic matter content. The organic-stained layer has moderately rapid permeability and moderate organic matter content. For about 8 months of the year the water table is at a depth of 40 to 60 inches. During the remaining 4 months the water table is at a depth of 30 to 40 inches.

Pomello fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping and moderately well drained soil. It is on low ridges and knolls in flatwoods. The slopes are smooth to convex. In most years, a seasonal high water table is at a depth of 24 to 40 inches for 1 month to 4 months and recedes to a depth of 40 to 60 inches during dry periods. The permeability is very rapid in the surface and subsurface layers, moderately rapid in the subsoil and rapid in the substratum. The available water capacity is very low in the surface and subsurface layers and in the substratum and medium in the subsoil.

Pompano fine sands, occasionally flooded. This is a nearly level and poorly drained soil with slopes of less than 2 percent. Occurring primarily on the flood plains, It is occasionally flooded

after high intensity rains. Durring most years, this soil has a seasonal high water table within 12 inches of the surface for 2 to 6 months. During rainy periods this soil is subject to occasional periods of flooding. This flooding varies in duration and extent in a direct relationship with the intensity and frequency of rainfall.

Pompano sand, acid. Poorly drained and nearly level, this sand has low available water capacity and low organic matter content. The water table is at a depth of 10 to 40 inches from 6 to 10 months of the year and within 6 inches the remainder of the year. The lowest areas are under water after heavy rains. This soil may have a black surface layer that is approximately 12 inches thick.

St. Johns fine sand. This is a nearly level and poorly drained soil. It is on broad flats in flatwoods. The slopes are smooth to concave and range from 0 to 2 percent. In most years, a seasonal high water table is within 10 inches of the surface for 6 to 12 months and between depths of 10 and 40 inches for more than 6 months. In rainy periods, it rises to the surface for brief periods. The permeability is rapid in the surface and subsurface layers and in the substratum and moderately slow to moderate in the subsoil. The available water capacity is medium in the surface layer and substratum, and medium to very high in the subsoil.

St. Lucie sand. This excessively drained soil is nearly level to gently sloping. The 4 inch thick surface layer is composed of gray, loose sand. The next layer runs to about 80 inches is composed of white, loose sand. The water table is more than 80 inches below the surface. This is a very rapidly permeable soil that has very low available water capacity, organic matter content, and natural fertility.

St. Lucie fine sand, 0 to 5 percent slopes. This is a deep, nearly level to gently sloping and excessively drained soil. It occurs on uplands. The slopes generally are uniform and range from 0 to 5 percent. A seasonal high water table is at a depth of 72 or more. The permeability is very rapid. The available water capacity is very low. Samsula-Hontoon-Basinger association, depressional soils are nearly level and very poorly drained. These soils are in freshwater swamps, depressions, sloughs and broad, poorly defined drainageways. They are in a regular repeating pattern. Generally, Samsula soil is in the exterior areas of freshwater swamps and depressions that have a thinner accumulation of organic material. Hontoon soil is in the interior areas of freshwater swamps and depressions that have a thicker accumulation of organic material. Basinger soil is along the outer rims of depressions and in sloughs and poorly defined drainageways adjacent to freshwater swamps. Undrained areas are ponded for 6 to 9 months or more each year except during extended dry periods. The water table fluctuates between depths of about 10 inches and the surface for the remainder of the year. The slopes are smooth to concave and range from 0 to 1 percent. If drained, the organic material of the Samsula and Hontoon soils, when dry, subsides to about half the original thickness. It then subsides further as a result of compaction and oxidation. The loss of the organic material is more rapid during the first 2 years. The lower the water table, the more rapid the loss of organic material. The permeability is rapid in Samsula and Hontoon soils and very rapid in Basinger soil. The available water capacity is very high in the organic material of Samsula and Hontoon soils and very low in the sandy part of Samsula soil. The available water capacity of Basinger soil is very low to low in the surface and subsurface layers, medium in the subsoil and low in the substratum.

Samsula - Hontoon - Basinger, depressional association and Sanibel muck are nearly level, very poorly drained, organic soils that are underlain by sandy materials. These soils are inundated by water in most years with normal rainfall. These soil types occur in the lower pine flatwoods areas.

Sanibel muck. This is a nearly level and very poorly drained soil. It is in depressions, freshwater swamps and marshes and in poorly defined drainageways. Undrained areas are ponded for 6 to 9 months or more each year. The slopes are concave and are less than 1 percent. In most years, undrained areas of this soil are ponded for 6 to 9 months or more except during extended dry periods. The water table fluctuates between depths of about 10 inches and the surface for 2 to 6 months. If drained, the organic material, when dry, subsides to about half the original thickness. It subsides further due to compaction and oxidation. The loss of organic material is more rapid during the first 2 years after the soil has been artificially drained. The lower the water table, the more rapid the loss of organic material. The permeability is rapid throughout. Internal drainage is low and is inhibited by the shallow water table. The available water capacity is very high in the organic material and is medium to low in the underlying sandy material.

Seffner fine sand. This is a nearly level and somewhat poorly drained soil. It is on the rims of depressions and on broad, low ridges in flatwoods. The slopes are smooth to concave and range from 0 to 2 percent. In most years, a seasonal high water table is within 18 to 40 inches of the surface for 2 to 4 months and between depths of 10 to 20 inches for periods of up to 2 weeks during wet periods. It recedes to a depth of less than 60 inches during extended dry periods. The permeability is rapid throughout. The available water capacity is medium in the surface layer and low to very low in the underlying material.

Smyrna fine sand. This is a nearly level and poorly drained soil. It is on broad flatwoods. The slopes are smooth and range from 0 to 2 percent. In most years, a seasonal high water table is within 10 inches of the surface for 1 month to 4 months. It recedes to a depth of 10 to 40 inches for more than 6 months. The permeability is rapid in the surface and subsurface layers and in the substratum and moderate to moderately rapid in the subsoil. The available water capacity is low to very low in the surface and subsurface layers and in the substratum and medium in the subsoil.

Swamp. These are unclassified soils that are very poorly drained and of high organic content. They have not been investigated due to excessive water and dense vegetation. They are flooded throughout the year with the exception of prolonged dry periods.

Tavares fine sand, 0 to 5 percent slopes. This moderately well drained soil is nearly level to gently sloping. It is found on upland ridges and knolls. This soil has a very dark gray fine sand surface layer about 9 inches thick. The underlying material is divided into 3 parts. The first, to a depth of 16 inches, is brown fine sand. The second, to a depth of 41 inches, is pale brown fine sand. The third, to a depth of 80 inches, is white fine sand. For half the year the water table is usually 40 to 80 inches beneath the surface. The other half of the year it recedes to more than 80 inches during the dry season. This soil has a very rapid permeability and a very low available water capacity. The natural fertility and organic matter content are also very low.

Tavares sand. Nearly level to gently sloping and moderately well drained, Tavares sand has a

very dark grayish-brown sand surface layer that is about 7 inches thick. Under this is about 18 inches of a very pale brown sand with faint yellowish-brown mottles. To about 34 inches is a layer of light yellowish-brown sand. Between 34 and 61 inches below the surface is very pale brown sand that has faint yellow mottles. This is underlain with white sand with very pale brown mottles. The water table is found at a depth of 40 to 60 inches for at least 6 months a year. This is a very rapidly permeable sand with very low organic matter content and available water capacity. The natural fertility is low.

Tavares sand, white subsurface variant. This soil is nearly level to gently sloping and is moderately well drained. There is a 3 inch thick surface layer of dark gray sand. The white sand subsurface layer is about 19 inches thick. This layer is underlain by about 58 inches of sand. This sand is light yellowish brown in the first 20 inches. There are a few mottles of yellowish brown and tongues of white material lined with coatings of dark reddish-brown, dark brown, and brown. The next 16 inches is pale brown. The last 22 inches is light-gray sand. The water table is found at a depth of 25 to 40 inches during periods of high rainfall and at a depth of 40 to 60 inches the rest of the year. During extended low rainfall periods, the water table may recede below 60 inches. This is a very rapidly permeable soil with very low available water capacity and organic matter content. The natural fertility of this sandy soil is very low.

Tavares-Millhopper fine sands, 0 to 5 percent slopes. They are nearly level to gently sloping and moderately well drained soils. These soils are on low ridges and knolls on the uplands and on the flatwoods. They occur in a regular repeating pattern. The slopes are nearly smooth to slightly convex. A seasonal high water table in Tavares soil is at a depth of 40 to 72 inches for more than 6 months, and it recedes to a depth of more than 80 inches during extended dry periods. A seasonal high water table in Millhopper soil is at a depth of 40 to 60 inches for 1 to 4 months, and it recedes to a depth of 60 to 72 inches for 2 to 4 months. During periods of high rainfall, the water table is at a depth of 30 to 40 inches for cumulative periods of 1 to 3 weeks. The permeability of Tavares soil is very rapid. The permeability of Millhopper soil is rapid in the surface and subsurface layers and moderately rapid or moderate in the subsoil. The available water capacity of Tavares soil is very low. The available water capacity of Millhopper soil is very low in the surface and subsurface layers and medium in the subsoil.

Wabasso sand. Nearly level and poorly drained, this soil has a loamy subsoil below an organic-stained layer. The surface layer is about 5 inches of very dark gray sand. The subsurface layer is about 13 inches of gray sand. From a depth of 18 inches to 28 inches is a later of black sand that is weakly cemented with organic material. The subsoil extends to a depth of 68 inches and is a mottled sandy clay loam. For 1 to 2 months in the wet season the water table is within 10 inches of the surface. It fluctuates the rest of the year between 10 and 40 inches deep. During very dry periods the water table may go below 40 inches. This is a moderately permeable soil with a medium available water capacity and a low organic matter content. Natural fertility is moderate.

Wauchula sand. Nearly level and poorly drained, this soil has a loamy subsoil below an organic-stained layer. The surface layer is 6 inches of black sand. The subsurface layer is about 16 inches of light brownish-gray sand. Below the subsurface later is a 6 inch thick layer of black sand weakly cemented with organic matter. Next, is a layer, about 4 inches thick, of weakly cemented dark reddish-brown sand. Following this is a layer of dark-brown sand that has weakly

cemented fragments of dark reddish-brown sand. This layer is found between depths of 32 and 35 inches. The next layer is very pale brown sand about 3 inches thick with mottlings of brown and strong brown sandy loam. Below this, to a depth of 44 inches is very pale brown sandy loam. The final layer, to a depth of 80 inches, is mottled sandy clay loam. The water table is within 10 inches of the surface for approximately 2 months of the year. The remainder of the year it fluctuates between 10 and 40 inches. This sand is rapidly permeable to 22 inches and moderately permeable to 80 inches. The available water capacity is very low to 22 inches deep and medium to 80 inches deep. Both the organic matter content and natural fertility are low.

Zolfo fine sand. This is a nearly level and somewhat poorly drained soil. It is in broad, slightly higher positions adjacent to flatwoods. The slopes are smooth to convex and range from 0 to 2 percent. In most years, a seasonal high water table is at a depth of 24 to 40 inches for 2 to 6 months. It is at a depth of 10 to 24 inches during periods of heavy rains. It recedes to a depth of about 60 inches during extended dry periods. The permeability is rapid in the surface and subsurface layers and is medium in the subsoil.

Addendum 4—Plant And Animal List

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
ALGAE		
Stonewort, Muskgrass	*Chara* spp.	47,46,55
Stoneworts	*Nitella* spp.	55
LICHENS		
Florida perforate cladonia	*Cladonia perforata*	3,14,15
Tiny button lichen	*Amandinea punctata*	
Brick-spored fire dot lichen	*Brigantiaea leucoxantha*	
Common button lichen	*Buellia stillingiana*	
C-Eyelash lichen	*Bulbothrix isidiza*	
Leaf dot lichen	*Calopadia fusca*	
Carolina shield lichen	*Canoparmelia caroliniana*	
Powder-headed Texas shield lichen	*Canoparmelia cryptochlorophaea*	
Powder puff deer moss	*Cladina evansii*	
Dixie reindeer lichen	*Cladina subtenuis*	
Pale-fruited funnel lichen	*Cladonia beaumontii*	
Bramble cladonia	*Cladonia floridana*	
Powder-foot British soldiers	*Cladonia incrassata*	
Jester cladonia	*Cladonia leporina*	
Slender ladder cladonia	*Cladonia rappii*	
Short-footed cladonia	*Cladonia santensis*	
Branched turban cladonia	*Cladonia simulata*	
Powdery peg cladonia	*Cladonia subradiata*	
Christmas lichen	*Cryptothecia rubrocincta*	
Green Christmas lichen	*Cryptothecia striata*	
Powdery medallion lichen	*Dirinaria picta*	
Purple-eyed medallion lichen	*Dirinaria purpurascens*	
Pastry script lichen	*Graphina peplophora*	
Powdered-script lichen	*Graphis afzelii*	
Script lichen	*Graphis grammatis*	
Script lichen	*Graphis striatula*	
Tree bloodspot	*Haematomma accolens*	
Bloodspot lichen	*Haematomma spp.*	
Wrinkled loop lichen	*Hypotrachyna livida*	
Grainy loop lichen	*Hypotrachyna osseoalba*	
Bumpy rim-lichen	*Lecanora hybocarpa*	
Mealy rim-lichen	*Lecanora strobilina*	
Dust lichen	*Lepraria spp.*	
Spiral spored lichen	*Letrouitia domingensis*	
Spiral spored lichen	*Letrouitia vulpina*	
Dot lichen	*Micarea* spp.	
Salted ruffle lichen	*Parmotrema crinitum*	

