Wekiva River Basin State Parks

Advisory Group Draft
Unit Management Plan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks
March 2017

TABLE OF CONTENTS

INTRODUCTION 1
PURPOSE AND SIGNIFICANCE OF THE PARK 1
Park Significance 2
PURPOSE AND SCOPE OF THE PLAN 7
MANAGEMENT PROGRAM OVERVIEW 9
Management Authority and Responsibility 9
Park Management Goals 9
Management Coordination 10
Public Participation 10
Other Designations 10

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION 13
RESOURCE DESCRIPTION AND ASSESSMENT 19
Natural Resources 19
Topography 19
Geology 20
Soils 20
Minerals 27
Hydrology 27
Natural Communities (FNAI) 42
Imperiled Species 85
Exotic and Nuisance Species 100
Special Natural Features 112
Cultural Resources 113
Condition Assessment 113
Level of Significance 113
Prehistoric and Historic Archaeological Sites 114
Historic Structures 116
Collections 118
RESOURCE MANAGEMENT PROGRAM 131
Management Goals, Objectives and Actions 131
Natural Resource Management 131
Hydrological Management 131
Natural Communities Management 135
Imperiled Species Management 146
Exotic Species Management 149
Cultural Resource Management 151
Special Management Considerations 154
Timber Management Analysis 154
Arthropod Control Plan 156
Resource Management Schedule 156
Land Management Review 156

LAND USE COMPONENT

INTRODUCTION ... 157
EXTERNAL CONDITIONS ... 157
Existing Use of Adjacent Lands ... 158
Planned Use of Adjacent Lands ... 160
PROPERTY ANALYSIS ... 163
Recreational Resource Elements ... 163
Land Area ... 163
Water Area ... 164
Natural Scenery ... 165
Significant Habitat ... 165
Natural Features ... 166
Archaeological and Historic Features ... 167
Assessment of Use ... 168
Past Uses ... 168
Future Land Use and Zoning ... 169
Current Recreation Use and Visitor Programs ... 169
Other Uses ... 171
Protected Zones ... 171
Existing Facilities ... 172
Wekiwa Springs State Park Recreation Facilities ... 172
Wekiwa Springs State Park Support Facilities ... 172
Rock Springs Run State Reserve Recreation Facilities ... 173
Rock Springs Run State Reserve Support Facilities ... 173
Lower Wekiva River Preserve State Park Recreation Facilities ... 174
Lower Wekiva River Preserve State Park Support Facilities ... 174
CONCEPTUAL LAND USE PLAN ... 181
Potential Uses ... 181
Public Access and Recreational Opportunities ... 181
Proposed Facilities ... 185
Capital Facilities and Infrastructure ... 185
Facilities Development ... 197
Recreational Carrying Capacity ... 198
Optimum Boundary ... 200

IMPLEMENTATION COMPONENT

MANAGEMENT PROGRESS ... 209
Park Administration and Operations ... 209
Resource Management ... 210
Natural Resources ... 210
Cultural Resources ... 210
Recreation and Visitor Services ... 210
Park Facilities ... 211
MANAGEMENT PLAN IMPLEMENTATION ... 212

TABLES

TABLE 1a – Wekiwa Springs State Park Management Zones 14
TABLE 1b – Rock Springs Run State Reserve Management Zones............ 16
TABLE 1c – Lower Wekiva River Preserve State Park Management Zones............ 18
TABLE 2 – Imperiled Species Inventory............ 95
TABLE 3 – Inventory of FLEPPC Category I and II Exotic Plant Species............ 103
TABLE 4 – Cultural Sites Listed in the Florida Master Site File 120
TABLE 5 – Prescribed Fire Management 136
TABLE 6 – Recreational Carrying Capacity............ 199
TABLE 7 – Implementation Schedule and Cost Estimates 215

MAPS

Vicinity Map............ 3
Reference Map 5
Wekiwa Springs State Park Management Zones Map............ 21
Rock Springs Run State Reserve Management Zones Map 23
Lower Wekiva River Preserve State Park Management Zones Map 25
Wekiwa Springs State Park Soils Map............ 29
Rock Springs Run State Reserve Soils Map 31
Lower Wekiva River Preserve State Park Soils Map 33
Wekiwa Springs State Park Natural Communities Map............ 45
Rock Springs Run State Reserve Natural Communities Map 47
Lower Wekiva River Preserve State Park Natural Communities Map 49
Wekiwa Springs State Park Desired Future Conditions Map............ 139
Rock Springs Run State Reserve Desired Future Conditions Map 141
Lower Wekiva River Preserve State Park Desired Future Conditions Map 143
Wekiwa Springs State Park Base Map 175
Rock Springs Run State Reserve Base Map............ 177
Lower Wekiva River Preserve State Park Base Map............ 179
Wekiwa Springs State Park Conceptual Land Use Plan............ 189
Wekiwa Springs State Park Conceptual Land Use Plan Page 2 191
Rock Springs Run State Reserve Conceptual Land Use Plan 193
Lower Wekiva River Preserve State Park Conceptual Land Use Plan 195
Wekiwa Springs State Park Optimum Boundary Map............ 201
Rock Springs Run State Reserve Optimum Boundary Map 203
Lower Wekiva River Preserve State Park Optimum Boundary Map 205

LIST OF ADDENDA

ADDENDUM 1
Acquisition History............ A 1 - 1
ADDENDUM 2
Advisory Group Members and Report .... A 2 - 1
ADDENDUM 3
References Cited .... A 3 - 1
ADDENDUM 4
Soil Descriptions .... A 4 - 1
ADDENDUM 5
Plant and Animal List .... A 5 - 1

LIST OF ADDENDA CONTINUED

ADDENDUM 6
Imperiled Species Ranking Definitions .... A 6 - 1
ADDENDUM 7
Cultural Information .... A 7 - 1
ADDENDUM 8
Timber Assessment .... A 8 - 1
ADDENDUM 9
Land Management Review .... A 9 - 1

INTRODUCTION

Wekiva River Basin State Parks encompasses three contiguous properties 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, Seminole, and Volusia Counties approximately 20 miles north of Orlando (see Vicinity Map). Because the parks are contiguous, with natural and cultural resources connected, the Wekiwa Springs State Park staff has management responsibilities for these units. 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. Access to the parks is from Interstate 4, exit 94 to State Road 434 and exit 101C to State Road 46 (see Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

Wekiwa Springs State Park was initially acquired on April 30, 1969 with funds from the Land Acquisition Trust Fund (LATF). Currently, the park comprises 9,503.90 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park, and on September 15, 1969, the Trustees leased (Lease Number 2386) the property to the DRP under a 99-year lease. The current lease will expire on September 14, 2068.

Rock Springs Run State Reserve was initially acquired on March 10, 1983 with funds from the Conservation and Recreation Lands (CARL) program. Currently, the park comprises 14,164.82 acres. The Trustees hold fee simple title to the park, and on March 7, 2006, the Trustees leased (Lease Number 3571) the property to the DRP under a 50-year lease. The current lease will expire on March 6, 2056.

Lower Wekiva River Preserve State Park was initially acquired on August 19, 1976 with funds from the Environmentally Endangered Lands (EEL) program. Currently, the park comprises 17,374.83 acres. The Trustees hold fee simple title to the park, and on April 4, 1977, the Trustees leased (Lease Number 2950) the property to the DRP under a 99-year lease. The current lease will expire on April 3, 2076.

At the Wekiwa River Basin State Parks, public outdoor recreation and conservation is the designated single-use of the properties. There are no legislative or executive directives that constrain the use of this property (see Addendum 1).

Purpose and Significance of the Park

The purpose of the Wekiva River Basin State Parks is to protect vitally important water resources such as the Wekiva River and Wekiwa Springs while providing outdoor recreation opportunities in one of the fastest growing and most visited regions of Florida.

Park Significance

- The parks protect the Wekiva River, which is one of only two rivers in the state to be nationally designated as a Wild and Scenic River. The Wekiva River is considered one of the last remaining pristine riverine systems in the state and is a major tributary of the St. Johns River.

- The parks conserve springs that include Wekiwa, Barrel, and Witherington Springs, as well as the spring run originating from Rock Springs that flows into the Wekiwa Springs Run to form the upper Wekiva River.

- The parks serve as a vibrant wildlife corridor that connects through the Seminole State Forest to the Ocala National Forest. From north to south, this wildlife corridor stretches over 60 miles and provides crucial habitat for umbrella and keystone species such as the Florida black bear and gopher tortoise.

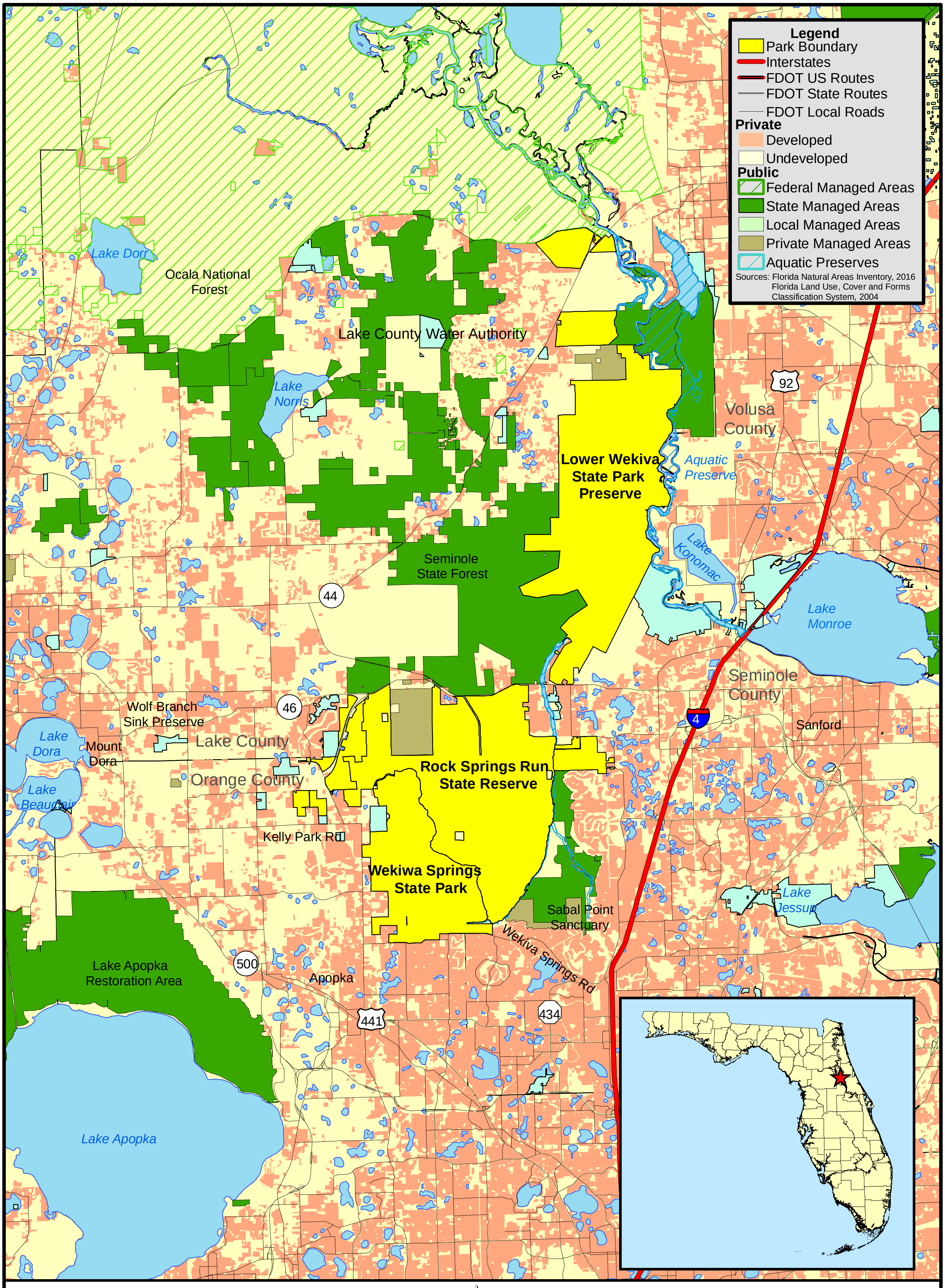
- In addition to the 44 imperiled animal species, the parks provide habitat for 19 imperiled plant species including hand ferns, giant orchids, and hooded pitcherplants. The Wekiva River Basin has the largest recognized population of the endangered star anise in the state.

- Given the diversity of natural communities, the parks are ideal locations for wildlife viewing and are a part of the Great Florida Birding Trail. The parks are also a hub for hiking, biking, equestrian, and paddling trails, with swimming and camping also being popular activities in a region of the state that has a high demand for outdoor recreational opportunities.

Wekiwa Springs State Park is classified as a state park in the DRP's unit classification system. In the management of a state park, a balance is sought between the goals of maintaining and enhancing 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 on the park's natural, aesthetic and educational attributes.

Rock Springs Runs State Reserve is managed according to a Multiple Agency Management Lease granting management authority to the Division of Recreation and Parks and the Florida Fish and Wildlife Conservation Commission. Management responsibilities are as follows:

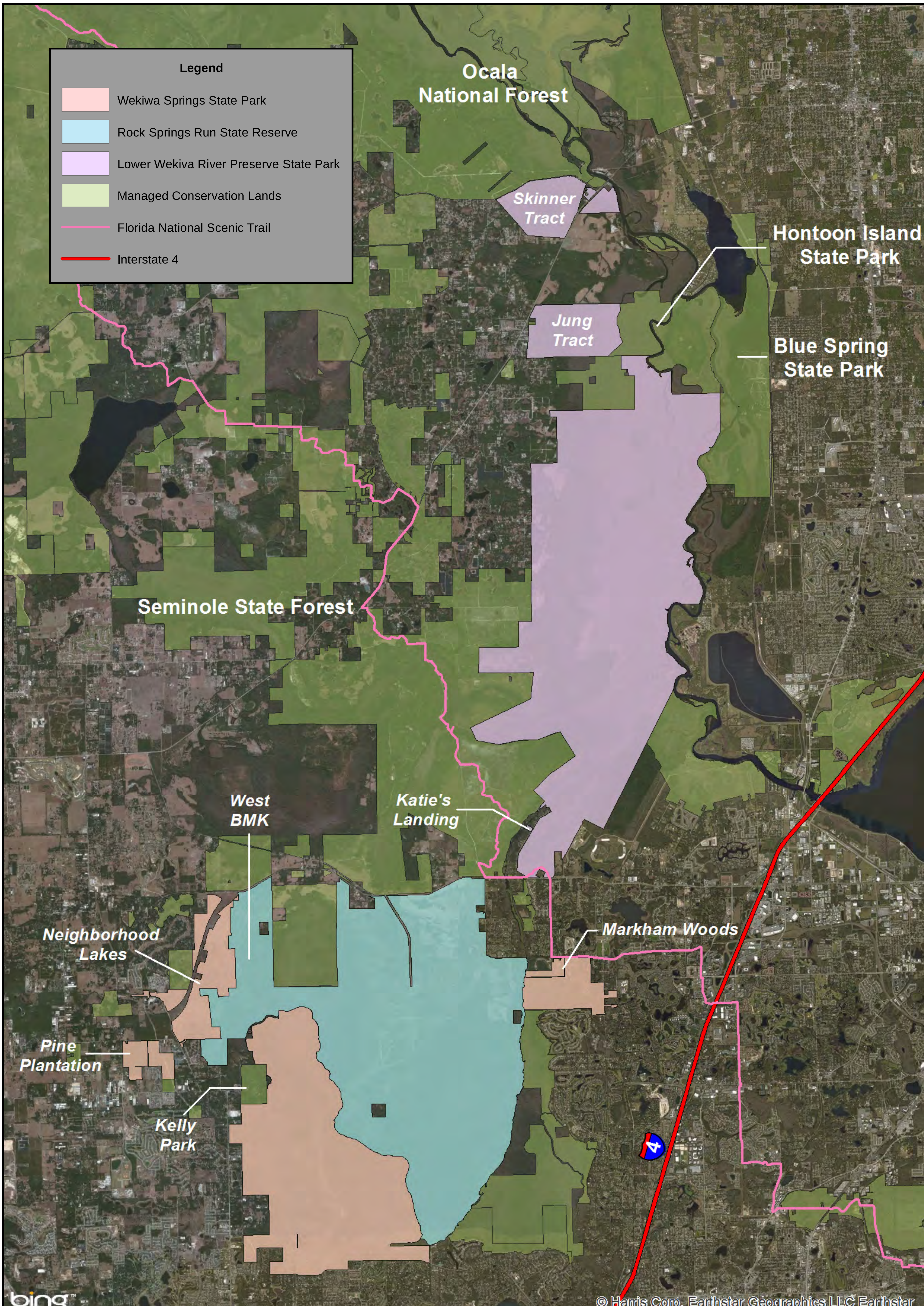
1. The DRP shall be the primary managing agency. As such, it shall coordinate and oversee all activities on the property.



WEKIVA RIVER BASIN STATE PARKS

VICINITY MAP

Florida Department of Environmental Protection
Division of Recreation and Parks



WEKIVA RIVER BASIN
STATE PARKS

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

REFERENCE MAP

2. The Florida Fish and Wildlife Conservation Commission shall, in coordination with the DRP, 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 the DRP 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.

Lower Wekiva River Preserve State Park is classified as a state preserve in the DRP's unit classification system. In the management of a state preserve, preservation and enhancement of natural conditions is all important. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring its protection and maintenance, limited access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily of a passive nature, related to the aesthetic, educational and recreational enjoyment of the preserve, although other compatible uses are permitted in limited amounts. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

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 units of Florida's state park system. It identifies the goals, objectives, actions and criteria or standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives and provide balanced public utilization. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and is intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2005 approved plan.

The plan consists of three interrelated components: Resource Management Component, Land Use Component and Implementation Component. The Resource Management Component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management needs and issues are identified, and measurable management objectives are established for each of the park's management goals and resource types. This component provides guidance on the application of such measures as prescribed burning, exotic species removal, imperiled species management, cultural resource management and restoration of natural conditions.

The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resources of the park, and current public uses and existing development, measurable objectives are set to achieve the desired allocation of the physical space of the park. These objectives identify use areas and propose the types of facilities and programs as well as the volume of public use to be provided.

The Implementation Component consolidates the measurable objectives and actions for each of the park's management goals. An implementation schedule and cost estimates are included for each objective and action. Included in this table are (1) measures that will be used to evaluate the DRP's implementation progress, (2) timeframes for completing actions and objectives and (3) estimated costs to complete each action and objective.

All development and resource alteration proposed 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.

In the development of this plan, the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of the DRP's statutory responsibilities and the resource needs and values of the park. This analysis considered the park natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that timber management utilized as part of the park's natural community management and restoration activities could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation. These compatible secondary management purposes are addressed in the Resource Management Component of the plan.Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that timber management utilized as part of the park's natural community management and restoration activities would be appropriate at this park as additional sources of revenue for land management since they are compatible with the park's primary purpose of resource-based outdoor recreation and conservation.

DRP may provide the services and facilities outlined in this plan either with its own funds and staff or through an outsourcing contract. Private contractors may provide assistance with natural resource management and restoration activities or a concessionaire may provide services to park visitors in order to enhance the visitor experience. For example, a concessionaire could be authorized to sell merchandise and food and to rent recreational equipment for use in the park. A concessionaire may also be authorized to provide specialized services, such as interpretive tours, or overnight accommodations when the required capital investment exceeds that which DRP can elect to incur. Decisions regarding outsourcing, contracting with the private sector, the use of concessionaires, etc. are made on a case-by-case basis in accordance with the policies set forth in DRP's Operations Manual (OM).

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 (DRP) 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 Board of Trustees of the Internal Improvement Trust Fund (Trustees) has granted management authority of certain sovereign submerged lands to the DRP 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 affect public recreational uses.

Many operating procedures are standardized system-wide and are set by internal direction. These procedures are outlined in the OM that covers such areas as personnel management, uniforms and personal appearance, training, signs, communications, fiscal procedures, interpretation, concessions, public use regulations, resource management, law enforcement, protection, safety and maintenance.

Park Management Goals

The following park goals express DRP’s long-term intent in managing the state park:

- Provide administrative support for all park functions.

- Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
- Restore and maintain the natural communities/habitats of the park.
- Maintain, improve or restore imperiled species populations and habitats in the park.
- Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
- Protect, preserve and maintain the cultural resources of the park.
- Provide public access and recreational opportunities in the park.
- Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

Management Coordination

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

The Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service (FFS), assists DRP staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FWC) assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. In addition, the FWC aids DRP with wildlife management programs, including imperiled species management. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historical sites. The Florida Department of Environmental Protection (DEP), Florida Coastal Office (FCO) aids staff in aquatic preserves management programs.

Public Participation

DRP provided an opportunity for public input by conducting a public workshop and an Advisory Group meeting to present the draft management plan to the public. These meetings were held on March 29, 2017 and March 30, 2017, respectively. Meeting notices were published in the Florida Administrative Register, [INSERT publication date, VOL/ISSUE], included on the Department Internet Calendar, posted in clear view at the park, and promoted locally. The purpose of the Advisory Group meeting is to provide the Advisory Group members an opportunity to discuss the draft management plan (see Addendum 2).

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, and it is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the Department's Office of Greenways and Trails.

All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class III waters by the Department. This park is within the Wekiva River Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

Rock Springs Run State Reserve is established as a Type 1 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 Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP) in accordance with Chapter 258, Florida Statutes, 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. Management measures expressed in this plan are consistent with DEP's overall mission in ecosystem management. Cited references are contained in Addendum 3.

The DRP's philosophy of resource management is natural systems management. Primary emphasis is placed on restoring and maintaining, to the degree possible, the natural processes that shaped the structure, function and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management for imperiled species is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes, and should not imperil other native species or seriously compromise park values.

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

Because park units are often components of larger ecosystems, their proper management can be affected by conditions and events that occur beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program that assesses resource conditions, evaluates management activities and refines management actions, and reviews local comprehensive plans and development permit applications for park/ecosystem impacts.

The entire park is divided into management zones that delineate areas on the ground that are used to reference management activities (see Management Zones Map). The shape and size of each zone may be based on natural community type, burn zone, and the location of existing roads and natural fire breaks. It is important to note that all burn zones are management zones; however, not all management zones include fire-dependent natural communities. Table 1 reflects the management zones with the acres of each zone.

Table 1a. Wekiwa Springs State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
WS-01	129.12	Yes	Yes
WS-02	62.48	Yes	Yes
WS-03	49.86	Yes	No
WS-04A	30.76	Yes	No
WS-04B	24.37	Yes	No
WS-05	39.73	Yes	No
WS-06	27.52	Yes	No
WS-07A	14.15	Yes	No
WS-07B	12.46	Yes	No
WS-08A	8.61	Yes	No
WS-08B	11.48	Yes	No
WS-09	40.21	Yes	No
WS-11	23.89	Yes	No
WS-12	276.68	Yes	No
WS-14A	21.08	Yes	No
WS-14B	21.47	Yes	No
WS-15	16.66	Yes	No
WS-16	20.26	Yes	No
WS-17	48.93	Yes	No
WS-18	38.13	Yes	No
WS-19	56.10	Yes	No
WS-20	60.27	Yes	No
WS-21	77.77	Yes	No
WS-22	137.28	Yes	No
WS-23	223.43	Yes	No
WS-24	46.04	Yes	No
WS-25	87.34	Yes	No
WS-27	363.7	Yes	No
WS-28	111.64	Yes	Yes
WS-29	113.27	Yes	Yes
WS-30	374.92	Yes	No
WS-31	136.78	Yes	No
WS-32	218.81	Yes	Yes
WS-33	545.86	Yes	No
WS-34	686.41	Yes	Yes
WS-36	224.11	Yes	No
WS-37	72.31	Yes	No
WS-38	95.16	Yes	No
WS-39	7.6	Yes	No
WS-40	18.78	Yes	No
WS-41	15.74	Yes	No

Table 1a. Wekiwa Springs State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
WS-42	1,009.03	Yes	Yes
WS-44	10.29	Yes	No
WS-45	61.63	Yes	Yes
WS-46	653.27	Yes	No
WS-47	40.76	Yes	No
WS-48	126.53	No	No
WS-MW01/02	39.38	Yes	Yes
WS-MW03	63.98	Yes	Yes
WS-MW03TH	6.97	No	No
WS-MW04	13.41	Yes	No
WS-MW05	27.13	Yes	No
WS-MW06	15.65	Yes	Yes
WS-MW07	87.47	Yes	No
WS-MW08A	69.92	Yes	No
WS-MW08B	71.66	Yes	Yes
WS-MW08C	114.01	Yes	No
WS-MW08D	67.19	Yes	No
WS-MW09	14.38	Yes	No
WS-MW10	114.88	Yes	No
WS-MW11	68.01	Yes	No
WS-MW12	25.41	Yes	No
WS-MW13	9.48	Yes	No
WS-MW14	6.28	Yes	No
WS-MW15	13.38	Yes	No
WS-MW16	7.05	No	No
WS-MW17	6.22	No	No
WS-MW18	13.08	No	No
WS-NL1	165.6	Yes	No
WS-NL2	535.67	Yes	No
WS-NL3	371.09	Yes	Yes
WS-NL4	82.26	Yes	No
WS-NL5	2.81	Yes	No
WS-NL6	22.07	No	No
WS-NL7	14.23	No	No
WS-PP1	151.77	Yes	No
WS-PP2	40.36	Yes	No
WS-PP3	72.39	Yes	No
WS-PP4	47.77	Yes	No
WS-PP5	32.43	Yes	No
WS-RKS113	37.62	No	No
WS-RKS18	177.91	No	Yes

Table 1a. Wekiwa Springs State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
WS-RKS23	88.17	No	Yes
WS-RKS28/9	123.54	No	No

Table 1b. Rock Springs Run State Reserve Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
RKS-001	423.14	Yes	No
RKS-002	84.31	Yes	No
RKS-003	142.97	Yes	No
RKS-004	56.84	Yes	No
RKS-005	146.87	Yes	No
RKS-006	61.27	Yes	No
RKS-007	93.23	Yes	No
RKS-008	106.84	Yes	No
RKS-011	82.22	Yes	No
RKS-012	1,493.75	Yes	Yes
RKS-014	140.44	Yes	No
RKS-015	119.04	Yes	No
RKS-016	130.33	Yes	No
RKS-017	1,278.97	Yes	Yes
RKS-018	1,566.68	Yes	Yes
RKS-023	393.20	Yes	No
RKS-024	591.35	Yes	No
RKS-025	123.28	Yes	No
RKS-026	312.31	Yes	No
RKS-027	136.44	Yes	No
RKS-028	905.25	Yes	No
RKS-051	31.08	Yes	No
RKS-052	18.07	Yes	No
RKS-053	51.99	Yes	No
RKS-054A	855.94	Yes	Yes
RKS-054B	165.99	Yes	Yes
RKS-054C	725.43	Yes	Yes
RKS-055	157.77	Yes	No
RKS-058	85.61	Yes	No
RKS-067	124.43	Yes	No
RKS-068	86.94	Yes	No
RKS-069	36.61	Yes	No

Table 1b. Rock Springs Run State Reserve Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
RKS-070	24.83	Yes	Yes
RKS-071	13.15	Yes	Yes
RKS-072	55.68	Yes	Yes
RKS-073	230.68	Yes	Yes
RKS-075	43.83	Yes	Yes
RKS-077	17.78	Yes	No
RKS-079	45.09	Yes	No
RKS-080	70.14	Yes	No
RKS-081	132.35	Yes	No
RKS-089	88.04	Yes	No
RKS-090	400.87	Yes	No
RKS-092	91.84	Yes	No
RKS-093	61.08	Yes	No
RKS-097	74.31	Yes	No
RKS-098	83.30	Yes	Yes
RKS-099	69.72	Yes	No
RKS-100	9.86	Yes	No
RKS-101	16.06	Yes	No
RKS-102	25.14	Yes	No
RKS-104	6.77	Yes	No
RKS-105	28.67	Yes	No
RKS-106	26.43	Yes	No
RKS-107	126.73	Yes	No
RKS-109	27.05	Yes	No
RKS-110	17.58	Yes	No
RKS-111	11.89	Yes	No
RKS-112	138.91	Yes	No
RKS-113	774.99	Yes	No
RKS-116	258.10	Yes	No
RKS-117	112.74	Yes	No
RKS-118	136.96	Yes	No
RKS-120	60.49	Yes	No
RKS-KT1	63.51	Yes	No
RKS-KT2	19.39	Yes	No
RKS-KT3	50.07	Yes	No
RKS-KT4	19.12	Yes	No

Table 1c. Lower Wekiva River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
LW-01	20.34	Yes	No
LW-02	10.37	Yes	No
LW-03	73.26	Yes	No
LW-04	41.60	Yes	No
LW-05	161.86	Yes	No
LW-07	64.94	Yes	No
LW-08	84.63	Yes	No
LW-10A	55.98	Yes	No
LW-10B	95.68	Yes	No
LW-11	24.24	Yes	No
LW-12	250.53	Yes	Yes
LW-13	27.19	Yes	No
LW-14	499.93	Yes	Yes
LW-15	18.69	Yes	No
LW-16	346.49	Yes	Yes
LW-18	86.58	Yes	No
LW-19	237.94	Yes	Yes
LW-20	1,635.25	Yes	Yes
LW-21	1,129.22	Yes	No
LW-23	396.70	Yes	No
LW-24	385.40	Yes	No
LW-26	844.31	Yes	No
LW-27	1,088.47	Yes	No
LW-28	1,041.98	Yes	Yes
LW-29	1,064.74	Yes	Yes
LW-30	381.02	Yes	NO
LW-31	450.65	Yes	NO
LW-32	4,722.36	Yes	Yes
LW-33	6.18	No	Yes
LW-34	11.07	No	No
LW-J02	51.79	Yes	No
LW-J03	25.23	Yes	No
LW-J04	71.40	Yes	No
LW-J05	639.52	Yes	No
LW-J06	15.12	Yes	No
LW-J07	52.17	Yes	No
LW-J08	49.93	Yes	No
LW-J09	37.04	Yes	No
LW-J10	24.66	Yes	No
LW-J11	73.01	Yes	No
LW-J12	40.71	Yes	No

Table 1c. Lower Wekiva River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
LW-J13	16.22	Yes	No
LW-SK01	71.72	Yes	No
LW-SK02	296.70	Yes	No
LW-SK03	209.92	Yes	No
LW-SK04	114.03	Yes	No
LW-SK05	113.27	Yes	No
LW-SK06	82.08	Yes	No
LW-SK07	20.27	No	No
LW-unmapped	156.24	N/A	N/A

Resource Description and Assessment

Natural Resources

Topography

Wekiwa Springs State Park (WSSP), Rock Springs Run State Reserve (RSRSR) & Lower Wekiva River Preserve State Park (LWRPSP) comprise the Wekiva River Basin State Parks (WRBSP) system 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 and Rock Springs Run State Reserve are included in the Apopka Hills subdistrict with residual sandhills modified by karst processes and seaward deposits of the Mount Dora Ridge (Brooks 1981a). The Mount Dora Ridge is nearly level to rolling, with slopes between zero and eight percent, except in areas near sinkholes where the soils have slopes of nearly 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 Parks varies from high sandy hills to low-flooded areas along Rock Springs Run, Wekiwa Springs Run, the St. Johns River 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 with the highest elevation of 140 feet above NGVD within the pine plantation property associated with Wekiwa Springs State Park.