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Unwhiskered ruffle lichen	*Parmotrema cristiferum*	
Cracked ruffle lichen	*Parmotrema dilatatum*	
Yellow-colored ruffle lichen	*Parmotrema endosulphureum*	
Ruffle lichen	*Parmotrema endosulphureum x gardneri*	
Pd+ powder crown ruffle lichen	*Parmotrema gardneri*	
Powdered ruffle lichen	*Parmotrema hypoleucinum*	
Unperforated ruffle lichen	*Parmotrema michauxianum*	
Perforated ruffle lichen	*Parmotrema perforatum*	
Powder-crown ruffle lichen	*Parmotrema praesorediosum*	
Powdered long-whisker ruffle lichen	*Parmotrema rampoddense*	
Long-whiskered ruffle lichen	*Parmotrema rigidum*	
Palm ruffle lichen	*Parmotrema tinctorum*	
Wart lichen	*Pertusaria pustulata*	
Wart lichen	*Pertusaria* spp.	
Brick-spored script lichen	*Phaeographina caesiopruinosa*	
Dark-spored script lichen	*Phaeographis lobata*	
Streaked rosette lichen	*Physcia atrostriata*	
Tar-spot lichen	*Placynthiella uliginosa*	
Striped ramalina	*Ramalina montagnei*	
Ramalina	*Ramalina peruviana*	
Southern strap lichen	*Ramalina stenospora*	
Thorny ramalina	*Ramalina willeyi*	
Cracked ruffle lichen	*Rimelia reticulata*	
Barnacle lichen	*Thelotrema lacteum*	
Board lichen	*Trapeliopsis flexuosa*	
Powder-tipped beard lichen	*Usnea dimorpha*	
Bloody beard lichen	*Usnea mutabilis*	
Beard lichen	*Usnea perplecta*	
Red beard lichen	*Usnea rubicunda*	
Bushy beard lichen	*Usnea strigosa*	
MOSSES	*Amblystegium riparium*	33,35
	Amblystegium serpens	33,35
	Anomodon attenuatus	33,35
	Atrichium augustatum	33,35
	Bracythecium acuminatum	33,35
	Calymperes erosum	33,35
	Calymperes nashii	33,35
	Campylopus surinamensis	33,35
	Clasmatodon parvulus	33,35
	Climacium americanum	33,35
	Cryphaea filiformis	33,35

* Non-native Species

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
	Cryphaea glomerata	33,35
	Cryphea nervosa	33,35
	Cyclodictyon varians	33,35
	Dicranum condensatum	33,35
	Entodon cladorrhizans	33,35
	Entodon macropodus	33,35
	Entodon seductrix	33,35
	Eurynchium hians	33,35
	Fissidens donnellii	33,35
	Fissidens garberi	33,35
	Fissidens osmundoides	33,35
	Forsstroemia trichomitria	33,35
	Isopterygium tenerum	33,35
	Leucobryum albidum	33,35
	Leucobryum glaucum	33,35
	Leucodon julaceus	33,35
	Macromitrium richardii	33,35
	Meteoropsis patula	33,35
	Mnium cuspida	33,35
	Neckeropsis disticha	33,35
	Neckeropsis undulata	33,35
	Octoblepharum albidum	33,35
	Papillaria nigrescens	33,35
	Rhizogonium spiniforme	33,35
	Rhyncostegium serrulatum	33,35
	Schwetschkeopsis fabronia	33,35
	Sematophyllum adnatum	33,35
	Sematophyllum caespitosum	33,35
	Sematophyllum demissum	33,35
	Spagnum spp.	33,35
	Syrrhopodon incompletus	33,35
	Syrrhopodon parasiticus	33,35
	Syrrhopodon texanus	33,35
	Thelia hirtella	33,35
	Thuidium delicatulum	33,35
	Thuidium minutulum	33,35
LIVERWORTS	*Aneura pinguis*	33,35
	Aneura multifida	33,35
	Aneura palmata	33,35
	Aphanolejeunea contractiloba	33,35
	Cephalozia lunulifolia	33,35
	Ceratolejeunea rubiginosa	33,35

***** **Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
	Cololejeunea cardiocarpa	33,35
	Cololejeunea minutissima	33,35
	Cololejeunea ornata	33,35
	Cololejeunea subcristata	33,35
	Crossotolejeunea bermudiana	33,35
	Euosmolejeunea clausa	33,35
	Euosmolejeunea myriantha	33,35
	Euosmolejeunea polyantha	33,35
	Euosmolejeunea rigidula	33,35
	Frullania brittoniae	33,35
	Frullania cobrensis	33,35
	Frullania eboracensis	33,35
	Frullania inflata	33,35
	Frullania kunzei	33,35
	Frullania obchordata	33,35
	Frullania riojanirensis	33,35
	Frullania riparia	33,35
	Frullania sabaliana	33,35
	Frullania squarrosa	33,35
	Harpalejeunea	33,35
	Lejeunea autoica	33,35
	Lejeunea bermudiana	33,35
	Lejeunea cardotii	33,35
	Lejeunea cladogyna	33,35
	Lejeunea flava	33,35
	Lejeunea laetevirens	33,35
	Lejeunea ulicina	33,35
	Leucolejeunea conchifolia	33,35
	Leucolejeunea unciloba	33,35
	Lophocolea apalachicola	33,35
	Mastigolejeunea auriculata	33,35
	Metzgeria furcata	33,35
	Odontoschizma prostratum	33,35
	Pallavicinia lyellii	33,35
	Phioceros laevis	33,35
	Plagiochila dubia	33,35
	Plagiochila floridana	33,35
	Plagiochila invisa	33,35
	Plagiochila ludoviciana	*33,35*
	Radula australis	*33,35*
	Radula complanata	*33,35*
	Radula floridana	*33,35*

***** **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
	Radula obconica	33,35
	Rectolejeunea brittoniae	*33,35*
	Rectolejeunea phyllobola	*33,35*
	Riccardia multifida	*33,35*
	Taxilejeunea obtusangula	33,35
HORNWORTS	*Phaeoceros laevis*	33,35
VASCULAR PLANTS		
Red maple	*Acer rubrum*	33, 35
Giant leather fern	*Acrostichum danaeifolium*	33
Sticky jointvetch	*Aeschynomene viscidula*	
Red buckeye	*Aesculus pavia*	33, 35
Purple false foxglove	*Agalinis purpurea*	8
Seminole false foxglove	*Agalinis filifolia*	8
Florida hobblebush; Pipestem	*Agarista populifolia*	33, 35
Hammock snakeroot	*Ageratina jucunda*	13,23
Silktree, mimosa *	*Albizia julibrissin*	13
Yellow colicroot	*Aletris lutea*	8
Alligatorweed*	*Alternanthera philoxeroides*	55
Bastard indigobush	*Amorpha fruticosa*	21, 33, 35
Peppervine	*Ampelopsis arborea*	33, 35
Splitbeard bluestem	*Andropogon ternarius*	13
Broomsedge bluestem	*Andropogon virginicus var. virginicus*	8, 13
Green silkyscale	*Anthaenantia villosa*	8,13
Groundnut	*Apios americana*	33
Nodding nixie	*Apteria aphylla*	21
Coral ardisia*	*Ardisia crenata*	35
Jack-in-the-pulpit	*Arisaema triphyllum*	21, 35
Wiregrass	*Aristida beyrichiana*	13,14,15,21
Virginia snakeroot	*Aristolochia serpentaria*	33, 35
Florida indian plantain	*Arnoglossum floridanum*	13
Switchcane	*Arundinaria gigantea*	35
Pinewoods milkweed	*Asclepias humistrata*	13, 8, 81
Whorled milkweed	*Asclepias verticillata*	8,13
Fewflower milkweed	*Asclepias lanceolata*	8, 41, 13
Butterflyweed; Butterfly milkweed	*Asclepias tuberosa*	13
Dwarf pawpaw	*Asimina pygmaea*	13
Netted pawpaw	*Asimina reticulata*	13
Smallflower pawpaw	*Asimina parviflora*	21, 35
Climbing aster	*Aster carolinianus*	33
Whitetop aster; Dixie aster	*Aster tortifolius*	13,14,23

* Non-native Species

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Whitetop aster; Pinebarren aster	*Aster reticulatus*	13
Elliott's aster	*Aster elliottii*	33, 35
Big carpetgrass	*Axonopus furcatus*	8,41,46
Carolina mosquito fern	*Azolla caroliniana*	55
Groundsel tree; Sea myrtle	*Baccharis halimifolia*	29, 35, 47
Lemon bacopa; Blue waterhyssop	*Bacopa caroliniana*	8, 41
Coastalplain honeycombhead	*Balduina angustifolia*	3, 14
Bamboo *	*Bambusa sp.*	35
Tarflower	*Befaria racemosa*	8, 14, 15
Wax begonia; club begonia*	*Begonia cucullata*	21,32,33,35
Alabama supplejack; Rattan vine	*Berchemia scandens*	21, 33, 35
Florida greeneyes	*Berlandiera subacaulis*	13
Beggarticks; Romerillo	*Bidens alba*	81
Smallfruit beggarticks	*Bidens mitis*	81, 13
Crossvine	*Bignonia capreolata*	33, 35
Toothed midsorus fern; Swamp fern	*Blechnum serrulatum*	8, 41, 46
False nettle, Bog hemp	*Boehmeria cylindrica*	35
Southern grape-fern	*Botrychium biternatum*	23, 35
Paper mulberry*	*Broussonetia papyrifera*	8, 13
American bluehearts	*Buchnera americana*	8,15
Densetuft hairsedge	*Bulbostylis ciliatifolia*	13,14,15
American beautyberry	*Callicarpa americana*	8, 13, 21
Tuberous grasspink	*Calopogon tuberosus*	8, 41
Pale grasspink	*Calopogon pallidus*	41
Manyflowered grasspink	*Calopogon multiflorus*	8, 41
Bandana-of-the-everglades	*Canna flaccida*	41, 33, 53
Chapman's sedge	*Carex chapmannii*	35
Bromelike sedge	*Carex bromoides*	33, 35
Long's sedge	*Carex longii*	32,33,35
Vanillaleaf	*Carphephorus odoratissimus*	13
Coastalplain chaffhead	*Carphephorus corymbosus*8, 13	
American hornbeam; Bluebeech	*Carpinus caroliniana*	33, 35
Pignut hickory	*Carya glabra*	21, 35
Chinquapin	*Castanea pumila*	13,23
Spadeleaf	*Centella asiatica*	32,33,35
Spurred butterfly pea	*Centrosema virginianum*	13, 14, 8
Common buttonbush	*Cephalanthus occidentalis*	33
Florida rosemary; Sand heath	*Ceratiola ericoides*	14
Partridge pea	*Chamaechrista fasciculata*	13,81
Sensitive pea	*Chamaecrista nictitans var. aspera*	8,13,15
Alicia	*Chapmannia floridana*	3, 14, 15
Slender woodoats	*Chasmanthium laxum*	13

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Shiny woodoats	*Chasmanthium nitidum*	33, 35
White fringetree; Old-man's beard	*Chionanthus virginica*	21
Spotted water hemlock	*Cicuta maculata*	32,33
Camphortree *	*Cinnamomum camphora*	8, 21
Nuttall's thistle	*Cirsium nuttallii*	All
Jamaica swamp sawgrass	*Cladium jamaicense*	55
Swamp leather-flower	*Clematis crispa*	21, 35
Bleeding-heart*	*Clerodendrum thomsoniae*	82
Rose glorybower*	*Clerodendrum bungei*	82
Atlantic pigeonwings	*Clitoria mariana*	13
Tread-softly; Finger-rot	*Cnidoscolus stimulosus*	All
Carolina coralbead	*Cocculus carolinus*	21
Wild taro; Dasheen; Coco yam *	*Colocasia esculenta*	55
Whitemouth dayflower	*Commelina erecta*	All
Dayflower	*Commelina diffusa*	All
Blue mistflower	*Conoclinium coelestinum*	35
Spring coralroot	*Corallorhiza wisteriana*	21, 35
Flowering dogwood	*Cornus florida*	21
Swamp dogwood; Stiff dogwood	*Cornus foemina*	33, 35
May haw; May hawthorn	*Crataegus aestivalis*	35
Yellowleaf hawthorn	*Crataegus flava*	21
Slender scratchdaisy	*Croptilon divaricatum*	82
Smooth rattlebox*	*Crotalaria pallida*	13, 81
Showy rattlebox*	*Crotalaria spectabilis*	81
Rabbitbells	*Crotalaria rotundifolia*	All
Woolly croton; Hogwort	*Croton capitatus*	13
Silver croton; Healing croton	*Croton argyranthemus*	13
Rushfoil; Michaux's croton	*Croton michauxii*	8,13,14
Roseling	*Cuthbertia sp.*	13
Florida scrub roseling	*Cuthbertia ornata*	13
Leafless swallowwort	*Cynanchum scoparium*	8,13,14,15,23,35,41
Jointed flatsedge	*Cyperus articulatus*	55
Feay's prairieclover	*Dalea feayi*	14
Summer farewell	*Dalea pinnata var. pinnata*	13
Cowitch vine; Climbing hydrangea	*Decumaria barbara*	21, 33, 5
Western tansymustard	*Descurainia pinnata*	82
Dixie ticktrefoil*	*Desmodium tortuosum*	23, 81
Florida ticktrefoil	*Desmodium floridanum*	13,15,23
Slimleaf ticktrefoil	*Desmodium tenuifolium*	13
Variable witchgrass	*Dichanthelium commutatum*	33, 35
----------	*Dichanthelium ensifolium var. breve*	14
Hemlock witchgrass	*Dichanthelium portoricense*	All

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Openflower witchgrass	*Dichanthelium laxiflorum*	All
----------	*Dichanthelium ensifolium var. ensifolium*	41,35
Cypress witchgrass	*Dichanthelium dichotomum*	13
Carolina ponysfoot	*Dichondra caroliniensis*	35, 81
Virginia buttonweed	*Diodia virginiana*	26,33,35,41
Poor joe; Rough buttonweed	*Diodia teres*	8,13,15
Air-potato *	*Dioscorea bulbifera*	13,21,81
Common persimmon	*Diospyros virginiana*	8, 13, 21,41,81
Southern wood fern	*Dryopteris ludoviciana*	35
Oblongleaf twinflower	*Dyschoriste oblongifolia*	21,35
Common water-hyacinth*	*Eichhornia crassipes*	55
Tall elephantsfoot	*Elephantopus elatus*	8,21
Carolina elephantsfoot	*Elephantopus carolinianus*	26,35
Carolina scalystem	*Elytraria caroliniensis var. caroliniensis*	8,41
Florida tasselflower*	*Emilia fosbergii*	81
Florida butterfly orchid	*Encyclia tampensis*	21,33,35
Earpod tree*	*Enterolobium contortisiliquum*	81
Green-fly orchid	*Epidendrum conopseum*	35
Golden pothos*	*Epipremnum pinnatum*	35
American burnweed; Fireweed	*Erechtites hieracifolia*	35
Oakleaf fleabane	*Erigeron quercifolius*	13, 81
Prairie fleabane	*Erigeron strigosus*	13,81
Tenangle pipewort	*Eriocaulon decangulare*	8,41
Dogtongue wild buckwheat	*Eriogonum tomentosum*	13,14,15
Fragrant eryngo	*Eryngium aromaticum*	8,13,14,41
Baldwin's eryngo	*Eryngium baldwinii*	8,41,81
Coralbean; Cherokee bean	*Erythrina herbacea*	21
Wild coco	*Eulophia alta*	33,35,41
American strawberrybush	*Euonymus americanus*	33,35
Queen-of-the-meadow; Joepyeweed	*Eupatorium fistulosum*	8, 35, 41
Lateflowering thoroughwort	*Eupatorium serotinum*	21,81
White thoroughwort	*Eupatorium album*	13
Dogfennel	*Eupatorium capillifolium*	8,13
Yankeeweed	*Eupatorium compositifolium*	All
Saltmarsh fingergrass	*Eustachys glauca*	8,13
Pinewoods fingergrass	*Eustachys petraea*	13
Green ash; Pumpkin ash	*Fraxinus pennsylvanica*	31
Carolina ash; Water ash; Pop ash	*Fraxinus carolinianus*	33
Southern umbrellasedge	*Fuirena scirpoidea*	Sand Lake
Elliott's milkpea	*Galactia elliottii*	13,14
Eastern milkpea	*Galactia regularis*	13,23
Soft milkpea	*Galactia mollis*	13, 14