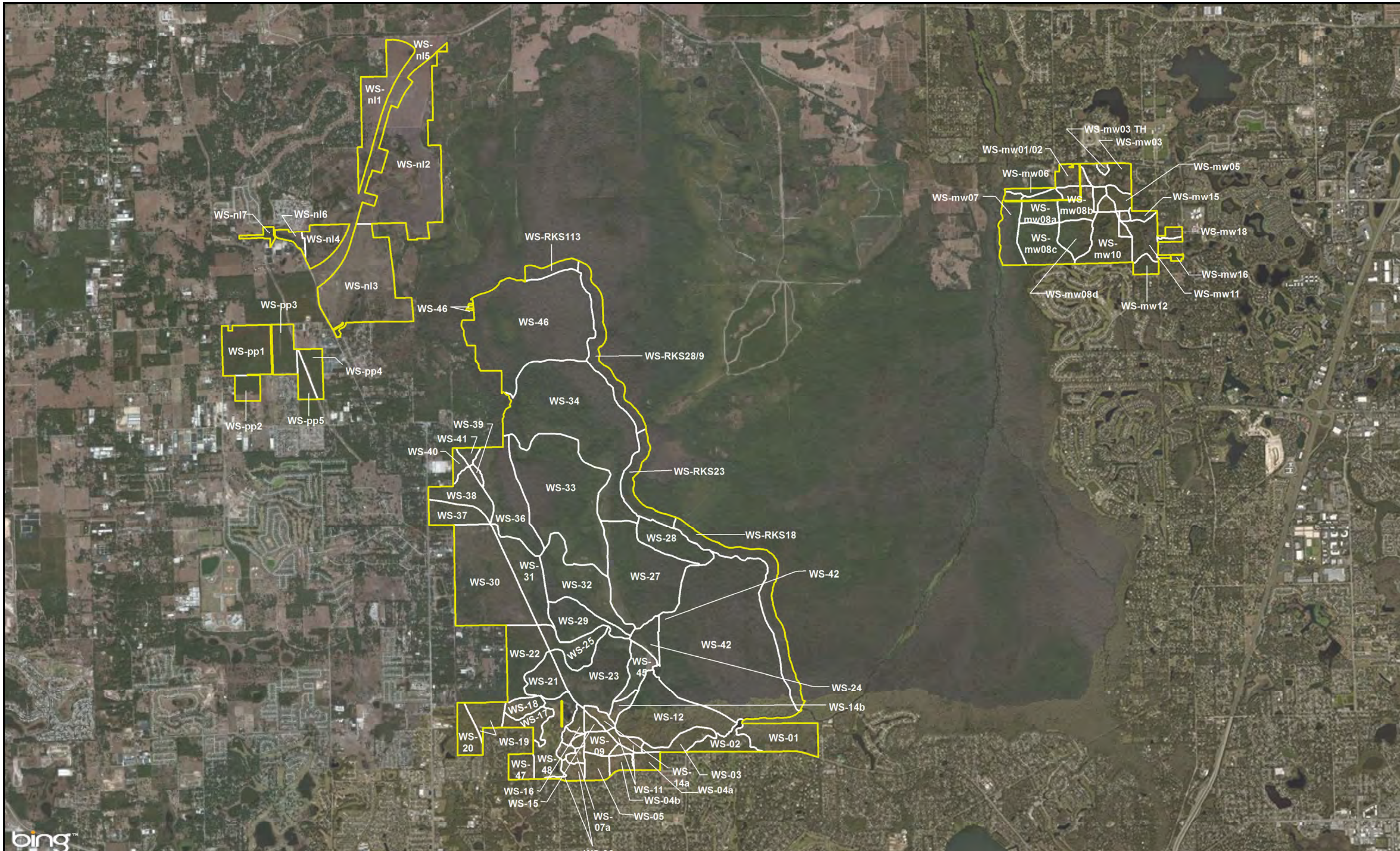
The topographic condition is generally undisturbed with the exception of three small borrow pits, two man-made lakes, and many raised tram beds derived from a narrow-gauge railroad system and logging activities.

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 4 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. Natural communities have specific soil types in which the community is found. For example, both Candelar fine sands and Tavrese fine sand are soil types that support Sandhill communities and Archbold fine sand and St. Lucie sands support scrub communities. This information becomes important when altered landcover types (ex: semi-impoved pastures) are being considered for restoration.



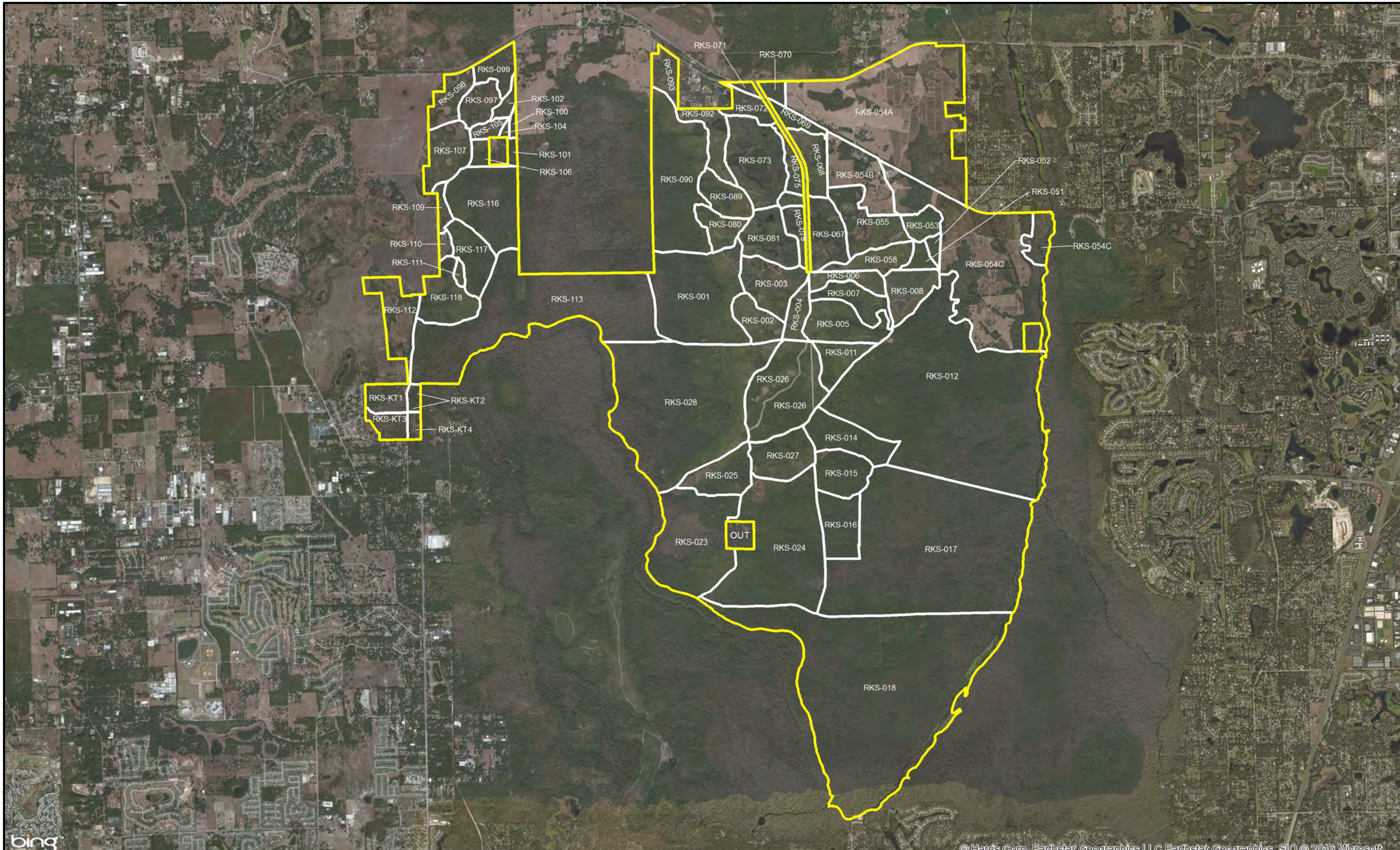
WEKIWA SPRINGS STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

MANAGEMENT ZONES MAP



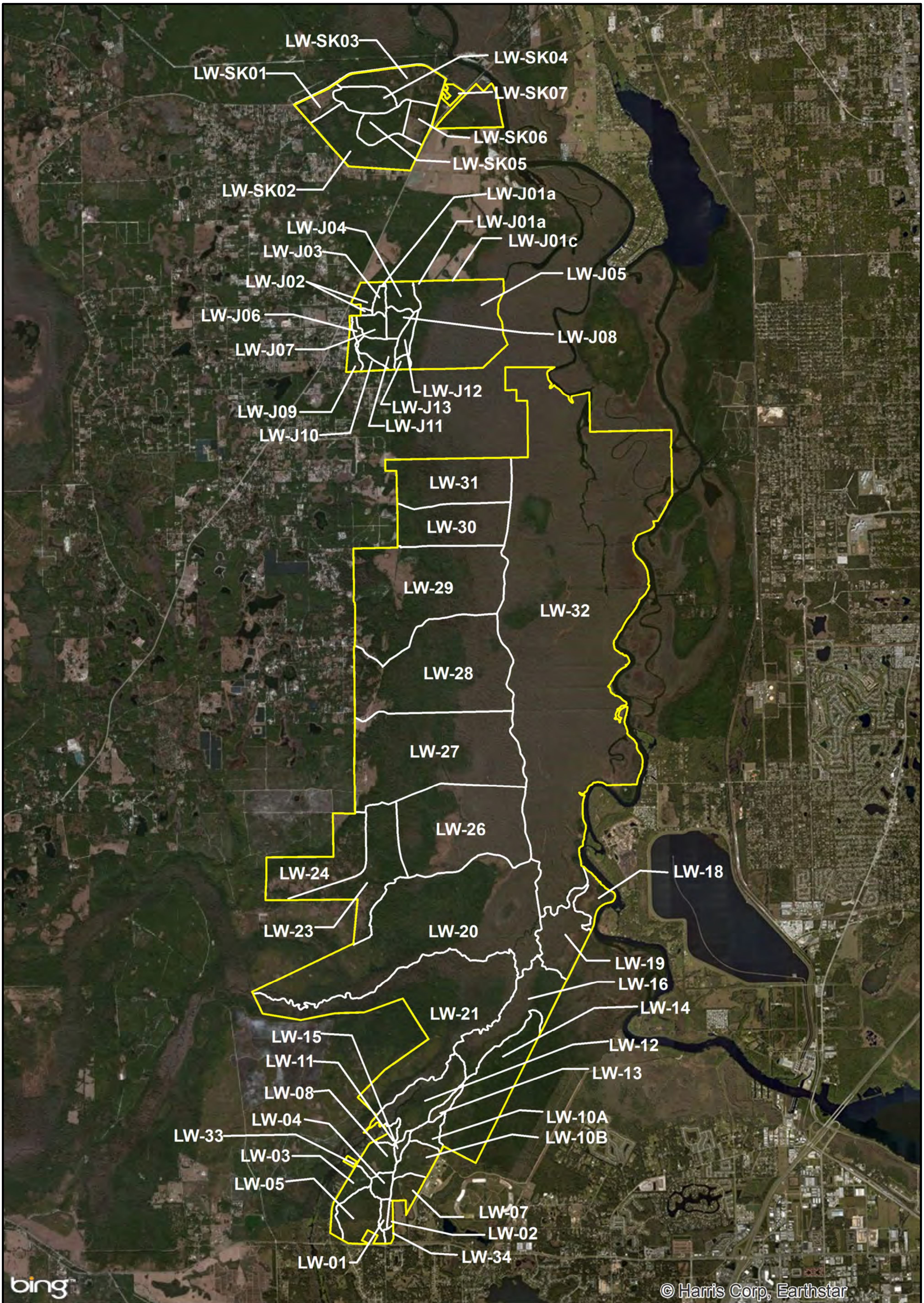
ROCK SPRINGS RUN STATE RESERVE

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

MANAGEMENT ZONES MAP



LOWER WEKIVA RIVER PRESERVE STATE PARK

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

MANAGEMENT ZONES MAP

The soils help to determine what the target community should be (basically what are the target plant species to plant). The soils maps have been used to determine desired future conditions for all Altered landcover types determined

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, soil types, and underlying geology within each unit contributes to the diverse assemblage of hydrologic features and regimes. Best known, are the numerous flowing springs within these parks. There are at least 30 known springs that feed into the Wekiva River system. Many of them are situated within the parks while some are on nearby private property or other conservation lands. All flow into the Wekiva River system via one of the many tributaries of the main river, which ultimately flows into the St. Johns River approximately 17 miles from its headwaters at Wekiwa Spring. Other hydrologic features include rainwater sheet flows across 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

Lake Prevatt is the largest lacustrine 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 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 mostly unknown. More research could determine the utility of stormwater ponds in those significant areas of urban input.

Currently, limited water quality data is available for Lake Prevatt with most of the data collected from 2008 to present associated with the development of a Minimum Flows and Levels (MFL) regime for the lake. Two St. Johns River Water Management District (SJRWMD) groundwater monitoring wells were installed along the lake's southeastern shore in 2008 and since 2009 have provided nearly daily groundwater level measurements. The SJRWMD also installed a staff gauge in 2009 and record lake surface water levels approximately quarterly.

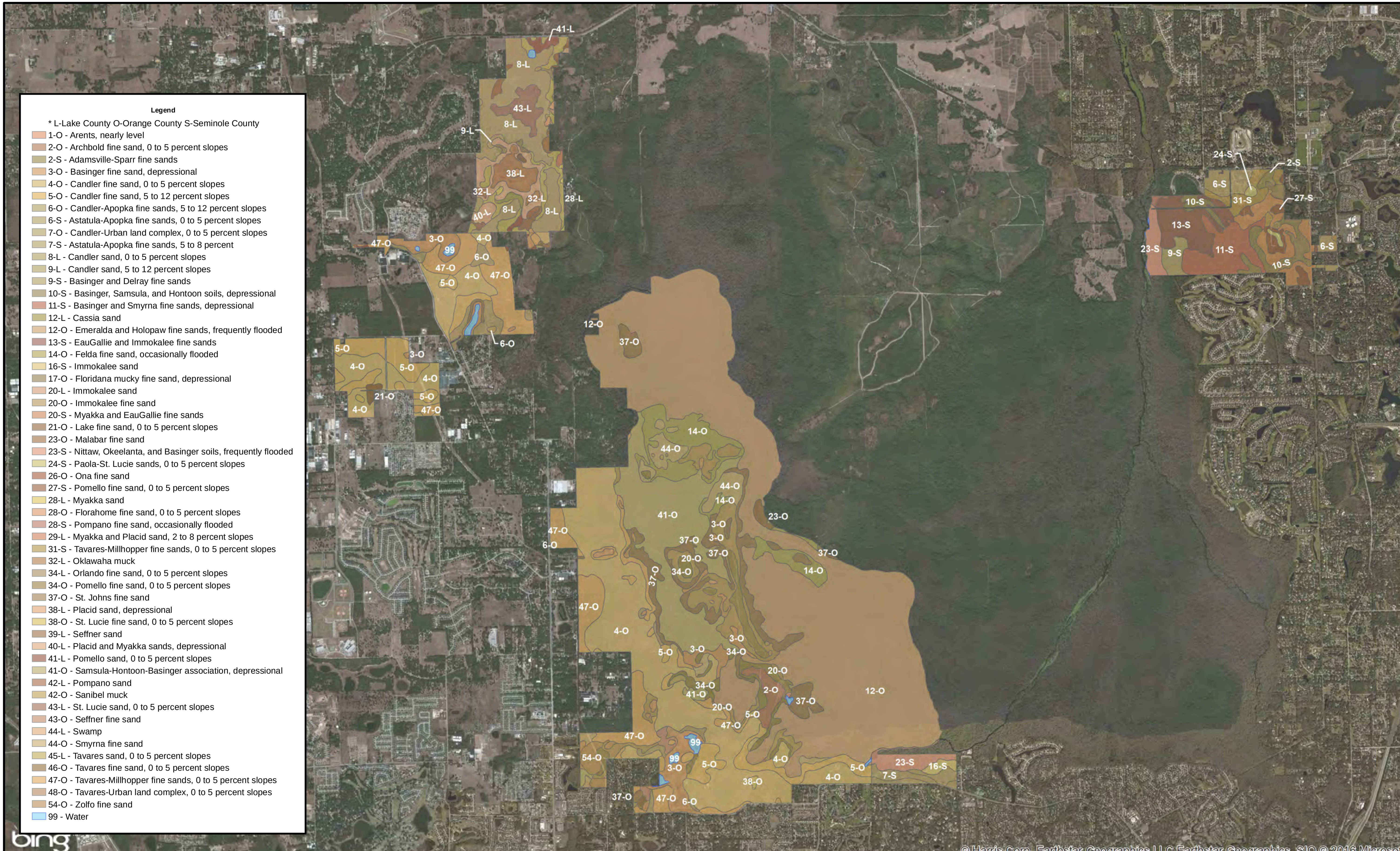
It appears as though land use changes outside of WSSP have contributed to altered hydroperiods in Lake Prevatt as well as other wetland systems within the park. Generally speaking, surface water now, compared to historic conditions, enters the park in larger quantities and much more quickly following storm events. For example, Lake Prevatt contained almost no surface water in early 2013 due to the extended drought. However, by August of 2013, surface water levels approached the maximum. Anthropogenic hydrologic alterations will undoubtedly have an immense impact to many ecosystems throughout the Wekiva Basin.

The recently-acquired Neighborhood Lakes property includes hydrologic features such as semi-permanent ponds and lakes, and ephemeral wetlands. The largest hydrological features are known as the Neighborhood Lakes and have been categorized under the Florida Natural Areas Inventory (FNAI) natural community classification system as marsh lakes. Two other marsh lakes along the Lake County boundary are part of the Neighborhood Lakes chain. With the exception of a lack of fire management, the lakes do not appear to have been altered in any way. There are also at least two sinkhole lake features on this section of property. All of these features will potentially be impacted by the footprint of the Wekiva Parkway, which is in the early phases of construction now. The DRP will continue to work with the Orlando-Orange County Expressway Authority (OOCEA), the Florida Department of Transportation (FDOT) and the SJRWMD throughout the road project to ensure that once complete, the parkway maintains the overall important hydrology of the Neighborhood Lakes property.

Historically a large storm water culvert, which drained surface runoff from Wekiva Springs Road and surrounding residential developments (the historic natural drainage area), has discharged into the southeast corner of WSSP (Management Zone WS-01). Trash, lawn chemicals, road runoff and exotic plant propagules typically entered the unit through this culvert. The result of the culvert, therefore, was heavy erosion problems for this area. In 2004, SJRWMD funded, designed and allowed construction of a storm water pond within WS-01 to address these inherent problems. Seminole County supervised the project. Hydrologic alterations associated with the construction and operation of this pond are thought to have contributed to a significant die-off event of mature longleaf pines in the adjacent area from about 2007-2009. There is also a persistent invasive exotic plant problem in the area near the pond. While the installation of the pond improved some storm water issues, it created some new problems and challenges at the same time.

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 the water in this creek is fully dependent on inputs from immediately outside the unit where it originates as a marsh.

Another 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 McCall Tract in WS-47. This pond discharges through an artificially created ditch to Lake Prevatt under very high water conditions.



WEKIWA SPRINGS STATE PARK

N

0 0.5 1 2 Miles

SOILS MAP

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

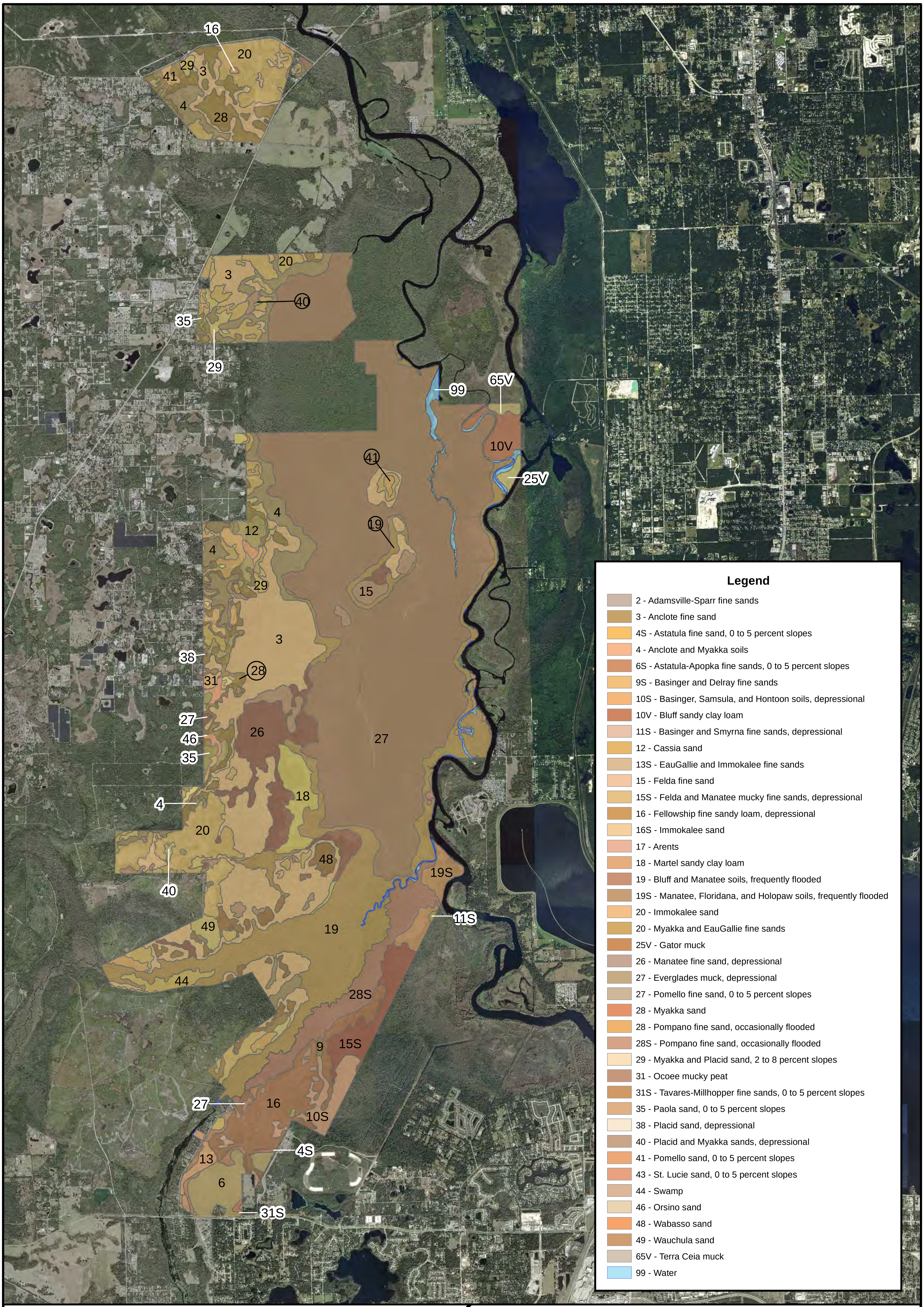
ROCK SPRINGS RUN STATE RESERVE

SOILS MAP

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011



LOWER WEKIVA RIVER
PRESERVE STATE PARK

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

SOILS MAP

Although mapped on the (United States Geological Survey) 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 in management zone WS-29 at 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 approximately 4 cubic feet per second (cfs). Mill Creek then bisects the park's interior and empties into the lagoon below Wekiwa Springs.

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. Johns 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. 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.

Discharge at Wekiwa Springs has been measured and monitored by the USGS and the SJRWMD. Flow data for Wekiwa Springs exists from as early as 1932 to present and SJRWMD currently performs bimonthly discharge measurements. In addition, discharge is also interpolated continuously from stage elevation and water levels measured in a nearby Floridan Aquifer well. Over the period of record from 1932-2010, the maximum measured discharge of 92.00cfs (59.46mgd) occurred in October 1960; the minimum discharge of 29.36cfs (18.98mgd) occurred in November 1985. The lowest periods of discharge correspond to periods of below normal rainfall in Florida. The mean and median discharges for the period 1932-2010 are 66cfs (43.1mgd) and 66.51cfs (42.99mgd), respectively (SJRWMD 2013). Recent flow measurements have been well below long-term averages, at about 32mgd. Flow rates vary over the period of record but the overall general trend is a gradual decline in flow.

From the Wekiwa Springs 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, together with several other smaller tributaries, form the Wekiva River.

The Wekiva River runs in a northeasterly direction for approximately 17 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 storm water runoff.

Located just north of the main park drive within management zone WS-12, in a low seepage area approximately 0.75 miles west of Wekiwa Springs, is a seep historically known as Barrel Spring (Rosenau *et al.* 1977). Recent repeated attempts have failed to locate a boil for Barrel Spring. Although named Barrel Spring, it is actually a seep. The SJRWMD measured discharge in 1995 and 1997 at 0.25cfs and 0.27cfs, respectively.

Sand Lake, a borrow pit constructed in the mid-1960s, also occurs at Wekiwa Springs State Park in management zone WS-42. The pit was believed to have flooded when an artesian spring was uncovered although some evidence suggests that there may be one or more flowing artesian wells in the pond bottom that also provide some inflow. Additional inflow to the lake is primarily through groundwater seepage and surface runoff. Sand Lake drains into the Wekiwa lagoon through an unnamed creek just below the bridge across the main springs. Flow through this creek is intermittent at the outfall from Sand Lake and at times is completely dry. This suggests that the flow from the artesian spring and/or well(s) within the lake may be very low. Future work should be conducted to determine the exact source(s) and level of flows entering the lake and to evaluate the costs, benefits, and feasibility of capping the artesian flow. Currently, Sand Lake is a recreational area in the park where visitors can picnic, fish, or bird watch.

Funding provided by the Springs Initiative in 2004 helped to secure the design and permits necessary for placing the day-use portion of WSSP on the county sewer system. In the following few years, this project was implemented, as were several other similar projects such as connecting the district administration buildings, shop, and some residences to municipal sewer and water. The campground is comprised of two loops of thirty sites. In loop 1-30 the bathhouse and all sites have been connected to sewer while the bathhouse and 7 site in the other have been connected. A project to bring sewer facilities to all campsites is currently pending. Additional park facilities should be assessed for municipal sewer and water connection to be made as soon as funding becomes available.

With the exception of Wekiwa Spring, nearly all of the smaller contributing springs within the basin are somewhat poorly studied and would benefit from additional surveys and monitoring. The SJRWMD has added several of the basin’s springs to their sampling schedule in recent years and we are now beginning to have some baseline data on water quality and flows. As future monitoring continues and is expanded, we will continue to learn more about the many springs within the basin.

In general terms, water quality remains good in the unit. This fact is reflected in biological and chemical water sampling on the Wekiva River by DEP. 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.

Generally, nitrate-nitrogen concentrations in groundwater are usually below 0.20 mg/L (Toth 1999). However, most of the springs within the Wekiva River Basin far exceed this concentration (Toth 1999), with some springs having reported concentrations as much as 480% higher than the 2008 Total Maximum Daily Load (TMDL) requirement of 0.25mg/L adopted for the three major springs in the Wekiva system (Gao 2008). Toth (1999) reported the following measurements for springs in the Wekiva system:

- 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 and surrounding land uses. A 2007 study used various isotopes to quantify the relative contributions of different nitrate sources within the Wekiwa Springs Basin. This report identified 9 categories of nitrate sources with the following relative contributions: On-site sewage treatment and disposal systems (OSTDS) 26%, agricultural fertilizers 26%, residential fertilizers 15%, wastewater treatment facilities (WWTF, sewer) 12%, livestock 6%, natural or unattributed 6%, other fertilizers 5%, golf course fertilizers 2%, and atmospheric nitrogen deposition 2%. This study showed that although nitrogen sources are varied, fertilizers and septic and sewer wastewater systems contribute significant amounts of nitrate to the springshed of Wekiwa Springs (MACTEC 2007).

The introduction of excess nitrogen to Florida springs is the most obvious stressor to their ecology due of the profuse overgrowth of algae that occurs and the subsequent ecological imbalances that follow. 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 and continue by SJRWMD staff.

In addition to nitrate, phosphorus is another nutrient that is essential to aquatic systems. Concentrations in Wekiwa Springs are elevated, near 0.1mg/L, however phosphorous is found at relatively high concentrations in many springs due to its natural abundance in groundwater. The geologic unit known as the Hawthorn Group is naturally rich in phosphate and in many areas it is in contact with the limestone of the lower Floridan aquifer. As a result, groundwater and spring water in many of these areas have moderate to high concentrations of orthophosphate, the inorganic form of phosphorus found in these geologic materials. Research has shown that phosphorus levels do influence algal growth, particularly at concentrations above 0.9mg/L, however, the naturally elevated background levels in many springs make it difficult to determine if anthropogenic sources contribute appreciably to phosphorus levels in springs.

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 spring waters, 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.

Some chemical characteristics of spring water can be used to evaluate the sources of discharge water and their potential vulnerability to contamination. Concentrations of analytes such as dissolved oxygen, calcium, sulfate, total dissolved solids, organic carbon, and fecal coliform bacteria can be used to identify springs that may at times have a surface water component (readily recharged by rainfall) as compared to springs which discharge from deeper, stable groundwater sources. Wekiwa Springs appears to be discharging water that includes a significant component of deeper, more mineralized water. However, the elevated nitrate concentrations indicate that the spring is still vulnerable to contamination from surface sources.

Due to urban development and increased groundwater withdrawals throughout the springshed, spring flows 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 spring flow of over 19 cubic feet per second for Wekiwa Springs and 13 cubic feet per second for Rock Springs from 1969 to 1982 (Friends of the Wekiwa River 1985).

The 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 spring flow 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 may 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). Staff will remain heavily engaged in this process.

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 are 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 60cfs, which equates to approximately 39mgd (Friends of the Wekiva River 1992). Water quality is generally good, with the exception of elevated nitrate concentrations averaging near 1.5mg/L (Harrington et al. 2008).

From Kelly Park, the Run flows along a 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 some of these areas being developed before State acquisition.

Sulfur Spring is located on the Kitteridge Tract in management zone RKS-KT2. Some hydrological restoration was done 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. Very little data are available regarding water quality or flows from Sulfur Spring. In 2013, at the request of Wekiwa Springs State Park staff, the SJRWMD installed a permanent staff gauge in the spring pool with a wireless data-logger unit that will collect basic water quality parameters. This additional level of monitoring should greatly increase our knowledge of Sulfur Spring.

Tram Springs is a small spring system with three vents located in management zone RKS-028. The three vents flow together into a small unnamed stream that flows about 0.6mi into Rock Springs Run. There are currently no flow data or water quality data available for Tram Springs. Staff should seek opportunities to gather preliminary data on Tram Springs and encourage SJRWMD and/or USGS to conduct future measurements at regular intervals to increase our knowledge of this system.

Several other 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. A few of the ephemeral wetlands on RSRSR are known to be important breeding ponds for striped newts (*Notophthalmus perstriatus)* and gopher frogs (*Rana capito).*

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.

<u>Lower Wekiva River Preserve State Park</u>

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 management zones 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 of them failed (blown out) within weeks of their installation and had to be 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 mostly inaccessible at this time due to damaged culverts at several water crossings (LW-30 and LW-31). New culverts are needed to restore passage and improve access for managing these sites properly.

Although located outside of the park boundary, there are three significant springs located just north of the SR46 bridge that contribute flow to the lower stretch of the Wekiva River that passes through this unit. 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 were conducted by SJRWMD from 2001-2010. Average discharge from this spring during that time was approximately 8.3cfs. Water flowing out of Island 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). Anecdotal accounts suggest that this spring is likely man-made, having been created during the digging of a canal across its location, but that has not yet been verified. Very little water quality data exists for Nova Spring but discharge and basic water quality parameters were measured by the SJRWMD in 2005. At that time, flow was measured at 8.52cfs (SJRWMD 2013).

Harden Spring flows from the bottom of a man-made pool on private property adjacent to the eastern shore of the Wekiva River, between Nova and Island Springs. Harden Spring appears to be a small spring with relatively low flows, however, no flow data or water quality data are currently available for this spring (SJRWMD 2013).

The management measures related to all three units' hydrology involve monitoring water quality and quantity which are affected by factors outside the parks. Water quality should be monitored for as many of the waters in the parks as possible, with priority given to the many springs. Flow measurements should be recorded as often as possible for each of the springs within the parks. Currently, SJRWMD staff performs bimonthly discharge measurements of Wekiwa and Rock Springs, and the smaller springs within the basin are sampled less frequently. Additional staff gauges should be installed at Sand Lake to help gain a better understanding of its hydrology. Readings need to be continued regularly on the staff gauge at Wekiwa Springs and the recently installed gauges at Witherington Springs and Sulfur Springs. Storm water runoff is degrading water quality in the Wekiva River and Lake Prevatt. Appropriate monitoring should continue to document changes and aid to formulate possible solutions. 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 beyond the park level. All involved permitting agencies are aware of the problems and have been on-site for several visits. Additional funds need to be allocated to adequately address these two problem areas.

Natural Communities

This section of the management plan describes and assesses each of the natural communities found in the state park. It also describes of the desired future condition (DFC) of each natural community and identifies the actions that will be required to bring the community to its desired future condition. Specific management objectives and actions for natural community management, exotic species management, imperiled species management and population restoration are discussed in the Resource Management Program section of this component.

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

When a natural community within a park reaches the desired future condition, it is considered to be in a "maintenance condition." Required actions for sustaining a community's maintenance condition may include; maintaining optimal fire return intervals for fire-dependent communities, ongoing control of non-native plant and animal species, maintaining natural hydrological functions (including historic water flows and water quality), preserving a community's biodiversity and vegetative structure, protecting viable populations of plant and animal species (including those that are imperiled or endemic), and preserving intact ecotones that link natural communities across the landscape.

The park contains 23 distinct natural communities as well as 12 altered land cover types (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Addendum 5.

Mesic Flatwoods

Desired future condition: Mesic flatwoods is characterized by an open canopy of tall pines typically longleaf pine (*Pinus palustris*) and/or south Florida slash pine *Pinus elliottii*), with the addition of pond pine (*Pinus serotina*) where the flatwoods are found in more hydric conditions, and a dense, low ground layer of low shrubs, grasses and forbes. Native herbaceous groundcover is over 50 percent of the area and is less than three feet in height. The saw palmetto/shrub component comprises no more than 50 percent of total shrub species cover, and are also less than three feet in height. Saw palmetto (*Serenoa repens*) will generally be present but not overly dominant. Other shrub species may include gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), runner oak (*Quercus elliottii*), dwarf live oak (*Quercus minima*), shiny blueberry (*Vaccinium myrsinites*), and dwarf huckleberry (*Gaylussacia dumosa*). The herbaceous layer is primarily grasses, including wiregrass (*Aristida stricta* var. *beyrichiana*), dropseeds (*Sporobolus curtissii, S. floridanus*), panicgrasses (*Dicanthelium* spp.), and broomsedge (*Andropogon* spp.). This community has minimal topographic relief and the soils contain a hardpan layer within a few feet of the surface which impedes percolation. Due to these factors, water can saturate the sandy surface soils for extended periods during the wet season but lengthy droughts also commonly occur during the dry season. The Optimal Fire Return Interval for this community is 2-4 years.