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Hairy bedstraw	*Galium pilosum*	All
Oneflower bedstraw	*Galium uniflorum*	13,21,23
Stiff marsh bedstraw	*Galium tinctorium*	35
Garberia	*Garberia heterophylla*	13,14,15
Southern beeblossom	*Gaura angustifolia*	81,13
Blue huckleberry	*Gaylussacia frondosa*	8, 14
Dwarf huckleberry	*Gaylussacia dumosa*	14
Yellow jessamine	*Gelsemium sempervirens*	8,21,35
Sweet everlasting; Rabbit tobacco	*Gnaphalium obtusifolium*	13,81
Loblolly bay	*Gordonia lasianthus*	26,33
Rough hedgehyssop	*Gratiola hispida*	14, 15
Bearded skeletongrass	*Gymnopogon ambiguus*	13
Longhorn false reinorchid	*Habenaria quinqueseta*	35, 41
Toothpetal false reinorchid	*Habenaria floribunda*	35, 41
Waterspider false reinorchid	*Habenaria repens*	35
American witchhazel	*Hammemelis virginiana*	21
English ivy*	*Hedera helix*	81
White gingerlily*	*Hedychium coronarium*	35
Innocence; Roundleaf bluet	*Hedyotis procumbens*	8,21
Southeastern sneezeweed	*Helenium pinnatifidum*	41
Pinebarren frostweed	*Helianthemum corymbosum*	14
Queen-devil	*Hieracium gronovii*	13
Waterthyme*	*Hydrilla verticillata*	55
Manyflower marshpennywort	*Hydrocotyle umbellata*	29,33
Coastalplain spiderlily	*Hymenocallis crassifolia*	55
Pineweeds; Orangegrass	*Hypericum gentianoides*	8
Fourpetal St. John's-wort	*Hypericum tetrapetalum*	13
St. Andrew's-cross	*Hypericum hypericoides*	8
Sandweed; Peelbark St. John's-wort	*Hypericum fasciculatum*	32,41,46,49
Roundpod St. John's-wort	*Hypericum cistifolium*	8
Atlantic St. John's-wort	*Hypericum reductum*	8,14
Yellow stargrass	*Hypoxis sp.*	35
Fringed yellow stargrass	*Hypoxis juncea*	8
Common yellow stargrass	*Hypoxis curtissii*	35
Clustered bushmint; Musky mint	*Hyptis alata*	35
Scrub holly	*Ilex opaca var. arenicola*	21
Inkberry; Gallberry	*Ilex glabra*	8
Dahoon holly	*Ilex cassine*	26,33,35
Carolina holly; Sand holly	*Ilex ambigua var. ambigua*	21
American Holly	*Ilex opaca var. opaca*	35
Yellow anisetree	*Illicium parviflorum*	33,35,41
Cogongrass *	*Imperata cylindrica*	81,8,14

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Carolina indigo	*Indigofera caroliniana*	13,14
Hairy indigo *	*Indigofera hirsuta*	81
Saltmarsh morningglory	*Ipomoea sagittata*	81
Oceanblue morningglory	*Ipomoea indica*	8
Largeroot morningglory*	*Ipomoea macrorhiza*	13
Man-of-the-earth	*Ipomoea pandurata*	8
Dixie iris; Prairie iris	*Iris hexagona*	33,46,47,53,55
Virginia iris	*Iris virginica*	35,41,46,49
Virginia willow	*Itea virginica*	33, 35
Virginia saltmarsh mallow	*Kosteletzkya virginica*	32
Sandspur; Ratany	*Krameria lanceolata*	13, 81
Virginia dwarfdandelion	*Krigia virginica*	21
Carolina redroot	*Lachnanthes caroliniana*	46, 8
Whitehead bogbutton	*Lachnocaulon anceps*	8, 41
Woodland lettuce	*Lactuca floridana*	8,41
Grassleaf lettuce	*Lactuca graminifolia*	13, 81, 8
Lantana; Shrubverbena*	*Lantana camara*	8, 13
Hairy pinweed	*Lechea mucronata*	13,23
Southern cutgrass; Clubhead cutgras	*Leersia hexandra*	46, 55
Duckweed	*Lemna sp.*	55
Lion's-ear; Christmas candlestick*	*Leonotis nepetifolia*	81
Virginia pepperweed	*Lepidium virginicum*	81
Hairy lespedeza	*Lespedeza hirta*	13
Coastal doghobble	*Leucothoe axillaris*	35
Fewflower gayfeather	*Liatris pauciflora*	8,13
Piedmont gayfeather	*Liatris secunda*	13, 14
Shortleaf gayfeather	*Liatris tenuifolia*	8, 13
Gopher apple	*Licania michauxii*	8,13,14
Catesby's lily; Pine lily	*Lilium catesbaei*	8
Florida yellow flax	*Linum floridanum*	8
Sweetgum	*Liquidambar styraciflua*	21,26,33,35
Tuliptree; Yellow poplar	*Liriodendron tulipifera*	35
Cardinalflower	*Lobelia cardinalis*	55
Glade lobelia	*Lobelia glandulosa*	33,41
Downy lobelia	*Lobelia puberula*	35
Bay lobelia	*Lobelia feayana*	26
Coral honeysuckle	*Lonicera sempervirens*	21,35
Anglestem primrosewillow	*Ludwigia leptocarpa*	47
Creeping primrosewillow	*Ludwigia repens*	33, 47
Skyblue lupine	*Lupinus diffusus*	13,14
Rose-rush	*Lygodesmia aphylla*	13
Japanese climbing fern *	*Lygodium japonicum*	13,35

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Fetterbush	*Lyonia lucida*	8
Rusty staggerbush	*Lyonia ferruginea*	14,15
Maleberry	*Lyonia ligustrina*	33,35
Coastalplain staggerbush	*Lyonia fruticosa*	14,15
Marianna maiden fern *	*Macrothelypteris torresiana*	35
Southern magnolia	*Magnolia grandiflora*	21,35
Sweetbay	*Magnolia virginiana*	26,33,35
Southern crabapple	*Malus angustifolia*	23
Angularfruit milkvine	*Matelea gonocarpos*	35
Chinaberrytree*	*Melia azedarach*	21
Creeping cucumber	*Melothria pendula*	21
Noyau vine*	*Merremia dissecta*	8
Browne's savory	*Micromeria brownei*	41
Florida keys hempvine	*Mikania cordifolia*	55
Climbing hempvine	*Mikania scandens*	55
Florida sensitive brier	*Mimosa quadrivalvis var. floridana*	13,14
Sensitive brier	*Mimosa quadrivalvis var. angustata*	13,15
Partridgeberry; Twinberry	*Mitchella repens*	21,35
Lax hornpod	*Mitreola petiolata*	41,47,55
Balsampear*	*Momordica charantia*	8
Spotted beebalm	*Monarda punctata*	21
Indianpipe	*Monotropa uniflora*	14
Red mulberry	*Morus rubra*	21
Southern bayberry; Wax myrtle	*Myrica cerifera*	21,26,29
Tuberous sword fern*	*Nephrolepis cordifolia*	21, 35
Sword fern; Wild Boston fern	*Nephrolepis exaltata*	33, 35
Spatterdock; Yellow pondlily	*Nuphar lutea*	47,55
Big floatingheart	*Nymphoides aquatica*	47
Swamp tupelo	*Nyssa sylvatica var. biflora*	33,35
Woodsgrass; Basketgrass	*Oplismenus hirtellus*	35
Pricklypear	*Opuntia humifusa*	13,14,15
Goldenclub; Neverwet	*Orontium aquaticum*	47,53,55
Wild olive	*Osmanthus americanus*	21,35
Cinnamon fern	*Osmunda cinnamomea*	33,35
Royal fern	*Osmunda regalis*	33,35
Common yellow woodsorrel	*Oxalis corniculata*	81
Pink woodsorrel*	*Oxalis debilis var. corymbosa*	81
Feay's palafox	*Palafoxia feayi*	13,14,15
Coastalplain palafox	*Palafoxia integrifolia*	13,14,15
Torpedograss*	*Panicum repens*	Sand Lake
Maidencane	*Panicum hemitomon*	29,33
Paronychia	*Paronychia sp.*	13, 14

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Virginia creeper; Woodbine	*Parthenocissus quinquefolia*	21,33,35
Egyptian paspalidium	*Paspalidium geminatum*	55
Bull crowngrass	*Paspalum boscianum*	21
Field paspalum	*Paspalum laeve*	8,41,46,81
Vaseygrass *	*Paspalum urvillei*	35
Purple passionflower	*Passiflora incarnata*	8,21
Buckroot	*Pediomelum canescens*	8,13
White arrow arum; Spoonflower	*Peltandra sagittifolia*	41
Green arrow arum	*Peltandra virginica*	33,35
Elephantgrass; Napiergrass*	*Pennisetum purpureum*	32,33,81
Manyflower beardtongue	*Penstemon multiflorus*	13
Red bay	*Persea borbonia var. borbonia*	21
Silk bay, scrub bay	*Persea borbonia var. humilis*	14
Swamp bay	*Persea palustris*	33,35
Savannah panicum	*Phanopyrum gymnocarpon*	33,35
Golden polypody	*Phlebodium aureum*	35,41
Florida false sunflower	*Phoebanthus grandiflora*	13
Oak mistletoe	*Phoradendron leucarpum*	Many
Red chokeberry	*Photinia pyrifolia*	41,53
Turkey tangle fogfruit; Capeweed	*Phyla nodiflora*	23,81
Husk tomato	*Physalis pubescens*	13
American pokeweed	*Phytolacca americana*	All
Wild pennyroyal	*Piloblephis rigida*	8,14,15
Small butterwort	*Pinguicula pumila*	8,41
Yellow butterwort	*Pinguicula lutea*	8,41
Blueflower butterwort	*Pinguicula caerulea*	8
Loblolly pine	*Pinus taeda*	35,41
Longleaf pine	*Pinus palustris*	8,14,41
Pond pine	*Pinus serotina*	8,41
Sand pine	*Pinus clausa*	8,13,14,15
Slash pine	*Pinus elliottii*	8,41
Florida needlegrass	*Piptochaetium avenacioides*	13,14
Water-lettuce*	*Pistia stratiotes*	55
Narrowleaf silkgrass	*Pityopsis graminifolia*	13,14,15
Resurrection fern	*Pleopeltis polypodioides var. michauxiana*	21,23
Stinking camphorweed	*Pluchea foetida*	8,41
Sweetscent	*Pluchea odorata*	33
Rosy camphorweed	*Pluchea rosea*	13
Rose pogonia; Snakemouth orchid	*Pogonia ophioglossoides*	41
Showy milkwort	*Polygala grandiflora*	13,21
Coastalplain milkwort	*Polygala setacea*	8
Orange milkwort	*Polygala lutea*	41

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Yellow milkwort	*Polygala rugelii*	8,41
King Solomon's seal	*Polygonatum biflorum*	21
Tall jointweed	*Polygonella gracilis*	13,14
Largeflower jointflower	*Polygonella fimbriata var. robusta*	13
Denseflower knotweed	*Polygonum densiflorum*	35
Comb polypody	*Polypodium ptilodon*	23,35
Rustweed; Juniperleaf	*Polypremum procumbens*	46,49
Pickerelweed	*Pontederia cordata*	47
Carolina laurelcherry	*Prunus caroliniana*	21
Black cherry	*Prunus serotina var. serotina*	21
Flatwoods plum; Hog plum	*Prunus umbellata*	21
Chickasaw plum	*Prunus angustifolia*	21,81C
Whisk-fern	*Psilotum nudum*	33,35
Wild coffee	*Psychotria nervosa*	21,35,41
Shortleaf wild coffee	*Psychotria sulzneri*	35
Common hoptree; Wafer ash	*Ptelea trifoliata*	21
Bracken fern	*Pteridium aquilinum*	8,21
Blackroot	*Pterocaulon pycnostachyum*	41
Giant orchid	*Pteroglossaspis ecristata*	13
Carolina desertchicory	*Pyrrhopappus carolinianus*	21
Myrtle oak	*Quercus myrtifolia*	13,14,15
Virginia live oak	*Quercus virginiana*	21,35
Water oak	*Quercus nigra*	35
Dwarf live oak	*Quercus minima*	14,15
Turkey oak	*Quercus laevis*	13
Scrub oak	*Quercus inopina*	14
Running oak	*Quercus pumila*	14
Small post oak	*Quercus stellata var. margaretta*	13
Bluejack oak	*Quercus incana*	13,14,15
Sand live oak	*Quercus geminata*	13,14,15
Spanish oak; Southern red oak	*Quercus falcata*	21
Chapman's oak	*Quercus chapmanii*	14,15
Laurel oak; Diamond oak	*Quercus laurifolia*	21,35
Needle palm	*Rhapidophyllum hystrix*	35
Fringed meadowbeauty	*Rhexia petiolata*	41
Pale meadowbeauty	*Rhexia mariana*	29,41
Swamp azalea	*Rhododendron viscosum var. serrulatum*	33,41
Winged sumac	*Rhus copallina*	8,21
Rose natalgrass*	*Rhynchelytrum repens*	13
Least snoutbean	*Rhynchosia minima*	13
Michaux's snoutbean	*Rhynchosia michauxii*	13
Doubleform snoutbean	*Rhynchosia difformis*	13

* Non-native Species

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Dollarleaf	*Rhynchosia reniformis*	13
Gray's beaksedge	*Rhynchospora grayii*	13
Sandyfield beaksedge	*Rhynchospora megalocarpa*	13,14
Fragrant beaksedge	*Rhynchospora odorata*	33,35,47
Shortbristle horned beaksedge	*Rhynchospora corniculata*	55
Millet beaksedge	*Rhynchospora miliacea*	33,35
Narrowfruit horned beaksedge	*Rhynchospora inundata*	55
Tropical Mexican clover*	*Richardia brasiliensis*	81
European watercress*	*Rorippa nasturtium-aquaticum*	53
Swamp rose	*Rosa palustris*	33
Sand blackberry	*Rubus cuneifolius*	8
Sawtooth blackberry	*Rubus argutus*	8
Blackeyed susan	*Rudbeckia hirta*	13,15
Carolina wild petunia	*Ruellia caroliniensis*	All
Heartwing dock; Hastateleaf dock	*Rumex hastatulus*	81
Swamp dock	*Rumex verticillatus*	33
Dwarf palmetto; Bluestem palm	*Sabal minor*	21,35
Cabbage palm	*Sabal palmetto*	8,21,33,35
Largeflower rosegentian	*Sabatia grandiflora*	41
Shortleaf rosegentian	*Sabatia brevifolia*	8,41
Coastal rosegentian	*Sabatia calycina*	35,41
Sugarcane plumegrass	*Saccharum giganteum*	8,32,41
American cupscale	*Sacciolepis striata*	13
Leafless beaked ladiestresses	*Sacoila lanceolata var. lanceolata*	15,23
Broadleaf arrowhead	*Sagittaria latifolia*	33,46
Bulltongue arrowhead	*Sagittaria lancifolia*	33,47
Carolina willow	*Salix caroliniana*	55
Lyreleaf sage	*Salvia lyrata*	8,21
American elder; Elderberry	*Sambucus canadensis*	47
Canadian blacksnakeroot	*Sanicula canadensis*	21,35
Bowstring hemp*	*Sansevieria hyacinthoides*	81
Popcorntree; Chinese tallowtree *	*Sapium sebiferum*	8,13,21,81
Hooded pitcherplant	*Sarracenia minor*	8,41
Sassafras	*Sassafras albidum*	21
Lizard's tail	*Saururus cernuus*	33,55
Florida feathershank	*Schoenocaulon dubium*	13.14
Cuban bulrush*	*Scirpus cubensis*	55
Giant bulrush; California bulrush	*Scirpus californicus*	55
Tall nutgrass; Whip nutrush	*Scleria triglomerata*	8,15,41
Littlehead nutrush	*Scleria oligantha*	33
Fringed nutrush	*Scleria ciliata var. ciliata*	13
Florida scrub skullcap	*Scutellaria arenicola*	14

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Helmet skullcap	*Scutellaria integrifolia*	13,14,15
Butterweed	*Senecia glabellus*	8,41,46
Coffeeweed; Sicklepod	*Senna obtusifolia*	81
Saw palmetto	*Serenoa repens*	8,21,35
Yellow bristlegrass; Yellow foxtail	*Setaria parviflora*	32,35,41
Piedmont blacksenna	*Seymeria pectinata*	13,14
Gum bully	*Sideroxylon lanuginosum*	13
Tough bully	*Sideroxylon tenax*	14,15
Starry rosinweed	*Silphium asteriscus*	13
Narrowleaf blueeyed grass	*Sisyrinchium angustifolium*	8,41
Earleaf greenbrier	*Smilax auriculata*	8,21
Saw greenbrier	*Smilax bona-nox*	8,21
Laurel greenbrier	*Smilax laurifolia*	35
Sarsaparilla vine	*Smilax pumila*	21
Jackson vine; Lanceleaf greenbrier	*Smilax smallii*	21,35
Tropical soda apple*	*Solanum viarum*	81
Chapman's goldenrod	*Solidago odora var. chapmanii*	8
Spiny sowthistle*	*Sonchus asper*	81
Lopsided Indiangrass	*Sorghastrum secundum*	8,13
Spring ladiestresses	*Spiranthes vernalis*	81,8
Pineywoods dropseed	*Sporobolus junceus*	13
Florida hedgenettle; Florida betony	*Stachys floridana*	8
Sweet shaggytuft	*Stenandrium dulce*	8
Queensdelight	*Stillingia sylvatica*	13
Pineland scalypink	*Stipulicida setacea*	13,14
Coastalplain dawnflower	*Stylisma patens*	13,14
Carolina false vervain	*Stylodon carneum*	13
Sidebeak pencilflower	*Stylosanthes biflora*	13
Yellow hatpins	*Syngonanthus flavidulus*	8,41
Bald-cypress	*Taxodium distichum*	26,33,35
Florida hoarypea	*Tephrosia florida*	21
Wood sage; Canadian germander	*Teucrium canadense*	32,35
Widespread maiden fern	*Thelypteris kunthii*	33,35
Hottentot fern; Willdenow's fern	*Thelypteris interrupta*	35
Downy maiden fern	*Thelypteris dentata*	35
Marsh fern	*Thelypteris palustris*	32,35
Carolina basswood	*Tilia americana var. caroliniana*	33,35
Bartram's airplant	*Tillandsia bartramii*	23,35
Ballmoss	*Tillandsia recurvata*	8,14,21
Southern needleleaf	*Tillandsia setacea*	21
Spanish moss	*Tillandsia usneoides*	8,14,21
Eastern poison ivy	*Toxicodendron radicans*	8,21

*** Non-native Species**

Wekiva River Basin State Parks

Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for Designated Species)
Poison sumac	*Toxicodendron vernix*	21,35
Bluejacket; Ohio spiderwort	*Tradescantia ohiensis*	13
Forked bluecurls	*Trichostema dichotomum*	8,21
Eastern gamagrass	*Tripsacum dactyloides*	32,33,35,53
Southern cattail	*Typha domingensis*	55
American elm; Florida elm	*Ulmus americana*	35
Caesarweed	*Urena lobata*	8,21
Floating bladderwort	*Utricularia inflata*	46
Zigzag bladderwort	*Utricularia subulata*	41,46
Darrow's blueberry	*Vaccinium darrowii*	13,14
Highbush blueberry	*Vaccinium corymbosum*	8,21
Shiny blueberry	*Vaccinium myrsinites*	8,13,14
Deerberry	*Vaccinium stamineum*	8,13,14
Tapegrass; American eelgrass	*Vallisneria americana*	55
Common mullein*	*Verbascum thapsis*	81
White crownbeard; frostweed	*Verbesina virginica*	13,14,81
Giant ironweed	*Vernonia gigantea*	21,35
Tall ironweed	*Vernonia angustifolia*	8,21
Water speedwell*	*Veronica anagallis-aquatica*	81
Walter's viburnum	*Viburnum obovatum*	35
Florida vetch	*Vicia floridana*	35,47,55
Common blue violet	*Viola sororia*	23
Early blue violet	*Viola palmata*	8,13
Summer grape	*Vitis aestivalis*	8,21
Calloose grape	*Vitis shuttleworthii*	21
Muscadine	*Vitis rotundifolia*	14,23,35
Shoestring fern	*Vittaria lineata*	33,35
Creeping oxeye*	*Wedelia trilobata*	33,35
Virginia chain fern	*Woodwardia virginica*	33,35
Netted chain fern	*Woodwardia areolata*	33,35
Arrowleaf elephantear*	*Xanthosoma sagittifolium*	33,35
Tallow wood; Hog plum	*Ximenia americana*	35
Coastalplain yelloweyed grass	*Xyris ambigua*	8,41,29
Savannah yelloweyed grass	*Xyris flabelliformis*	8
Spanish bayonet; Aloe yucca*	*Yucca aloifolia*	81
Adam's needle	*Yucca filamentosa*	13,14
Florida arrowroot; Coontie	*Zamia pumila*	21,23
Soldier's orchid; Lawn orchid*	*Zeuxine strateumatica*	81
Crowpoison; Osceola's plume	*Zigadenus densus*	8,41
Annual wild rice; Indian rice	*Zizania aquatica*	55
Viperina	*Zornia bracteata*	8,13,15

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
	INVERTEBRATES	
BEETLES		
Eyed click beetle	*Alaus oculatus*	35,41
Scrub beetle	*Gerstaekeria hubbardi*	13
Whirlabout	*Polites vibex*	Throughout
Ox beetle	*Staegus antacus*	8,13
GRASSHOPPERS		
Eastern lubber	*Romalea microptera*	Throughout
Mole cricket	*Scapteriscus vicinus*	Throughout
ANTS		
Ant	*Aphaenogaster carolinensis*	35
Ant	*Aphaenogaster flemingi*	8
Ant	*Aphaenogaster fulva*	35
Ant	*Aphaenogaster lamellidens*	13
Florida harvester ant	*Aphaenogaster treatae*	8,13
Subfamily Formininae	*Brachymyrmex depilis*	8,13,35
Ant	*Brachymyrmex obscurior*	8,13
Florida Carpenter Ant	*Camponotus abdominalis floridanus*	8,13,35
Ant	*Camponotus castaneus*	8,35
Ant	*Camponotus impressus*	35
Ant	*Camponotus nearcticus*	8,13
Carpenter ant	*Camponotus socius*	13
Ant	*Cardiocondyla emeryi**	13
Ant	*Crematogaster ashmeadi*	8,13,35
Ant	*Crematogaster cerasi*	8,13
Ant	*Crematogster minutissima*	35
Ant	*Crytopone gilva*	35
Ant	*Cyphomyrmex septemtrionalis*	8,13,35
Ant	*Discothyrea testacea*	35
Ant	*Dorymyrex bossuta*	13
Ant	*Dorymyrmex bureni*	8,13
Ant	*Eurhopalothrix floridana*	35
Ant	*Forelius pruinosis*	8,13
Ant	*Formica pallidefulva*	8, 13
Ant	*Hypoponera opaciceps*	13,35
Ant	*Hypoponera opacior*	8,13,35
Cornfiled ant	*Lasius alienus*	35
Ant	*Leptogenys manni*	35
Ant	*Leptothorax pergandei*	8,13
Ant	*Leptothorax texanus*	8,13

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Ant	*Myrmecina americana*	35
Subfamily Ecitoninae	*Neivamyrmex opacithoralis*	8,13
Subfamily Dolichoderinae	*Ochetellus glabra*	8
Ant	*Odontomachus brunneus*	35
Ant	*Paratrechina arenivaga*	8, 13
Ant	*Paratrechina bourbonica**	
Ant	*Paratrechina concinna*	8, 35
Ant	*Paratrechina faisonensis*	35
Ant	*Paratrechina longicornis**	
Ant	*Paratrechina wojciki*	8, 13
Ant	*Pheidole dentata*	8,13,35
Ant	*Pheidole dentigula*	8,13,35
Ant	*Pheidole floridana*	8,13,35
Ant	*Pheidole moernes**	8,13,35
Ant	*Pheidole morrisi*	8,13
Florida Harvester ant	*Pogonomyrmex badius*	13
Subfamily Poncrinae	*Proceratium silaceum*	35
Ant	*Pseudomyrex ejectus*	35
Subfamily Pseudimytmecinae	*Pseudomyrmex mexicanus**	13,35
Ant	*Smithistruma angulata*	8
Ant	*Smithistruma laevinasis*	35
Ant	*Smithistruma ornata*	35
Ant	*Smithistruma pulchella*	35
Ant	*Smithistruma talpa*	13.35
Ant	*Solenopsis abdita*	8,13,35
Ant	*Solenopsis carolinesis*	8,13,35
Ant	*Solenopsis geminata*	
Imported fire ant*	*Solenopsis invicta**	8
Ant	*Solenopsis nekersoni*	8,13
Ant	*Solenopsis picta*	35
Ant	*Strumigenys eggersi**	35
Ant	*Strumigenys louisianae*	13,35
Ant	*Strumigenys rogeri**	13,35
Ant	*Trachymyrmex septentrionalis*	8, 13
Ant	*Trichoscapa membranifera**	13
Ant	*Xenomyrmex floridanus*	35
DAMSELFLIES		
Ebony jewelwing	*Calopteryx maculate*	53, 55
Sparkling jewelwing	*Calopteryx dimidiate*	53, 55
Fragile forktail	*Ischnura posita*	53, 55
Variable dancer	*Argia fumipennis*	53, 55

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Duckweed firetail	*Telebasis byersi*	53, 55
Smoky rubyspot	*Hetaerina titia*	53, 55
Blue damselfly	*Enallgma civile*	53,55
DRAGONFLIES		
Common green darner	*Anax junius*	53,55
Regal darner	*Coryphaeschna ingens*	53,55
Blue dragonlet	*Erythrodiplax connata minuscula*	53,55
Eastern pondhawk	*Erythemis simplicicollis*	53, 55
Two-striped forceptail	*Aphylla williamsoni*	53, 55
Eastern amberwing	*Perithemis tenera*	53, 55
Black-shouldered spinyleg	*Dromogomphus spinosus*	53, 55
Prince baskettail	*Epitheca princeps*	53, 55
Greater hyacinth glider	*Miathyria marcella*	53, 55
Cypress clubtail	*Gomphus minutus*	53,55
FLIES		
Love bug	*Plecia nearctica*	Throughout
Striped horse fly	*Tabanus lineola*	Throughout
Crane fly	*Tipula abdominalis*	Throughout
Spottedwinged antlion	*Dendoleon obsoletus*	13,14,15
Coconut mealybug	*Nipaeciccus nipae*	21
WASPS		
Gall wasp	*Callirhytis cornigera*	13
Velvet ant	*Dasymutilla occidentalis*	14,15
MOTHS		
Luna moth	*Actias luna*	Throughout
Polyphemus moth	*Antheraea polyphemus*	Throughout
Io moth	*Automeris io*	Throughout
Imperial moth	*Eacles imperialis*	Throughout
Sphinx moth	*Enyo lugubris*	Throughout
Tent caterpillar moth	*Malacosoma americanum*	Throughout
Plume moth	*Oidaematophorus balanotes*	Throughout
Oleander moth	*Syntomeida jucundissima*	Throughout
BUTTERFLIES		
White peacock	*Anartia jatrophae guantanamo*	
Least Skipper	*Ancyloxpha numitor*	Throughout