Description and assessment: Within the Wekiva River Basin State Parks, there are 5,321.02 acres of mesic flatwoods. The mesic flatwoods have an open canopy of slash pine, pond pine and or longleaf pine with a ground cover of saw palmetto, gallberry, and fetterbush. Dispersed among the palmetto there is also a component of wiregrass (*Aristida beyrichiana*) and other herbaceous species. Much of this community type was logged in the 1930s and 1940s; accordingly, there are few, if any, old growth pines throughout the WRBSP. In many locations where the logging has occurred the slash/longleaf pine canopy has been replaced by pond pine through natural recruitment. This is especially apparent where mesic flatwoods is adjacent to hydric hammocks. 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. The habitat condition varies greatly primarily due to the burn history of each burn unit.

At Wekiwa Springs State Park, there are 719.66 acres of mesic flatwoods that occur in a relatively continuous block in the central portion of the park and extend into RSRSR and LWRPSP. Most of the community within the park is in good to excellent condition. In addition to the extensive logging, other disturbances are evident. For example, in management zone WS-34 sometime in the past, most likely in the 1930s or 1940s, a ditch was dug in the zone 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 harvesting. 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 canopy of pine and saw palmetto and fewer grasses.

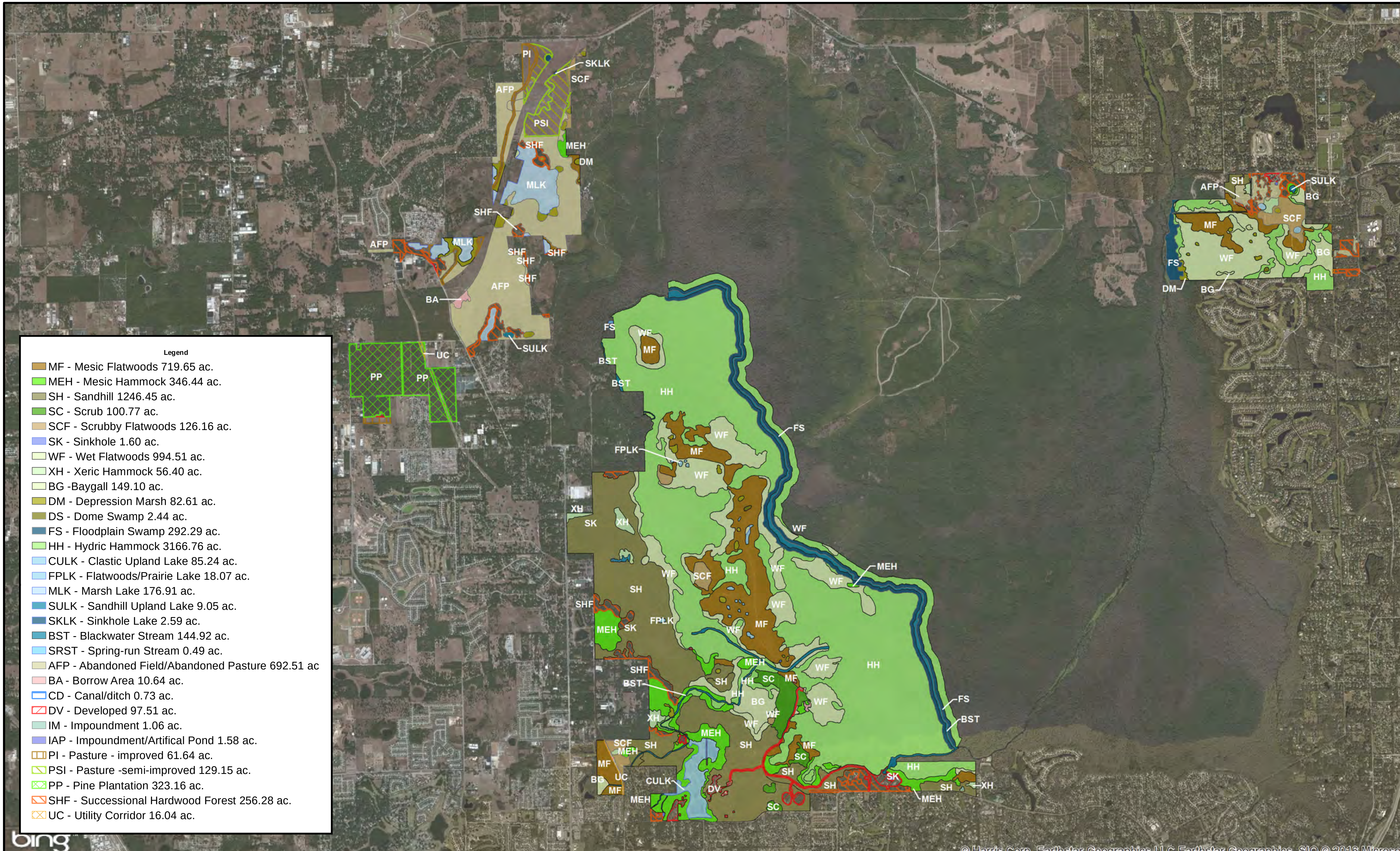
The mesic flatwoods in management zone WS-20 in the southwest corner of the park also and within the Markham Woods property are in fair condition with very high fuel loads of saw palmetto reaching up to eight feet in height in some areas. These areas also have a high accumulation of duff on the ground. Due to the high fuel loads, caution must be exercised during prescribed fires. Old plow lines are evidence of past wildfires.

At Rock Springs Run State Reserve, there are 3,095.02 acres of mesic flatwoods. The central portion of the park contains a north-south “band” of mesic flatwoods. Prescribed fire has been used within a majority of these flatwoods which has resulted in a good condition. Pond pine also occurs in these areas in high concentrations also due to historic selective logging activities (hydrated right before purchase). Longleaf pine planting would be required periodically in these zones to restore the historic pine overstory.

At Lower Wekiva River Preserve State Park, there are 1,507.29 acres of mesic flatwoods that occur mainly in the southern portions of LWRPSP, east of the Wekiva River. These flatwoods are also considered to be in good condition, with the exception of management zone LW-14. This zone is in fair condition and has a very high fuel load and accumulation of duff on the ground due to an extended period of fire exclusion. There have been several wildfires within this zone over the last ten years resulting in pockets of pine morality.

Mesic flatwoods also occur in the northern parcels – the Jung and Skinner tracts where it would be considered to be in fair condition because of the lack of fire. There is an extensive pine canopy that may require pine thinning to reduce the basal area within in these areas. In 2011 there was a wild fire that burned through management zones LW-SK01, LW-SK03 and LW-SK04 that removed 80-90% of the standing pines within this community.

General Management Measures: The long-term restoration of this community will require the regular application of prescribed fire on a 2-4 year burn rotation, the thinning or removal of pond pine, and the planting of longleaf pine. The mesic flatwoods at all three parks could benefit from timber thinning in order to reduce the total basal area in each stand. Firebreaks may need to be widened and fuel heights reduced along these lines prior to burning. Management zones that have no burn history or have been out of rotation for an extended period of time will require prescribed fire applied on a 1-3 year rotation to reduce fuels gradually over time.



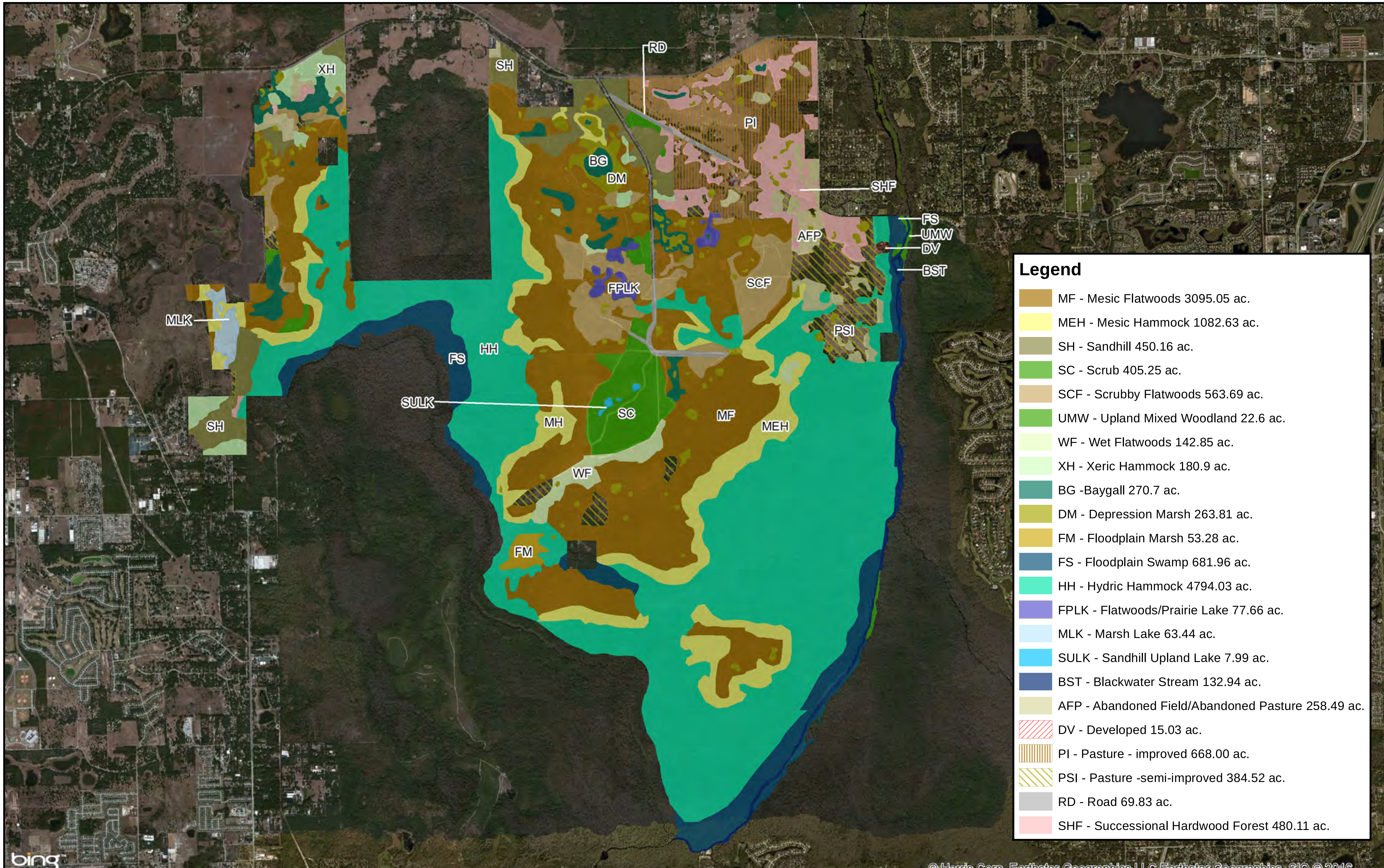
WEKIWA SPRINGS STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

NATURAL COMMUNITIES
EXISITING CONDITIONS MAP



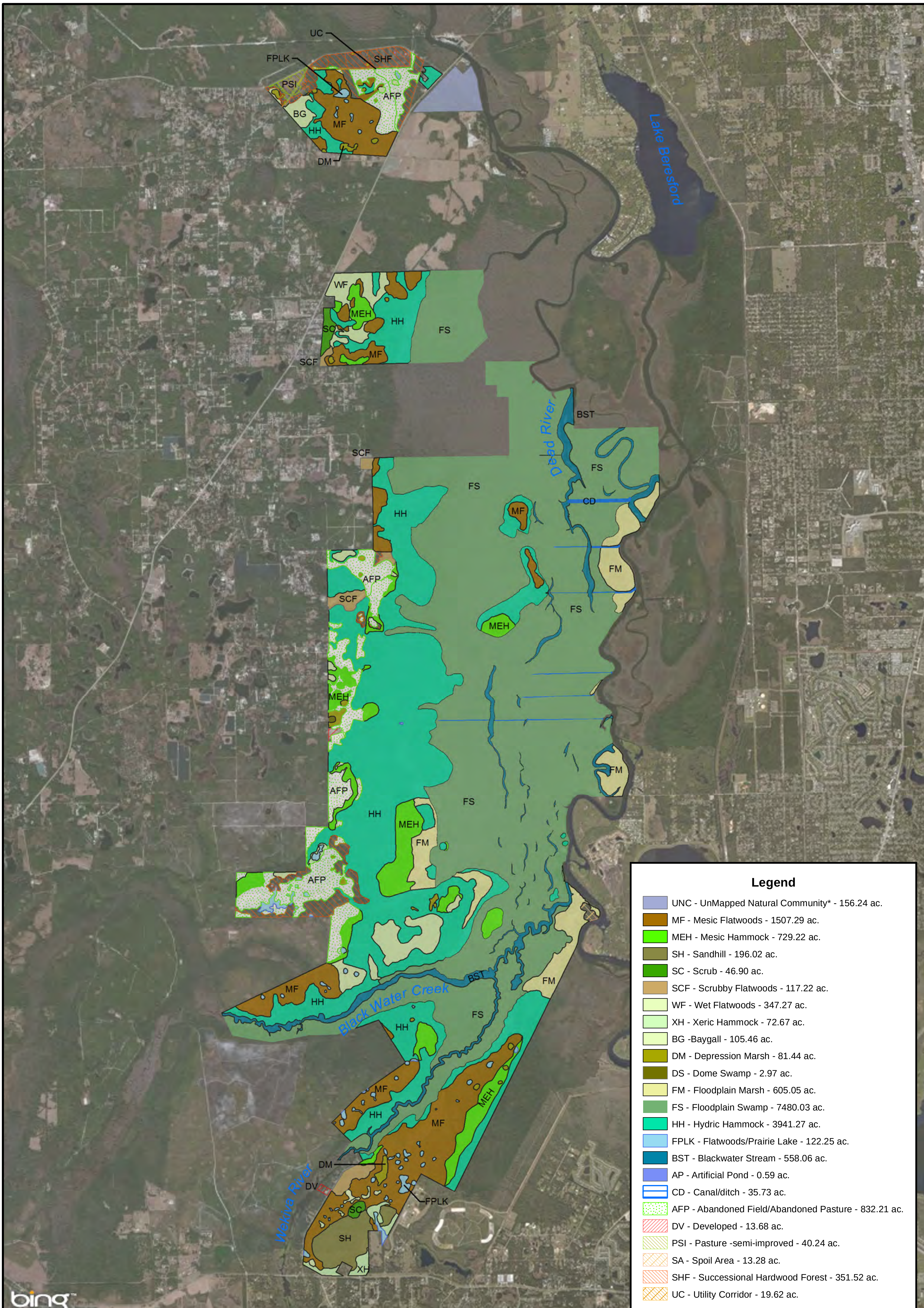
ROCK SPRINGS RUN STATE RESERVE

N

0 0.25 0.5 1 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2011

NATURAL COMMUNITIES MAP
EXISTING CONDITIONS



LOWER WEKIVA RIVER
PRESERVE STATE PARK

N
0 0.25 0.5 1 Mile
Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

NATURAL COMMUNITIES
EXISTING CONDITIONS MAP

Adequate duff moisture should exist before burning in an effort to remove fuel accumulations slowly over time in order to reduce tree mortality. Monitoring and treatment of exotic plants will continue.

Mesic Hammock

Desired future condition: Mesic hammock is a well-developed evergreen hardwood and/or palm forest which can occur, with variation, through much of peninsular Florida. The often dense canopy will typically be dominated by live oak (*Quercus virginiana*) with cabbage palm (*Sabal palmetto*) mixed into the understory. Southern magnolia (*Magnolia grandiflora*) and pignut hickory (*Carya glabra*) can be common components in the subcanopy as well. The shrubby understory may be dense or open, tall or short, and will typically be composed of saw palmetto, beautyberry (*Callicarpa americana*), American holly (*Ilex opaca*), gallberry and sparkleberry (*Vaccinium arboreum*). The groundcover may be sparse and patchy but generally contains panicgrasses (*Panicum* spp.), switchgrass (*Panicum virgatum*), sedges, as well as various ferns and forbs. Abundant vines and epiphytes will occur on live oaks and cabbage palms and other subcanopy trees. Pine trees, particularly slash pine or loblolly pine (*P. taeda*), may form a sparse emergent layer. Mesic hammocks will generally contain sandy soils with organic materials and may have a thick layer of leaf litter at the surface. Mesic hammocks will rarely be inundated and not considered to be fire-adapted communities and will typically be shielded from fire.

Mesic hammock can arise in pyrogenic, naturally pine-dominated areas when shielded from fire as a result of human activities, a common example being old home sites overgrown with oaks and cabbage palms. Once mature, oaks and cabbage palms can provide shade and leaf litter that subsequently “fire-proof” an area and allow for the establishment of other hammock species (Craighead 1971; Davis 1943). Hardwoods will also invade from the edges of natural hammocks into pine-dominated communities in the absence of fire. These invading hammocks are generally lack species compared to natural hammocks in the understory and often have an emergent pine canopy (USFWS 1999). Even in areas that are often burned, frequent cool season burn regimes may still allow oak regeneration in pine-dominated communities and lead to hammock development.

Description and assessment: Within the Wekiva River Basin State Parks, there are 2,202.65 acres of mesic hammock. These hammocks occur in scattered ecotonal areas grading toward the more hydric regions of the park. The existence of mesic hammocks may be factor of a historic “fire shadow” effect from the adjacent wet habitat and from fire exclusion. This community is well established and does not require special management efforts other than exotic species removal.

At Wekiwa Springs State Park, there are 346.41 acres of mesic hammock. This community occurs in the south and west portions of the park. A large portion of mesic hammock can be found around Lake Prevatt, extending west into the McCall tract property (WS-47). Management zones WS-22 and WS-30 both have a portion of mesic hammock along the western perimeter of these zones. The location of this community in both locations may be a natural occurrence or may be due to fire shadow effect. Because these areas are located in the urban interface, the park conducts prescribed burns with the same wind direction each time, resulting in this mesic hammock strip of habitat that most likely mesic flatwoods. In management zone WS-12, mesic hammock exists with the transition area between mesic flatwoods and hydric hammock.

At Rock Springs Run State Reserve, there are 1,082.63 acres of mesic hammock most of the acreage in the park exists as a transition between the mesic flatwoods and the hydric hammock. These transitions are located in the southeastern and western areas of the park. In management zones RKS-072 and RKS073, this community occurs around the edges of a large depression marsh. This community can also be found in the transitional areas of the West BMK portion of Rock Springs Run and around Lake Bartho, a marsh lake located in management zone RKS-112.

At Lower Wekiva River Preserve State Park, there are 773.61 acres of mesic hammock. In the lower portion of the park south of the Wekiva River, there is a linear tract of 16 acres of mesic hammock in management zone LW-16. This area forms an ecotone between mesic flatwoods and hydric hammock. The rest of the acreage is located north of the Wekiva river. There is 94 acres found within the Jung property in management zones LW-J03, LW-J0, LW-J08 and along the south boundary of the property in zones LW-J10 and LW-J11. Mesic hammock is scattered throughout the rest of the LWRPSP property in small habitat islands. Again, these hammocks appear to exist along the ecotone as the habitat grades down in hydric hammock.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs. These areas will also need to be monitored for erosion caused by recreational use on trails and roads.

Sandhill
Desired Future Condition: The dominant pine of sandhill, depending on region of state, will usually be longleaf pine (*Pinus palustris*) and/or South Florida slash pine (*Pinus elliottii*). For sandhill within the WRBSP, longleaf pine is the desired canopy species. Herbaceous cover will be very dense, typically wiregrass (*Aristida stricta* var. *beyrichiana*) and other herbaceous species, and low in stature. Most of the plant diversity is contained in the herbaceous layer including other three-awns (*Aristida* spp.), pineywoods dropseed (*Sporobolus junceus*), lopsided Indiangrass (*Sorghastrum secundum*), bluestems (*Andropogon* spp.) and little bluestem (*Schizachyrium scoparium*). In addition to groundcover and pines, there will be scattered individual trees, clumps, or ridges of onsite oak species [usually turkey oaks (*Quercus laevis*), sand post oak (*Quercus margaretta*), and blue-jack oak (*Quercus incana*)]. In old growth conditions, sand post oaks will commonly be 150-200 years old, and some turkey oaks will be over 100 years old. The Optimal Fire Return Interval for this community is 1-3 years.

Description and assessment: Within the Wekiva River Basin State Parks, there are 1,892.66 acres of sandhill. Sandhill occupies the unit's higher elevations. The longleaf pine trees in the sandhills were logged and turpentine extracted 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 the time of year that burns were conducted was inappropriate because 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.

At Wekiwa Springs State Park, there are 1,246.45 acres of sandhill located in the western and southern portions of the park. Most of the sandhill is in excellent condition due to the park's active burn program. There are portions of the sandhill community that are in fair to poor condition as an artifact of burning techniques due the proximity of the urban interface.

Several types of sandhill restoration projects are currently being conducted and evaluated at WSSP. Considerable oak girdling was conducted in a number of management zones in addition to a prescribed fire. In addition to girdling of the oaks there has also been the application of herbicide (Velpar) to restore these areas. In 2002, approximately 60 acres of Velpar treatments were applied (WS-23b and WS-17/18). An additional 40 acres were treated in 2004 in WS-47 and the southern section of WS-30. 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. Ecological progress is evident but additional spring burns may be necessary to knock back growing oaks. 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 addition, cogon grass (*Imperata cylindrica)* and rose Natalgrass *(Melinis repens*) have invaded these locations.

A limited number of exotic plants, largely from adjacent private yards, have invaded the sandhills on the Wekiwa Springs perimeter. Cats (*Felis catus*) are another exotic problem in the sandhill community. Small mammal abundances within sandhill communities statewide are not high (Stout and Corey 1995). Cats can have a very deleterious effect on small mammal populations because they are very efficient predators (Churcher and Lawton 1989). House cats are occasionally observed hunting in sandhill areas near the Wekiwa Springs' perimeter.

At Rock Springs Run State Reserve, there are 450.19 acres of sandhill located in the northern portion~~s~~ of the park and adjacent to County Road 433. Most of the sandhill is in poor to fair condition with the exception of management zones RKS-068 and RKS-75; the majority of the sandhill within these two zones are in good to excellent condition. As part of a mitigation project in October and November of 2001, the roadsides along CR 433 that were historically planted with bahiagrass were re-contoured 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). Rose Natal grass 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.

At Lower Wekiva River Preserve State Park, there are 196.02 acres of sandhill that is located near the southern boundary, just north of State Road 46. This sandhill is in poor to fair condition that will require some mechanical treatment along with prescribed fire. Prescribed fire was last applied in this location was in February~~,~~ 2003.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community along with repeated prescribed fire on a 1-3 year rotation with an emphasis on growing season burns. Areas that are in poor to fair condition will need the addition of mechanical treatment along with prescribed fire.

<u>Scrub</u>

Desired future condition: Within the scrub community, the dominant plant species include scrub oak (*Quercus inopina*), sand live oak (*Quercus maritime*), myrtle oak (*Quercus myrtifolia*), Chapman's oak (*Quercus chapmanii*), saw palmetto, and rusty staggerbush (*Lyonia ferruginea*). There will be a variety of oak age classes/heights between different scrub patches. There will be scattered openings in the canopy with bare patches of sand that support many imperiled and/or endemic plant species; these species will be regularly flowering and replenishing their seed banks. Sand pine (*Pinus clausa*), where present, will usually not be dominant in abundance, percent cover, or height. Some areas of mature sand pine may occur. The Optimal Fire Return Interval for this community will be regionally variable; typically, 4-15 years when aiming to achieve a mosaic of burned and unburned areas.

Description and assessment: Within the Wekiva River Basin State Parks, there are 552.92 acres of scrub. Dramatic changes to WRBSP the scrub community have taken place since 1998. In 1998, extensive scrub restoration began by harvesting all of the sand pines from this habitat throughout all three parks (see Timber Management section). Fire had been restricted from these areas for many years and because of this, fuel loads were high in many areas. After restoration efforts were completed, fire has been applied at the recommended fire return interval 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 communities at the parks will improve in quality in the coming years.

Florida scrub-jays (*Aphelocoma coerulescens*) and Florida mice (*Podomys floridanus*), which are imperiled Florida endemics species that depend on scrub habitat and associated communities to survive. Both species depend on open scrub habitat with many bare ground openings. Florida scrub-jays will generally leave an area when vegetation height becomes too tall (Fitzpatrick *et al.*1991). This could be one possible reason to explain the complete disappearance of the Florida scrub-jays (FSJ) in all three units over the past 20 years (unpublished park data 1994-2013). Since scrub enhancement activities have taken place, scrub jays have been seen occasionally in numerous locations, but for only a short period of time. Seminole State Forest to the north of Rock Springs Run Reserve manages a large population of scrub jays that are reproducing that is with dispersal range of the park. Scrub jays most likely will return these treated scrub areas since the habitat is much more suitable compared to what it was in the past. Additional oak reduction and the creation of bare ground openings are needed in order to sustain a viable population of scrub jays at the park while bring the scrub community into a more desirable state.

At Wekiwa Springs State Park, there are 100.77 acres of scrub. The largest patch of scrub in this unit occurs west of Sand Lake, adjacent to Main Park Drive (WS-45). Restoration began in 2002 after the southern pine beetle infestation killed pockets of pines which initiated a timber harvest to remove affected trees, sand pines, and large oaks. After the harvest, a dense monoculture of sand pines grew back, making management difficult. In 2011 the park conducted a prescribed burn successfully reducing the sand pine cover by 60% in this area. There is also an area of scrub located in an isolated pocket in zone WS-12 that contains a stand of mature sand pines which will require mechanical treatment most likely with a timber harvest. Accessing this area with timber equipment may be difficult.

At Rock Springs Run State Reserve, there are 405.24 acres of scrub. This community is distributed in three disjointed areas, two of which dominate 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 contains 320 acres of scrub which has been enhanced since 2007. Virtually all of Spear’s Scrub was timbered in 2002 to remove mature sand pines and overgrown oaks except for a 30-acre buffer around interior ponds where striped newts (*Notopthalmus perstriatus*) were found. Pine regeneration after the harvest was dense forming a monoculture canopy of pine with very little bare ground. Since 2011, all of Spear’s Scrub has been successfully burned under prescription except for 20 acres in the center of the zone, this was followed up with mechanical removal using a bulldozer and roller chopper. New mineral fire lines were also installed to divide the unit into six smaller and more manageable sections in order to manage these units more effective for the Florida scrub-jay

At Lower Wekiva River Preserve State Park, there are 46.91 acres of scrub. Currently there is only a single mapped area that contains scrub habitat within this park (LW-04). This entire area is currently overgrown with scrub oaks and sand pines; mechanical treatment to enhance this area will be needed.

General Management Measures: Monitoring and treatment of exotic plants will continue within this community along with continual prescribed fire on a 5-15 year rotation with a focus on growing season burns. If scrub jays are not present with a management zone, then prescribed fire will be applied between mid-March through April because it appears that this is the most effective time of the year to burn scrub to meet the future desired conditions. Where scrub habitat is found within habitat that has a more frequent fire return interval, such as mesic flatwoods or scrubby flatwoods, fire will be applied to these areas on a more frequently. It is acceptable in this case that the scrub within these units will not burn every time fire is applied, but may only burn every other time. Areas that are in poor to fair condition will need to be mechanically treated in addition to prescribed fire. The fire return interval will be reduced to a 3-6 year rotation in stands where sand pine density is high in order to reduce this density. Scrub will be managed in order to produce a mosaic of differing structure classes, with a preference given to early succession scrub that can support a viable population of scrub jays. Firebreaks around the zone may need to be widened and fuel heights adjacent to firebreaks reduced. Timber removal will be utilized on an as needed basis in order to keep fuel loading low prior to burning.

Scrubby Flatwoods

Desired future condition: The dominant tree species of the interior of scrubby flatwoods will usually be longleaf pine and slash pine in northern and central Florida and South Florida slash pine south of Lake Okeechobee. Mature sand pines will typically not be present. There will be a diverse shrubby understory often with patches of bare white sand. A scrub-type oak “canopy” will contain a variety of oak age classes/heights across the landscape. Dominant shrubs will include sand live oak, myrtle oak, Chapman’s oak, saw palmetto, rusty staggerbush, and tarflower (*Bejaria racemosa*). Cover by herbaceous species will often be low to moderately dense. The Optimal Fire Return Interval for this community will be regionally variable; typically, 5-15 years when aiming to achieve a mosaic of burned and unburned areas.

Description and assessment: Within the Wekiva River Basin State Parks, there are 891.17 acres of scrubby flatwoods that is typically burned on a 3-5 year fire return interval, depending on the condition and context of the habitat patch. 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 "islands" within a mesic flatwoods matrix. RSRSR has the largest amount of scrubby flatwoods of the three units. 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 parks. The severe consequence of this fact is that most scrub jays have subsequently abandoned their previous territories that were once well established within scrubby flatwoods. Another main concern of unburned scrubby flatwoods habitats is that high fuel accumulations create a significantly higher potential for wildfires and more intense prescribed fires. In 2002, 2003, 2007, 2009 and 2011 prescribed fire was used in conjunction with firebreaks and mechanical treatment at all three parks to enhance this habitat.

At Wekiwa Springs State Park, there are 126.16 acres of scrubby flatwoods that occur in small pockets within a larger matrix of mesic flatwoods in management zones WS-19, 27, 32 and 33. In March of 2012, scrub jays were found within the small pocket of habitat in management zone WS-19 and have seen from time to time in that area. Florida mice are also present within this community but their range at the park has not been determined. A significant patch of scrubby flatwoods also occurs in the Markham Woods tract of WSSP within management zones WS-MW04, WS-MW05, WS-MW09 & WS-MW14.

At Rock Springs Run State Reserve, there are 563.67 acres of scrubby flatwoods. The largest contiguous area of this community is 169 acres in management zones RKS-008, 051, and 052 and along portions of RKS-053, 055 and 058. The scrubby flatwoods in RKS-008, 051 and 052 contained a mature stand of sand pines with an over grown understory of oaks. The sandpines and overgrown oaks were removed from RKS-008 during the 2002 Spear's Scrub timber harvest (see scrub section above), but no treatments were initiated in any of the other zones. Zones RKS-52 also contained approximately 50 acres of mature sand pine which has also been removed during a 2015 sand pine harvest. However, the WBMK portion of RSRSR represents another significant Florida Scrub-jay territory that is considerably disjointed from the central region of RSRSR. A recent survey for the scrub jays in 2011 and 2012 confirmed that this species is no longer present in the WBMK property, which can be attributed to habitat degradation. The scrubby flatwoods in this area most closely resemble xeric hammock. Intensive mechanical treatment techniques followed up with prescribed fire would be needed in order to restore these areas into a more desirable state.

At Lower Wekiva River Preserve State Park, there are 201.34 acres of scrubby flatwoods in several small widely scattered islands either within or adjacent to mesic flatwoods.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community along with continual prescribed fire on a 3-5 year rotation with mechanical fuel reduction such as mowing, roller chopping, or timber removal to reduce fuel heights adjacent to firebreaks and within the zone itself. This is especially important where the fuels have become overgrown and the community condition has degraded to a condition where prescribed fire cannot be implemented safely or at all.

<u>Sinkhole</u>
Desired future condition: Sinkholes are characterized by cylindrical or conical depressions with limestone or sand walls. Sinkholes do not contain standing water for long periods of time as do sinkhole lakes. Depending upon the age of the sinkhole, the vegetation of sandy sinkholes may represent a well-developed forest

including southern magnolia, sweetgum (*Liquidambar styraciflua*), wax myrtle (*Myrica cerifera*), grape vines (*Vitis* spp.), Virginia creeper (*Parthenocissus quinquefolia*), water oak (*Quercus nigra*) and pignut hickory. Sinkholes with vertical limestone walls may be covered by a variety of mosses, liverworts, ferns and small herbs. Sinkholes will generally have a very moist microclimate due to seepage and being buffered by the lower elevation and a tree canopy. Desired future conditions include limiting unnatural erosion and protecting the microclimate from disturbance.

Description and assessment: Within the Wekiva River Basin State Parks, there are 13 known sinkholes. Eleven are in WSSP and two in LWRPSP. There are no known sinkholes in RSRSR. Most of the sinkholes are located in sandhill. The largest sinkhole is in WS08A next to the recreation hall in the youth camp. In management zone WS30 there is a sinkhole off of the white trail that has formed between 10-15 years ago. One distinguishing feature of this sinkhole is that there is a mature longleaf pine growing along the edge with the taproot fully exposed. Over the years of exposure, a full layer of bark has grown along the root. This sinkhole has a number of issues associated with it. Due to the sinkhole being located close to a heavily-used trail, there is evidence of visitors entering the sinkhole, causing some significant erosion along the access points. Along with this issue, two invasive species, cogongrass (*Imperata cylindrical)* and tuberous sword fern (*Nephrolepis cordifolia)* have formed infestations along the walls and at the bottom. The newest sinkhole to form in the park was in management zone WS-18 west of the primitive youth camp. A split rail fence has been erected around the perimeter as a measure to keep visitors out. The two know sinkholes found in LWRPSP are located in management zones LW-04 and LW34 near the southern boundary of the park.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area. This area will also need to be monitored for erosion that may occur due to recreational use on trails and roads. Though it may not be feasible to secure/isolate the sinkholes from direct public access in a number of locations, all efforts should be made to dissuade entering in remote location off of hiking trails. This may be as simple as posting a sign describing the feature and explaining how fragile of community that is contained within along with the potential impacts that entering the feature may have on the community.