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Monk Skipper	*Asbolis capucinus*	Throughout
Great southern white	*Ascia monuste phileta*	Throughout
Hackberry emperor	*Asterocampa celtis alicia*	Throughout
Sachem	*Atalopedes campestris*	Throughout
Delaware skipper	*Atrytone logan*	
Pipevine swallowtail	*Battus philenor philenor*	Throughout
Polydamas swallowtail	*Battus polydamas lucayas*	Throughout
Red-banded hairstreak	*Calycopis cecrops*	Throughout
Southern dogface butterfly	*Colias cesonia*	
Queen butterfly	*Danaus gillippus berenice*	Throughout
Monarch or milkweed butterfly	*Danaus plexippus*	Throughout
Gulf fritillary	*Dione vanilla nigrior*	Throughout
Southern pearly eye	*Enodia portlandia*	Throughout
Silver-spotted skipper	*Epargyreus clarus*	Throughout
Sleepy duskywing	*Erynnis brizo*	
Horace's duskywing	*Erynnis horatius*	
Zarucco duskywing	*Erynnis zarucco*	Throughout
Palmetto skipper	*Euphyes arpa*	Throughout
Dun skipper	*Euphyes vestris*	Throughout
Barred sulphur butterfly	*Eurema daira*	
Barred yellow	*Eurema daira daira*	Throughout
Little yellow butterfly	*Eurema lisa*	Throughout
Sleepy orange	*Eurema nicippe*	Throughout
Zebra swallowtail	*Eurytides marcellus floridensis*	Throughout
Souther hairstreak	*Fixsenia favonius favonius*	Throughout
Sandhill clubtail	*Gomphus cavillaris*	82
Blackwater clubtail	*Gomphus dilatatus*	53,55
Lichen mantis	*Gonatista grisea*	13
Twilight darner	*Gynacantha nervosa*	53,55
Zebra longwing butterfly	*Heliconius charitonius tuckeri*	Throughout
Mayfly	*Heptagenia flavescens*	53,55
Ceraunus blue	*Heriargus ceraunus antbubastus*	Throughout
Carolina satyr	*Hermeuptychia hermes sosybius*	Throughout
Dotted skipper	*Hesperia atalus*	Throughout
Fiery skipper	*Hylephila phyleus*	Throughout
Cassius blue	*Lepotes cassius theonus*	
Clouded skipper	*Lerema accius*	Throughout
Eufala skipper	*Lerodea eufala*	Throughout
Viceroy	*Limenitis archippus floridensis*	Throughout
Yucca giant-skipper	*Megathymus yuccae*	Throughout
Little wood satyr	*Megisto cymela*	Throughout
Viola's wood satyr	*Megisto viola*	Throughout

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Neamathla skipper	*Nastra neamathla*	Throughout
Dainty sulphur	*Nathalis iole*	Throughout
Twin-spot skipper	*Oligoria maculata*	Throughout
Ocola skipper	*Panoquina ocola*	Throughout
Giant swallowtail	*Papilio cresphontes*	Throughout
Eastern tiger swallowtail	*Papilio glaucus australis*	Throughout
Palamedes swallowtail	*Papilio palamedes*	Throughout
American swallowtail	*Papilio polyxenes asterius*	Throughout
Spice-bush swallowtail	*Papilio troilus ilioneus*	Throughout
White M hairstreak	*Parrhasius m-album m-album*	Throughout
Orange-barred sulphur	*Phoebis philea*	Throughout
Cloudless sulfur	*Phoebis sennae eubule*	Throughout
Phaon cresent butterfly	*Phyciodes phaon*	Throughout
Pearl crescent	*Phyciodes tharos tharos*	Throughout
Tawny-edged skipper	*Polites themistocles*	Throughout
Checkered white butterfly	*Pontia protodice*	Throughout
Buckeye butterfly	*Precis coenia*	Throughout
Byssus skipper	*Problema byssus*	Throughout
Tropical checkered-skipper	*Pyrgus oileus*	Throughout
Gray hairstreak	*Strymon melinus melinus*	Throughout
Southern cloudywing	*Thorybes bathyllus*	
Confused cloudywing	*Thorybes confusis*	
Northern cloudywing	*Thorybes pylades*	Throughout
Dorantes longtail	*Urbanus dorantes*	Throughout
Long-tailed skipper	*Urbanus proteus*	Throughout
Red admiral butterfly	*Vanessa atalanta rubria*	Throughout
American lady butterfly	*Vanessa virginiensis*	Throughout
Southern Broken-Dash	*Wallengrenia otho*	Throughout
Zarcco duskywing	*Zerynnis zarucco*	Throughout
SPIDERS/SCORPIONS		
Blue purse-web spider	*Sphodros abboti*	
Arachnid	*Dermatophagoides* sp.	13
Arachnid	*Mexecheles hawaiiensis*	13
Arachnid	*Micrathena gracilis*	13
Arachnid	*Misumenoides formosipes*	41
Giant vinegaroon	*Mastigoproctus giganteus*	13
Vinegaroon	*Idiogaryops paludis*	13
CRAYFISH/MUSSELS/SNAILS/AMPHIPODS/ISOPODS		
Orlando cave crayfish	*Procambarus acherontis*	Wekiwa Springs Cave
Crayfish	*Procambarus fallax*	55

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Crayfish	*Procambarus geodytes*	55
Wekiwa hydrobe	*Aphaostracon monas*	Wekiwa Springs
Wekiwa siltsnail	*Cincinnatia wekiwae*	Wekiwa Springs
Asian clam	*Corbicula fluminea**	53,55
Mussel	*Corbicula manilensis*	RSR, Wekiva River
Mussel	*Elliptio* sp	RSR, Wekiva River
Mussel	*Melanoides turriculus*	Wekiwa Spgrings
Mussel	*Planorbella duryi* ssp.*	Wekiwa Springs
Iridescent liliput mussel	*Toxoplasma paulus*	53,55
Florida rainbow mussel	*Villosa amygdala*	53,55
Gastropod	*Tryonia aequicostata*	Wekiwa Springs
Gastropod	*Palaemonetes paludosus*	55
Amphipod	*Hyalella* sp.	Wekiwa Springs
Silverfish	*Lepisma saccharina*	82
Isopod	*Lirceus* sp.	55
Hobbs cave amphipod	*Crangonyx hobbsi*	Wekiwa Springs Cave
Florida cave isopod	*Caecidotea hobbsi*	Wekiwa Springs Cave

FISH

DASYATIDAE		
Sea lamprey	*Petromyzon marinus*	55
Atlantic stingray	*Dasyatis sabina*	33,35
LEPISOSTEIDAE		
Longnose gar	*Lepisosteus osseus*	47,53,55
Florida gar	*Lepisosteus platyrhincus*	47,53,55
AMIIDAE		
Bowfin	*Amia calva*	47,53,55
CYPRINIDAE		
Golden shiner	*Notomigonus chrysoleucas*	53,55
Ironcolor shiner	*Notropis chalybaeus*	53,55
Tailfin shiner	*Notropis maculatus*	53,55
Coastal shiner	*Notropis petersoni*	53,55
Bluenose shiner	*Notropis welaka*	53,55
Pugnose minnow	*Opsopoeodus emiliae*	53,55
Sailfin shiner	*Pteronotropsis hypselopterus*	53,55
Bluenose shiner	*Pteronotropsis welaka*	53,55
CATOSTOMIDAE		
Lake chubsucker	*Erimyzon sucetta*	47
ATHERINOPSIDAE		
Brook silverside	*Labidesthes sicculus*	53,55
ICTALURIDAE		

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Snail bullhead	*Ameiurus brunneus*	53,55
Brown bullhead	*Ameiurus nebulosus*	47,53,55
Channel catfish	*Ictalurus punctatus*	53,55
Tadpole madtom	*Noturus gyrinus*	53,55
LORICARIIDAE		
Radiated Ptero*	*Pterygoplichthys multiradiatus*	55,79
Armored catfish*	*Pterygoglichthys disjunctivus*	55,79
CALLICHTHYIDAE		
Brown hopolo*	*Hopolosternum littorale*	55,79
ESOCIDAE		
Chain pickerel	*Esox niger*	47,53,55
APHREDODERIDAE		
Pirate perch	*Aphredoderus sayanus*	53,55
CYPRINODONTIDAE		
Golden topminnow	*Fundulus chrysotus*	53,55
Seminole killifish	*Fundulus seminolis*	53,55
Bluefin killifish	*Lucania goodei*	53,55
Rainwater killifish	*Lucania parva*	53,55
POECILIIDAE		
Western mosquitofish	*Gambusia affinis*	47,53,55
Least killifish	*Heterandria formosa*	53,55
Sailfin molly	*Poecilia latipinna*	47,55
CENTRARCHIDAE		
Redbreast sunfish	*Lepomis auritus*	47,53,55,81
Warmouth	*Lepomis gulosus*	47,53,55
Bluegill	*Lepomis macrochirus*	47,53,55,81
Dollar sunfish	*Lepomis marginatus*	53,55
Redear sunfish	*Lepomis microlophus*	53,55,81
Spotted sunfish	*Lepomis punctatus*	53,55,81
Largemouth bass	*Micropterus salmoides*	47,53,55,81
Black crappie	*Pomoxis nigromaculatus*	53,55
PERCIDAE		
Swamp darter	*Etheostoma fusiforme*	53,55
Blackbanded darter	*Percina nigrofasciata*	53,55
MUGILIDAE		
Striped mullet	*Mugil cephalus*	53,55
	AMPHIBIANS	
PLETHODONTIDAE		
Dwarf salamander	*Eurycea quadridigitata*	33,35
Southeastern slimy salamander	*Plethodon grobmani*	33,35

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
SALAMANDRIDAE		
Striped newt	*Notophthalmus perstriatus*	46,33,35
Peninsula newt	*Notophthalmus viridescens piaropicola*	46,33,35
SIRENIDAE		
Greater siren	*Siren lacertina*	47,55
Lesser siren	*Siren intermdia*	47,55
AMPHIUMIDAE		
Two-toed amphiuma	*Amphiuma means*	33,46,47,53,55
PELOBATIDAE		
Eastern spadefoot	*Scaphiopus holbrookii*	13
BUFONIDAE		
Oak toad	*Bufo quercicus*	8,13,14,15
Southern toad	*Bufo terrestris*	Throughout
LEPTODACTYLIDAE		
Greenhouse frog *	*Eleutherodactylus planirostris*	Throughout
HYLIDAE		
Florida cricket frog	*Acris gryllus dorsalis*	41,35,33,8
Green treefrog	*Hyla cinerea*	Throughout
Pine woods treefrog	*Hyla femoralis*	8,13,15
Barking treefrog	*Hyla gratiosa*	21,14,15
Squirrel treefrog	*Hyla squirella*	Throughout
Cuban treefrog*	*Osteopilus septentrionalis*	Unknown
Southern spring peeper	*Pseudacris crucifer*	41,33,35
Florida chorus frog	*Pseudacris nigrita verrucosa*	33,35
Little grass frog	*Pseudacris ocularis*	8
RANIIDAE		
Florida gopher frog	*Rana capito aesopus*	13,81
Bullfrog	*Rana catesbeiana*	47
Bronze frog	*Rana clamitans*	33,35
Pig frog	*Rana grylio*	47
Florida leopard frog	*Rana utricularia*	33,35,47
MICROHYLIDAE		
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*	8,13

REPTILES

CROCODYLIDAE		
American alligator	*Alligator mississippiensis*	47,53,55
KINOSTERNIDAE		
Striped mud turtle	*Kinosternon bauri*	47
Florida mud turtle	*Kinosternon subrubrum steindachneri*	47,53,55
Loggerhead musk turtle	*Sternotherus minor minor*	47,53,55

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Common musk turtle	*Sternotherus odoratus*	47,53,55
TESTUDINIDAE		
Gopher tortoise	*Gopherus polyphemus*	13,14,15
EMYDIDAE		
Peninsula cooter	*Chrysemys floridana peninsularis*	47,53,55
Florida chicken turtle	*Deirochelys reticularia chrysea*	47,53,55
Florida redbelly turtle	*Chrysemys nelsoni*	47,53,55
Florida box turtle	*Terrapene carolina bauri*	21
Red-eared slider*	*Trachemys scripta elegans*	55
CHELYDRIDAE		
Florida snapping turtle	*Chelydra serpentina*	53,55
TRIONYCHIDAE		
Florida softshell	*Apalone ferox*	47,53,55
GEKKONIDAE		
Indo-Pacific gecko*	*Hemidactylus garnotii*	81,82
African house gecko*	*Hemidactylus mabouia*	81,82
POLYCHRIDAE		
Green anole	*Anolis carolinensis carolinensis*	8,21,35
Brown anole *	*Anolis sagrei sagrei*	81,82,21
PHRYNOSOMATIDAE		
Southern fence lizard	*Sceloporus undulatus undulatus*	8,13,14,15
AMPHISBAENIDAE		
Florida worm lizard		
ANGUIDAE	*Rhineura floridana*	13,14,15
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*	21
Eastern glass lizard	*Ophisaurus ventralis*	21
TEIIDAE		
Six-lined racerunner	*Cnemidophorus sexlineatus sexlineatus*	13,14,15
SCINIDAE		
Peninsula mole skink	*Eumeces egregius onocrepis*	13,14,15
Southeastern five-lined skink	*Eumeces inexpectatus*	8,13,14,15
Broad-headed skink	*Eumeces laticeps*	21,26,35
Sand skink	*Neoseps reynoldsi*	13, 14, 15
Ground skink	*Scincella laterale*	8,21,26,35
COLUBRIDAE		
Florida scarlet snake	*Cemophora coccinea coccinea*	8,13,14,15
Southern black racer	*Coluber constrictor priapus*	21,35
Southern ringneck snake	*Diadophis punctatus punctatus*	21,26,35
Eastern indigo snake	*Drymarchon corais couperi*	13,14
Corn snake	*Elaphe guttata guttata*	8,13,14,15,21,35
Yellow rat snake	*Elaphe obsoleta quadrivittata*	8,21,35
Eastern mud snake	*Farancia abacura abacura*	26,47,55

*** Non-native Species**

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Rainbow snake	*Farancia erytrogramma erytrogramma*	53,55
Eastern hognose snake	*Heterodon platyrhinos*	8,13,14,15
Common kingsnake	*Lampropeltis getula*	35
Eastern kingsnake	*Lampropeltis getula getula*	35
Scarlet kingsnake	*Lampropeltis trianglulum elapsoides*	8
Eastern coachwhip	*Masticophis flagellum flagellum*	13,14,15
Florida water snake	*Nerodia fasciata pictiventris*	47,53,55
Brown water snake	*Nerodia taxispilota*	47,53,55
Rough green snake	*Opheodrys aestivus*	21,35
Florida pine snake	*Pituophis melanoleucus mugitus*	13,14,15
Pine woods snake	*Rhadinaea flavilata*	8
North Florida swamp snake	*Seminatrix pygaea pygaea*	29,33,46/47,49
Short-tailed snake	*Stilosoma extenuatum*	13,14,15
Central Florida crowned snake	*Tantilla relicta neilli*	13,14,15
Peninsula ribbon snake	*Thamnophis sauritus sackeni*	35,47
Eastern garter snake	*Thamnophis sirtalis sirtalis*	35,47
ELAPIDAE		
Eastern coral snake	*Micrurus fulvius fulvius*	8,21,35
VIPERIDAE		
Florida cottonmouth	*Agkistrodon piscivorus conanti*	47,53,55
Eastern diamondback rattlesnake	*Crotalus adamanteus*	8
Dusky pigmy rattlesnake	*Sistrurus miliarius barbouri*	8,13,14,15

BIRDS

GREBES		
Pied-billed grebe	*Podilymbus podiceps*	47
Horned grebe	*Podiceps auritus*	47
PELICANS		
American white pelican	*Pelecanus erythrorhynchos*	47
Brown pelican	*Pelecanus occidentalis*	47
CORMORANTS		
Double-crested cormorant	*Phalacrocorax auritus*	47
DARTERS		
Anhinga	*Anhinga anhinga*	47,53,55
BITTERNS & HERONS		
American bittern	*Botaurus lentiginosus*	47
Great blue heron	*Ardea herodias*	47,53,55
Great egret	*Ardea alba*	47,53,55
Snowy egret	*Egretta thula*	47,53,55
Little blue heron	*Egretta caerulea*	47,53,
Tricolored heron	*Egretta tricolor*	47,53,55

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Cattle egret	*Bubulcus ibis*	8
Green heron	*Butorides striatus*	47,53,55
Black-crowned night-heron	*Nycticorax nycticorax*	47
Yellow-crowned night-heron	*Nyctanassa violaceus*	53,55
STORKS		
Wood stork	*Mycteria americana*	47,53,55
IBISES		
White ibis	*Eudocimus albus*	47,53,55
Glossy ibis	*Plegadis falcinellus*	47,55
SPOONBILLS		
Roseate spoonbill	*Ajaia ajaja*	47,55
DUCKS & GEESE		
Wood duck	*Aix sponsa*	47,53,55
American wigeon	*Anas americana*	47,55
American black duck	*Anas rubripes*	47,55
Mottled duck	*Anas fulvigula*	47
Blue-winged teal	*Anas discors*	47
Northern pintail	*Anas acuta*	47,55
Green-winged teal	*Anas crecca*	47
Redhead	*Aythya americana*	47,55
Ring-necked duck	*Aythya collaris*	47
Hooded merganser	*Lophodytes cucullatus*	47
Common merganser	*Mergus merganser*	47
Red-breasted merganser	*Mergus serrator*	47
VULTURES, HAWKS, KITES, EAGLES		
Black vulture	*Coragyps atratus*	8,21
Turkey vulture	*Cathartes aura*	8,21
Osprey	*Pandion haliaetus*	47
Swallow-tailed kite	*Elanoides forficatus*	35,33
Mississippi kite	*Ictinia mississippiensis*	Flyover
Bald eagle	*Haliaeetus leucocephalus*	8
Northern harrier	*Circus cyaneus*	8
Sharp-shinned hawk	*Accipiter striatus*	8,13,21
Cooper's hawk	*Accipiter cooperii*	8,13,21
Red-shouldered hawk	*Buteo lineatus*	8,21,35
Short-tailed hawk	*Buteo brachyurus*	Flyover
Red-tailed hawk	*Buteo jamaicensis*	8,13
American kestrel	*Falco sparverius*	8
Eastern American kestrel	*Falco sparverius sparverius*	8,13
Merlin	*Falco columbarius*	8
Peregrine falcon	*Falco peregrinus*	8

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
PHEASANTS & ALLIES		
Wild turkey	*Meleagris gallopavo*	8,13,21
Northern bobwhite	*Colinus virginianus*	8,13
RAILS		
King rail	*Rallus elegans*	47
Virginia rail	*Rallus limicola*	47
Sora	*Porzana carolina*	47
Purple gallinule	*Porphyrula martinica*	47
Common moorhen	*Gallinula chloropus*	47,55
American coot	*Fulica americana*	47,55
LIMPKIN		
Limpkin	*Aramus guarauna*	47,53,55
CRANES		
Sandhill crane	*Grus canadensis*	Flyover
Florida sandhill crane	*Grus canadensis pratensis*	8,81
PLOVERS		
Semipalmated plover	*Charadrius semipalmatus*	47
Killdeer	*Charadrius vociferus*	8,47,81
STILTS		
Black-necked Stilt	*Himantopus mexicanus*	47
SANDPIPERS		
Greater yellowlegs	*Tringa melanoleuca*	47
Lesser yellowlegs	*Tringa flavipes*	47
Solitary sandpiper	*Tringa solitaria*	47
Spotted sandpiper	*Actitis macularia*	47,55
Western sandpiper	*Calidris mauri*	47
Least sandpiper	*Calidris minutilla*	47
Short-billed dowitcher	*Limnodromus griseus*	47
Common snipe	*Gallinago gallinago*	8,21
American woodcock	*Scolopax minor*	8,21
GULLS & TERNS		
Laughing gull	*Larus atricilla*	Flyover
Bonaparte's gull	*Larus philadelphia*	Flyover
Ring-billed gull	*Larus delawarensis*	Flyover
Herring gull	*Larus argentatus*	Flyover
Caspian tern	*Sterna caspia*	Flyover
Royal tern	*Sterna maxima*	47
Forster's tern	*Sterna forsteri*	47
Least tern	*Sterna antillarum*	47
DOVES		
Rock dove *	*Columba livia*	8
Eurasian collared-dove *	*Streptopelia decaocto*	81

*** Non-native Species**

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Mourning dove	*Zenaida macroura*	8,13,21
Common ground-dove	*Columbina passerina*	8,13,21
CUCKOOS		
Black-billed cuckoo	*Coccyzus erythropthalmus*	21
Yellow-billed cuckoo	*Coccyzus americanus*	21,35
OWLS		
Barn owl	*Tyto alba*	81
Eastern screech-owl	*Otus asio*	13,21
Great horned owl	*Bubo virginianus*	8
Barred owl	*Strix varia*	21,28,35
GOATSUCKERS		
Common nighthawk	*Chordeiles minor*	8,21
Chuck-will's-widow	*Caprimulgus carolinensis*	8,21
Whip-poor-will	*Caprimulgus vociferus*	8,21
SWIFTS		
Chimney swift	*Chaetura pelagica*	Flyover
HUMMINGBIRDS		
Ruby-throated hummingbird	*Archilochus colubris*	8,21,82
KINGFISHERS		
Belted kingfisher	*Ceryle alcyon*	47,53,55
WOODPECKERS		
Red-headed woodpecker	*Melanerpes erythrocephalus*	8,13,15
Red-bellied woodpecker	*Melanerpes carolinus*	8,21,28,35
Yellow-bellied sapsucker	*Sphyrapicus varius*	21,35
Downy woodpecker	*Picoides pubescens*	8,21
Hairy woodpecker	*Picoides villosus*	8,21
Northern flicker	*Colaptes auratus*	8,13
Pileated woodpecker	*Dryocopus pileatus*	8,21,33,35
TYRANT FLYCATCHERS		
Eastern wood-pewee	*Contopus virens*	21
Yellow-bellied flycatcher	*Empidonax flaviventris*	21
Acadian flycatcher	*Empidonax virescens*	21
Alder flycatcher	*Empidonax alnorum*	8
Least flycatcher	*Empidonax minimus*	21
Eastern phoebe	*Sayornis phoebe*	21,35
Great crested flycatcher	*Myiarchus crinitus*	8,21
Eastern kingbird	*Tyrannus tyrannus*	8,21
SHRIKES		
Loggerhead shrike	*Lanius ludovicianus*	13
VIREOS		
White-eyed vireo	*Vireo griseus*	21,33,35
Yellow-throated vireo	*Vireo flavifrons*	21,35

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Blue-headed vireo	*Vireo solitarius*	21
Philadelphia vireo	*Vireo philadelphicus*	21
Red-eyed vireo	*Vireo olivaceus*	21,35
JAYS & CROWS		
Blue jay	*Cyanocitta cristata*	8,21,82
Florida scrub-jay	*Aphelocoma coerulescens*	15
American crow	*Corvus brachyrhynchos*	8,21
Fish crow	*Corvus ossifragus*	8,21
SWALLOWS		
Purple martin	*Progne subis*	Flyover
Tree swallow	*Tachycineta bicolor*	Flyover
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Flyover
Barn swallow	*Hirundo rustica*	Flyover
TITMICE		
Carolina chickadee	*Parus carolinensis*	8,21
Tufted titmouse	*Parus bicolor*	8,21
NUTHATCHES		
Red-breasted nuthatch	*Sitta canadensis*	8,21
White-breasted nuthatch	*Sitta carolinensis*	8,21
Brown-headed nuthatch	*Sitta pusilla*	8,21
WRENS		
Carolina wren	*Thryothorus ludovicianus*	21,35
House wren	*Troglodytes aedon*	21
Sedge wren	*Cistothorus platensis*	47,55
Marsh wren	*Cistothorus palustris*	47,55
KINGLETS		
Golden-crowned kinglet	*Regulus satrapa*	21,28,35
Ruby-crowned kinglet	*Regulus calendula*	21,28,35
GNATCATCHERS		
Blue-gray gnatcatcher	*Polioptila caerulea*	8,13,21,28,35
THRUSHES		
Eastern bluebird	*Sialia sialis*	8
Veery	*Catharus fuscescens*	21
Gray-cheeked thrush	*Catharus minimus*	21
Swainson's thrush	*Catharus ustulatus*	21
Bicknel's thrush	*Catharus bicknelli*	21
Hermit thrush	*Catharus guttatus*	21
Wood thrush	*Hylocichla mustelina*	21
American robin	*Turdus migratorius*	21,28,35
MIMIC THRUSHES		
Gray catbird	*Dumetella carolinensis*	21,35
Northern mockingbird	*Mimus polyglottos*	8,21,82

* Non-native Species

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Brown thrasher	*Toxostoma rufum*	8,21
STARLINGS		
European starling *	*Sturnus vulgaris*	8,21
PIPITS		
American pipit	*Anthus rubescens*	21
WAXWINGS		
Cedar waxwing	*Bombycilla cedrorum*	21,28,35
WOOD WARBLERS		
Blue-winged warbler	*Vermivora pinus*	35
Golden-winged warbler	*Vermivora chrysoptera*	21
Tennessee warbler	*Vermivora peregrina*	21
Orange-crowned warbler	*Vermivora celata*	21,35
Nashville warbler	*Vermivora ruficapilla*	21
Northern parula	*Parula americana*	13,21
Yellow warbler	*Dendroica petechia*	13,21
Chestnut-sided warbler	*Dendroica pensylvanica*	21,35
Magnolia warbler	*Dendroica magnolia*	21,35
Cape May warbler	*Dendroica tigrina*	21,35
Black-throated blue warbler	*Dendroica caerulescens*	21,35
Yellow-rumped warbler	*Dendroica coronata*	8,21
Black-throated green warbler	*Dendroica virens*	21
Blackburnian warbler	*Dendroica fusca*	21,35
Yellow-throated warbler	*Dendroica dominica*	21,35
Pine warbler	*Dendroica pinus*	8,13,21
Prairie warbler	*Dendroica discolor*	8
Palm warbler	*Dendroica palmarum*	21
Bay-breasted warbler	*Dendroica castanea*	13
Blackpoll warbler	*Dendroica striata*	21
Cerulean warbler	*Dendroica cerulea*	21
Black-and-white warbler	*Mniotilta varia*	21,35
American redstart	*Setophaga ruticilla*	21,35
Prothonotary warbler	*Protonotaria citrea*	33
Worm-eating warbler	*Helmitheros vermivorus*	21
Swainson's warbler	*Limnothlypis swainsonii*	21
Ovenbird	*Seiurus aurocapillus*	21,35
Northern waterthrush	*Seiurus noveboracensis*	21
Louisiana waterthrush	*Seiurus motacilla*	21
Kentucky warbler	*Oporornis formosus*	8
Connecticut warbler	*Oporornis agilis*	21
Common yellowthroat	*Geothlypis trichas*	21,35
Hooded warbler	*Wilsonia citrina*	21
Canada warbler	*Wilsonia canadensis*	21

*** Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Yellow-breasted chat	*Icteria virens*	8
TANAGERS		
Summer tanager	*Piranga rubra*	21
Scarlet tanager	*Piranga olivacea*	21
CARDINALS		
Northern cardinal	*Cardinalis cardinalis*	8,13,21
GROSBEAKS		
Rose-breasted grosbeak	*Pheucticus ludovicianus*	21
Blue grosbeak	*Guiraca caerulea*	21
Indigo bunting	*Passerina cyanea*	21
Painted bunting	*Passerina ciris*	21
SPARROWS AND ALLIES		
Eastern towhee	*Pipilo erythrophthalmus*	8,13,14,15
Bachman's sparrow	*Aimophila aestivalis*	14
Chipping sparrow	*Spizella passerina*	21
Field sparrow	*Spizella pusilla*	13
Vesper sparrow	*Pooecetes gramineus*	13
Savannah sparrow	*Passerculus sandwichensis*	21
Grasshopper sparrow	*Ammodramus savannarum*	13
Henslow's sparrow	*Ammodramus henslowii*	8
LeConte's sparrow	*Ammodramus leconteii*	8
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*	47
Fox sparrow	*Passerella iliaca*	13
Song sparrow	*Melospiza melodia*	21
Swamp sparrow	*Melospiza georgiana*	47
White-throated sparrow	*Zonotrichia albicollis*	21
White-crowned sparrow	*Zonotrichia leucophrys*	81
ICTERIDS		
Bobolink	*Dolichonyx oryzivorus*	47
Red-winged blackbird	*Agelaius phoeniceus*	47
Eastern meadowlark	*Sturnella magna*	8
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	47
Rusty blackbird	*Euphagus carolinus*	21
Common grackle	*Quiscalus quiscula*	21
Boat-tailed grackle	*Quiscalus major*	47,55
Brown-headed cowbird	*Molothrus ater*	13
Orchard oriole	*Icterus spurius*	13
Baltimore oriole	*Icterus galbula*	21
FINCHES		
Purple finch	*Carpodacus purpureus*	21
American goldfinch	*Carduelis tristis*	21
OLD WORLD SPARROWS		