Wet Flatwoods

Desired future condition: Within a wet flatwoods community the dominant pines species will usually be longleaf pine, slash pine, pond pine, and/or loblolly pine. The species composition within a location will be determined by drainage and periods of higher moisture content. Pond cypress (*Taxodium ascendens*) may reach canopy in some locations. The canopy will be open, with pines being widely scattered and of variable age classes. Native herbaceous cover is dense and includes pitcher plants (*Sarracenia* spp.) and other plants such as terrestrial orchids may be present and abundant in some areas. Common shrubs will include sweet pepperbush (*Clethra alnifolia*), fetterbush (*Lyonia lucida*), large gallberry (*Ilex coriacea*), titi (*Cyrilla racemiflora*), and wax myrtle. The Optimal Fire Return Interval for this community is 2-4 years.

Description and assessment: Within the Wekiva River Basin State Parks, there are 1,484.63 acres of 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, shiny lyonia, saw palmetto and grasses while others are clearly dominated by saw palmetto. Pine density also varies greatly throughout the parks. Areas near Rock Springs Run are dense with small diameter pines while other areas towards the center of the park have more widely spaced, larger diameter pines. Many of these vegetative differences are probably related to differences in burn histories and logging practices.

At Wekiwa Springs State Park, there are 994.51 acres of wet flatwoods. Most of the community is found adjacent to hydric hammock in the eastern half of the park. There is a narrow strip of wet flatwoods along the west side of the park separating the sandhill community from the center portion of hydric hammock. The occurrence of this strip is due to a significant elevation change between the sandhill and hammock. Due to long-term fire exclusion from the wet flatwoods at Markham Woods, fuel levels are very high. A prescribed fire was conducted in March of 2008 which reduced some of the fuel loading but many more inches of duff still exists. This burn also caused some minor smoke management issues with the surrounding community due to prolonged residual smoke from smoldering duff that persisted for many days.

At Rock Springs Run State Reserve, there are 142.86 acres of wet flatwoods. Pond pine dominate much of the canopy of these wet flatwoods at RSRSR. However, pond pine may be dominant only because of historical selective harvesting and altered fire return intervals. Anecdotal conversations with retired loggers indicate that longleaf pine trees dominated this area but were clear-cut out. Specifically, EK Ranch (the area between CR433 and the boundary with the New Garden Coal property) 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 using a roller chopper may be needed to enhance survivorship of longleaf pines and to encourage growth of grasses

At Lower Wekiva River Preserve State Park, there are 347.26 acres of wet flatwoods. It occurs as an isolated island (in management zone LW-20) within the hydric hammock community. Three aerial ignition burns have been conducted within this unit in 1998, 2005 and 2011, but the habitat did not burn well because of its remoteness and difficultly of access.

General Management Measures: Monitoring and treatment of exotic plants as well as the removal of exotic hogs will continue for this community along with continual prescribed fire on a 3-5 year rotation with mechanical fuel reduction such as mowing and/or roller chopping to reduce fuel heights adjacent to firebreaks and within the zone itself. This is especially important where the fuels have become overgrown and the condition has degraded to a point where prescribed fire cannot be implemented safely or not at all.

Restoration will be a slow meticulous process in areas with poor to fail condition, beginning with fuel reduction burns and progressing towards restoration burns. These burns could be conducted on a 1-3 year rotation until the community health improves to good condition. If ground water levels continue to 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 burn increases producing two main problems. First, the roots of vegetation will also burn causing plant mortality. Second, smoke management becomes an issue because large amounts of smoke are produced that tends to find its way out onto roads and urban development.

Xeric Hammock

Desired future condition: Typically considered a late successional stage of scrub or sandhill that generally occurs in small isolated patches on excessively well drained soils. Vegetation will consist of a low closed canopy dominated by live oak (*Quercus virginiana*) which provides shady conditions. Typical plant species may also include Chapman's oak, and laurel oak. Sand pine, slash pine, or longleaf pine may also be a minor component. Understory of species will include saw palmetto, fetterbush, myrtle oak, yaupon holly (*Ilex vomitoria*), Hercules' club (*Zanthoxylum clava-herculis*), and Florida rosemary (*Ceratiola ericoides*). A sparse groundcover layer of wiregrass and other herbaceous species may exist but will typically be absent. A continuous leaf litter layer may be present. Overgrown scrub in need of fire and/or mechanical treatment should not be confused with true xeric hammock.

Description and assessment: Within the Wekiva River Basin State Parks, there are 309.95 acres of xeric hammock. These areas are self-maintaining communities that have fluctuated 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 maintain themselves, hammocks that form from poor land management should be restored, if possible to either sandhill or scrubby flatwoods. Differentiating between the two conditions is often times difficult and will be done on a case-by-case basis.

Wekiwa Springs State Park contains approximately 56.40 acres, RSRSR contains approximately 180.88 acres and the LWRPSP contains approximately 72.67 acres of xeric hammock. Virtually all of the xeric hammock appear to be overgrown sandhill plant community.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community. Areas that have been determined to be severely degraded sandhill will need restoration efforts to return the community to historic conditions. This would require timbering of the mature trees and then mowing or roller-chopping of the understory fuels combined with fire. These methods would only be conducted in areas that have been determined to be degraded sandhill and not true xeric hammock.

Baygall

Desired future condition: Baygall consists of a wet densely forested, peat filled depression typically near the base of a slope. Seepage from adjacent uplands will maintain saturated conditions. Medium to tall trees will mainly consist of sweetbay, loblolly bay (*Gordonia lasianthus*), and/or swamp bay (*Persea palustris*). Occasionally sparse pines may also exist. A thick understory consisting of gallberry, fetterbush, dahoon holly, titi, and red maple (*Acer rubrum*) will be typical with climbing vines such as greenbriar and muscadine grape will usually be abundant. The dominant baygall species are fire intolerant indicating an infrequent Optimal Fire Return Interval of 25-100 years. Frequent fires from adjacent communities should be allowed to enter baygall ecotone however, being aware of the problems associated with peat fires.

Description and assessment: Within the Wekiva River Basin State Parks, there are 525.25 acres of baygall. The highest concentration can be found in Rock Springs Run State Reserve. Baygalls are extremely dependent upon seepage flow and high groundwater levels. Continued quantities of water are necessary to maintain this community. Hydrologic impacts due to the groundwater reductions from the surrounding urban development may be observed first in baygalls.

At Wekiwa Springs State Park, there are 149.09 acres of baygall. The largest contiguous area of baygall is in management zone WS-23. Carpenter Branch feeds into this baygall from Lake Prevatt and then flows back out into Mill Creek. There is a baygall community in management zone WS-20 that extends out beyond the park property onto private land. The creek that runs through it receives storm water runoff from the surrounding developed areas. The baygall acts as a filter for this water as it flows into the park. This area functions naturally but depends on seepage flow from the higher elevations in the zone.
On the Markham Woods property portion of Wekiwa Springs State Park, there is a large area of baygall in the eastern portion of the property. Similar to management zone WS-20, the community extends out of the property boundary onto private properties. Altered hydrology has allowed slash pine densities to increase in most of these baygall communities. Baygalls at Markham Woods are mixed with dense pond pine trees due to the exclusion of fire as well.

At Rock Springs Run State Reserve, there are 270.71 acres of baygall. Baygall is most extensive in the Lake County regions of RSRSR. 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.

At Lower Wekiva River Preserve State Park, there are 105.45 acres of baygall. Only two baygalls are mapped within the LWRPSP. One is within the Jung Tract and one is within the Skinner Tract

General Management Measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs. Prior to prescribed fire in the surrounding communities, baygalls should be checked for moisture levels because of the increased fuel loads and the potential for muck fires (see wet flatwoods section above for muck fire issue). Water quality and quantity inputs into the WS-20 baygall should be investigated to determine if a feasible solution exists. This community is determined to be in good condition.

<u>Depression Marsh</u>

Desired future condition: Depression marsh is characterized as containing low emergent herbaceous and shrub species which will be dominant over most of the area and include open vistas. Trees will be few and if present, will occur primarily in the deeper portions of the community. There will be little accumulation of dead grassy fuels due to frequent burning; one can often see the soil surface through the vegetation when the community is not inundated. Dominant vegetation in basin marsh and depression marsh may include maidencane (*Panicum hemitomon*), panic grasses (*Panicum* spp.), cutgrass (*Leersia* sp.), common reed (*Phragmites australis*), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria* sp.), buttonbush (*Cephalanthus occidentalis*), St. John's wort (*Hypericum fasciculatum*), and coastalplain willow (*Salix caroliniana*). The Optimal Fire Return Interval for this community is 2-10 years depending on fire frequency of adjacent communities.

Description and assessment: Within the Wekiva River Basin State Parks, there are 427.86 acres of depression marsh. There are numerous small depression marshes scattered throughout the mesic flatwoods community with the parks. Many of these water bodies often have no standing water during majority of the time and the integrity of this wetland community is highly dependent upon its ephemeral nature. These wetlands are important breading habitat for listed species, such as the stripped newt, gopher frog (*Rana capito*) and the Florida sandhill crane (*Grus canadensis*).

At Wekiwa Springs State Park there are 82.60 acres of depression marsh. Many of the ponds show signs of prolonged stress due to the drought and/or a reduction in the water table height. There is an 11-acre depression in management zones WS21and22 which is contained in a low lying area within sandhill that is fed by Carpenter Branch as it flows out of Lake Prevatt. A recent prescribed burn conducted in January 2011 produced a muck fire within the depression marsh area which continually smoldered and burned for several months. This fire caused minimal issue for the park, but there was a significant positive ecological effect on the natural community with the removal of accumulated organic material that had built up over time.

On the Neighborhood lakes property most of the depression marsh acreage occurs on the periphery of the Marsh lakes occurring within the property.

At Rock Springs Run State Reserve there are 263.82 acres of depression marsh. These marshes vary in size and are widely scattered throughout the park; however, they dominate several burn zones in the lake county portion of the property. The largest marsh is located in management zone RKS-73. Depression marsh most frequently occurs with the mesic flatwoods communities but some are located within scrub and scrubby flatwoods in management zones RKS-3 and RKS-67.

At Lower Wekiva River Preserve State Park there are 81.44 acres of depression marsh. These marshes are small, isolated and scattered and can be found within flatwoods on the southern portion of the property, south of the Wekiva river and in a few isolated ponds in the abandoned fields/pastures north of the river in management zones LW-23, LW-24 and LW-28. One marsh system at LWRPSP remains somewhat unique because of its close association with one of two dome swamps found in the parks. The integrity of this community, as with other hydric communities, is dependent upon natural water level fluctuations. Because of groundwater withdrawals, these marshes may be in jeopardy.

General Management Measures: Recent droughts (2006-2008 and 2011-2013) in combination with any artificially lowered groundwater level, may result in drastic vegetative changes to this wetland community. What effect the basin-wide lowering of the water table has on these ponds is unknown. Park staff will monitor community changes over the long-term.

In addition, an active burn program in the fire-type communities surrounding these marshes 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. Shrubs around the marsh edge can be reduced by regular burning or mowing. The individual marshes should be burned on the same rotation as the surrounding upland communities.

Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs.

<u>Dome Swamp</u>
Desired future condition: Dome swamp is an isolated, forested, depression wetland occurring within a fire maintained matrix such as mesic flatwoods. The characteristic dome appearance will be created by smaller trees that grow on the outer edge (shallower water and less peat) and larger trees that grow in the interior. Pond cypress (*Taxodium ascendens*) will typically dominate, but swamp tupelo (*Nyssa sylvatica biflora*) may also form a pure stand or occur as a co-dominant. Other subcanopy species may include red maple, dahoon holly, swamp bay, sweetbay, and loblolly bay. Shrubs may be absent to moderate (a function of fire frequency) and can include Virginia willow (*Itea virginica*), fetterbush, buttonbush (*Cephalanthus occidentalis*), wax myrtle, and titi. An herbaceous component may range from absent to dense and include ferns, maidencane, sawgrass (*Cladium jamaicense*), sedges (*Carex* spp.), lizards tail (*Saururus cernuus*), and sphagnum moss. Vines and epiphytes will be commonly found. Maintaining the appropriate hydrology and fire frequency is critical for preserving the structure and species composition of the community. Dome swamps should be allowed to burn on the same frequency as the adjacent fire type community,

allowing fires to naturally burn across ecotones. Fires should be appropriately planned to avoid high severity fuel consumption within the dome swamp.

Description and assessment: Within the Wekiva River Basin State Parks, there are 35.41 acres of dome swamp, in two locations. There is one dome swamp located in southern portion of Markham Woods in management zone WS-MW10 and one located at Lower Wekiva River Preserve State Park in management zone LW-28 along its western border with Seminole State Forest.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs. Prior to prescribed fire in the surrounding communities, dome swamps should be checked for moisture levels will require special attention to potential for muck fires.

Floodplain Marsh

Desired future condition: Floodplain marsh can be characterized as emergent low herbaceous and shrub species which are dominant over most of the area, and there is an open vista. Trees will be few and if present, will occur primarily in the deeper portions of the community. There will be little accumulation of dead grassy fuels due to frequent burning; one can often see the soil surface through the vegetation when the community is not inundated. Dominant vegetation in floodplain marsh will include sand cordgrass, sawgrass, maidencane, panicgrasses, cutgrass (*Leersia* sp.), common reed, pickerelweed, arrowheads, buttonbush, St. John's wort, and coastal plain willow. The Optimal Fire Return Interval for this community is 2-10 years depending on fire frequency of adjacent communities.

Description and assessment: Within the Wekiva River Basin State Parks, there are 658.32 acres of floodplain marsh**.** Within the managed parks, floodplain marsh occurs primarily along the St. Johns River within the north portion of Lower Wekiva River Preserve State Park across the river to Blue Springs State Park and in the south portion of the park near the mouth of the Wekiva River. Both portions encompass 605.04 acres in LWRPSP. There is an additional 53.28 acres found within Rock Springs Run State Reserve adjacent to Rock Springs Run in management zone RLK-23. The condition of this community is fair. Past fire suppression has allowed woody species such as wax myrtle, button bush, Carolina willow, sweetgum, and red maple to invade and become established. Recent efforts to burn this community have been met with mixed results.

General Management Measure: The continued efforts to restore this community must emphasize prescribed fire. Mechanical treatments or herbicide applications may also be needed for restoration efforts to remove the hardwoods. Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs.

Floodplain Swamp

Desired future condition: Floodplain swamp will be a frequently or permanently flooded community in low lying areas along streams and rivers. Soils will consist of a mixture of sand, organics, and alluvial materials. The closed canopy will typically be dominated by bald cypress but commonly includes tupelo species as well as water hickory, red maple and overcup oak (*Quercus lyrata*). Trees bases are typically buttressed. Understory and groundcover will typically be sparse.

Description and assessment: Within the Wekiva River Basin State Parks, there are 8455.18 acres of floodplain swamp. Floodplain swamp is the second most prevalent community type and occurs at all three parks adjacent to the primary rivers and creeks. The majority of this community acreage occurs at Lower Wekiva River Preserve State Park. Presently, 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 swamp to more of a hydric hammock or floodplain forest appearance. Logging was extensive throughout both of these communities. While wetland hardwoods regenerated, bald cypress 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.

At Wekiwa Springs State Park, there are 292.30 acres of floodplain swamp. This community occurs only as a narrow band on the edges 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.

At Rock Springs Run State Reserve, there are 681.95 acres of floodplain swamp. 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.

At Lower Wekiva River Preserve State Park, there are 7,480.93 acres of floodplain swamp. Roughly half the acreage can be found within management zone LW-32. 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.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs. Prior to prescribed fire in the surrounding communities, floodplain swamps should be checked for moisture levels before burning because the increased fuel loads increase the potential for muck fires (see wet flatwoods portion).

Hydric Hammock

Desired future condition: Hydric hammock is characterized with a closed canopy, evergreen hardwood and/or palm forest with a variable understory dominated by palms, with sparse to moderate ground cover of grasses and ferns. Typical canopy species will include laurel oak, cabbage palm, live oak, sweetbay, swamp tupelo, American elm, red maple and other hydrophytic tree species. Soils will be poorly drained but only occasionally flooded. Hydric hammock should occasionally burn by allowing fires to naturally burn across ecotones from fires originating in adjacent upland natural communities.

Description and assessment: Within the Wekiva River Basin State Parks, there are 11,942.89 acres of hydric hammock. This community is the most prevalent community found within the Wekiva River Basin State Parks and is distributed throughout in low, flat areas. This community contains large hardwood trees and numerous cabbage palms. 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.

At Wekiwa Springs State Park, there are 3,166.80 acres of hydric hammock. 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.

At Rock Springs Run State Reserve, there are 4,834.85 acres of hydric hammock. This community encompasses two separate continuous areas of park property located on property in management zones RKS-12, 17 and 18 near the Wekiva River and along the north portion of Rock Springs Run in management zones RKS-1, 28, 90 and 113. The latter portion of hydric hammock is contiguous with hydric hammock occurring in the adjacent property (New Garden Coal mitigation bank property). Hand ferns (*Ophioglossum palmatum*), a known listed species, are known to occur epiphytically on cabbage palms in the southern portions of RSRSR. Recent population surveys have not been conducted.

At Lower Wekiva River Preserve State Park, there are 3,941.24 acres of hydric hammock. Similar to the other two parcels, hydric hammock is extensive within LWRPSP. This community found adjacent to floodplain swamp. Minimal biological surveys have been conducted in these areas.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs. Prior to prescribed fire in the surrounding communities, hydric hammocks should be checked for moisture levels will require special attention to increased fuel loads and the potential for muck fires (see wet flatwoods portion).

Clastic Upland Lake

Desired future condition: Clastic Upland Lakes are shallow to relatively deep, irregular-shaped depressions or basins occurring in uplands on clay substrates. They are lentic water bodies with surface inflows but often without significant outflows. Water is generally dissipated through evaporation and transpiration, but it may also disappear, especially during prolonged droughts, through sinks that connect with the aquifer.

Description and assessment: Within the Wekiva River Basin State Parks, there is only one clastic upland lake, Lake Prevatt. The lake in the in the sandhill community located in the south portion of Wekiwa Springs State park. The immediate community type surrounding the lake is mesic hammock which may be attributed to both natural process and fire shadow effect in addition to the proximity of the lake to the urban landscape surrounding the lake, both inside and outside the park boundary. The area of the lake accounts for roughly 85.23 acres. There are two known sinkholes within the lake basin. In 1990 and in 2002, the lake dried up due to local drought conditions. Since 2006, every one to two years the lake has dried out completely except for at least one of the sinkholes. This may be due to a combination of seasonal droughts conditions and the increase of water consumption from urban development and increased groundwater withdrawals throughout the surrounding springshed. Over time and specifically during drier time periods, shrubs such as willow, buttonbush, saltbush, and dog fennel can invade the edges of Lake Prevatt. During recent prolonged drought events the entire basin has been invaded by dog fennel. This may be an ongoing problem if the lake continues with this cycle.

A number of native plant and animal species are found in and around Lake Prevatt. Along with these species there are a number exotic species that have also been observed. At least four exotic fish species have been found in the lake basin, armored catfish (*Pterygoplicththys disjunctivus),* brown hopolo *(Hopolosternum littorale)* blue tilapia *(Oreochromis aureus)* and walking catfish *(Clarias batrachus)*. Along the north boundary of the lake there is was a healthy stand of mature chinese tallow trees (*Sapium sebiferum*). This stand has been treated through a grant from Florida Fish and Wildlife Conservation Commission (FWC) between 2011 and 2012. This stand had existed in this location for a long time without any treatment, resulting in the spread of the species along the shores and surrounding communities of Lake Prevatt. Pockets of torpedograss have been located and treated on the lake shore and in the shallow areas of the lake.

General Management Measure: 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 SJRWMD 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.

Monitoring and treatment exotic plants will continue along with the removal of exotic fish. In order to reduce encroachment of shrubby species, and to control the bio-accumulation of organic matter into the benthic portions of the lake, mowing and burning should be considered though prescribed fire may not be a feasible option due to the surrounding urban landscape.

Flatwoods/Prairie Lake and Marsh Lake
Desired future condition: Flatwoods/prairie lakes and marsh lakes are often associated with depression marshes and are characterized as shallow, generally round or elliptical depressions, vegetated with concentric bands of aquatic vegetation. Depending upon the depth and slope of the depression, an open water zone, with or without floating plants, may occur at the center. The open water zone will be considered to be a marsh lake if it is small in comparison to the surrounding marsh. Otherwise, the system will be considered to be a flatwoods lake or a prairie lake, depending upon the surrounding community. The hydrosoil will typically be acidic sand with some peat and occasionally a clay lens. Although water levels may fluctuate significantly, water will typically be present year-round.

Description and assessment: Within the Wekiva River Basin State Parks, there are 217.98 acres of flatwoods lakes and 240.36 acres of marsh lakes. Both wetland communities are naturally occurring shallow lake with a broad zone of emergent plants and are found associated with a number of uplands communities. Water levels have fluctuated seasonally and long periods of dry conditions have occurred with prolonged periods of droughts. The lake may even completely dry up at times. Weather conditions such as the most recent droughts (2006-2008 and 2011-2013), in combination with any artificially lowered groundwater level, have caused more extensive drying periods. These occurrences may have result in drastic vegetative changes to this wetland community. What effect the basin-wide lowering of the water table has on these ponds is unknown. Park staff will monitor community changes over the long-term. These systems within the park have certain anthropogenic challenges to overcome as will be defined below

There are scattered flatwoods lakes occurring throughout the WRBSP. At Wekiwa Springs State Park, there are 18.08 acres of flatwoods lake. There are two concentrations where this community is found. One is located in management zones WS-33 and WS-34 in the mesic flatwoods close to the northwest boundary near Kelly Park. The other concentration is located near the boundary between management zones WS-32 and WS33 with most of the lake being located in WS-32. There are additional lakes scattered at the main park and at the Markham Woods property in management zones WS-MW3, 8B, 9 and 14.

At Rock Springs Run State Reserve, there are 77.65 acres of flatwoods lake. These lakes are located in flatwoods and scrubby flatwoods communities in the park. There is a large concentration of this community in zones RKS-3 and RKS-81. There is another large isolated lake in zone RKS-55 just south of the pastures in RKS-54B.

At Lower Wekiva River Preserve State Park, there are 122.25 acres of flatwoods lakes. The highest concentration of this community is located in two separate locations. One location is southeast of the Wekiva River in management zones LW-10A, 10B, 12 and 15 with more scattered throughout. The other concentration of lakes is located north of Blackwater Creek in management zone LW-24. In this location the surrounding community is abandoned field /abandoned pasture.

There are three currently recognized marsh lake systems that occur within the WRBSP.

At Wekiwa Springs State Park there are 176.92 acres of marsh lake, all located within the Neighborhood Lakes property. This is the dominant wetland community on the property. The Neighborhood Lakes are the largest continuous block of marsh lake and extend to the west onto neighboring property managed by Lake County. Over time and specifically during drier time periods, shrubs such as willow, buttonbush, saltbush, and dog fennel can invade the lake’s littoral zone. These species have been found around the perimeter of most of the marsh lakes within the property. Some exotic woody species like Chinese tallow and a number of grass species such as cogongrass and to a lesser degree, torpedograss occur in infestations in several locations on the edges of these marsh lakes. Water quality within the lakes may have been affected by past agricultural uses of the property. There may be a continual effect on water quality from the adjacent residential areas to the west and northwest and also from run-off from SR 435.

Lake Lerna in the southwest corner of the property is also a marsh lake. Presumably, it has been subjected to the same stress both historically and currently as the Neighborhood Lakes. There is a neighborhood directly south and southeast of the lake; and it is also near SR 435. Around the edges of Lake Lerna the shrubby species discussed above are more prolific with the addition of blackberry (*Rubus* spp.), grape vine and climbing aster (*Aster carolinianus*). A number of these shrubby species have grown to heights of 10-15ft and many areas are dense with vegetation. Additionally, a duckweed species (species or genus not identified) was observed growing on the water surface.

At Rock Springs Run State Reserve, there are 63.44 acres of marsh lake. This wetland system is referred to as Lake Bartho and is located in management zone RKS-112. The lake is within close proximity to the Neighborhood Lakes system. The west portion of the lake is bound by abandoned field/abandoned pasture. Similar to the Neighborhood Lakes system, Lake Bartho may have been subject to the same stresses. Periodically, this wetland community has dried out during drought conditions. 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. In February 2007 the park conducted a controlled burn in RKS-112 that resulted in a muck fire at the south end of the lake. Due to the isolated location within the park there were no issues caused by this occurrence.

General Management Measures: Recurring weather conditions such as the most recent drought (2006-2008), 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 lakes is unknown; however, long-term community changes will be monitored by park staff.

In addition, an active burn program in the fire-type communities surrounding these small wetlands will help maintain their integrity. Historically fire occasionally consumed the accumulated organic material in the bottom of these lakes, especially when they were dry. As a management tool, fire should be used as a means to maintain this community. This is especially important if water levels continue to decline. The location of the future Wekiva Parkway may impede the ability to use fire safely as a management tool due to potential smoke management and containment issues associated with the road. These wetlands are important habitat for wading birds, such as the Florida sandhill crane.
A hydrological assessment is needed. In the interim exotic species should be treated with an appropriate herbicide for wetland communities and shrubs around the lake edge can be reduced by regular burning.

<u>Sandhill Upland Lake</u>
Desired future condition: Sandhill upland lake can be described as shallow sandy-bottomed lake formed in shallow depressions within sandhill upland communities. Water levels may fluctuate dramatically, including completely drying up only during extreme droughts. Typical vegetation will include emergent, submerged aquatic plants and transitional species along the shoreline. Species include water lilies, sawgrass, pickerelweed, meadow beauty (*Rhexia* spp.), St. John’s wort, yellowed-eyed grass (*Xyris* spp.), hatpins (*Syngonanthus flavidulus*), and spikerushes (*Eleocharis* spp.). Impacts such as altered water table or disturbances in adjacent uplands that would cause artificial erosion and an increase in turbidity should be restored.

Description and assessment: Within the Wekiva River Basin State Parks, there are 17.04 acres of sandhill upland lakes. This community occurs only in Wekiwa Springs and Rock Springs Run State Reserve. In Wekiwa Springs State Park there is 9.04 acres of sandhill upland lake. One of these lakes is located in the main park in Northeast corner of management zone WS-30. Located within the Wekiwa sandhill community, the area around the lake has changed to an uplands xeric hammock. This may be due it fire shadow effect and the location on a corner boundary of the management zone. At the Neighborhood Lakes property there is one other location for sandhill upland lakes community along the south boundary. The surrounding habitat is abandoned pasture and successional hardwood forest, though based on the soil maps the area historically was most likely sandhill community.

At Rock Springs Run State Reserve, there are 8 acres of sandhill upland lakes. There is a group of 3 lakes in management zone RKS-026. These small water bodies are located within a large continuous area of scrub. In this location these 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 have been documented in this community. Recent drought conditions have prevented both these species and many other species of amphibians from successfully breeding. Although amphibian populations appear to be stable, it is very important for managers to burn frequently. Recent studies suggest that burn intervals for prescribed fires be carefully considered by managers due to potential negative effects 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.

General Management Measure: Weather conditions such as the most recent droughts (2006-2008 and 2011-2013), in combination with any artificially lowered groundwater level, may result in drastic vegetative changes to this wetland community. What effect the basin-wide lowering of the water table has on these ponds is unknown. Park staff will monitor community changes over the long-term.

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.

A hydrological assessment, completed by a hydrologist is needed. In the interim exotic species should be treated with an appropriate herbicide for wetland communities and shrubs around the marsh edge can be reduced by regular burning or mowing. The individual marshes should be burned on the same rotation as the surrounding upland communities.

Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs.

<u>Sinkhole Lake</u>

Desired future condition: Sinkhole lakes can be described as a relatively permanent and typically deep lake characterized by clear water with a high mineral content formed in depressions within a limestone base. Vegetative cover may range from being completely absent, consist of a fringe of emergent species, or be completely covered with floating plants. Typical plant species may include smartweed (*Polygonum hydropiperoides*), duckweed, bladderwort (*Utricularia* spp.), and rushes

(*Juncus* spp.). Desired conditions include minimizing disturbances that cause unnatural erosion and minimizing pollution to the connected aquifer system.

Description and assessment: Within the Wekiva River Basin State Parks, there are two sinkhole lakes, which encompass approximately 3 acres. The 2 lakes are located at the north end of The Neighborhood Lakes property of Wekiwa Springs State Park. Both lakes are adjacent to the footprint of where the Wekiva Parkway will pass through the property, and may be affected by location of the road.

General Management Measures: With both lakes, a hydrological assessment is needed. The primary concern for these two features is on the effects of water quality due to storm-water run-off from the road and erosion along the edges. Measures should be taken and enforced to prevent contamination and ensure the health of both lakes. Species composition is unknown for both lakes and a survey should be conducted for this information. Monitoring water quality should be conduct during road construction and after the construction has been completed. In addition, the lakes should have a permanent system set up for monitoring water quality and exotic species. Exotic plants should be treated with an appropriate herbicide for wetland communities and shrubs around the lake edge can be reduced by regular burning. When treating for exotic plants around the lakes, extra caution should be used due to the direct connection the lakes have to the aquifers.

<u>Blackwater Stream</u>
Desired future condition: Blackwater stream can be characterized as perennial or intermittent watercourses originating in lowlands where extensive wetlands with organic soils collect rainfall and runoff, discharging it slowly to the stream. The stained waters will be laden with tannins, particulates, and dissolved organic matter derived from drainage through adjacent swamps resulting in sandy bottoms overlain by organic matter. Emergent and floating vegetation [including golden club (*Orontium aquaticum*), smartweeds, grasses and sedges] may occur but is often limited by steep banks and dramatic seasonal fluctuations in water levels. Desired conditions include minimizing disturbance and alterations and preserving adjacent natural communities.

Description and assessment: Within the Wekiva River Basin State Parks, there are 835.02 acres of 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.

At Wekiwa Springs State Park, there is 144.93 acres of blackwater stream. Within WSSP blackwater stream pertains to the unnamed stream that flows into Lake Prevatt and to Carpenter Branch. Input to the Lake Prevatt streams is from surface runoff and nursery irrigation. Carpenter branch flows out from Lake Prevatt north through the sandhill. This blackwater stream forms the boundary between WS-21, 22, 23 and 25 before it merges with Mill Creek at the north boundary of zone WS-29. In addition to both streams named above Mill Creek is another blackwater stream, though the initial source of the stream is Witherington Springs (see Spring-run stream below) located in the hydric hammock where zones WS-29, 31 and 32 converge. Mill Creek also forms the boundary between WS-29 and WS32 the stream flows through WS-24 and then through WS-42 before converging with Rock Springs Run. The stream flows through hydric hammock and so most of the streams water source is from surface runoff through the hammock, the flow from Witherington is minimal in comparison. The park has one other unnamed blackwater stream the flows out from Sand Lake through hydric hammock and converging with Wekiwa Springs Run in the lagoon. This flow of this stream has not been mapped.

At Rock Springs Run State Reserve, there are 132.90 acres of blackwater streams mapped within this unit. Rock Springs Run runs the entire length of the north and east boundary of Wekiwa Springs State Park. Though the River is named "Rock Springs Run" it is actually a black water stream. The source of the stream is Rock Springs located in Kelly Park and so is a spring run portion of the river (managed by Orange County Parks and Recreation). Though the stream is located within the boundary of Wekiwa Springs State Park it is used as a reference feature for separating the park the boundary of Rock Springs Run State Reserve. There are two other known streams in the park that need to be mapped one stream flows into the park from an adjacent neighboring property through RKS-54C merging with the Wekiva River. The other stream creates the boundary between management zones RKS-5 and RKS-7. This stream has an unknown origin and it is also unknown where it flows to beyond the two zones mentioned.

At Lower Wekiva River Preserve State Park, there are over 557.19 acres of blackwater streams 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 from Seminole State Forest through the Lower Wekiva River Preserve State Park and merges with the Wekiva River about 1.5 miles before the Wekiva merges with the St. Johns River. In the park, Blackwater Creek creates the boundary between management zones LW-20 and LW-21. In the northeast corner of Lower Wekiva River Preserve State Park, the Hontoon Dead River and Snake Creek pass into the park

General Management Measures: Generally, the blackwater streams are in basic maintenance, though water quality should be monitored and general surveys should be conducted on aquatic species. Also, exotic plant species should be monitored and treated in and around this community.