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
House sparrow *	*Passer domesticus*	81
	MAMMALS	
DIDELPHIDAE		
Virginia opossum	*Didelphis virginiana*	21,26,35
SORICIDAE		
Least shrew	*Cryptotis parva*	8
Northern short-tailed shrew	*Blarina brevicauda*	30
TALPIDAE		
Eastern mole	*Scalopus aquaticus*	21
VESPERTILIONIDAE		
Eastern pipistrelle	*Pipistrellus subflavus*	Throughout
DASYPODIDAE		
Nine-banded armadillo *	*Dasypus novemcinctus*	21
LEPORIDAE		
Eastern cottontail	*Sylvilagus floridanus*	8,13,14
Marsh rabbit	*Sylvilagus palustris*	35
SCIURIDAE		
Gray squirrel	*Sciurus carolinensis*	21,82
Sherman's fox squirrel	*Sciurus niger shermani*	13
Southern flying squirrel	*Glaucomys volans*	13,21
GEOMYIDAE		
Southeastern pocket gopher	*Geomys pinetis*	13
CRICETIDAE		
Eastern harvest mouse	*Reithrodontomys humulis*	14,15,81/82
Cotton mouse	*Peromyscus gossypinus*	8,13
Florida mouse	*Podomys floridanus*	15
Golden mouse	*Ochrotomys nuttalli*	8
Eastern woodrat	*Neotoma floridana*	35
Marsh rice rat	*Oryzomys palustris*	47
Hispid cotton rat	*Sigmodon hispidus*	8
MURIDAE		
Black rat *	*Rattus rattus*	82
CANIDAE		
Red fox *	*Vulpes vulpes*	13,21
Gray fox	*Urocyon cinereoargenteus*	8,13,21,35
Coyote*	*Canis latrans*	8,13,26,28,35
URSIDAE		
Florida black bear	*Ursus americanus*	8,13,26,28,35
PROCYONIDAE		
Raccoon	*Procyon lotor*	8,13,21,35,82
MUSTELIDAE		

Wekiva River Basin State Parks

Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
River otter	*Lutra canadensis*	47,53,55
Striped skunk	*Mephitis mephitis*	21
FELIDAE		
Bobcat	*Felis rufus*	8,35
SUIDAE		
Wild pig *	*Sus scrofa*	33,35
CERVIDAE		
White-tailed deer	*Odocoileus virginianus*	8,13,21

*** Non-native 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. Coastal Grasslands
10. Pine Rockland
11. Prairie Hammock
12. Rockland Hammock
13. Sandhill
14. Scrub
15. Scrubby Flatwoods
16. Shell Mound
17. Sinkhole
18. Slope Forest
19. Upland Glade
20. Upland Hardwood Forest
21. Upland Mixed Forest
22. Upland Pine Forest
23. Xeric Hammock

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

Lacustrine
43. Clastic Upland Lake
44. Coastal Dune Lake
45. Coastal Rockland Lake

Lacustrine—Continued
46. Flatwood/Prairie Lake
47. Marsh Lake
48. River Floodplain Lake
49. Sandhill Upland Lake
50. Sinkhole Lake
51. Swamp Lake

Riverine
52. Alluvial Stream
53. Blackwater Stream
54. Seepage Stream
55. Spring-Run Stream

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

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

Subterranean
79. Aquatic Cave
80. Terrestrial Cave

Miscellaneous
81. Ruderal
82. Developed

MTC Many Types Of Communities
OF Overflying

Addendum 5—Designated Species List

Wekiva River Basin State Parks

Designated Species—Plants

Common Name/ *Scientific Name*	Designated Species Status FDA	USFWS	FNAI
Cinnamon fern			
Osmunda cinnamomea	CE		
Royal fern			
Osmunda regalis	CE		
Comb polypody			
Polypodium ptilodon	E		
Florida arrowroot; Coontie			
Zamia pumila	CE		
Needle palm			
Rhapidophyllum hystrix	CE		
Catesby's lily; Pine lily			
Lilium catesbaei	T		
Manyflowered grasspink			
Calopogon multiflorus	E		G2G3/S2S3
Florida butterfly orchid			
Encyclia tampensis	CE		
Green-fly orchid			
Epidendrum conopseum	CE		
Rose pogonia; Snakemouth orchid			
Pogonia ophioglossoides	T		
Giant orchid			
Pteroglossaspis ecristata	T	MC	G2/S2
Yellow anisetree			
Illicium parviflorum		MC	G2/S2
Hooded pitcherplant			
Sarracenia minor	T		
Angularfruit milkvine			
Matelea gonocarpos	T		
Blueflower butterwort			
Pinguicula caerulea	T		
Yellow butterwort			
Pinguicula lutea	T		
Cardinalflower			
Lobelia cardinalis	T		
Garberia			
Garberia heterophylla	T		
Chapman's sedge			
Carex chapmannii	T		

Wekiva River Basin State Parks

Designated Species—Plants

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

Wekiva River Basin State Parks

Designated Species—Animals

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI
INVERTEBRATES			
Wekiwa hydrobe *Aphaostracon monas*			G1/S1
Wekiwa siltsnail *Cincinnatia wekiwae*			G1/S1
Blue purse-web spider *Sphodros abboti*			G?/S3
Orlando cave crayfish *Procambarus acherontis*			G1G2/S1
Hobbs cave amphipod *Crangonyx hobbsi*			G5/S2S3
Florida cave isopod *Caecidotea hobbsi*			G3G4/S2
FISH			
Bluenose shiner *Pteronotropsis welaka*	SSC		G3G4/S3S4
Snail bullhead *Ameiurus brunneus*			G4/S3
AMPHIBIANS			
Florida gopher frog *Rana capito aesopus*	SSC		G3G4/S3
Striped newt *Notophthalmus perstriatus*			G2G3/S2S3
REPTILES			
American alligator *Alligator mississippiensis*	SSC	T(S/A)	G5S4
Eastern diamondback rattlesnake *Crotalus adamanteus*			G4/S3
Eastern indigo snake *Drymarchon corais couperi*	T	T	G4T3/S3
Gopher tortoise *Gopherus polyphemus*	SSC		G3/S3
Sand skink *Neoseps reynoldsi*	T	T	G2/S2

Wekiva River Basin State Parks

Designated Species—Animals

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI
Florida pine snake			
Pituophis melanoleucus mugitus	SSC		G4T3/S3
Short-tailed snake			
Stilosoma extenuatum	T		G3/S3
BIRDS			
Brown pelican			
Pelecanus occidentalis	SSC		G4/S3
Snowy egret			
Egretta thula	SSC		G5/S3
Great egret			
Ardea alba			G5/S4
Little blue heron			
Egretta caerulea	SSC		G5/S3
Tricolored heron			
Egretta tricolor	SSC		G5/S4
Black-crowned night-heron			
Nycticorax nycticorax			G5/S3
Yellow-crowned night-heron			
Nyctanassa violaceus			G5/S3
White ibis			
Eudocimus albus	SSC		G5/S4
Glossy ibis			
Plegadis falcinellus			G5/S3
Roseate spoonbill			
Ajaia ajaja	SSC		G5/S2
Wood stork			
Mycteria americana	E	E	G4/S2
Osprey			
Pandion haliaetus			G5/S3S4
Swallow-tailed kite			
Elanoides forficatus			G5/S2
Bald eagle			
Haliaeetus leucocephalus	T	T	G4/S3
Cooper's hawk			
Accipiter cooperii			G5/S3
Short-tailed hawk			
Buteo brachyurus			G4G5/S1
Eastern american kestrel			
Falco sparverius sparverius	T(S/A)		G5/T4/S3

Wekiva River Basin State Parks

Designated Species—Animals

Common Name/ *Scientific Name*	Designated Species Status FFWCC	USFWS	FNAI
Merlin			
Falco columbarius			G5/S2
Peregrine falcon			
Falco peregrinus	E		G5/S2
Limpkin			
Aramus guarauna	SSC		G5/S3
Florida sandhill crane			
Grus canadensis pratensis	T		G5T2T3/S2S3
Caspian tern			
Sterna caspia			G5/S2
Royal tern			
Sterna maxima			G5/S3
Least tern			
Sterna antillarum	T		G4/S3
Hairy woodpecker			
Picoides villosus			G5/S3
Florida scrub-jay			
Aphelocoma coerulescens	T	T	G2/S2
White-breasted nuthatch			
Sitta carolinensis			G5/S2
American redstart			
Setophaga ruticilla			G5/S2
Florida prairie warbler			
Helmitheros vermivorus			G5T3/S3
Worm-eating warbler			
Helmitheros vermivorus			G5/S1
Louisiana Waterthrush			
Seiurus motacilla			G5/S2
Painted bunting			
Passerina ciris			G5/S3
Bachman's sparrow			
Aimophila aestivalis			G3/S3
MAMMALS			
Florida black bear			
Ursus americanus	T		G5T2/S2
Sherman's fox squirrel			
Sciurus niger shermani	SSC		G5T3/S3
Florida mouse			
Podomys floridanus	SSC		G3/S3

Wekiva River Basin State Parks

Designated Species—Animals

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

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)

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

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.

MC = Management Concern.

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.

CE = Listed as Commercially Exploited.

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 Resource Management

Hydrological study at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park - research on removal of remaining tram roads to restore natural hydrologic flow. Actual removal of roads can be accomplished through mitigation programs. 1-3 years. **Estimated Cost: $50,000.**

Funding to study and analyze water quality/quantity, establish baseline data regarding nutrient inputs and pollutants, determine/delineate recharge areas, and to develop a comprehensive strategy for management of all springs within the Wekiva River Basin. 1-3 years. **Estimated Cost: $20,000.**

Funding to mechanical treatment of sand pine and scrub to improve habitat for the Florida scrub jay and to prepare and ready burn zones in these communities for regular burn rotation at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. 1-3 years. **Estimated Cost: $25,000.**

Restore pastures by planting trees, removing Bahia, and adding ecologically-significant species of groundcover at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. 1-3 years. **Estimated Cost. $20,000.**

Funding to continue prescribed fire program including the purchase of new equipment, maintenance of existing equipment, and creating an OPS position for line preparation at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park.. 1-3 years. **Estimated Cost: $18,000.**

Research to update the existing plant and animal species lists for Wekiva River Basin State Parks. 1 year. **Estimated Cost: $10,000**.

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

Continue the removal of exotic terrestrial species at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. 1-3 years. **Estimated Cost: $18,000**.

Continue the removal of exotic aquatic species at Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. 1-3 years. **Estimated Cost: $10,000.**

Cultural Resource Management

Protect and preserve the cultural resources of the Lower Wekiva River Preserve State Park, Rock Springs Run State Reserve, and Wekiwa Springs State Park. 0-10 years. **Estimated Cost: $8,000, plus $3,000/year in reoccurring costs.**

Develop and implement a written plan to protect and preserve the recorded archaeological sites from erosion, slumpage, animal burrowing, root damage and tree fall, and vandalism. 2-5 years. **Estimated Cost: $15,000.**

Establish monitoring measures to monitor recorded archaeological sites for erosion, vegetation intrusion, animal burrowing, and human disturbance. 1-3 years. **Estimated Cost: $10,000, plus $1,000/year in reoccurring costs.**

Complete archaeological reconnaissance surveys of the three parks, marking site locations with GPS technology. 3-5 years. **Estimated cost: $75,000.**

Interpret the cultural resources of the three parks in their context to educate park visitors about the parks' and area's prehistory and history through interpretive signs and programs. 2-10 years. **Estimated Cost: $50,000, plus $2,000/year in reoccurring costs.**

Seek grant funding for a research project to document the prehistory and history of the three parks and the surrounding Wekiva River basin. 1-3 years. **Estimated Cost: $5,000.**

Improve public awareness and encourage protection and stewardship of the cultural resources of the three parks through education, interpretation, and enforcement of agency rules and regulations. 0-5 years. **Estimated Cost: $10,000, plus $2,000/year in reoccurring costs.**

Total Estimated Cost:	**$344,000.**
Plus recurring annual costs over 10 years:	**$ 80,000.**
Total for 10 year period	**$424,000.**

NOTE: 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 Facility	Cost
Wekiwa Springs State Park	
Support Facilities	$1,680,000.00
Trails	$24,000.00
Visitor Center	$350,000.00
Total with Contingency	**$2,464,800.00**
Rock Springs Run State Reserve	
Support Facilities	$330,000.00
Trails	$24,000.00
Total with Contingency	**$424,800.00**
Lower Wekiva River Preserve State Park	
Katies Landing	$453,000.00
Support Facilities	330,000.00
Trails	24,000.00
Total with Contingency	**$968,400.00**

NOTE: These preliminary cost estimates, based on Divisions standards, do not include costs for site-specific elements not evident at the conceptual level of planning. Additional costs should be investigated before finalizing budget estimates. All items fall in the new facility construction category © of the uniform cost accounting system required by ch. 259.037 F.S.

NOTE: These preliminary cost estimates, based on Divisions standards, do not include costs for site-specific elements not evident at the conceptual level of planning. Additional costs should be investigated before finalizing budget estimates. All items fall in the new facility construction category © of the uniform cost accounting system required by ch. 259.037 F.S.

Addendum 7—Additional Information

FNAI Descriptions

DHR Cultural Management Statement

2003 Land Management Reviews

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

Land Management Review of Wekiwa Springs State Park (Lease No.2386), August 3, 2004

Prepared by Division of State Lands Staff

William Howell, OMC Manager
Sarah Hall, Administrative Assistant
Ann Massey, Administrative Assistant

For

Wekiwa Springs State Park Review Team

Final Report January 18, 2005

Land Manager:	DRP
Area:	7,750
County:	Orange
Mngt. Plan Revised:	11/10/1998
Mngt. Plan Update Due:	11/10/2008

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	Bill Korn	Bill Korn
DEP District	Jim Lee	Jim Lee
DRP District	Rosi Mulholland	Rosi Mulholland
FWCC	David Turner	David Turner
County	Ken Pelham	Ken Pelham
Conservation Org.	Walt Thomson	Walt Thomson
Soil and Water Cons. Dist.	Lisa Bullion	Lisa Bullion
Private Land Manager	Fred Harden	Fred Harden
Observer	Carolyn Kindell	Carolyn Kindell

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 is given to the managing agency under review, the Acquisition and Restoration Council, 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 Wekiwa Springs State Park considered approximately 7,750 acres in Orange 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 DRP

management plan was approved on November 10, 1998, and the management plan update is due on November 10, 2008.

Management Review Determination

1. Is the land being managed for the purpose for which it was acquired? **All team members agreed that Wekiwa Springs 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

1. The Team commends the manager and staff for their exceptional invasive plant removal program.
2. The team commends the Manager and staff for the exceptional amount of natural resource management activity that has occurred at the Wekiwa Springs State Park, particularly considering the myriad of management issues and limited staffing dedicated specifically to natural resource management.
3. The team commends the manager and staff for continuing to successfully address and minimize the impacts from storm-water from outside the park, on park resources.
4. The team commends the manager and staff for the exceptional wildlife habitat at Wekiwa Springs State Park.

Exceptional Management Actions

The following items received high scores (excellent) on the review team

Exceptional Management Actions

1. Management and protection of the mesic flatwoods, sandhill, scrub, scrubby flatwoods, upland mixed forest, baygall, xeric hammock, marsh lake, floodplain swamp, hydric hammock, wet flatwoods and flatwoods/prairie lake communities.
2. Protection and preservation of listed animals and plants.
3. Excellent area and quality of the prescribed burns.
4. Excellent management and restoration of sandhill, borrow pit, stormwater runoff and scrub.
5. Excellent management of wildlife habitat and hunting/fishing quality.
6. Excellent management of non-native invasive & problem plants.
7. Exceptional boundary surveys, gates, fencing and signage.
8. Exceptional success in acquiring inholdings and additions.