<u>Spring-Run Stream</u>
Desired future condition: Perennial water courses which derive most, if not all, of their water from limestone artesian openings from the underground aquifer. The waters will be typically cool, clear, and circumneutral to slightly alkaline. These factors allow for optimal sunlight penetration and minimal environmental fluctuations which promote plant and algae growth. However, the characteristics of the water can change significantly downstream as surface water runoff becomes a

greater factor. Areas of high flow will typically have sandy bottoms while organic materials concentrate around fallen trees and limbs and slow moving pools. Typical vegetation will include eel grass (*Valisneria americana*), arrowheads (*Sagittaria* spp.), southern naiad (*Najas guadalupensis*), and pondweeds (*Potamogeton* spp.).

Description and assessment: Within the Wekiva River Basin State Parks, there are .049 acres of spring-run stream all located within the Wekiwa Springs State Park. The flow of spring-run streams is comprised primarily of groundwater from the aquifer 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. Wekiwa Springs Run is the portion of the Wekiva River that is considered spring-run stream. This portion of the river starts at the spring head and changes to blackwater stream where Rock Springs Run merges with the Wekiva. There is one other spring-run stream located in the park and that would be a portion of Mill Creek. As state above, the source of Mill Creek is Witherington Springs. Most of Mill Creek has been designated a blackwater stream, but the initial outflow from the Spring (100-200 feet) would technically be considered a spring-run stream.

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 Florida Fish and Wildlife Commission conducts annual surveys and treatments for exotic plant 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 and the run have concentrations of hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*). This concentration serves as a potential source of infestation to the entire Wekiva River. The staff of the Wekiva River Aquatic Preserve assist FWC with the exotic surveys. They also conduct aquatic turtle and bird surveys. An herbicide treatment program was implemented in 2003 for hydrilla removal in the Wekiwa Lagoon, and has continued annually. The initial treatment should be effective for three to five years. Since the initial treatment the hydrilla has become more resistant and required a treatment every two years. Since 2008 the treatments are now on an annual schedule.

The U.S. Army Corps of Engineers (USACE) has historically been responsible for control of water hyacinths on the Wekiva River. However, USACE has transferred responsibility for control of water hyacinths and water lettuce to FWC Invasive Plant Management, Orlando District. The aquatic preserves Park Service Specialist will serve as the field coordinator for exotic plant inspections and herbicide monitoring and reporting to FWC.

General Management Measures: 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.

<u>Aquatic and Terrestrial Caves</u>
Desired future condition: Aquatic and terrestrial caves are characterized as cavities below the ground surface in karst areas. A cave system may contain portions classified as terrestrial caves and portions classified as aquatic caves. The latter will vary from shallow pools highly susceptible to disturbance, to more stable, totally submerged systems. Because all caves develop under aquatic conditions, terrestrial caves can be considered essentially dry aquatic caves. Near the cave entrance, the vegetation may be typical of the surrounding natural community. Within the cave, illumination levels and therefore vegetation densities will drop rapidly. Species of mosses, algae, liverworts, may be present. Plants may be absent or limited to a few inconspicuous species of fungi that grow on guano or other organic debris. Cave systems are extremely fragile. Desired future conditions include protecting against alterations that may affect light penetration, air circulation, microclimate, or increase pollution in aquatic systems.

Description and assessment: 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 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 populations. Nothing is known about the system beneath Witherington Spring. Since 2005, extensive cave survey work has been performed by the Cambrian Foundation. These surveys have included 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.

General Management Measures: Continual monitoring of Minimum Flows and Levels (MFLs) and water quality from the cave entrances where water outflow occurs along with all species found within the cave/spring community. In addition, all exotics, specifically armored catfish will be monitored and removed from the cave passages and surrounding watershed.

Altered Landcover Types

FNAI recognizes that not all habitats and landscapes in Florida are in natural condition. Some have been completely converted from their historic natural community (e.g., agriculture, pasture) while others have been severely altered by human impacts such as fire suppression or silvicultural activities. These altered habitats do not fit into FNAI's Natural Community Classification. For these reasons FNAI recognizes the following altered landcover types to describe the most common non-natural habitats observed on conservation lands in Florida.

<u>Abandoned field/abandoned pasture</u>
Old fields, fallow pastures, early successional areas formerly grazed or in agriculture without recent activity to maintain the area as pasture or planted field. These areas are often dominated by weedy natives such as blackberry and wax myrtle and non-native species such as hairy indigo (*Indigofera hirsuta*). In old pastures, generally designated when weedy cover from woody is greater than 20 percent.

Desired future condition: Most of the abandoned field/abandoned pasture within the Wekiva River Basin State Parks will require extensive restoration. General restoration measures for pasture areas within all properties are discussed below and specific measures are discussed in the restoration objectives in the Resource Management Program section of this plan. The desired future condition of the improved pasture would be restoration of the native habitat communities. There are multiple communities that had existed within this acreage prior to alterations. Based on soil type, hydrology and the existing communities that bound the pastures we can determine the appropriate location of the community. The soil type that dominates the area at the Neighborhood Lakes property is candler fine sands. This sand type is typically found in sandhill communities at the Markham Woods property most of the soil types where the abandoned field/abandoned pasture is located are typical of sandhill communities. In Lower Wekiva River Preserve State Park the soils are typical of a flatwoods community, due to the more hydric nature of the pastures within the management zones LW23 and LW-24 the community may have been a wet flatwoods community instead of mesic flatwoods.

Description and assessment: Within the Wekiva River Basin State Parks, there are 1,783.24 acres of abandoned field/abandoned pasture. This is the most prevalent altered community in the WRBSP. The majority of the abandoned field/abandoned pasture acreage is found within the Neighborhood Lakes tract which is part of the Wekiwa Springs State Park. Historically these pasture lands were used for citrus production and cattle grazing prior to the property being acquired by the state. The major plant species found within the pasture is bahiagrass (*Paspalum notatum*).

There are various other species (both native and non-native) found within these pastures, with a number of the exotic species being Category I and II invasives (see exotic species section below). There is also the remnant of a citrus grove that predates recent cattle grazing activities. What remains of the citrus groves are some of the original trees and subsequent generations that have sprouted since the grove was replaced by pasture. The old irrigation system also remains and the property is littered with black PVC pipe used to irrigate the trees. Some of the piping is exposed and some is still buried. It is unknown if there was any fire applied to either property prior to state acquisition. Abandoned field/abandoned pasture also occurs at the Markham Woods property which is also a part of the WSSP in management zones WS-MW01/02, 3, 4 and 5.

There second largest area of abandoned field/abandoned pasture occurs in the west portion of Lower Wekiva River Preserve State Park north of Blackwater Creek extending north to the north boundary of the park, in management zones LW-23, 24, 27, 28 and 29. It also occurs at the Skinner property in management zones LW-SK3 and 6.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community as well as the removal of exotic hogs. Prescribed fire will also be conducted in management zones containing abandoned fields/abandoned pastures. Other management measures will include limited restoration efforts designed to minimize the effect of the pasture on adjacent natural areas. Cost-effectiveness and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures.

<u>Artificial Pond/impoundment</u>
Desired future condition: Artificial Pond/impoundment will be maintained current conditions. Where located in WSSP the ponds were installed. The Artificial Pond/impoundment areas within the park will be managed to minimize the effect of the Artificial Pond/impoundment areas on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) along with non-category exotic species will be removed from in and around the perimeter of the Artificial Pond/impoundment areas. Other management measures include development guidelines that are compatible with prescribed fire management in adjacent natural areas.

Description and assessment: Within the Wekiva River Basin State Parks, there are 3.23 acres of artificial pond. Found in three separate locations. In Wekiwa Springs State Park there is a stormwater pond that was installed in 2004 in management zone WS-01 adjacent to Wekiwa Springs Road. The stormwater runoff brings in trash from the road which settles into and around the pond. This pond has also been a source of CAT I and II exotic species. The primary species found around the pond and spreading into the surrounding sandhill community are cogon grass, natal grass and air potato. In addition to these species, there are also non-category exotic species found around the pond. At the Markham Woods property, a stormwater pond has been installed at the south end of the Seminole County hiking trailhead facility on the north side of the property. This feature doesn't hold water: water drains into the depression from the facility and quickly drains into the soil. On the Skinner Tract at Lower Wekiva River Preserve State Park, there is an artificial pond adjacent to the old pole barn in the north portion of management zone LWSK3 near State Road 42. This was an old cattle pond that was installed by the previous owners of the property.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community as well as the removal of exotic hogs. This community will also need to be monitored for erosion that may occur due to exotic removal efforts and proximity to roads.

<u>Borrow area</u>
Desired future condition: Borrow pit areas will be maintained current conditions. There is only one location within the WRBSP, Sand Lake. The borrow pit areas within the park will be managed to minimize the effect of the borrow pit areas on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) along with non-category exotic species will be removed from in and around the perimeter of the borrow pit areas. Other management measures include development guidelines that are compatible with prescribed fire management in adjacent natural areas.

Description and assessment: Within the Wekiva River Basin State Parks, there are 10.64 acres of borrow area. Sand Lake located at Wekiwa Springs State Park in management zone WS-42 is a borrow pit. This feature was constructed on the property when it was under the ownership of a private hunt club between 1934 and 1969. The sand was removed from the pit for the process of making concrete. The owners of the property installed an artesian well and then flooded the pit forming an artificial pond. In 2005 the park had the well capped with the intention drying out the pond filling in the borrow pit and restoring the natural community. This action has not caused the lake to dry up, which may be due to seepage from where the pipe from the well was installed into the aquifer. Inflow to the lake is primarily through the artesian spring and surface runoff. Sand Lake drains into the Wekiva River system by means of an unnamed creek that flows during periods of high precipitation through management zones WS-12 and WS-42 and empties into the Wekiwa Lagoon just below the bridge across the main springs. There is one other borrow pit located at the Neighborhood Lakes property in management zone WS-NL3, just south of where the Wekiwa Parkway will be built adjacent to SR 435. The history of this feature is unknown.

General Management Measures: Monitoring and treatment of exotic plants will continue for this area. This area will also need to be monitored for erosion that may occur due to exotic removal efforts public use in the surrounding area and proximity to roads. Sand lake has become a popular location for public uses like fishing and picnicking and will be maintain in its current state due to these factors. Due these recreational uses Sand lake has historically become a location where the park has had problems with nuisance American alligators (*Alligator mississippiensis).* The result of this being the park having the nuisance animal removed.

Canal/ditch

Desired future condition: Internal discussions/speculations have been made that filling in the canals would help with restoring some of the sheet-flow in the adjacent flood-plain swamp and hydric hammocks to the west of the St. Johns River, but no tangible plans has been developed (a full comprehensive study on the hydrology of the canals and surrounding area should be conducted to determine the negative impact of the canals and the potential benefits of removing the canals). If it was determined that removal of the canals was beneficial and the process was to occur, at least one of the canals, the third from the north, would remain undisturbed to the high amount of boat traffic between the St. Johns River and the Hontoon Dead River.

Description and assessment: Within the Wekiva River Basin State Parks, there are 35.80 acres of canal/ditch. These features are located within Lower Wekiva River Preserve State Park in management zone LW-32. There are 6 canals in all varying in length with the longest one extending beyond the east boundary of LW-32 and forming a portion of the boundary between management zones LW-27 to the south and LW-28 to the north. The canals were installed and used during the cypress logging period between 1884 and 1944 as a means to float cypress logs out of the surrounding palustrine communities and into the St. Johns River to be transported down river to a mill for processing.

General Management Measures: The canals are cooperatively managed by the Wekiva River Basin State Parks, the Wekiva River Aquatic Preserve, FWC and the USACE. Currently there are no management procedures being conducted for the any of the canals except for the canal near light beacon 83 along the St. Johns River. This canal is used as a navigable system connecting the St. Johns with the Hontoon Dead River. FWC and the USACE monitor and remove exotic species along with the removal any debris that may impede watercraft navigation along this canal. None of the other 5 canals are navigable.

Developed

Check stations, ORV use areas, parking lots, buildings, maintained lawns (as part of recreational, business, or residential areas), botanical or ornamental gardens, campgrounds, recreational, industrial, and residential areas.

Desired future condition: Developed areas will be maintained current conditions. The developed areas within the park will be managed to minimize the effect of the developed areas on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) along with non-category exotic species will be removed from all developed areas. Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

Description and assessment: Within the Wekiva River Basin State Parks, there are 126.23 acres of developed community. At Wekiwa Springs State Park there are 97.51 acres of developed community. Most of the acreage is divided between the parks' shop and administration facilities, main use area, the youth camp and the family campgrounds. In addition, there are 7 residences the horse coral and parking area near Sand Lake. At Rock Springs Run State Reserve there are 15.04 acres of developed. 5.95 acres are at the main use area which incorporates the horse stables horse barn and pasture, restrooms and camping area. There is another 7.46 acres at the hammock house facilities. The additional acres a spread out through the park. There are three residents and two cultural sites, the Ethel house and Ethel cemetery. At Lower Wekiva River Preserve State Park there is 13.68 acres of developed. The developed portions of the park are divided into two locations, 6.18 acres at the Katie's Landing property and 7.5 acres which incorporates the horse stable and corrals, a restroom facility and areas for camping in the north portion of the park.

General Management Measures: The developed areas within the park will be managed to minimize the effect of the developed areas on adjacent natural areas. Priority invasive plant species (EPPC Category I and II species) will be removed from all developed areas. Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

<u>Pasture – Improved</u>
Dominated by planted non-native or domesticated native forage species and evidence of current or recent pasture activity and/or cultural treatments (mowing, grazing, burning, fertilizing; Agro-Ecology Grazing Issues Working Group 2009). Improved pastures have been cleared of their native vegetation. Most improved pastures in Florida are planted with bahiagrass and to a lesser extent with Bermudagrass (*Cynodon dactylon*) or pangolagrass (*Digitaria eriantha*). Weedy native species are often common in improved pastures in Florida and include dogfennel, many species of flatsedge (*Cyperus* spp.), carpetgrasses (*Axonopus* spp.), crabgrasses (*Digitaria* spp.), and rustweed (*Polypremum procumbens*) among many others. Lawns or turf areas that are being maintained by mowing for human/recreational-use should be classified as developed (see above).

Desired future condition: Most of the pasture - improved within the Wekiva River Basin State Parks will require extensive restoration. General restoration measures for pasture areas within all properties are discussed below and specific measures are discussed in the restoration objectives in the Resource Management Program section of this plan. The desired future condition of the improved pasture would be restoration of the native habitat communities. There are multiple communities existed within this acreage prior to alterations. Based on soil type, hydrology and the existing communities that bound the pasture we can determine the appropriate location of community. In management zone RKS-54A there is a large pocket of Myakka sand and pomello sand both are typical flatwoods community soils. Along the southwest portion of the zone is St. Lucia sand this soil type is typical of scrub community. Much of RKS-54B has Candler fine sand which a typical sandhill soil type along with Tavares sand which is a typical flatwoods soil type. See respective community types in the above section of natural communities for descriptions of the full desired conditions.

Description and assessment: Within the Wekiva River Basin State Parks, there are 940.32 acres of pasture - improved. The majority of the pasture improved acreage is found within Rock Springs Run State Park in within management zones RKS-54A and RKS-54B located in the northeast corner of the park.

General Management Measures (interim): The pasture - improved areas with RKS-54A and RKS-54B were maintained by John Deere between the months of November through March for an interim period from 2004 to 2012. The use of the area was for training exercises and testing of new equipment. Currently the park maintains the acreage by bi-annually mowing the pastures, this effort will continue until restoration efforts have been established. In addition to these management activities monitoring and treatment of exotic plants will continue for this community as well as the removal of exotic hogs. Other management measures will include limited restoration efforts designed to minimize the effect of the pasture on adjacent natural areas. Cost-effectiveness, return on investment and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures.

<u>Pasture - Semi-Improved</u>
Dominated by a mix of planted non-native or domesticated native forage species and native groundcover, due to an incomplete conversion to pasture, not regeneration. Semi-improved pastures have been cleared of a significant percentage of their native vegetation and planted in non-native or domesticated native forage species, but still retain scattered patches of native vegetation with natural species composition and structure (most often small areas of mesic flatwoods) among the pastured areas. The planted areas are usually dominated by and can resemble improved pastures. Seeding of bahiagrass can also occur within areas of native groundcover. This category should apply regardless of recent pasture maintenance.

Desired future condition: Most of the pasture – semi-improved within the Wekiva River Basin State Parks will require extensive restoration. General restoration measures for pasture areas within all properties are discussed below and specific measures are discussed in the restoration objectives in the Resource Management Program section of this plan. The desired future condition of the improved pasture would be restoration of the native habitat communities. There are multiple communities existed within this acreage prior to alterations. Based on soil type, hydrology and the existing communities that bound the pastures we can determine the appropriate location of the community. The soil type that dominates the area at Neighborhood Lakes property is candler fine sands. This sand type is typically found in sandhill communities. There is a large pocket of St. Lucia sand in the pasture-semi-improved that is a typical soil type found in scrub communities. In RKS-54C most of the soil types are typical of flatwoods communities, due to the more hydric nature of the pastures within the zone the community may have been a wet flatwoods community instead of mesic flatwoods. The other pockets of flatwoods scattered throughout the parks have similar soils and are located amongst flatwoods communities.

Description and assessment: Within the Wekiva River Basin State Parks, there are 553.92 acres of pasture – semi-improved. The two largest blocks are located in Wekiwa Springs State Park, at the north end of the Neighborhood Lakes property and in Rock Springs Run State Reserve in zone RKS-54C. There are smaller blocks scattered throughout Rock Springs Run State Reserve and an additional small block located in Lower Wekiva River Preserve State Park at the Skinner property in management zone LW-S01.

General Management Measures: The pasture – semi-improved areas with RKS-54c were maintained by John Deere between the months of November through March for an interim period from 2004 to 2012. The use of the area was for train exercises and testing of new equipment. Monitoring and treatment of exotic plants will continue for this community as well as the removal of exotic hogs. Other management measures will include limited restoration efforts designed to minimize the effect of the pasture on adjacent natural areas. Cost-effectiveness and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures.

Pine plantation
Areas altered by silvicultural activities. These include lands where either 1) planted pines are having or will have an ongoing detrimental effect on native groundcover, 2) the history of planted pines has damaged ground cover to the point where further restoration beyond thinning and burning is required, and/or 3) the method of planting (e.g. bedding) has severely impacted groundcover. Pine plantations in Florida are often dominated by even-aged loblolly, sand, or slash pine. Dense pine plantations typically have sparse to absent herbaceous vegetation as a result of shading or a cover of deep pine needle duff. These plantations may be very shrubby or vine-dominated or open at ground level. The groundcover in most cases has been severely impacted by mechanical site preparation, such as roller chopping and bedding. However, while perennial grasses such as wiregrass may be greatly reduced, many components of the native groundcover persist even though the relative abundance is altered. Groundcover can be partially restored by thinning and/or frequent burning, although some planting of perennial grasses such as wiregrass may be required. With activities such as thinning and burning, plantations with intact native groundcover can be restored to the former natural community. Within the Wekiva River Basin State Parks, there are 323.16 acres of pine plantation.

Desired future condition: The desired future condition of the pine plantation would be to restoration of the native sandhill community.

Description and assessment: The only location where pine plantation is found in the Wekiva River Basin State Parks is at the Pine Plantation property which is part of Wekiwa Springs State Park. Which consist of planted northern slash pines, Prior to state acquisition of this property it was managed as a tree farm. Periodically pine needle straw was harvested in the past. The tree stands within the property are all in the same stage of development, a forester will need to be brought in for an assessment of the stage class and basal area. The number of rotations that the stands have gone through is currently unknown. The groundcover consists of a two to four-inch layer of needle cast, there are a few scattered patches of bahia grass. The property does not have an understory layer. In addition to past pine needle harvesting, fire may have also been used to manage the undergrowth and fuel loads under the tree canopy in the stands. A number of exotic plant species have been found on the property with the most notable being Brazilian pepper (*Schinus terebinthifolius*). This is the first occurrence of this species within the Wekiva River Basin.

General Management Measures: The former pine plantation will be managed to remove priority invasive plant species (FLEPPC Category I and II species). A plan is being developed for the restoration of the property through soil evaluation park staff have been able to determine that the acreage on the Pine Plantation property historically was sandhill. Timber management for restoration purposes should be considered for this property. The replacement stand should consist of longleaf pine for the canopy. Cost-effectiveness and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures.

<u>Spoil area</u>
Area where dredge or spoil material is deposited, may be re-colonized by plants Within the Wekiva River Basin State Parks, there are 13.28 acres of spoil area.

Desired future condition: The desired future condition of the spoil area would be to restoration to native flood plain marsh.

Description and assessment: The spoil area is located at Lower Wekiva River Preserve State Park in management zone LW-18. This management zone is located along the southeast bank of the Wekiva River where the river empties into the St. Johns River. The spoil area was the result historic dredging operations conducted at the mouth of the Wekiva River into the St. Johns River. The spoil area is covered with a canopy of cabbage palms there is not much of an understory or ground cover. The lack of an understory and ground cover may the results of the area being heavily used by hogs. The heavy use from the hogs has also brought in some exotic plant species, like Caesar's weed (*Urena lobata*). The seeds from this species are easily carried in the hogs' fur.

General management measures: Monitoring and treatment of exotic plants will continue for this area as well as the removal of exotic hogs.

Successional hardwood forest

Closed-canopied forest dominated by fast growing hardwoods such as laurel oak, water oak, and/or sweetgum, often with remnant pines. These forests are either invaded natural habitat (i.e., mesic flatwoods, sandhill, upland pine, upland mixed woodland) due to lengthy fire-suppression or old fields that have succeeded to forest. The subcanopy and shrub layers of these forests are often dense and dominated by smaller individuals of the canopy species. Successional hardwood forests can contain remnant species of the former natural community such as turkey oak, saw palmetto, gallberry, and infrequently wiregrass. Additionally, species such as beautyberry (*Callicarpa americana*), muscadine, and sparkleberry are common. Restoration of these forests includes mechanical tree removal and reintroduction of fire. Where characteristic herbaceous species (e.g., wiregrass) have been lost, reintroduction via seed or plants may be necessary to restore natural species composition and community function. Within the Wekiva River Basin State Parks, there are 1,048 acres of successional hardwood forest.

Desired future condition: Most of the successional hardwood forest within the Wekiva River Basin State Parks will require extensive restoration. General restoration measures within all properties are discussed below and specific measures are discussed in the restoration objectives in the Resource Management Program section of this plan. The desired future condition of the successional hardwood would be the restoration of the native habitat communities. There are multiple communities that had existed within this acreage prior to alterations. Based on soil type, hydrology and the existing communities that bound the altered community we can determine the appropriate location of the historic community matrix.

Description and assessment: Within the Wekiva River Basin State Parks, there are 1,093.63 acres of successional hardwood forest. Most of the acreage is located in areas of the parks that have had a history of community alterations due to some form of agricultural practices or there has been a history of fire suppression. Within most of the WRBSP properties successional forest has an association with the pasture type altered communities. For example, at Wekiwa Springs State Park, the Neighborhood Lakes property, portions of the pasture that have become overgrown with large hardwoods and have the appearance of a successional hardwood forest. This same pattern can be found at Markham Woods and within the pastures at Rock Springs Run State Reserve. Within Wekiva Springs State Park there are pockets of successional hardwood forest that occur in portions of sandhill due to a fire shadow effect and a history of fire suppression in these locations. Where this is most apparent is in the south portion of the park around the main use and the park offices.

General Management Measures: Monitoring and treatment of exotic plants will continue for this community, along with the removal or feral hogs. Aggressive restoration efforts will be needed to return the community to a natural condition. This would require the removal of mature trees and/or the addition of mowing/roller-chopping understory fuels along with the application of prescribed fire.

Utility corridor

Desired future condition: Utility corridors will be maintained according to current conditions; the corridors are right-a-ways for the utility companies/agencies whose conduits use the land. The Utility corridors within the park will be managed to minimize the effect of the corridors on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) along with non-category exotic species will be removed from all developed areas. Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas. Certain management activities may need to be coordinated with the company/agency associated with the corridor.

Description and assessment: Within the Wekiva River Basin State Parks, there are 35.65 acres of utility corridor. In Wekiwa Springs State Park, there is a gas line that runs through the southwest corner of the park between management zones WS-19 and WS-20. There is also another gas line that runs along the south end of WS-PP1 and WS-PP3 at the Pine Plantation property.

There are three locations where there are high tension electrical power lines. There is a line that passes through the northeast corner of WS-PP3 at the pine plantation property and then continues through the property separating WS-PP4 from WS-PP5. The second location for the high tension power lines is at Markham Woods. This line passes along the east boundary adjacent to WS-MW11, 12 and 15. The third location for these power lines is found within the Skinner Tract which is part of the Lower Wekiva River Preserve State Park. This corridor passes through LW-SK1 and LW-SK3.

*General management measure*s: Control of invasive plant species in utility corridors will be on going. These corridors are easements managed by the utility companies. They mechanically maintain these corridors and the equipment they use may be an ongoing source of exotics brought into these locations. Caution may need to be used when conducting control burns in adjacent management zones.

Imperiled Species

Imperiled species are those that are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2); or (2) listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened or of special concern.

The Wekiva River Basin State Parks currently have 60 imperiled species found within the park boundaries. There are 18 imperiled plant species and 42 imperiled animal species; the majority of the animal species are birds. This high number of listed species is a reflection of the biologically diverse nature of the Basin. Twenty-three of the species have been observed in all three parks. The following discussion highlights some of these species and their management concerns.

There are 19 imperiled plant species within the WRBSP. Discussion of the plants will be limited to two endangered species: star anise (*Illicium parviflorum*) and hand fern (*Ophioglossum palmatum*), and two other sensitive species: the giant orchid (*Pteroglossaspis ecristata*) and the hooded pitcher plant (*Sarracenia minor*). In addition, the Wekiva River Basin State Parks have a number of plant species considered distinctive. None are currently listed as designated species, nor are they rare or in 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*).

Wekiwa Springs State Park has the distinction of having the state's largest known population of star anise (*Illicium parviflorum*). Star anise occurs throughout the hydric hammock/floodplain swamp communities along Rock Springs Run. It is particularly abundant along the hiking trail that runs from the park main use area to Sand Lake and 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 effects of the southern pine beetle. This population needs to be remapped, monitored, and the recovery followed.

Hand ferns (*Ophioglossum palmatum*) 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 Wildlife Management Area, over 25 miles away. 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. Research investigating fire frequency, fire intensity and the distance to hand ferns and hand fern survivorship should be conducted.

Hand ferns have only been found within two of parks in the basin. At Rock Springs Run State Reserve, this species has only been found in several places in the southern portion of the park. Hand ferns have also been observed at Lower Wekiva River Preserve State Park in the hydric hammocks on the portions of the property north of the Wekiva River. These observations were made by park staff prior to the previous management plan in 2005. Surveys should be undertaken to assess the status of the known populations and locate any new populations; locations should be recorded using GPS.

The giant orchid (*Pteroglossaspis ecristata*) is typically found within sandhill communities in the WRBSP. A larger population is located in the sandhill around the Wekiwa Springs State Park youth camp facilities. This species responds well to prescribed burning and an increase in the population size has been noted by park staff during the growing season after a fire. Giant orchids are the only imperiled plant species found within the Pine Plantation property. The addition of fire into the Pine Plantation property would be an effective tool to increase the orchid population in this unit. A more thorough survey is needed for a full population assessment throughout all potential habitat within WRBSP.

A number of small isolated populations of hooded pitcher plants (*Sarracenia minor*) occur throughout the Wekiva River Basin State Parks. Rock Springs Run State Reserve contains numerous populations of hooded pitcher plants. These 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 other factors. At Lower Wekiva River Preserve State Park pitcher plants have been found at both the Skinner and Jung properties. Both populations occupy habitat at the ecotonal boundary between a baygall and the adjacent flatwoods. Systematic surveys are required to estimate the current population size within RSRSR and LWRPSP. No records currently exist for hooded pitcher plants at Wekiwa Springs State Park. A 2001 Resource Management Evaluation provided information on status and management criteria for several species of pitcher plants statewide (Johnson 2001). Park staff should develop a management plan for the Wekiva Basin populations of pitcher plants in order to enhance this species' survival.

There are 44 imperiled animal species within the WRBSP. The Wekiwa hydrobe (*Aphaostracon monas*) and the Wekiwa siltsnail (*Floridobia wekiwae*) are two invertebrates discovered in and near the WSSP main spring area in the 1960s (Thompson 1968; 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 in May 2002, Dick Franz collected and forwarded samples of hydrobiid snails to Dr. Fred Thompson at the Florida Museum of Natural History for identification. It was determined that both species of aquatic snails were still present in Wekiwa Springs. In 2010 both species were petitioned for federal listing by the center of biological Diversity(CBD) to the U. S. fish and Wildlife Service (Center for Biological Diversity 2010; Warren and Bernatis 2015)

The Orlando cave crayfish (Procambarus acherontis) is an invertebrate 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. This species is a candidate for listing by the United States Fish and Wildlife Service (Wood 1991). Mr. Franz did not find P. acherontis during the May 2002 surveys. Another survey was conducted in January 2005 but no invertebrates were captured (Giannotti pers. comm. 2004). Information is needed regarding successful resource management over the long-term for these invertebrate species.

Florida burrowing owls (*Athene cunicularia*) have only been observed at the Neighborhood Lakes unit of Wekiwa Springs State Park. Between 2007 (when the state acquired this unit) through 2009, park staff and volunteers had conducted surveys to search, locate and monitor the Florida burrowing owls in the pastures. Eighteen burrows were found, but the population size was unknown. During the first two surveys park staff located burrows and mowed a 20-foot perimeter with a push mower and weed eater around each burrow; they also placed a T-stand perch approximately 3 feet from the burrow entrance for the owls to use. This was in direct response to the plant growth that was occurring due to the removal of cattle from the property; cattle grazing had been maintaining a desirable grass height for the owls. As more burrows were located the mowing did not seem to be feasible, but park staff were still able to place the T-stand perches by the burrow entrances. The locations of the known burrows have been recorded using GPS.

In preparation for the construction of the Wekiwa Parkway through the property the FDOT had surveys conducted to establish the locations of owl nests on the property. Once the population size and burrow sites were determined, owls were removed from the footprint of the parkway and relocated to locations elsewhere on the unit in suitable habitat near where other owls were located; all activities were conducted by a private consultant with permits from the FWC. As part of the relocation process starter burrows were installed along with T-perches near the entrance to the burrows. In 2013 park staff conducted casual surveys of the unit. The older burrows were located as well as the new starter burrows. Only two owls were observed on location, but this may have been due to the time of day. One disturbing observation that was made was the occurrence of several coyote (*Canis latrans*) burrows within the burrowing owl colony. The current population status of the burrowing owls on this unit is unknown. This will require a new extensive survey to be conducted within the near future to assess the effects of the nearby road construction. The survey should be followed up with regular monitoring of the colony. A more thorough survey is needed for the entire property to establish if there are other locations where the species has established a colony.

The gopher tortoise (*Gopherus polyphemus*) is a known “keystone” species and is located in nearly 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). Recent genetic work on tortoises in the southeastern United States has revealed 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 burrow surveys and occupancy rates are standard monitoring measures 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. Burrow measurements were also used to extrapolate size and age structure of the populations (unpublished data). This is the current survey method used by park staff for gopher tortoise population estimates. These surveys are conducted on a sporadic basis, usually as part of post-burn analysis after a prescribed burn has been conducted in a management zone. The data from these early park surveys has not been analyzed. In Addition, a gopher tortoise survey was completed on the Orange County-owned portion of the Neighborhood Lakes property to obtain a current population assessment in 2009. This survey confirmed the presence of numerous tortoises on the property.

Upper respiratory tract disease (URTD) is known to be present on public lands in Florida (Berish et al. 2000). In 1997, URTD was confirmed in tortoises at Wekiwa Springs State Park (Berish et al. 2000). Animals were tested as part of an on-going FWC project.

Park staff cooperated with the University of Florida Veterinary College in a basin-wide analysis of the tortoise population. The objectives of this study were primarily to determine the prevalence and distribution of the URTD. The research has been ongoing and the results will be communicated to the appropriate agencies and interested parties.

In August 2001, 125 dead tortoises were discovered in several management zones at Rock Springs Run State Reserve (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 at the time. Park staff has put forth the following factors that may have contributed to the multiple deaths:

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

In 2001 along the southern boundary of Lower Wekiva River Preserve State Park gopher tortoises were relocated on-site due to the Florida Gas Pipeline going through part of the LWRPSP near State Road 46. Prior to relocation, the tortoises went through URTD testing and none were positive. In addition, 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.

The staff should expand their public education of URTD problems through interpretation and outreach. Division policy disallowing the drop-off of tortoises from outside of the park should continue to be followed.

Striped newts (*Notophthalmus perstriatus*) 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, specifically sandhill and scrub communities (Moler and Franz 1988; Johnson 2002; Johnson and Owen 2005).

The southernmost known locations of striped newts occur within a number of wetlands of Rock Springs Run State Reserve. This species as well as gopher frogs (*Rana capito*) were first documented in 1994 after many years of sampling by various biologists. It is of special interest that this population is one of two extant populations within the southern range limits for this species (Franz and Smith 1999; Johnson and Owen, in preparation). The previous southernmost range limit was on the campus of the University of Central Florida (UCF) (Owen 2004). This site has since been encroached upon by development and the wetland encircled by a highly traveled paved road; the UCF population is presumed to be extirpated for these reasons.

The presence within only four known ponds at RSRSR highlights the importance of the historic ephemeral nature of upland marsh communities throughout the entire basin. Striped newts were documented in ephemeral ponds during surveys in 1994, 2005, 2006, and 2010. Surveys should continue in known locations, and additional surveys should be conducted to locate other ponds where newts may exist.

The gopher frog is one of many species that are closely associated with burrows created by the gopher tortoise (Breininger et al. 1988; Dodd et al. 1990). This amphibian is also state-listed, primarily due to loss of habitat (Fogerty 1978; Cox and Kautz 2000). Surveys were conducted for gopher frogs during the same surveys conducted for striped newts at RSRSR in 2005, 2006 and 2010. Surveys should continue in known locations, and additional surveys should be conducted throughout the Wekiva River Basin State Parks.

Like the Florida gopher frog, the Florida mouse (*Podomys floridanus*) is a highly specialized Florida endemic closely allied with tortoise burrows (Layne and Ehrhart 1970). It is the only mammal genus endemic to Florida. It has one of the narrowest habitat ranges of any Florida mammal (Layne 1992). It has historic populations in all three units. Surveys conducted in 2004 and 2009 confirmed the presence of Florida mice at Wekiwa Springs State Park and Lower Wekiva River Preserve State Park; another small mammal survey in 2011-12 verified the continuing presence of Florida mice at WSSP (Catano and Stout 2015). A bioblitz conducted in 2012 also confirmed the species’ presence in Rock Springs Run State Reserve. Small mammal surveys should be conducted periodically throughout the WRBSP for this species in order to determine its status. Survey and monitoring efforts for Florida mice should continue to target scrub, scrubby flatwoods, and sandhill communities throughout the WRBSP.

Another designated species of great interest at the park is the Florida scrub-jay (*Aphelocoma coerulescens*) (FSJ). The FSJ is endemic to Florida and exclusively uses oak scrub and scrubby flatwoods communities throughout its life history. Its closest relative (western scrub-jay, *A. californica*) is 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). Florida scrub-jays 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.

There have been historic populations of FSJ in all three units of the Wekiva River Basin State Parks (Cox et al. 1994). Initial surveys at Wekiwa Springs State Park were conducted by the Orange Audubon Society in 1977. Additional surveys for the FSJ in WRBSP began in 1983, and more consistent data collection began in 1992 (McMurtray 1992). One study in the basin found that jays were not sedentary within the individual park units, and it appeared there was some movement of the birds between units (Small 1997). A brief analysis of the trends in overall family numbers (territories) from past to present suggested a drastic decline from 1992-2004 (Owen 2004). An important consideration from past research was that all known territories throughout the basin likely represented 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. Any decline in FSJ territories should not be taken lightly by park management.

At Wekiwa Springs State Park monitoring to document the presence of FSJ has been ongoing since the initial surveys in 1977. There was a single territory that was occupied by a small number of FSJ individuals until 2007. In 2004 blood samples were taken for genetic analysis by staff from Archbold Biological Station and most of the FSJ were banded. After Hurricane Wilma in October 2005, two members of the FSJ family (a breeding adult and a helper) disappeared; it is unknown what happened to these two individuals. In 2007 the remaining adult moved to another management zone within the park; it later disappeared and was found in Seminole State Forest the following year. The bird paired up and has successfully reproduced at Seminole State Forest. A new, unbanded pair of FSJ was discovered in management zone WS19 adjacent to the gas line corridor in 2011; they disappeared from the park later in 2011.

At Rock Springs Run State Reserve intensive scrub-jay monitoring took place from 2002 through 2005. In 2004, RSRSR had the largest number of occupied FSJ territories compared to WSSP and LWRPSP. In 2004 at least two FSJ that had territories at RSRSR dispersed to Seminole State Forest and set up new territories there (Lyon 2004). This highlights the need for multi-agency coordination concerning conservation of this species in the basin. Surveys in 2005 confirmed the presence of FSJ at the WBMK parcel of RSRSR; by 2011, however, no FSJ were present on the unit. A survey conducted in 2012 confirmed the absence of FSJ at RSRSR. This highlights the urgency of continued habitat restoration of scrub and scrubby flatwoods in RSRSR. Since 2007 park staff have initiated aggressive restoration efforts using a combination of roller-chopping and prescribed fire to return the scrub and scrubby flatwoods to a condition that would optimal for FSJ. Currently 785 acres have been treated and are at varying stages of restoration.

Lower Wekiva River Preserve State Park had historically supported up to three families of FSJ in the south portion of the park east of the Wekiva River (Small 1997). No FSJ have been observed at the park in annual surveys since 2005. Foraging activities of FSJ from adjacent populations (Seminole State Forest and Yankee Lake Wastewater Treatment Facility) may have occurred in this unit.

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 for future management decisions for this species in the parks. Continued study of scrub-jay populations within the basin should further expand multi-agency efforts to understand the future conservation needs 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. Currently FSJ are monitored as part of the statewide Jay Watch program.

Sherman's fox squirrels (*Sciurus niger shermani*) occur in all three parks in the Basin. Sherman's fox squirrels have been largely isolated to public lands due to habitat fragmentation and destruction. The primary communities where the species occurs are sandhill and pine flatwoods dominated by longleaf and/or slash pines (Kantola and Humphrey 1990). Fox squirrels prefer these communities due to the more open understory, which allows for easier movement and foraging; during some parts of the year they may shift their activities to more mesic communities (Weigl et al. 1989). The natural process of fire burning through these communities maintains the open understory. In the WRBSP prescribed fire is used to mimic this natural process and keep natural communities in a maintenance condition.

Population surveys were conducted by park staff during the 1980s and early 1990s. Since then no systematic surveys have been conducted and the population status is unknown; reproduction has been occurring. Individuals have been noted at various locations within WSSP, both in areas of optimal and suboptimal habitat. Mortality through road-kill has been an ongoing problem along the park boundary as well as within the park.

At Rock Springs Run State Reserve and Lower Wekiva River Preserve State Park the population density may not be as robust as WSSP. Within the WRBSP, Sherman's fox squirrels appear to favor sandhill communities over flatwoods. At WSSP the sandhill is burned on a more regular rotation and it's in better condition than at either RSRSR or LWRPSP. Most of the sandhill at RSRSR and LWRPSP has deteriorated due to a lack of consistent application of fire on a regular basis. In these two parks the amount of optimal sandhill acreage may not be sufficient to support many fox squirrels. These communities need to be brought back into a more frequent burn rotation and maintained at an appropriate return interval.

Additional survey work to determine the distribution and population size of Sherman's fox squirrels within the WRBSP needs to be conducted.

The Florida black bear (*Ursus americanus floridanus*) is one of the most prominent of the designated species in the Wekiva Basin. Black bears occur throughout the three parks. Wekiva Basin bears occur within the southern range limits of the Ocala/St. Johns metapopulation, one of six remaining strongholds for the species throughout Florida. Multi-agency land acquisition efforts for this flagship species in the basin have attempted to secure connectivity to source populations in the Ocala National Forest (Roof and Wooding 1996; Eason 2003; Walker and Baber 2003). Previous radio-tracking work conducted within the Wekiva Basin 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).

In December 1994, the Florida 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 they also 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 the success of the initial bear underpass, 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 completed in February 2004. Continued restoration of the habitat adjacent to the fence will aid in funneling animals towards the underpass at this site. Currently there is a black bear population study being conducted in the basin. The study was started in 2015 and is being conducted by Florida Fish and Wildlife Commission and the University of Central Florida.

Staff from the Wekiva River Aquatic Preserve conducts bird surveys along the Wekiva River with assistance from volunteers and park staff when available. These surveys have been conducted on a quarterly basis and should continue. While these surveys target all avian species, wading birds (e.g., herons and egrets) are targeted. Some of the more notable species documented during these surveys are woodstork (*Mycteria americana*) and limpkin (Aramus guarauna).

No other organized surveys or monitoring activities are currently being conducted on the remainder of the species listed.

The bald eagle (*Haliaeetus leucocephalus*), formerly listed as a threatened species was de-listed by USFWS in August 2007 and was de-listed by the FWC in April 2008. The change in status under the Endangered Species Act and state law does not enable arbitrary disturbance of the birds or their nesting habitats in Florida. Nesting and migrating bald eagles are protected under the federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. The FWC has adopted USFWS guidelines for eagle nest protection - the 660-foot buffer rule – in the 2008 Bald Eagle Management Plan.

Bald eagle nests are known from two of the three units in the WRBSP. These nests have been intermittently monitored by park staff since 1987. FWC staff also conducts annual bald eagle nest surveys 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. The last known bald eagle nesting activity within WSSP was in 2012; there is also an active nest at the Markham Woods property. There have been five known eagle nests at Lower Wekiva River Preserve State Park. Aerial surveys by FWC since 1998 have confirmed their nearly continuous use and reproductive success. There have not been any known eagle nests at Rock Springs Run State Reserve.

Although it isn't a listed species, the purseweb spider (*Sphodros abboti*) is rare and known from only two locations within the parks. This species is characterized by a unique tube-like web that they spin at the base of trees in mesic woods (Wallace and Edwards 1994). It was discovered in Wekiwa Springs State Park by park staff and confirmed by a Florida Fish and Wildlife Conservation Commission employee in 2002. Following the discovery of the WSSP population an additional population was discovered in Lower Wekiva River Preserve. This population constitutes the southernmost range limit for this species, extending its currently recognized distribution from the Ocala National Forest into the Wekiva Basin. Further surveys throughout the basin are needed.

Table 2 contains a list of all known imperiled species within the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP staff or others, and identifies the current level of monitoring effort. The codes used under the column headings for management actions and monitoring level are defined following the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Addendum 6.

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Pinewoods bluestem (WS) *Andropogon arctatus*	N/A	N	LT	G3, S3	1, 2, 10	Tier 1
Many-flowered grasspink (LWR, WS) *Calopogon multiflorus*	N/A	N	LT	G2G3, S2S3	1, 2, 10	Tier 1
Chapman's sedge (LWR) *Carex chapmanii*	N/A	N	LT	G3, S3	1, 2, 10	Tier 1
Sand butterfly pea (RS, WS) *Centrosema arenicola*	N/A	N	LE	G2Q, S2	1, 2, 10	Tier 1
Garberia (RS, WS) *Garberia heterophylla*	N/A	N	LT	N/A	1, 2, 10	Tier 1
Star anise (LWR, WS) *Illicium parviflorum*	N/A	N	LE	G2, S2	1, 2, 10	Tier 1
Nodding pinweed (WS) *Lechea cernua*	N/A	N	LT	G3, S3	1, 2, 10	Tier 1
Florida spiny-pod (WS) *Matelea floridana*	N/A	N	LE	G2, S2	1, 2, 10	Tier 2
Angularfruit milkvine (WS, RSR) *Matelea gonocarpus*	N/A	N	LT	G2, S2	1, 2, 10	Tier 2
Sandhill spiny-pod (WS) *Matelea pubiflora*	N/A	N	LE	N/A	1, 2, 10	Tier 2
Florida beargrass (WS) *Nolina atopocarpa*	N/A	N	LT	G3, S3	1, 2, 10	Tier 1
Hand fern (RSR) *Ophioglossum palmatum*	N/A	N	LE	G4, S2	2, 10	Tier 2
Swamp plume polypody (LWR) *Pecluma ptilodon*	N/A	N	LE	G5, S2	2, 10	Tier 1
Blueflower butterwort (RS) *Pinguicula caerulea*	N/A	N	LT	N/A	1, 2, 10	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Yellow-flowered Butterwort (WS) *Pinguicula lutea*	N/A	N	LT		1, 2	Tier 2
Snakemouth orchid (WB) *Pogonia ophioglossoides*	N/A	N	LT	N/A	1, 2, 10	Tier 1
Giant orchid (LWR, WS) *Pteroglossaspis ecristata*	N/A	N	LT	G2G3, S2	1, 2, 10	Tier 3
Florida willow (WS) *Salix floridana*	N/A	N	LE	G4T2, S1	2, 10	Tier 1
Giant air-plant/Giant wild pine (RS) *Tillandsia utriculata*	N	N	LE	N/A	2, 10	Tier 1
INVERTEBRATES						
Wekiwa hydrobe (WS) *Aphaostracon monas*	N	N	N/A	G1, S1	4, 13	Tier 2
Florida cave isopod (WS) *Caecidotea hobbsi*	N	N	N/A	G2G3, S2	4, 13	Tier 2
Hobbs' cave amphipod (WS) *Crangonyx hobbsi*	N	N	N/A	G2G3, S2S3	4, 13	Tier 2
Florida pearly eye (LWR) *Enodia portlandia floralae*	N	N	N/A	G4TU, S2S3	10	Tier 1
Berry's skipper (RS) *Euphyes berryi*	N	N	N/A	G1G3 S1S2	1, 2	Tier 1
Wekiwa siltsnail (WS) *Floridobia wekiwae*	N	N	N/A	G1, S1	4, 13	Tier 2
Eastern Meske's skipper (RS) *Hesperia meskei straton*	N	N	N/A	G3G4T3S2/S3	1, 2	Tier 1
Little Oecetis longhorned caddisfly (LWR) *Oecetis parva*	N	N	N/A	G2, S2	4, 10	Tier 1
Orlando cave crayfish (WB) *Procambarus acherontis*	N	N	N/A	G1, S1	4, 13	Tier 2

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
FISH						
Bluenose shiner (WS) *Pteronotropis welaka*	LS	N	N/A	G3G4, S3S4	4	Tier 2
AMPHIBIANS						
Striped newt (RSR) *Notopthalmus perstriatus*	N	C	N/A	G2G3, S2S3	1, 2, 7	Tier 3
Gopher frog (RSR) *Rana capito*	LS	N	N/A	G3, S3	1, 2, 7	Tier 3
REPTILES						
American alligator (WB) *Alligator mississippiensis*	LS	T (S/A)	N/A	G5, S4	10	Tier 1
Eastern indigo snake (WB) *Drymarchon couperi*	LT	T	N/A	G3, S3	1, 6, 7, 10, 13	Tier 1
Gopher tortoise (WB) *Gopherus polyphemus*	LT	C	N/A	G3, S3	1, 6, 7, 8, 10,13	Tier 3
Short-tailed snake (WS) *Lampropeltis extenuata*	LT	N	N/A	G3, S3	1, 6, 10	Tier 1
Florida pine snake (WB) *Pituophis melanoleucus mugitus*	LS	N	N/A	G4T3, S3	1, 6, 10	Tier 1
Sand skink (WB) *Plestiodon reynoldsi*	LT	T	N/A	G2, S2	1, 6, 7, 10	Tier 1
BIRDS						
Roseate spoonbill (WS) (*Ajaia ajaja*)	LS	N	N/A	G5, S2	4, 10	Tier 1
Florida scrub-jay (WS) *Aphelocoma coerulescens*	ST	T	N/A	G2, S2	1, 2, 7, 10, 13	Tier 3

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Limpkin (WB) *Aramus guarauna*	LS	N	N/A	G5, S3	2, 4, 10, 13	Tier 1
Florida burrowing owl (WS) *Athene cunicularia floridana*	LS	N	N/A	G4T3, S3	1, 2, 7, 14	Tier 2
Short-tailed hawk (RS, WS) *Buteo brachyurus*	N	N	N/A	G4G5, S1	1	Tier 1
Little blue heron (WB) *Egretta caerulea*	LS	N	N/A	G5, S4	4, 10	Tier 1
Snowy egret (WB) *Egretta thula*	LS	N	N/A	G5, S3	4, 10	Tier 1
Tricolored heron (WB) *Egretta tricolor*	LS	N	N/A	G5, S4	4, 10	Tier 1
Swallow-tailed kite (WB) *Elanoides forficatus*	N	N	N/A	G5, S2	1	Tier 1
White-tailed kite (WB) *Elanoides leucurus*	N	N	N/A	G5, S1	1	Tier 1
White ibis (WB) *Eudocimus albus*	LS	N	N/A	G5, S4	4, 10	Tier 1
Merlin (WB) *Falco columbarius*	N	N	N/A	G5, S2	1	Tier 1
Peregrine falcon (WB) *Falco peregrinus*	N	N	N/A	G4, S2	1	Tier 1
Southeastern American kestrel (WB) *Falco sparverius paulus*	ST	N	N/A	G5T4, S2	1	Tier 1
Whooping Crane (WS) *Grus americana*	LE	E	N/A	N/A	1	Tier 1
Florida sandhill crane (WB) *Grus canadensis pratensis*	ST	N	N/A	G5T2T3/S2S3	1	Tier 1
Worm-eating warbler (WB) *Helmitheros vermivorum*	N	N	N/A	G5, S1	1	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Wood stork (WB) *Mycteria americana*	LE	E	N/A	G4, S2	4, 10	Tier 1
Brown Pelican (WS) *Pelecanus occidentalis*	LS	N	N/A	G4, S3		Tier 1
Louisiana waterthrush (WB) *Seiurus motacilla*	N	N	N/A	G5, S2	4, 10	Tier 1
American redstart (WB) *Setophaga ruticilla*	N	N	N/A	G5, S2	1	Tier 1
MAMMALS						
Florida mouse (WB) *Podomys floridanus*	LS	N	N/A	G3, S3	1, 7, 8, 10	Tier 1
Sherman's fox squirrel (WB) *Sciurus niger shermani*	LS	N	N/A	G5T3, S3	1, 8, 10	Tier 1
West Indian (Florida) manatee *Trichechus manatus*	E	E	N/A	G2, S2	10, 13	Tier 1
Florida black bear (WB) *Ursus americanus floridanus*	LT	N	N/A	G5T2, S2	1, 10, 13	Tier 3
Florida Panther (RS) *Puma concolor coryi*	ST	N	N/A	G5/S1	1,10	Tier 1

*Wekiva River Basin (WB), Wekiwa Springs State Park (WS), Rock Springs Run State Reserve (RS), Lower Wekiva River Preserve State Park (LWR)

Management Actions:

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from visitor impacts (establish buffers)/law enforcement
11. Decoys (shorebirds)
12. Vegetation Planting
13. Outreach and Education
14. Other

Monitoring Level:

Tier 1. Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of Wildlife Observation Forms, or other district specific methods used to communicate observations.

Tier 2. Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.

Tier 3. Population Estimate/Index: an approximation of the true population size or population index based on a widely accepted method of sampling.

Tier 4. Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.

Tier 5. Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Detailed management goals, objectives and actions for imperiled species in this park are discussed in the Resource Management Program section of this component and the Implementation Component of this plan.

Exotic and Nuisance Species

Exotic species are plants or animals not native to Florida. Invasive exotic species are able to out-compete, displace or destroy native species and their habitats, often because they have been released from the natural controls of their native range, such as diseases, predatory insects, etc. If left unchecked, invasive exotic plants and animals alter the character, productivity and conservation values of the natural areas they invade.

Exotic animal species include non-native wildlife species, free ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to exotic animals, the DRP actively removes exotic animals from state parks, with priority being given to those species causing the greatest ecological damage.

In some cases, native wildlife may also pose management problems or nuisances within state parks. A nuisance animal is an individual native animal whose presence or activities create special management problems. Examples of animal species from which nuisance cases may arise include venomous snakes or raccoons and alligators that are in public areas. Nuisance animals are dealt with on a case-by-case basis in accordance with the DRP's Nuisance and Exotic Animal Removal Standard.

Detailed management goals, objectives and actions for management of invasive exotic plants and exotic and nuisance animals are discussed in the Resource Management Program section of this component.

At the time this plan was written, there were over 207 acres infested with exotic plants within the Wekiva River Basin State Parks with new infestation found periodically during treatments, surveys, and at random during daily activities.

There are at least 90 exotic plant species that are known to be found within the parks' boundaries with 30 of these know species to be either a Category I or

Category II invasive species. Some of the most invasive exotic plant species that occur within the parks are rosary pea (*Abrus precatorius*), coral ardisia (*Ardisia crenata*), camphor tree (*Cinnamomum camphora*), air potato (*Dioscorea bulbifera*), cogon grass (*Imperata cylindrica*), Japanese climbing fern (*Lygodium japonicum*), rose Natalgrass (*Melinis repens*), tuberous sword fern (*Nephrolepis cordifolia*), sewervine (*Paederia cruddasiana*), skunkvine (*Paederia foetida*), torpedograss (*Panicum repens*), Chinese tallowtree (*Sapium sebiferum*) Brazilian pepper (*Schinus terebinthifolius*) and Caesarweed (*Urena lobata*).

The two species that cause the worst ecological issues within the park are cogongrass and rose Natalgrass. Cogongrass has invaded some of the park's best sandhill communities in Wekiwa Spring State Park (see below for management zones). Rose Natalgrass may be a more serious problem than cogongrass; the total acreage is more extensive than cogongrass though many of the infestations are found within the Neighborhood Lakes property. This species has also infested well-maintained natural communities. The source of the infestations is from the outside the park but it has spread through the park by vehicles and equipment. Park staff have noticed that rose Natalgrass has occasionally replaced cogongrass in locations where it has been treated. The infestations of rose Natalgrass need to be treated frequently throughout much of the year.

Chinese tallowtree exhibits varying degrees of infestation. The largest infestation is located within Rock Springs Run State Park in management zones RKS-054A and RKS-054C. This infestation was discovered during a 2010 survey and has been treated multiple times since then. This area may require the use of an outside contractor. Another location where Chinese tallowtree has been a serious problem is along the north side of Lake Prevatt in Wekiwa Springs State Park. This site was aggressively treated between 2010 and 2013, but it will require ongoing monitoring and treatment, as well as surveys of the surrounding area.

In 2001 a wetland restoration project involving the removal of nine old logging tram roads was conducted at Rock Springs Run State Reserve; the purpose of the restoration was to improve hydrology by restoring sheet flow in the hydric hammock. Although the project did accomplish its hydrological objectives, a number of exotic plant species were inadvertently brought into the location, including cogongrass and tuberous sword fern. These locations will be treated by an FWC exotic species contractor in the 2013-2014 fiscal year. Tuberous sword fern is also a problem in wetlands and riparian areas along Rock Springs Run and the Wekiva River; there are scattered infestations of varying sizes.

Various exotic aquatic plant species can be found in the Wekiva River and its associated creeks and spring runs. These include hydrilla (*Hydrilla verticillata*), wild taro *(Colocasia esculenta),* common water-hyacinth (*Eichhornia crassipes*) and water-lettuce (*Pistia stratiotes*).

In the fall of 2002, the lagoon within Wekiwa Springs State Park was severely choked with hydrilla. Since then the species has spread into the spring-run stream.

Since 2002 the Wekiva River Aquatic Preserve and FWC staffs have chemically treated the infestations (see spring-run stream for additional information).

Wild taro is found within WSSP, throughout Rock Springs Run, and along the Wekiva River and is a significant exotic problem. It occurs as scattered plants, as dense floating mats, and as dense rooted clumps. Hand removal is only practical for scattered individual plants; the dense infestations require chemical treatment. FWC treats this species along with hydrilla.

Common water-hyacinth occurs within Wekiwa State Park, in several places along Rock Springs Run, and within the Wekiva River. It occurs in relatively low concentrations but can form very large mats which sometimes block boat traffic along the river. In areas where concentrations of common water-hyacinth are relatively low, the plants can be removed by hand; large concentrations of water-hyacinth along Rock Springs Run and the Wekiva River may be too extensive for hand removal. The use of biological control methods should be explored.

Water-lettuce occurs in the lagoon area within WSSP and along both Rock Springs Run and the Wekiva River. The plant forms dense mats in areas where water flow is minimal; it is removed from the lagoon by hand. Once water-lettuce and 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.

Caesar’s weed can be found extensively but heavy infestations are localized. Coral ardisia is restricted to certain zones; these infestations have the potential to become difficult to control if park staff do not continue ongoing treatments. Other species that pose the same issues for park staff are air potato, skunkvine, rosary pea, torpedograss, and Japanese climbing fern.

Park staff conduct regular visits to all portions of the parks, and all infestations are noted during these visits and recorded with GPS. Additionally, staff members are being trained to recognize the most serious exotic plants and their desirable native look-alikes, and any sightings by these staff members are reported as soon as possible. As these sightings are confirmed, the populations are assessed and prioritized for control. The park also has had members of the Florida State AmeriCorps service program working on resource management-based projects. From 2008 to the present WRBSP has had one or two member(s) dedicated to resource management with exotic species removal as the primary priority.

Most of the known infestations within the three parks have been treated multiple times within the last five years. This has been accomplished by park staff, AmeriCorps, and/or by FWC contractors. In addition, volunteers have assisted with exotic removals when appropriate. Since 2009 the park has participated in an annual air potato raid.

Table 3 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive, exotic plant species found within the park (FLEPPC, 2011). The table also identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes is provided following the table. For an inventory of all exotic species found within the park, see Addendum 5.

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species

Common and Scientific Name	FLEPPC Category	Distribution	Management Zone(s)
PLANTS			
Rosary pea *Abrus precatorius*	I	1	WS-PP2, WS-PP4, WS-PP5, WS-02, RKS-054A,
		2	WS-PP1, WS-PP2, WS-NL7, WS-04A, WS-02,
		4	WS-NL1
Mimosa *Albizia julibrissin*	I	1	WS-NL3, LW-J09
		2	WS-20, WS-PP3, WS-PP5
Coral ardisia *Ardisia crenata*	I	1	WS-02
		2	WS-12, WS-20, WS-01, WS-47
		3	RKS-112, RKS-113, RKS-KT2, RKS-KT4
Sprenger's asparagus-fern *Asparagus aethiopicus*	I	2	WS-PP2
Camphor-tree *Cinnamomum camphora*	I	1	WS-20, WS-22, WS-PP5, RKS-054A, LW-33
		2	WS-PP4, WS-NL2, WS-NL4, WS-NL6, WS-NL7, WS-PP1, WS-PP3, WS-NL3, WS-PP5, WS-NL1, WS-PP2, WS-03, WS-47, WS-NL5, WS-02, WS-04A, WS-04B, WS-08B, WS-12, WS-16, WS-19, WS-20, WS-22, RKS-098, RKS-KT2,

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
			RKS-120, RKS-112, RKS-099, RKS-097, RKS-055, RKS-054C, RKS-054B, RKS-054A, RKS-107, LW-33
		3	WS-NL6, WS-NL3
		6	WS-38, WS-NL4
Wild taro *Colocasia esculenta*	I	2	WS-42, WS-RKS18, WS-RKS23, RKS-018, LW-33
		3	RKS-120
		6	WS-28, WS-RKS113, WS-46, WS-42, WS-34, RKS-012, RKS-018, RKS-054C
Wild taro *Dioscorea bulbifera*	I	1	WS-42, RKS-054A,
		2	WS-38, WS-47, WS-40, WS-20, WS-19, WS-17, WS-02, WS-01, WS-42, RKS-069, RKS-054B, LW-34
		3	WS-17, WS-47, WS-48, RKS-069
		4	WS-NL3, WS-01, WS-47
		5	WS-47, RKS-097, RKS-099
		6	WS-19, RKS-KT1
Common water-hyacinth *Eichhornia crassipes*	I	2	WS-RKS23, RKS-018
Hydrilla	I	2	WS-42, WS-RKS18

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
Hydrilla verticillata			
		5	WS-02
Cogon grass *Imperata cylindrica*	I	1	WS-11
		2	WS-38, WS-PP5, WS-45, WS-37, WS-30, WS-28, WS-24, WS-23, WS-14A, WS-12, WS-11, WS-07B YC, WS-01, WS-06, WS-03, WS-NL7, WS-20, RKS-017, RKS-054C, RKS-054B, RKS-028, RKS-098, RKS-008, RKS-005, RKS-054A, LW-21, LW-J02, LW-29, LW-26, LW-14, LW-27
		3	WS-18, WS-PP4, WS-29, WS-05, WS-04A, WS-03, WS-PP1, RKS-093, RKS-102, RKS-113, RKS-054A, RKS-028, RKS-001, RKS-018, LW-29
		4	WS-MW08C, WS-PP1, WS-NL7, WS-NL6, WS-NL5, WS-NL4, WS-23, WS-NL2, WS-PP3, WS-MW18, WS-MW08D, WS-07B, WS-37, WS-MW08A, WS-06, WS-14A, WS-21, WS-30, WS-MW01/02, WS-MW03, WS-MW07, WS-02, RKS-112, RKS-012, RKS-017, RKS-018, RKS-054A,

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
			RKS-054C, LW-27, LW-03, LW-21
		5	WS-01, WS-14A, WS-20, WS-34, RKS-107, RKS-054A, LW-J02, LW-21
		6	WS-37, LW-31
Lantana *Lantana camara*	I	1	WS-47
		2	WS-NL5, WS-PP5, WS-PP4, WS-PP3, WS-PP2, WS-PP1, WS-02, WS-NL6, WS-NL4, WS-NL3, WS-NL2, WS-NL1, WS-29, WS-NL7, LW-33
Japanese climbing fern *Lygodium japonicum*	I	1	WS-30, WS-NL4, WS-04A, RKS-018
		2	WS-18, WS-36, WS-48, WS-31
		3	RKS-120
		4	WS-02, RKS-054C
		6	WS-17
Old world climbing fern *Lygodium Microphyllum*		3	WS-20
		4	WS-20
Cat's claw vine *Macfadyena unguis-cati*	I	4	WS-47
		5	WS-06

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
Chinaberry *Melia azedarach*	II	1	WS-NL2, WS-02, WS-47, RKS-120, LW-33
Rose Natalgrass *Melinis repens*	I	1	WS-44, WS-09
		2	WS-47, WS-01, WS-04A, WS-06, WS-14B, WS-46, WS-14A, WS-PP1, WS-41, WS-15, RKS-054A, RKS-069, RKS-113, RKS-KT3, RKS-KT2, RKS-KT1, RKS-068, LW-21
		3	WS-08A, WS-08B, WS-07B, WS-06, WS-01, WS-23, RKS-067, RKS-026, RKS-070, RKS-097
		4	WS-11, WS-PP2, RKS-KT1
		5	LW-05, RKS-079
		6	WS-04A, WS-05, WS-03, WS-04B, RKS-KT1
Heavenly bamboo *Nandina domestica*	I	2	WS-01
Tuberous sword fern *Nephrolepis cordifolia*	I	1	RKS-024
		2	WS-RKS113, WS-30, WS-28, WS-12, WS-38, WS-40, WS-31, WS-46, WS-42, RKS-018, RKS-112, RKS-113, LW-33
		3	WS-47, WS-34, WS-02, WS-01, RKS-KT2, RKS-001, RKS-018, RKS-028, LW-33

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
		4	WS-01, WS-42, WS-34, WS-NL6, WS-27, WS-12, WS-02, WS-NL7, RKS-018, LW-28, LW-27
		5	WS-02, WS-PP4, WS-PP1, WS-47, WS-PP3, RKS-018, RKS-012, LW-27
		6	WS-02, WS-RKS28/9, WS-RKS23, WS-RKS18, WS-RKS113, WS-40
Sewer vine *Paederia cruddasiana*	I	4	WS-02
Skunk vine *Paederia foetida*	I	2	WS-01, WS-02
		4	WS-02, WS-20
		5	WS-12, WS-02, WS-03
Torpedo grass *Panicum repens*	I	3	WS-06
		5	WS-48
Water-lettuce *Pistia stratiotes*	I	2	WS-02, WS-42, WS-RKS23, RKS-018
Mexican petunia *Ruellia tweediana*	I	5	LW-33
Chinese tallowtree *Sapium sebiferum*	I	1	WS-18, WS-15, WS-16, WS-NL2, RKS-017, LW-J09
		2	WS-20, WS-PP5, WS-PP3, WS-PP2, WS-PP1, WS-NL7, WS-47, WS-01, WS-21, WS-19, WS-17, WS-16, WS-11, WS-08B, WS-08A, WS-

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
			30, RKS-054A, RKS-054C
		3	WS-17, WS-18, WS-48, RKS-054A
Brazilian pepper *Schinus terebinthifolius*	I	2	WS-PP2, WS-PP3, WS-PP4, WS-PP5, WS-PP1
Tropical soda apple *Solanum viarum*	I	1	WS-47
Arrowhead vine *Syngonium podophyllum*	I	2	WS-02
		3	WS-38
Caesar's weed *Urena lobata*	I	2	WS-01, WS-18, WS-06, WS-19, WS-20, WS-47, WS-NL4, WS-17, RKS-120, RKS-113, RKS-054C, RKS-054B, RKS-018, RKS-028, LW-16, LW-34
		3	WS-47, RKS-054A, RKS-120
		4	WS-47, WS-PP1, LW-18
		6	WS-PP5, WS-20, WS-47, WS-PP4, RKS-023
Guinea grass *Panicum maximum*	II	2	WS-38, WS-20, WS-47
		3	WS-04A, WS-47
		4	WS-47
		6	WS-19, WS-41, WS-03
Senegal date palm *Phoenix reclinata*	II	2	WS-03

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
Chinese wisteria *Wisteria sinensis*	II	2	RKS-098

Distribution Categories:

0 No current infestation: All known sites have been treated and no plants are currently evident.
1 Single plant or clump: One individual plant or one small clump of a single species.
2 Scattered plants or clumps: Multiple individual plants or small clumps of a single species scattered within the gross area infested.
3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.
4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.
5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.
6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature, such as a road, trail, property line, ditch, ridge, slough, etc. within the gross area infested.