9. Exceptional coordination with government, public use and resource protection.

10. Exceptional roads, parking, visitor center, recreational opportunities, interpretive facilities/signs and environmental education/outreach.

11. Exceptional sanitary facilities and waste disposal program.

Recommendations and Checklist Findings

Recommendations

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

1. The team recommends that the DRP conduct an analysis and develop a strategy to determine what staffing and resources are needed to successfully conduct the fire program for the Wekiva river basin state parks.

Manager's Response: assuming "success" means making consistent and regular progress towards closing the gap between acres burned and acres needing to be burned. The DRP Bureau of Natural and Cultural Resources will coordinate with park and DRP District 3 staff to implement this recommendation, as part of a much larger ongoing effort to increase capabilities of its highly complex statewide fire management program.

It should be noted that this park has traditionally had one of the more active burn programs in the state, but in the last few years has suffered from frequent turnover in burn staff.

2. The team recommends that goals and objectives in the management plan be established with focus on clearly defined ecological targets, and determine resource needs to achieve protection of those targets.

Manager's Response: The Division will consider this in updating its guidelines for preparing park management plans.

3. The team recommends that DRP encourage the manager and staff to actively participate in all levels of local and regional government regulatory agency meetings/councils etc., to help protect the entire springs watershed for these parks.

Manager's Response: Agree, to the degree practicable. Park staff already stays actively involved. A recent example is the park manager's role on the Wekiva Parkway committee.

4. The team expresses concern that consumptive use permitting is not providing sufficient protection to water levels/spring flows within the basin. The team recommends that the DRP ask the Water Management District to uphold the 2020 water plan in order to protect the spring-shed water levels.

Manager's Response: Agree. DRP shares the LMR team's concerns, and diligently seeks establishment of minimum flows and levels for state park water resource and WMD adherence to them.

5. The team recommends that the DRP coordinate restoration and burning of the scrub jay habitat with the other management entities in the basin.

Manager's Response: Agree. We have already identified such coordination as a priority. Park staff will coordinate with other Basin agencies on an annual plan.

6. The team has found that the current wastewater systems in the Wekiwa Springs State Park are inadequate to protect the springs. The team recommends that DRP make it a high priority to get all the park sanitary facilities on public sewer as soon as possible. The team also recommends that the package treatment plants be removed after the sanitary facilities are connected to the sewer.

Manager's Response: This item is already contained in the new draft unit plan.

7. The team recommends that DRP take the necessary steps to accomplish surveys and more frequent monitoring of listed plants and animals.

Manager's Response: Agree, contingent on staffing and budgets.

8. The team recommends that DRP create an annual work-plan that includes resources required to implement and achieve the goals and objectives outlined in the unit management plan.

Manager's Response: This is beyond the scope of the land management review team.

9. The team recommends that DRP increase its expertise in areas of hydro-geology in order to adequately monitor, evaluate the health of, and to advocate for aquatic/springs resources.

Manager's Response: Agree. The Division recognizes the value of a hydro geologist(s) could contribute, but must consider many unmet needs when allocating scarce staff positions.

10. The team recommends that the DRP add to the next management plan update, measurable goals and objectives with a list of accomplishments.

Manager's Response: The Division will consider this in updating its guidelines for preparing park management plans. It is noted, however, that these items are not currently required by the statutes and administrative rules which govern the development of management plans for Board of Trustees lands.

Checklist Findings

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

11. Discussion in the management plan of boundary survey needs (p).

Manager's Response: Disagree. Operational issues are not typically included in the planning

document.

12. Discussion in the management plan of improving resource protection regarding the need for gates and fencing (p).

Manager's Response: Disagree. Operational issues are not typically included in the planning document.

13. Discussion in the management plan of improving resource protection and the need of boundary signage. (P).

Manager's Response: Disagree. Operational issues are not typically included in the planning document.

14. Discussion in the management plan of the hydro-geological impacts from increasing consumptive use permits being issued in the basin (p)(f).

Manager's Response: Agree. Discussion is incorporated into new draft of unit plan.

15. Discussion in the management plan of the need for additional staff (p)(f).

Manager's Response: Agree. If it is determined that additional staff are needed at the time of the next unit management plan revision, it will be included in the plan. However, no new staff can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Additional staff is needed by a majority of parks statewide which is why we regularly seek positions, volunteers, and partners. Funding is determined annually by the Florida Legislature.

16. Discussion in the management plan of the need for additional funding (p)(f).

Manager's Response: Agree (assuming land management issues are the concern). The updated unit management plan will address land management funding needs. However, Division funding is determined annually by the Florida Legislature and funds are allocated to the 150+ state parks according to priority needs.

17. Discussion in the management plan of Law enforcement issues (p).

Manager's Response: Agree. The management plan update will address law enforcement needs. The Division must request additional assistance through the Division of Law Enforcement or from a local law enforcement agency.

Land Management Review of Rock Springs Run Reserve State Park

(Lease No.3571), August 4, 2004

Prepared by Division of State Lands Staff

William Howell, OMC Manager
Sarah Hall, Administrative Assistant.

For

Rock Springs Reserve State Park Review Team

Final Report January 30, 2005

Land Manager:	DRP
Area:	13,710
County:	Orange, Lake and Seminole
Mngt. Plan Revised:	11/10/1998
Mngt. Plan Update Due:	11/10/2008

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	Bill Korn	Bill Korn
DEP District	Brian West	Brian West
DRP District	Rosi Mulholland	Rosi Mulholland
FWCC	Tom Shupe	David Turner
County	Bob Stevens	Bob Stevens
Conservation Org.	Walt Thomson	Laura Butterfield
Soil and Water Cons. Dist.	Nadine Foley	Nadine Foley
Private Land Manager	Fred Harden	Pat Harden
Observer	Carolyn Kindell	Carolyn Kindell

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 Acquisition and Restoration Council, 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 Rock Springs Run Reserve State Park considered approximately 13,710 acres in Orange, Lake and Seminole Counties 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 DRP management plan was approved on November 10, 1998, and the management plan update is due on November 10, 2008.

Review Team Determination

1. Is the land being managed for the purpose for which it was acquired? **All team members agreed that Rock Springs Run Reserve 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 Team commends the manager and staff for their restoration of the Spears Scrub, and for the large amount of land that has been treated with prescribed fire at Rock Springs.

Exceptional Management Actions

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

Exceptional Management Actions

1. Management and protection of mesic flatwoods, sandhill, scrub, scrubby flatwoods, baygall, xeric flatwoods, floodplain swamp/marsh, Hydric hammock, wet flatwoods, flatwood/ prairie lake, and sandhill upland lake communities.

2. Protection and preservation of listed plant species.

3. Survey of cultural sites.

4. Excellent area burned and quality of the burns.

5. Excellent sandhill restoration.

6. Excellent management of wildlife habitat and hunting and fishing quality.

7. Excellent control of invasive plants and animals.

8. Excellent roads, culverts and ditches.

9. Excellent boundary survey and signage.

10. Excellent roads, parking recreational opportunities, and interpretive signs and facilities.

11. Excellent waste disposal and sanitary facilities.

12. Excellent buildings and equipment.

Recommendations

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

1. The team recommends that the DRP develop a long term scrub jay habitat management plan which is integrated with other public and private lands in the area that contain scrub. The plan should include long term monitoring of the jays.

Manager's Response: Agree. Plan is under development and will be finalized.

2. The team recommends that the local DRP staff maintain a high level of involvement in the local land use planning process; with particular attention to road projects and land use/comprehensive plan changes.

Manager's Response: Agree. Local staff do stay involved in local issues.

3. The team recommends that the DRP make it a high priority to develop a restoration plan for the pastures at Rock Springs addressing desired future conditions with timeframes.

Manager's Response: Agree. D3 staff are currently developing a plan for another park that Basin staff could use a template once it is completed.

4. The team recommends that DRP increase its expertise in areas of hydrogeology in order to adequately monitor, evaluate the health of, and to advocate for aquatic/springs resources.

Manager's Response: Agree. Park has recently hired a biologist with an aquatic background who will increase general knowledge of aquatic systems. Division needs to pursue hydro-geological expertise at the Division level. A possible source of funding is FDOT or the Orlando Expressway Authority related to impacts from road development through the Basin.

5. The team recommends that DRP develop a strategy to increase resources at this park to accomplish fire goals.

Manager's Response: Agree, assuming the goals noted refer to making consistent and regular progress towards closing the gap between acres burned and acres needing to be burned. The DRP Bureau of Natural and Cultural Resources will coordinate with park and DRP District 3 staff to implement this recommendation, as part of a much larger ongoing effort to increase capabilities of its highly complex statewide fire management program.

6. The team recommends that DRP initiate more inventory and monitoring programs for listed species.

Manager's Response: Agree. Success is contingent on staffing and budgets.

7. The team recommends that the DRP add to the next management plan update, measurable goals and objectives with a list of accomplishments.

Manager's Response: The Division will consider this in updating its guidelines for preparing park management plans. It is noted, however, that these items are not currently required by the statutes and administrative rules which govern the development of management plans for Board of Trustees lands.

Checklist Findings

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

8. Discussion in the management plan of management issues related to the proposed Wekiva Parkway (p).

Manager's Response: Agree. Information will be incorporated into new unit plan.

9. Discussion in the management plan of the need for additional groundwater testing to get baseline data to protect springs in the basin (f).

Manager's Response: Agree. Information will be incorporated into the new unit plan.

10. Discussion in the management plan for the need for additional staff (f).

Manager's Response: Agree. If it is determined that additional staff are needed at the time of the next unit management plan revision, it will be included in the plan. However, no new staff can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Additional staff is needed by a majority of parks statewide which is why we regularly seek positions, volunteers, and partners. Funding is determined annually by the Florida Legislature.

Land Management Review of Lower Wekiva River Preserve State Park

(Lease No. 2950), August 6, 2004

Prepared by Division of State Lands Staff

William Howell, OMC Manager
Sarah Hall, Administrative Assistant
Ann Massey, Administrative Assistant

For
Lower Wekiva River Preserve Review Team

Final Report January 30, 2005

Land Manager:	DRP
Area:	17,240
County:	Lake and Seminole
Mngt. Plan Revised:	11/10/1998
Mngt. Plan Update Due:	11/10/2008

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	Bill Korn	Bill Korn
DEP District	Jim Lee	Jim Lee
DRP District	Rosi Mulholland	Rosi Mulholland
FWCC	Tom Shupe	Tom Shupe
County	Bob Stevens	
Conservation Org.	Walt Thomson	Laura Butterfield
Soil and Water Cons. Dist.	Nadine Foley	Nadine Foley
Private Land Manager	Fred Harden	Fred Harden
Observer	Carolyn Kindell	Carolyn Kindell

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

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Review Site

The management review of Lower Wekiva River Preserve State Park considered approximately 17,240 acres in Lake and Seminole Counties 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 DRP management plan was approved on November 10, 1998, and the management plan update is due on November 10, 2008.

Review Team Determination

1. Is the land being managed for the purpose for which it was acquired? **All team members agreed that Lower Wekiva River Preserve 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

1. The Team commends the DRP on the amount of area that has been treated with prescribed fire.

2. The team commends the manager and staff for their outstanding resource management activities within the Wekiva basin parks.

Exceptional Management Actions

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

Exceptional Management Actions

1. Management and protection of the Mesic Flatwoods, Sandhill, Floodplain Swamp, Hydric Hammock, and Flatwoods/Prairie Lake communities.

2. Protection and preservation of listed animals and plants.

3. Excellent survey of cultural sites.

4. Excellent area and quality of the prescribed burns.

5. Excellent restoration of the Hydric Hammock community.

6. Excellent control of invasive plants.

7. Excellent restoration of ditches.

8. Exceptional boundary surveys, gates and fencing, signage and law enforcement presence.

9. Exceptional success adapting management to expanding development.

10. Exceptional trails.

11. Exceptional roads, parking, horse-camping site and recreational opportunities.

12. Exceptional sanitary facilities and waste disposal program.

Recommendations and Checklist Findings

Recommendations

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

1. The team finds that a greater DRP presence is needed at the Lower Wekiva Preserve on the west side of the river to assist visitors and perform management activities. The team recommends that a residence be located on the west side of the river to facilitate resource and operational management.

Manager's Response: Agree, with implementation being contingent on having budget to do so. This resource protection measure will be included in the re-draft of the unit plan.

2. The team recommends that the DRP add to the next management plan update, measurable goals and objectives with a list of accomplishments.

Manager's Response: The Division will consider this in updating its guidelines for preparing park management plans. It is noted, however, that these items are not currently required by the statutes and administrative rules which govern the development of management plans for Board of Trustees lands.

3. The team recommends that DRP develop a maintenance and restoration plan for the pastures at Lower Wekiva.

Manager's Response: Agree. D3 staff are currently developing a plan for another park that Basin staff could utilize once it is completed.

4. The team recommends that the DRP prepare an operational plan to restore the scrub habitat as well as for the monitoring of the scrub jay populations. (VOTE: 8+, 1-)

Manager's Response: Agree. This information is included in the scrub restoration plan that the park is currently completing.

5. The team recommends that DRP increase its expertise in areas of hydro-geology in order to adequately monitor, evaluate the health of, and to advocate for aquatic/springs resources.

Manager's Response: Agree. The Division recognizes the value of a hydro geologist(s) could contribute, but must consider many unmet needs when allocating scarce staff positions.

Checklist Findings

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

6. Discussion in the management plan of problems in the scrubby flatwoods, baygall, floodplain marsh and wet flatwoods communities (p).

Manager's Response: Agree. Significant resource management needs and problems in these communities will be addressed in the unit plan re-draft.

7. Discussion in the management plan of the need for more ground water quality testing (f).

Manager's Response: Agree. A discussion on groundwater quality will be incorporated into the new unit plan.

8. Discussion in the management plan for the need of additional staff (f).

Manager's Response: Agree. If it is determined that additional staff are needed at the time of the next unit management plan revision, it will be included in the plan. However, no new staff can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Additional staff is needed by a majority of parks statewide which is why we regularly seek positions, volunteers, and partners. Funding is determined annually by the Florida Legislature.

9. Discussion in the management plan of the need to develop a restoration plan for the pastures (back to sandhill and flatwoods) (p).

Manager's Response: Agree. DRP District 3 staff is currently developing a plan for another park that Basin staff could utilize once it is completed.