Exotic animal species include non-native wildlife species, free ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to exotic animals, DRP actively removes exotic animals from state parks, with priority being given to those species causing the ecological damage.

Nine-banded armadillos (*Dasypus novemcinctus*) and wild hogs (*Sus scrofa*) occur within the WRBSP; both species pose a significant threat to both natural and cultural resources. Their rooting in native soils disturbs a significant amount of acreage in a number of well-maintained natural communities including mesic and hydric hammock, floodplain marsh, depression marsh, and mesic and wet flatwoods. In addition, they also disturb cultural sites, including middens and burial mounds.

The Wekiva River Basin State Parks have had an ongoing history of exotic animal removal. During the current plan cycle both park staff and a USDA contractor have been involved in exotic animal removal in all units.

Feral cats and dogs (*Canis familiarus*) can occasionally be found, and should be removed immediately. Black rats (*Rattus rattus*) are found in the shop area and around the horse barn at Rock Springs Run State Reserve, and are removed when necessary.

European starlings (*Sturnus vulgaris*) occur throughout the park in small numbers. Greenhouse frogs (*Eleutherodactylus planirestris*) and Cuban treefrogs (*Osteopilus septentrionalis*) are also found within WRBSPs. Brown anoles (*Anolis sagrei*) are common in areas adjoining private residences and in the main use area. Incidental control of brown anoles has taken place in the past. Red imported fire ants (*Solenopsis invicta*) also occur within WRBSPs. Fire ants which occur in public use areas are treated with pesticides approved for use by DEP.

Vermiculated sailfin catfish (*Pterygoplichthys disjunctivus*) have been seen in large numbers in Wekiwa Springs, Witherington Springs and Sulfur Springs. In the area of the main spring 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; this has caused the wall to collapse in two locations in the swimming area. Staff and volunteers have been involved in removal efforts over the years. Although vermiculated sailfin catfish numbers were reduced following these efforts, populations are established throughout the St. Johns River. Brown hoplo (*Hoplosternum littorale*) have been found in three locations in WRBSP; they have been confirmed present in Sulfur Springs (Kitteridge Tract) in 2001, in Mill Creek in 2003, and in Rock Springs Run in 2005.

Laurel wilt is a plant disease caused by a fungus (*Raffaellea lauricola)* that infects plant vascular tissue. The disease targets a number of plant species within the Lauraceae family; both red bay (*Persea borbonia*) and scrub bay (*P. humilis*) have been affected by it. The fungus has a symbiotic relationship with the redbay ambrosia beetle (*Xyleborus glabratus*), an exotic beetle native to the Asian continent. Laurel wilt was detected in the Wekiva River Basin State Parks in 2010. By 2013 the disease was detected in all areas of the WRBSPs. Park staff and the USDA are monitoring the spread of the disease within the basin.

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 in the day-use area while raccoons are an intermittent problem related to their population levels. All of the trash receptacles are in bear-proof containers which exclude bears, squirrels, and raccoons. Park visitors are the major source of food and encouragement to these animals. Interpretation, both through signage 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. Bear-proof dumpsters and trashcans were installed in WSSP in 2003 and have been very effective. The potential still remains for bears to become a nuisance in the campground area, though. A black bear hazing program is in place as a non-lethal method when necessary to re-educate and potentially change the bears' habits. When a black bear is deemed a nuisance bear the Florida Fish and Wildlife Conservation Commission is contacted to assist with the issue.

Special Natural Features

Wekiwa Springs is a special natural feature. It is a second magnitude spring (Rosenau *et al.* 1977) with a flow rate of 44 million gallons per day, the spring exhibits exposed limestone from the Hawthorn Formation just below the surface of the water. It is located in the south portion of the park in the area of the park main use. The spring-flow empties into a large public swimming area. And then proceeds to form the Wekiwa Spring-run before merging with Rock Springs Run to form the Wekiva River.

The Wekiva River, together with Wekiwa Springs Run, Rock Springs Run and Black Water Creek were designated by the United States Congress as a National Wild and Scenic River in October 2000. The Wekiva River System is one of only two rivers in the state of Florida with this designation. Five Outstandingly Remarkable Values (ORVs) have been identified for the river system: scenic, recreation, wildlife and habitat, historic and cultural, and water quality and quantity. In accordance with the Wild and Scenic Rivers Act, these ORVs, the river system's free flow characteristics, and its immediate environment "shall be protected for the benefit and enjoyment of present and future generations" (section 1(b) Wild and Scenic Rivers Act). Unlike most rivers in the National Wild and Scenic River System that are managed exclusively by either a federal or state agency, the Wekiva River System is considered a "Partnership Wild and Scenic River." This means that it is jointly managed by a consortium of local stakeholder groups, referred to as the Wekiva River System Advisory Management Committee (AMC), with oversight and coordination provided by the National Park Service. The AMC approved a Wekiva Wild and Scenic River System Comprehensive River Management Plan in May 2012.

The sandhills at WSSP are also a special natural feature. Comprising approximately 1,246 acres, these are one of the largest holdings of sandhill community 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.

The Wekiva River Basin State Parks has three champion tree, two of which are challengers for the state and the other is a national co-champion. The two state challenger trees are located at Lower Wekiva River Preserve State Park in the south portion of LW-27 100 - 200ft off of the tram road along the zone boundary. The first tree is a Bald Cypress (*Taxodium distichum*). At the base this tree has a trunk diameter of 72.9 inches (circumference of 229 inches) and a height of 80ft; the total points, which includes crown spread, was 329 points. The cypress tree is hollow in the center, and park staff have been able to fit five full grown adults in the base of the tree. The second tree in LWRPSP which is 1,000ft west of the first is a live oak (*Quercus virginiana*). At the base this tree has a diameter of 69.4 inches (circumference of 218 inches) and a height of 115 ft; the total points, which includes crown spread, was 351 points. The remarkable thing about this live oak is that the tree has grown straight and tall. Both trees were measured by Christopher

Otermba, a Lake county forester for the Florida Forest Service and then registered as state champions September 2012.

The National co-champion tree is a loblolly bay (*Gordonia lasianthus*). This tree is located in Wekiwa Springs State Park in management zone WS12. At the base this tree has a diameter of 40.42 inches (circumference of 127 inches) and a height of 97 feet; the total points, which includes crown spread, was 237 points. The tree was measured by William Blozen and then registered as a national co-champion August 2013.

Cultural Resources

This section addresses the cultural resources present in the park that may include archaeological sites, historic buildings and structures, cultural landscapes and collections. The Florida Department of State (FDOS) maintains the master inventory of such resources through the Florida Master Site File (FMSF). State law requires that all state agencies locate, inventory and evaluate cultural resources that appear to be eligible for listing in the National Register of Historic Places. Addendum 7 contains the FDOS, Division of Historical Resources (DHR) management procedures for archaeological and historical sites and properties on state-owned or controlled properties; the criteria used for evaluating eligibility for listing in the National Register of Historic Places, and the Secretary of Interior’s definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation). For the purposes of this plan, significant archaeological site, significant structure and significant landscape means those cultural resources listed or eligible for listing in the National Register of Historic Places. The terms archaeological site, historic structure or historic landscape refer to all resources that will become 50 years old during the term of this plan.

Condition Assessment

Evaluating the condition of cultural resources is accomplished using a three-part evaluation scale, expressed as good, fair and poor. These terms describe the present condition, rather than comparing what exists to the ideal condition. 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 assessment is usually a cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action is needed to reestablish physical stability.

Level of Significance

Applying the criteria for listing in the National Register of Historic Places involves the use of contexts as well as an evaluation of integrity of the site. A cultural resource's significance derives from its historical, architectural, ethnographic or archaeological context. Evaluation of cultural resources will result in a designation of NRL (National Register or National Historic Listed or located in an NR district), NR (National Register eligible), NE (not evaluated) or NS (not significant) as indicated in the table at the end of this section.

There are no criteria for determining the significance of collections or archival material. Usually, significance of a collection is based on what or whom it may represent. For instance, a collection of furniture from a single family and a particular era in connection with a significant historic site would be considered highly significant. In the same way, a high quality collection of artifacts from a significant archaeological site would be of important significance. A large herbarium collected from a specific park over many decades could be valuable to resource management efforts. Archival records are most significant as a research source. Any records depicting critical events in the park's history, including construction and resource management efforts, would all be significant.

The following is a summary of the FMSF inventory. In addition, this inventory contains the evaluation of significance.

Prehistoric and Historic Archaeological Sites
Desired future condition: All significant archaeological sites within the park that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: There are Seventy-eight (78) Archaeological sites recorded in the FMSF for the Wekiva River Basin State Parks. The sites consist of one (1) prehistoric village site, four (4) Indian Mounds, seven (7) lithic scatter sites, thirty (30) Shell middens identified from the Early Archaic, Orange, St. Johns I, St. Johns II, and modern periods, and twenty-five (25) recently identified cultural sites dating from the early 19^{th} century through the 1960s. Twin Mounds Archaeological District, is the National Register combination of two adjacent snail middens.

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, and St. Johns Periods (Blackman 1973; Barton 1981).

The known archaeological record of the park demonstrates human inhabitation of the region occurred as early as 12,000 B.C.E. with significant shell fishing occurring in the area as early as 7500 years ago. Eleven mounds or middens exist for which reliable volume figures can be produced (Weisman 1993), of which Twin Mounds and Rollins are the largest and best excavated. These mounds demonstrate habitation from the Orange through the St. Johns II period with scattered individual finds dating to the Archaic.

The Wekiva River Basin is an area little studied by archaeologists (Weisman 1993), therefore large gaps exist in the archaeological and historic record pertaining to the Natives who inhabited the WRB prior to European contact. In previous Unit Management Plans it was thought that the Timucuan tribe set up villages in the WRB, but historical documentation suggests that the Mayaca, Jorroro, or Rinconada tribes were the likeliest Natives to have settled the area (Milanich 2004). More research is required to make any definitive conclusions. The archaeological and historical record for the park becomes clearer starting about 150 years ago at the conclusion of the Seminole Wars and American Civil War when the area was used for farming and milling by white and African American settlers.

One significant archaeological find in the park since the previous UMP is the headstone of Anthony Frazier, an African American soldier and former slave who fought for the Union during the Civil War and later settled near the WRBSP. The gravestone was found just 1500 feet from the construction of the new Wekiva Parkway on the Neighborhood Lakes property of the park. The gravestone is thought to be in the vicinity of the actual grave of Anthony Frazier, but further investigation utilizing ground penetrating radar or other modern equipment would be necessary prior to moving the gravestone from its current location underneath a stand of trees where it is protected from the elements.

Other recent finds include a tree stand from the Apopka Sportsmen's club (the group who managed much of WSSP prior to acquisition by the state), a human made mill pond, a cement mixer, a gutter, a late 1940's trash pile, a water control feature in the spring run, a dock at the end of a tram road, remains of a 1936 international pick up, an early 1960's bus site, a railroad marker, the start of a turpentine railroad bed, a turpentine railroad marker, a Dairy complex. These finds reinforce previous knowledge of the WRB as a thriving tourist destination and turpentine farm in the early to mid-20th century. They also provide new clues and further pathways for future research into the African American history and conservation and preservation activities that took place in the mid to late 20th century.
The Markham woods property of WSSP was once a vibrant African American Community in the 1880's. Pinnie Ridge Cemetery and the Oak Grove Missionary Church remains are two notable archaeological features of the area. Pinnie Ridge Cemetery is thought to contain between 24 and 75 burial sites and the Church is thought to have burned down around 1928. Today there is no visible evidence for either of these sites. Further investigations of both historical documentation and archaeological remains could yield further information about the little known but fascinating African American community of Markham.

The WRBSP presents archaeologists with a rare opportunity to explore a relatively untapped gold mine of paleo-Indian and early Florida historical artifacts. According to Dr. Asa Randall, greater amounts of St. Johns II period pottery and other significant artifacts likely exist within the boundaries of the park. The primary reason these artifacts remain to be discovered is that the Wekiwa region has received little to no archaeological attention in comparison with other sites in the middle St. Johns. To provide the public with an accurate portrait of the rich native and early cultural history of the WRBSP; further excavations, comprehensive archaeological surveys, and historical research must be conducted.

Condition Assessment: Most sites are listed in fair to poor condition, but a number of sites are preserved in good condition. Among the sites in good condition are many of the recent 20th century finds added to the FMSF, the Anthony Frazier Gravestone, and numerous shell middens.

Late 19th and Early 20th century archaeological excavations, the actions of prospectors, miners, looters, and individual treasure hunters, all contributed to the current poor or fair condition of many sites in the region. Nevertheless, most of the middens and mounds within the park have remained undisturbed since the destruction of the late 19th and early 20th century through the preservation efforts of previous and current land managers (i.e. the Apopka Sportman's Club and the Department of Environmental Protection). Thus although very few archaeological sites in the WRBSP are undisturbed, many are thought to still hold significant archaeological artifacts at lower strata.

The cultural resources within the WRBSP has been subjected to and is still threated by a number of issues. Some of these threats are natural like overgrown vegetation, damage by both native and /or exotic animal species or being inundated by high water periods. Alternatively, a number of threats to the resources have been anthropogenic in nature. For example, damage from bulldozers or other heavy equipment, digging, vandalism, looting, Archeological excavation residential development and recreational activities.

Another possible threat that deserves mention is development along the proposed Wekiva Parkway. Specifically in danger of complete destruction are the Rock Springs Dairy Barn (8LA04425) and a railroad grade and markers (8LA04505). The Anthony Frazier gravestone is also precariously close to the construction and could potentially be affected by future development. The priorities of the Park are to protect these and all other cultural resources from future development.
General Management Measures: Archaeological surveys of particular areas have been conducted, but there is no park-wide survey for three units; un-surveyed areas should be surveyed, and also conduct an archaeological reconnaissance survey of the Wekiva River Basin State Parks. The park should conduct further documentary and archaeological research on past inhabitants of the area, especially pre-Colombian natives. The park should also have ground disturbing activities conducted in accordance with DHR guidelines. The park should also look to improve public awareness and encourage protection and stewardship of cultural and natural resources through education and enforcement of agency rules and regulations.

Historic Structures
Desired future condition: All significant historic structures and landscapes that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: Twelve (12) Historic structures/sites/landscapes exist within the WRBSP. One (1) historic building, two (2) historic shipwrecks, (1) historic cemetery, three (3) historic structures, and five (5) historic building sites/building remains are recorded on the FMSF.

The majority of the building remains and remaining historic structures within the WRBSP date from the mid-19th century to mid-20th century and represent the tourism, logging, and hunting activities that occurred within the three properties of the park prior to state acquisition. Also represented are possible former homesteads and an African American settlement in Markham woods.

Settlers began colonizing the WRB in the early 1800's causing one of the only battles of the Seminole Wars to be fought in the swamps of Wekiva on July 29, 1840. It was not until after the Civil War that large numbers of white and African American settlers descended upon the area to set up farms, mills, and homesteads. Wekiwa Springs was first known as Clay Springs in the 1880's and was a popular tourist destination complete with a hotel, sanitarium, cabins, bathhouse, boathouse, boat docks, and a rail toboggan ride down the slope into the springs. Thus, Wekiwa Springs can lay claim to being the first amusement park in the state of Florida. In 1906 Clay Springs was renamed Wekiwa springs and has remained so ever since.

The Wekiva ferryboat operated in the 1920's and brought supplies and mail to areas like Zellwood and Winter Park. The ferryboat remains as a shipwreck, but is listed in poor condition. In 1923 a Detroit entrepreneur M.E. Miller bought Wekiwa Springs, cut three streets, and built miles of sidewalk in the hopes of selling plots of land. After only selling two by the end of the 1920's he gave up and nature reclaimed the land. In the 1930's the Wilson Cypress Company built a narrow gauge railroad into the swamp and logged old growth cypress and longleaf pine from the area. The Wilson Cypress Company owned the land until 1941 when it was purchased by the Apopka Sportsmen club. The Sportsmen club operated the land that is now WSSP for recreational use before selling it to the state in 1969. Rock Springs Run State Reserve was purchased by the State in 1983 under the Conservation and Recreation Land (CARL) program for habitat preservation, watershed protection, and limited recreational use. Notable historic structures include the Ethel House and Ethel Cemetery, the oldest known cemetery in Lake County, FL.

The Lower Wekiva River Preserve was purchased by the state under the Environmentally Endangered Lands program to protect portions of the lower Wekiva River while allowing limited recreational use. In the early 1900s several large tram roads were built within the northern sections of the park to facilitate the harvest of cypress trees. In areas, these earthen roads are over 10 feet high and 20 feet wide. Notable recent historic structure finds include three windmill refuse sites.

Condition Assessment: The Ethel House is listed in good condition. All other sites are listed in fair to poor condition due to deterioration and prolonged exposure to the elements. Many of the sites prove difficult to access for much of the year when access roads are inundated with water. Most sites are difficult for looters to access and all sites are contained within a fence line. No sites are currently planned for demolition. Detailed GPS surveys and more field visits should be conducted to better map and correlate known sites.

General Management Measures: The Ethel House should be preserved from further deterioration; there is no interpretive need to restore the building. The Ethel Cemetery should be stabilized and preserved in its current condition and the fence line surrounding the cemetery should continue to be maintained by Park staff. Field visits should be conducted at least yearly on all sites to ensure accuracy and monitor for deterioration.

<u>Collections</u>
Desired future condition: All historic, natural history and archaeological objects within the park that represent Florida's cultural periods, significant historic events or persons, or natural history specimens are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: The park has accumulated a modest collection of cultural objects since its inception in 1970. These objects have been kept in boxes and on display at the nature center for interpretive purposes. Few have been logged for date or location of discovery. Some were donated in 1988 by Ms. Shirley Rielly while others represent the Florida Fossil Hunters collection donated in 1995. The remaining artifacts represent the Chris Lee collection and miscellaneous artifacts held by the park for an unspecified number of years before being officially documented between 2004 and 2006.

Most collections held by the park are from the Rielly collections and are stored in two (2) approximately seven (7) cubic foot containers in a storage closet in the Park administrative complex. The Nature center holds around 100 artifacts from the Chris Lee, Florida Fossil Hunters, and Rielly collections. The artifacts consist of fossilized bones and teeth from various large animals that existed in the Park Boundaries during the Miocene epoch including Rhino bones, mastodon teeth, camel bones, a Bison tooth, and sabertooth cat bones. Some Native artifacts (small arrow points, clay pottery fragments and shards) representative of the Orange and St. Johns I and II periods are also on display at the nature center.

The Park Nature center also holds fourteen taxidermy animals preserved between 1994 and 2004. These animals are representative of common species encountered within the park including Florida Black Bears, Great Blue Heron, Bobcat, Red-shouldered Hawk, and the River Cooter among others.

Condition Assessment: All artifacts in the Park's collections are in good condition and are maintained in climate controlled environments with minimal to no exposure to the elements. Artifacts contained in boxes are rarely handled (perhaps every few years), and artifacts in the nature center are located on display shelves out of reach of the general public. All buildings where artifacts are stored are monitored and treated regularly for pest control.

General Management Measures: The Scope of Collections Statement for the Park reads as follows: Wekiva River Basin State Parks has accumulated a modest collection of cultural objects and artifacts since its inception in 1970. These objects have been kept for interpretive purposes and few if any have been logged for date or location of discovery. The Scope of Collections for Wekiva River Basin State Parks should be limited to within the geographic boundary and the history of these land parcels. Objects found on or about the property of anthropological or historical significance are to be included. Those objects that have no date or location of discovery are to be dated as of 22 March 2005.

Collection Process: The process for making future collection objects should continue with those started on 22 March 2005. All objects of historical or archaeological significance should be bagged as individual items. The date found (by year) should be the first number accorded to the item on the bag as well as the listing in the Collections binder. The second number should be a grouping (location, date, or like item). The final number is an item number based on the actual item (first, second, etc. of an object). The description should include the exact date of location, which property it was found on and an educated guess as to what it is. If it was found on an archaeological site add that site number from the Archaeological Site Files. The process followed is according to National museum standards for listing, numbering, and bagging collections.

Two inventory binders are kept at the administrative offices of the Park. One binder is maintained in the management office and another with the boxed collections. A Scope of Collections Statement and Collections process statement are contained in each binder. The staff is trained in proper reporting and collecting procedures.

A new interpretive nature pavilion is currently under construction and will be opened to the public in 2014. This new nature center will be an outdoor pavilion with a climate controlled island containing live animals and some interpretive artifacts. Other artifacts will be maintained in sealed display cases along the perimeter walls of the pavilion. All artifacts will continue to be displayed in accordance with prescribed policies and procedures.

Detailed management goals, objectives and actions for the management of cultural resources in this park are discussed in the Cultural Resource Management Program section of this component. Table 4 contains the name, reference number, culture or period, and brief description of all the cultural sites within the park that are listed in the Florida Master Site File. The table also summarizes each site's level of significance, existing condition and recommended management treatment. An explanation of the codes is provided following the table.

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Wekiwa Springs State Park					
Neighborhood Lakes 8LA03353	St.Johns II: unknown	Archaeological Site	NS	G	P
Rock Springs Run 1 (EW 1) 8OR00447	Orange. Prehistoric with pottery	Archaeological Site	NE	P	P
Rock Springs Run 2 (EW 2) 8OR00448	St. Johns; St. Johns I; St. Johns II	Archaeological Site	NE	P	P
Rock Springs Run 3 (EW 3)/HAYSTACK 8OR00449	St. Johns; St. Johns I	Archaeological Site	NE	P	P
Rock Springs Run 4 (EW 4) 8OR00450	St. Johns; St. Johns I	Archaeological Site	NE	NA	P
Love's Cabin (EW 10) 8OR00454	Prehistoric	Archaeological Site	NE	NA	P
Rock Springs Run 6 (EW 11) 8OR00455	Unknown	Archaeological Site	NE	NA	P
Wekiwa Springs #2 8OR00456	Unknown	Archaeological Site	NE	P	P
Rock Springs Mound 8OR02089	Unknown	Archaeological Site	NE	NA	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Big Buck Hunting Camp 1 8OR02220	St. Johns	Archaeological Site	NE	P	P
Big Buck Hunting Camp 2 8OR02221	St. Johns	Archaeological Site	NE	G	P
Cozy Camp Middens 8OR02222	St. Johns	Archaeological Site	NE	P	P
Witherington Hunting Cabin 8OR02229	Twentieth century American, 1900-present	Homestead/Building remains	NS	P	P
Anthony Frazier Gravestone 8OR09251		Historic cemetery/Single Gravesite	NR	G	P
Wekiva Springs 8SE00027	St. Johns; St. Johns II; Nineteenth century American, 1821-1899	Archaeological Site	NS	P	P
Plantation Lithic Scatter 8SE00565	Prehistoric	Archaeological Site	NE	NA	P
Plantation Hotel/Mitchell Farm House 8SE00566	Nineteenth century American, 1821-1899; Twentieth century American, 1900-present; African-American	Archaeological Site	NS	P	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Pinnie Ridge Cemetery 8SE00567	Nineteenth century American, 1821-1899; Twentieth century American, 1900-present; African-American	Historic cemetery	NR	F	RS
Oak Grove Missionary Baptist Church 8SE00568	Nineteenth century American, 1821-1899; Twentieth century American, 1900-present; African-American	Archaeological Site	NS	P	P
Overstreet Midden 8SE00582	St. Johns I	Archaeological Site	NE	NA	P
Markham Pond 8SE01095	St. Johns I	Archaeological Site	NE	NE	P
Wekiva Scatter 8SE01096	Prehistoric	Archaeological Site	NE	NE	N/A
Sand lake/ borrow pit 8OR10848	Twentieth century American, 1900-present	Archaeological Site	NE	G	N/A
Apopka Sportsman Club Hunting tree 8OR10849	Twentieth century American, 1900-present	Archaeological Site	NR	G	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
WS12 1940s Trashpile 8OR10845	Twentieth century American, 1900-present	Archaeological site	NS	G	P
Submerged cut logs in spring run 8OR10850	Twentieth century American, 1900-present	Archaeological Site	NE	F	P
Mill Pond 8OR10846	Twentieth century American, 1900-present	Archaeological Site	NE	G	P
Sand funnel from Sandlake 8OR10847	Twentieth century American, 1900-present	Archaeological Site	NE	G	R
Metal gutter 8OR10851	Twentieth century American, 1900-present	Archaeological Site	NE	F	R
Unknown automobile WS01 8SE02812	Twentieth century American, 1900-present	Archaeological object	NE	F	P
Tram leading to river 8SE02822	Twentieth century American, 1900-present	Linear feature	NE	G	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Rock Springs Run State Reserve					
Bear Crossing 8LA00532	St. Johns	Archaeological Site	N/A	N/A	N/A
Bear Crossing 2 8LA00538	Unknown	Archaeological Site	NS	F	P
Bear Crossing 3 8LA00539	Unknown	Archaeological Site	NS	F	P
Bear Crossing 4 8LA00540	Unknown	Archaeological Site	NS	N/A	N/A
Bear Crossing 5 8LA00541	Unknown	Archaeological Site	NS	N/A	N/A
Bear Crossing 6 8LA00542	Unknown	Archaeological Site	NS	N/A	N/A

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Ethel Cemetery 8LA01135	Twentieth century American, 1900-present;	Historic Cemetery	NR	G	P
Wekiva Ferryboat 8LA02127	Nineteenth century American, 1821-1899;	Historic Shipwreck	NE	P	P
Cassia Station 8LA02760	Twentieth century American, 1900-present	Resource group-Linear feature	NE	NE	P
WRMB 6 8LA03542	Prehistoric	Archaeological Site	NS	NE	P
Rock Springs Run Site 8LA03585	Prehistoric	Archaeological Site	NS	NE	P
Wekiva 4 (EW 8) 8OR00451	Prehistoric	Archaeological Site	NS	F	P
Rollins Island/Wekiva 5/Shell Island 8OR00452	St. Johns I; St. Johns II	Archaeological Site	NR	P	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Wekiva 6 (EW 9)/EW #9/DNR Cabin 7 8OR00453	St. Johns	Archaeological Site	NE	P	P
Wekiva 7 (PB 1) 8OR00457	St. Johns I	Archaeological Site	NR	F	P
Wekiva 8 8OR00459	St. Johns; St. Johns I	Archaeological Site	NR	F	P
Cypress Stump Midden 8OR02226	St. Johns; St. Johns II	Archaeological Site	NE	G	P
Pennel's Cabin 8OR02227	St. Johns	Archaeological Site	NE	P	P
Pappy's Cabin 8OR02228	St. Johns	Archaeological Site	NE	P	P
Wekiva River Barge 8OR09987	Twentieth century American, 1900-present	Historic Shipwreck	NE	NE	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Plantation Indian Midden Mound 8SE00564	St. Johns	Archaeological Site	NS	P	P
Town of Ethel 8LA04422	Twentieth century American, 1900-present	Archaeological Site	NR	F	P
WBMK Homestead 8LA04421	Twentieth century American, 1900-present	Archaeological Site	NR	F	P
Harden's Dairy complex 8LA04425	Twentieth century American, 1900-present	Archaeological Site	NR	G	P
Lewis House 8LA04419	Twentieth century American, 1900-present	Historic structure	NR	G	RS
Amphibious vehicle 8OR10856	Twentieth century American, 1900-present	Archaeological object	NE	G	P
Ethel Windmill 8LA04420	Twentieth century American, 1900-present	Historic structure	NE	F	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
1936 international pick-up truck 8LA04418	Twentieth century American, 1900-present	Archaeological object	NE	P	P
1960's bus 8OR10855	Twentieth century American, 1900-present	Archaeological object	NE	G	P
Railroad bed with 3 railroad markers 8LA04505	Twentieth century American, 1900-present	Resource group linear feature	NE	G	P
WBMK Fenceline 8LA04504	Twentieth century American, 1900-present	Resource group-linear feature	NE	G	P
Lower Wekiva River Preserve State Park					
South Of Crow's Bluff 8LA00046	Prehistoric	Archaeological Site	NE	NE	P
Banana River Mound 8LA00193	Prehistoric; Historic; American, 1821-present	Archaeological Site	NS	F	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Wekiva River 8LA00510	Prehistoric	Archaeological Site	NS	G	P
Otter Mound 8LA02022	St. Johns	Archaeological Site	NS	P	P
Bush Island 8LA02023	St. Johns	Archaeological Site	NE	G	P
Logging trail 8LA02024	Twentieth century American, 1900-present	Resource group-linear feature	NE	F	P
Windmill 8SE00081	Twentieth century American, 1900-present	Historic structure	NE	P	P
DNR Mound 8SE00083	Prehistoric; St. Johns II	Archaeological Site	NE	NA	N/A
Orange Tree 8SE00577	Prehistoric	Archaeological Site	NE	F	RH

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
Hollow Tree 8SE00578	St. Johns	Archaeological Site	NE	F	R
Katie's Landing 8SE01177	St. Johns; St. Johns I; St. Johns II	Archaeological Site	NS	P	P
Burch 8SE01686	St. Johns II	Archaeological Site	NS	G	P
Cypress Culvert/logging road 8LA04413	Twentieth century American, 1900-present	Archaeological - object	NS	G	P
Fectel windmill #1 8LA04411	Twentieth century American, 1900-present	Historic structure	NE	F	P
Fectel windmill #2 8LA04412	Twentieth century American, 1900-present	Historic structure	NE	F	P

Significance
NRL – National Register Listed
NR – National Register Eligible
NE – Not Evaluated
NS – Not Significant

Condition
G – Good
F – Fair
P – Poor
NA – Not Accessible
NE – Not Evaluated

Recommended Treatment
RS – Restoration
RH – Rehabilitation
ST – Stabilization
P – Preservation
R – Removal
N/A – Not Applicable

Resource Management Program

Management Goals, Objectives and Actions

Measurable objectives and actions have been identified for each of the DRP's management goals for the Wekiva River Basin State Parks. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While, the DRP utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for DRP staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer- term work plans are developed for natural community restoration and hydrological restoration. The work plans provide the DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system.

The work plans are reviewed and updated annually. Through this process, the DRP's resource management strategies are systematically evaluated to determine their effectiveness. The process and the information collected is used to refine techniques, methodologies and strategies, and ensures that each park's prescribed management actions are monitored and reported as required by Sections 253.034 and 259.037, Florida Statutes.

The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. The ten-year management plan is based on conditions that exist at the time the plan is developed. The annual work plans provide the flexibility needed to adapt to future conditions as they change during the ten-year management planning cycle. As the park's annual work plans are implemented through the ten-year cycle, it may become necessary to adjust the management plan's priority schedules and cost estimates to reflect these changing conditions.

Natural Resource Management

Hydrological Management

Goal: Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.

The natural hydrology of most state parks has been impaired prior to acquisition to one degree or another. Florida's native habitats are precisely adapted to natural drainage patterns and seasonal water level fluctuations, and variations in these factors frequently determine the types of natural communities that occur on a particular site. Even minor changes to natural hydrology can result in the loss of plant and animal species from a landscape. Restoring state park lands to original natural conditions often depends on returning natural hydrological processes and conditions to the park. This is done primarily by filling or plugging ditches, removing obstructions to surface water “sheet flow,” installing culverts or low-water crossings on roads, and installing water control structures to manage water levels.

Objective A: Conduct/obtain an assessment of the park’s hydrological restoration needs.

Action 1 Formulate a plan for erosion control for multiple locations throughout parks.

As described above, a good deal of research and assessment work related to hydrological restoration of the parks’ springs and other water bodies has already occurred. Many projects have already been implemented. Staff should thoroughly assess the need for and feasibility of remaining hydrological restoration projects and formulate an implementation plan. This would include such projects as backfilling of remaining ditches, removal of remaining tram roads, and erosion control measures for problem areas such as the canoe beach and slope at Wekiwa Springs. It should also include assessing hydrological restoration needs of newly acquired property such as the Neighborhood Lakes and Pine Plantation parcels.

Action 2 Continue working with county, city and other local officials along with other agencies on continuing to educate businesses and residents within the spring and river basins on the effects of nutrient loading based on fertilizer and septic tank issues.

The Wekiva River system is a true natural treasure deserving of protection for the resource and for current and future generations to enjoy. Water quality and quantity are of utmost importance to the system. Several agencies are involved in monitoring and protecting the water resources including, several divisions within DEP, SJRWMD, USGS, local counties, etc. As managers of the property, the Division of Recreation and Parks staff should continue to work closely with partner agencies to foster relationships, share information, and support ongoing and future research and monitoring efforts that help to document and protect the park’s water resources. The major threats to the Wekiva Basin and its unique water resources include threats to water quality and water quantity (spring flow) as detailed in the hydrology section above.

The SJRWMD is the lead agency charged with protection of water quantity related to the Wekiva River system and associate springs. They issue consumptive use permits for water withdrawal and formulate district water supply plans. They are also responsible for developing a Minimum Flow and Level (MFL) regime for several of the springs in the basin and the Wekiva River. As described above, the Wekiva MFL was the first adopted MFL and is due for periodic re-evaluation. Division staff should remain heavily involved as stakeholders in that process. In connection with the MFL process, an MFL violation Prevention/Recovery Strategy will be developed to identify measures required to prevent levels from declining beyond the values set by the MFL for Lake Prevatt. Division Staff should also remain involved as stakeholders in that process.

The DEP is the main agency responsible for protection of water quality in the Wekiva River system. Overall, water quality in the system is good with the exception of elevated levels of nitrate as described above. The elevated nitrate levels have caused excessive algal growth and prompted the development of a Total Maximum Daily Load (TMDL) threshold value for nitrate. The TMDL process called for the development of a Basin Management Action Plan (BMAP) to identify measures required to obtain the target nitrate reduction. The BMAP was recently completed and division staff were heavily involved as stakeholders in that process.

The Division should also stay informed regarding land use planning in the surrounding area. Properties in the spring's recharge basin should be acquired when possible to protect important recharge areas and spring water quality. The Division staff should continue to participate in local springs working groups to encourage projects that will benefit the health of the springs. The FPS District staff should continue to review all consumptive use permits submitted to the SJRWMD within the vicinity of Wekiwa and Rock Springs and their springsheds and provide comments to SJRWMD regarding issues that could negatively impact the resources of the springs and the Wekiva River. The SJRWMD monitors surface and groundwater levels on and around the Wekiva Basin. Water quality information is collected periodically and made available.

Objective B: Restore natural hydrological conditions and functions to approximately 600 acres of Hydric hammock, 130 acres of mesic flatwoods, and 110 acres of wet flatwoods communities.

Action 1 Install 9 low-water crossings or culverts along tram roads and park service roads within the WRBSP.

- 1 at Lower Wekiva River Preserve State Park South of Wekiva River along the main north to south tram road.
- 4 at Wekiwa Springs State Park, there are two locations where hydric hammock community cross over main service roads, one where a stream flows over the service road and one on the Markham Woods property where a bay community crosses over the service road.
- 4 at Rock Springs Run State Reserve. one is located where a bay gall drains into a hydric hammock the other two are located where two separate depression marshes drain into hydric hammock and one is where the service road runs through the hydric hammock.

Action 2 Rehab 44,939 feet of plow scars. within the WRBSP

- In RSRSR: 19,573 feet divided between two wildfires that both occurred in the southern hydric hammock of the park.
- In WSSP: 5,143 feet in the north flatwoods of the main park and 8,607 feet at the Markham woods property in wet flatwoods and hydric hammock
- In LWRPSP: 11,616 feet in wet flatwoods and hydric hammock in the portion of the park south of the Wekiva river (NW of the Yankee lake property.

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 wildlife species dependent upon them.

Objective C: Restore sheet-flow to hydric hammocks and floodplain swamp in Lower Wekiva River Preserve State Park

Action 1 Preliminary analysis should be conducted to determine the costs and feasibility of filling in the old logging canals off of the St. Johns River into Lower Wekiva River Preserve State Park.

Action 2 Install 6 low-water crossings or culverts along main tram roads a within the LWRPSP.

- 4 crossings north portion of road in management LW-27 the main north to south tram road.
- 2 crossings south portion of road in management LW-27

There are six canals located in the west portion of Lower Wekiva River Preserve State Park. All six canals total an approximate length of 6 miles with each canal varying in length. The southernmost canal is approximately 1.8 miles in length while the other 5 vary in length, each between 0.7 to 1 mile in length. The depth of each canal is unknown. A significant number of tram road have been removed associated with the canals for the purpose of restoring sheet-flow. The results of these efforts have not been determined, and so an analysis of the effects of the tram removals has been effective is needed. Along with this study a preliminary study should be conducted on the effectiveness of removing the canals along with a cost analysis and realistic feasibility of these action and an analysis of the what the ecological effect and environmental impacts to the surrounding communities.

On the LWRPSP property there is a main north-south service road within the Fecthal Tract. This road is main road used to maneuver through the property. The natural sheet flow on the property is from west to east towards the St John's River. 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.

Natural Communities Management

Goal: Restore and maintain the natural communities/habitats of the park.

The DRP practices natural systems management. In most cases, this entails returning fire to its natural role in fire-dependent natural communities. Other methods to implement this goal include large-scale restoration projects as well as smaller scale natural communities' improvements. Following are the natural community management objectives and actions recommended for the state park.

Prescribed Fire Management

Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystem. Prescribed burning increases the abundance and health of many wildlife species. A large number of Florida's imperiled species of plants and animals are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels.

All prescribed burns in the Florida state park system are conducted with authorization from the FDACS, Florida Forest Service (FFS). Wildfire suppression activities in the park are coordinated with the FFS.

Objective A: Within 10 years, have 12,080 acres of the park maintained within the optimum fire return interval.

Action 1	Develop/update annual burn plan
Action 2	Manage fire dependent communities by burning between 2,200 - 5,900 acres annually.
Action 3	Establish 6.5 miles of new fire breaks (2 miles along perimeter of Pine Plantation property, 4.5 miles along perimeter of Wekiva Parkway in Neighborhood Lakes property.

Table 5 contains a list of all fire-dependent natural communities found within the park, their associated acreage and optimal fire return interval, and the annual average target for acres to be burned.

Table 5. Prescribed Fire Management		
Natural Community	**Acres**	**Optimal Fire Return Interval (Years)**
Sandhill	1,892.66 acres	1-3
Mesic Flatwoods	5,321.97 acres	2-5
Scrub	552.92 acres	7-15
Scrubby Flatwoods	891.17 acres	3-7
Wet Flatwoods	1,484.63 acres	2-5
Depression Marsh	427.86 acres	2-5
Annual Target Acreage	2,243-5,892 acres	

Prescribed fire is planned for each burn zone on the appropriate interval. The park's burn plan is updated annually because fire management is a dynamic process. To provide adaptive responses to changing conditions, fire management requires careful planning based on annual and very specific burn objectives. Each annual burn plan is developed to support and implement the broader objectives and actions outlined in this ten-year management plan.

The parks contain six fire type communities (see Table 5 above and the natural community section for a description of each). Each community has a specific burn interval in order to maintain that community in an optimal maintenance condition.

Based upon the fire return intervals and acreage for the natural communities within the park, optimally the minimum of 2,243 acres should be burned each year to maintain the natural communities within their target fire return intervals. This amount would be based on all the fire type acres being in an ecological maintenance condition and none of the acres are overly out of rotation. Taking these factors into consideration the park should be pushing to burn more acreage, closer to the maximum interval of 5,892acres to account for acreage that has fallen out of rotation and is in sub-optimal condition. Park staffing, funding and weather conditions will influence the ability of the park to keep natural communities within their optimal fire return intervals. Not all zones will be burned within the maximum recommended fire return intervals, while others may be burned more frequently. Some fire type acres will be unavailable for burning until conditions within the management zone allow.

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). 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 three parks are partitioned into burn zones, and burn prescriptions are implemented for each zone (see individual park Burn Zones Maps).

Overall, the Wekiva River Basin has a successful prescribed burning program. The staff includes some of the best trained burners in the State. A determined effort is being made to prevent burn units in maintenance condition from deteriorating. Even with a conscious effort, the fire return 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.

In the past, the park already uses aerial ignition to burn large acreage. Since 2001, the National Interagency Prescribed Fire Training Center (PFTC) has been used to assist with prescribed burns. This saved some of the park staff to complete other tasks. The park utilizes staff from other parks as well as providing its staff and equipment to burn in other units.

The parks system contains 4,694.27 acres of altered landcover that historically were fire type communities. Under optimum maintenance condition the altered land cover types would resemble the proper habitat communities that they have been determined to be (see Desired Future Conditions Map). Once restored to maintenance conditions, an additional 900 to 2,300 acres need to be included in the burn plan each year. Until restoration efforts can be initiated in these locations fire will be used as a management tool in the interim with no set fire interval assigned.

There are two burn seasons: spring/summer or growing season and fall/winter dormant season. 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, though the possibility for burning during this seasonal period is still practiced where pine mortality is not an issue or when crews are able to control the fire intensity.

In order to track fire management activities, the DRP maintains a statewide burn database. The database allows staff to track various aspects of each park's fire management program including individual burn zone histories and fire return intervals, staff training and experience, backlog, etc. The database is also used for annual burn planning which allows the DRP to document fire management goals and objectives on an annual basis. Each quarter the database is updated and reports are produced that track progress towards meeting annual burn objectives.

Natural Community Restoration

In some cases, the reintroduction and maintenance of natural processes is not enough to reach the desired future conditions for natural communities in the park, and active restoration programs are required. Restoration of altered natural communities to healthy, fully functioning natural landscapes often requires substantial efforts that may include mechanical treatment of vegetation or soils and reintroduction or augmentation of native plants and animals. For the purposes of this management plan, restoration is defined as the process of assisting the recovery and natural functioning of degraded natural communities to desired future condition, including the re-establishment of biodiversity, ecological processes, vegetation structure and physical characters.

Examples that would qualify as natural community restoration, requiring annual restoration plans, include large mitigation projects, large-scale hardwood removal and timbering activities, roller-chopping and other large-scale vegetative modifications. The key concept is that restoration projects will go beyond management activities routinely done as standard operating procedures such as routine mowing, the reintroduction of fire as a natural process, spot treatments of exotic plants, and small-scale vegetation management.

Following are the natural community/habitat restoration and maintenance actions recommended to create the desired future conditions in the sandhill, mesic flatwoods, wet flatwoods and scrub natural communities (see Desired Future Conditions Map).

Objective B: Conduct habitat/natural community restoration activities on 750 acres of sandhill, 560 acres of mesic/wet Flatwoods and 156 acres of scrub/scrubby flatwoods natural communities

Action 1 Develop/update site specific restoration plan

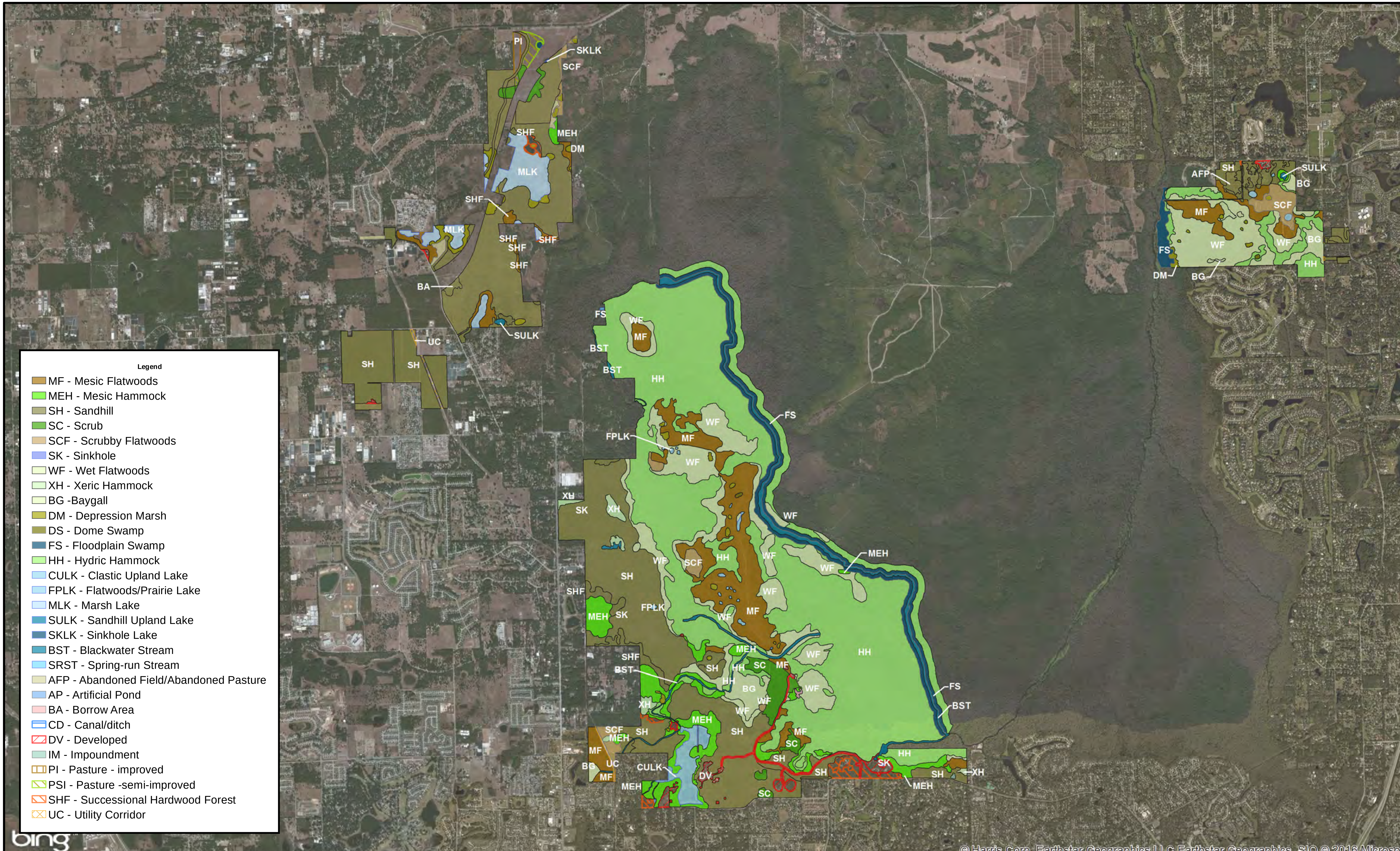
- finalize restoration plan for altered land cover in RSRSR (management zones RKS-054A, 054B and 054C)
- develop plan for restoration of pine plantation property
- develop plan for restoration of altered land cover on Neighborhood Lakes property (management zones WS-NL2, WS-NL3 and WS-NL4)

Action 2 Initiate/Implement restoration plans

Action 3 Conduct hardwood removal on 661 acres.

- 214 acres on LWRPSP including the Skinner and Jung properties
- 172 acres on WSSP including the Markham woods property
- 275 acres on RSRSR including the west BMK and Kitteridge properties

In the Wekiva River Basin State Parks there is a total of 1,466ac of restoration to be scheduled for the 10-year duration until the next management plan revision. This acreage does not constitute the entire amount of acreage that would need restoration within the park boundaries.



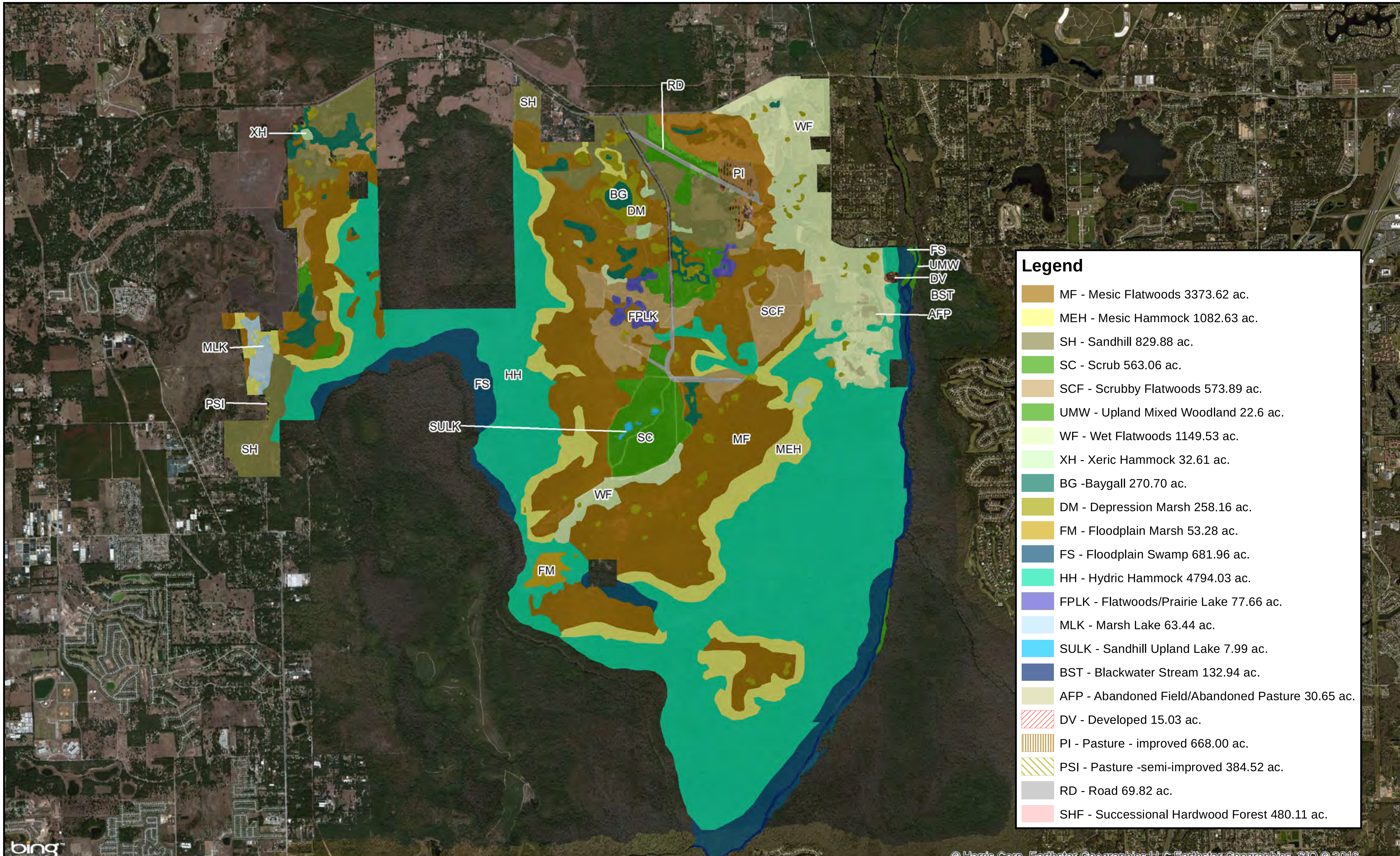
WEKIWA SPRINGS STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

NATURAL COMMUNITIES
DESIRED FUTURE CONDITIONS MAP



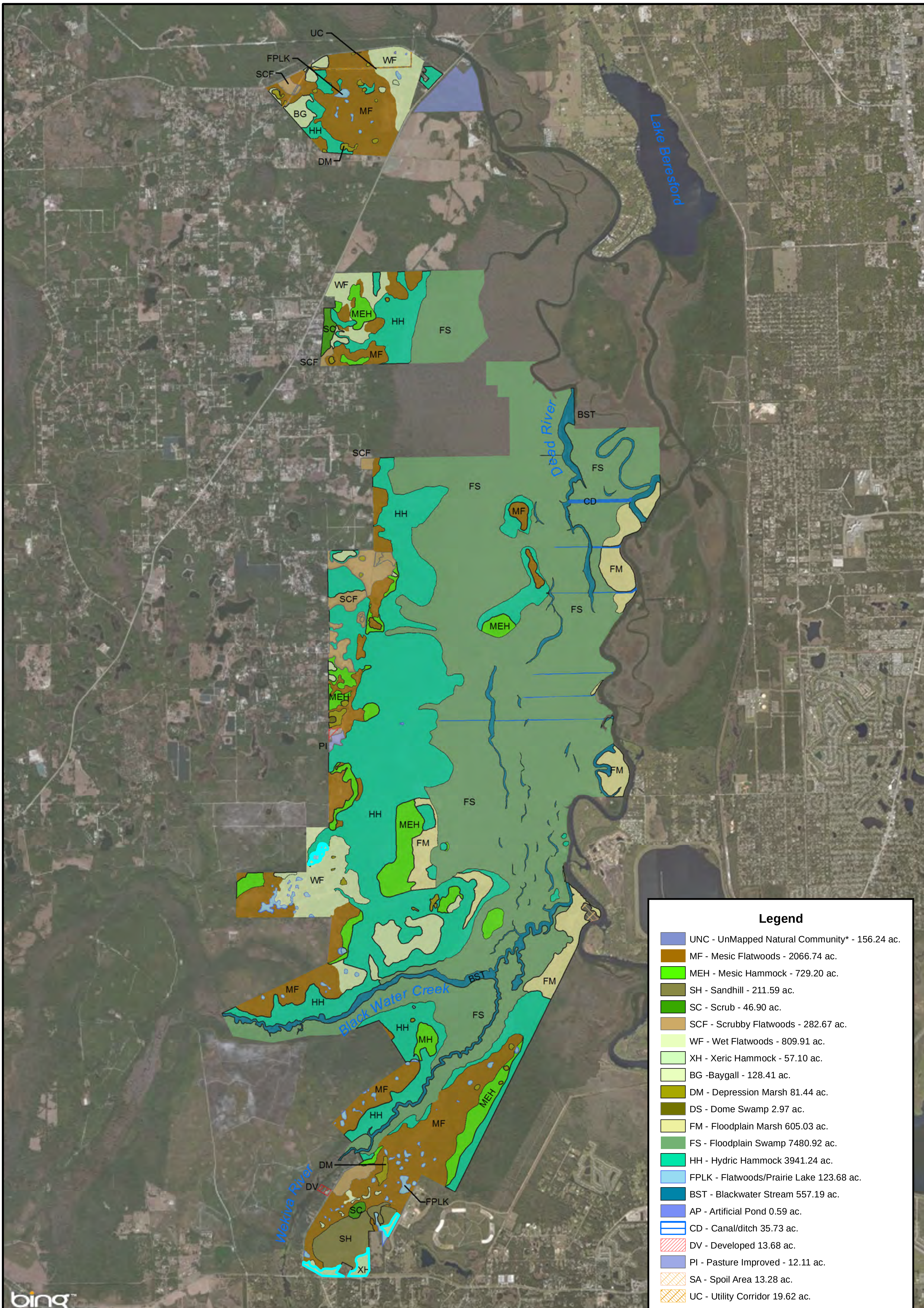
ROCK SPRINGS RUN STATE RESERVE

N

0 0.25 0.5 1 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2011

NATURAL COMMUNITIES MAP
DESIRED FUTURE CONDITIONS



LOWER WEKIVA RIVER
PRESERVE STATE PARK

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

NATURAL COMMUNITIES
DESIRED FUTURE CONDITIONS MAP

A plan for general restoration of all locations within the parks in addition to two other specific plans for the restoration of altered land covers found within Rock Spring Run State Reserve, Neighborhood lakes and for Pine Plantation. The general restoration efforts will require a variety of treatments. The locations for these activities are within communities that have deteriorated in extreme sub-optimal condition. These locations will either require mowing, roller-chopping or hardwood removal. Groundcover restoration will also be needed. This will require the application of mechanical and/or chemical treatments to remove the current groundcover species on location. This will be followed up with monitoring and additional treatments. Planting of native species will be included in the process along with additional monitoring.

There are 661 acres of hardwood removal required within WRBSP. In all four habitat communities discussed above. WSSP will require 172 acres of removal, RSRSR will require 275 acres of removal and finally LWRPSP will require 214 acres of removal. The removal of these hardwood will allow for the park to follow behind with prescribed fire and if need the planting native species as part of the restoration effort. Smaller area of hardwood removal may be accomplished in-house with park staff and AmeriCorps members. Larger area will require that use of an outside contractor. The proceeds from these efforts will be used for continual restoration efforts.

The Pine Plantation unit is a former planted northern slash pine community that will require removal of off-site tree species from the northern slash pine community and planting of native longleaf pine and wiregrass seedlings. The initial step will be the removal of exotic plant species and a timber management assessment would need to be conducted for the purpose of pine removal. The appropriate tree species (primarily longleaf pine) should be made available from a native species resource within the WRBSP as part of the restoration efforts.

The plan for restoration of the large portion of altered land cover in RSRSR will be a long-term project. Initially the plan will be to re-forest a 200-acre section of improved pasture with long-leaf pines. Due to the expense of conducting full restoration of bahia grass pasture to native communities. Re-forestation is a lot more cost effective.

<u>Natural Community Improvement</u>

Improvements are similar to restoration but on a smaller, less intense scale. This typically includes small-scale vegetative management activities or minor habitat manipulation. Following are the natural community/habitat improvement actions recommended at the park.

Objective C: Conduct natural community/habitat improvement activities on 255 acres of sandhill, 425 acres of mesic/wet flatwoods and 485 acres of scrub/scrubby flatwoods natural communities.

Action 1	Thinning of oaks and other hard woods in each of the three parks, (fuel wood reduction, roller-chopping, and/or mowing) totaling 1,165 acres
Action 2	Removal of 10-20 year stage class sand pines in sandhill and scrub/scrubby flatwoods communities
Action 3	Minor roller-chopping/lay down fuels 2 to 3 dozer/tractor widths along overgrown edges of management zones
Action 4	Minor roller-chopping/lay down fuels 1 to 2 dozer/tractor widths through overgrown fuels in select management zones.

In the Wekiva River Basin State Parks there is approximately 1,165 acres of habitat/community improvements needed. At WSSP there is 115acres of sandhill, 20 acres of flatwoods and 145 acres of scrub/scrubby flatwoods. At RSRSR there is 75 acres of sandhill, 80 acres of flatwoods and 275 acres of scrub/scrubby flatwoods. At LWRPSP there is only 65 acres of sandhill 325 acres of flatwoods and 85 acres of scrub/scrubby flatwoods.

In all locations there are oaks need thinning in order to effectively restore this habitat and effectively apply prescribed burning to it. Along with the oak removal there are patches of sand pines that either need thinning or removal. Prescribed fire alone will likely not carry well through this area unless under extreme conditions. Mechanical measures such as using a combination of chain sawing the larger trees and tree cutting the smaller trees should be pursued. Minor roller-chopping may also be required along edges of overgrown areas and paths through the overgrown patches to channel fire through the location. Soil disturbance should be minimized and equipment checks for exotic plant material should be conducted prior to equipment entering the site. Areas where soil disturbance may be an issue the fuels should be mowed instead of chopped. The mechanical measures should be followed up with prescribed burning this section. Photopoints should be established in the project area to monitor project success over time.

Imperiled Species Management

Goal: Maintain, improve or restore imperiled species populations and habitats in the park.

The DRP strives to maintain and restore viable populations of imperiled plant and animal species primarily by implementing effective management of natural systems. Single species management is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes, and should not imperil other native species or seriously compromise park values.

In the preparation of this management plan, DRP staff consulted with staff of the FWC's Imperiled Species Management or that agency's Regional Biologist and other appropriate federal, state and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by park staff periodically to inform management of decisions that may have an impact on imperiled species at the park.

Ongoing inventory and monitoring of imperiled species in the state park system is necessary to meet the DRP's mission. Long-term monitoring is also essential to ensure the effectiveness of resource management programs. Monitoring efforts must be prioritized so that the data collected provides information that can be used to improve or confirm the effectiveness of management actions on conservation priorities. Monitoring intensity must at least be at a level that provides the minimum data needed to make informed decisions to meet conservation goals. Not all imperiled species require intensive monitoring efforts on a regular interval. Priority must be given to those species that can provide valuable data to guide adaptive management practices. Those species selected for specific management action and those that will provide management guidance through regular monitoring are addressed in the objectives below.

Objective A: Develop/Update baseline imperiled species occurrence inventory lists for plants and animals.

Objective B: Monitor and document 19 selected imperiled animal species in the park.

Action 1 Develop monitoring protocols for 3 selected imperiled animal species including Sherman's Fox Squirrel, Florida Mouse and Florida burrowing Owl.

Action 2 Implement monitoring protocols for 16 imperiled animal species including those listed in Action 1 above and gopher tortoise, striped newt, gopher frog, Florida scrub-jay, swallow-tail kite, and imperiled wading birds.

Action 3 Conduction regular bird surveys at a monthly or quarterly basis.

This should capture a number of other bird species for example swallow-tailed kites. This survey becomes critical for migratory specie that may only be accounted for during spring and fall migrations like Worm-eating warbler, Louisiana water thrush and American Redstart. In addition, this survey would also capture winter residents like Merlins. Alligators will be counted with the wading bird surveys conducted on the river.

19 species have been listed for monitoring in the park boundaries. Only three of total number will need new protocols. Even though we've conducted surveyed the burrowing owls in the past no set protocols were established. The purpose was to find out where they were and estimate how many burrows. This population may require a tier 4 level of monitoring. If this level cannot be achieved than a tier 3

should be implemented, especially with the current and future conditions that the colony will be living under. The two other species, Florida mouse and Sherman's fox squirrel have had monitoring conducted in the past. Due to the time since this was last conducted both species need new protocol for monitoring since conditions may have changed in the time frame.

Gopher tortoise monitoring consists of conducting burrow surveys and assessing whether the burrows are active inactive or abandoned. This protocol is good enough to gain a population assessment. This monitoring process easiest to conduct after a management zone has been burned. Man-power and time become the only issues with conducting this survey on a regular basis.

Striped newt and gopher frogs will be monitored on an annual basis using the protocol set-up during the 2005 and 2006 surveys. These surveys will be conduted at a tier 2 level. The bird surveys that the Aquatic preserve conducts along the Wekiva river will continue on a quarterly basis this survey will continue to account for little blue and tricolored herons, snowy egrets, limpkins, woodstorks, white-ibis and swallow-tailed kites (only during spring and summer months) and in addition to American Alligators will also be counted on the surveys. Park staff will assist with these surveys. These will be tier 1 level surveys. Woodstorks and Limpkins may need to be surveyed at a tier 2 separate from the other birds.

Objective C: Monitor and document 10 selected imperiled plant species in the park.

Action 1	Develop monitoring protocols for 7 selected imperiled plant species including hand fern, garberia, blue flower butterwort, sand butterfly pea and the three milk vine species (see table 2 for species info).
Action 2	Implement monitoring protocols for 7 imperiled plant species including those listed in Action 1
Action 3	Continue with the monitoring efforts for hooded pitcher-plants, yellow-flowered butterwort and giant ground orchid.

Of the 10 species listed for monitoring efforts there are five species that park staff has knowledge of the location. These species are the giant ground orchid, yellow butterwort, hooded pitcher-plant, garberia and hand fern (currently a small number of plants has been found in one location). In addition to these five species all three milk vine species have been located, but determining which species has been found at a specific location can only be determined when the plant is either flowering or fruiting. Three of the five species have had some recent monitoring efforts initiated. These three species are the yellow flowered butterwort, giant ground orchid and the hooded pitcher plant. These monitoring methods have documented the species at a tier 2 level. To gain a population census of any species it should be monitored at a tier 2. For each of the species it would be helpful to monitor them during growing season. For giant ground orchids the plant only grows between the months of May through August in the park with flowering occurring mid-early through early August. Yellow butterworts flower between mid-February to mid-May. All species would require an annual survey preferable during flowering or fruiting/seeding for easy identification. A number of the species listed are fire adaptive spicies and a continued existence of a number of these species and continual population growth would be a positive testament to the parks burn program.

Hand ferns have been documented at both RSRSR and LWRPSP. The locations are unknown for where the plants were located at either park unit. July 2015 during an exotic species survey a number plants were located in the southern hydric hammock areas in RSRSR. A tier 2 monitoring protocol will be used with a focus on documentation of the existence on property.

The hooded pitcher-plant will also be monitored. The last efforts for monitoring this species were 2007-2008. Using the monitoring protocols from this study. The species should be monitored at a tier 2 level. This species is not a listed species but the existence of the hooded pitcher-plants is important for the parks because we can use it as an indicator of the health of our flatwoods and depression marsh communities. The plant is a fire-dependent species. We know where the species populations occur on property. Like the giant ground orchid for sandhill, the hooded pitcher-plant can be used by park staff as an indicator of the health of the parks flatwoods communities.

The other two species would require locating the where they may occur. For two of the species, blue flower butterwort and sand butterfly pea we have past FNAI data for park locations. The Sand Butterfly pea was found in two locations at Wekiwa Springs in 2007 and the blueflower butterwort was found in one location at Rock Springs Run State Reserve in 2008. For both species a tier 2 monitoring protocol will be developed and implemented. Initially park staff will need to visit the last known locations for both species and determine if the plants still exist at those locations and how many individuals are on site. A search for other plants can be initiated based on habitat conditions where the plants are found.

The park will require the assistance of district staff along requesting assistance from other agencies and experts in the field, in locating sand butterfly pea, blueflower butterwort and hand fern. This may become critical in species identification, for example sand butterfly pea resembles the more common species of butterfly pea.

Exotic Species Management

Goal: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.

The DRP actively removes invasive exotic species from state parks, with priority being given to those causing the ecological damage. Removal techniques may include mechanical treatment, herbicides or biocontrol agents.

Objective A: Annually treat 15-35 acres of exotic plant species in the park.

Action 1 Annually develop/update exotic plant management work plan.

Action 2 Implement annual work plan by treating 15-35 acres in park, annually, and continuing maintenance and follow-up treatments, as needed.

Action 3 conduct surveys of existing infestations along with searching other locations on property for new infestations.

Action 4 park staff member will continue to participate as a board member for the Central Florida CISMA (Cooperative Invasive Species Management Areas)

The Wekiva River Basin State Parks has an approximate known total of 207 acres infested with exotic plant species. The park will continually treat these infestations and monitors the effectiveness of the treatments. Infestations are prioritized based on ecological impact and not on severity of the species. For example, large areas of Neighborhood lakes (abandoned field/pasture) are infested with natal grass. This species is high on the parks priority list and is highly invasive, though the species in this location has been placed low on the priority list for treatment due to the location in an altered community. In management zone WS-01 a non-category species sweet tanglehead has invaded from outside the park boundary and is continually pushing further into the sandhill in the management zone. Though this exotic grass species is not as high of a priority as natal grass, the infestation in management zone WS-01 is a much higher priority than the infestation of natal grass at Neighborhood Lakes.

Park staff will be tasked with the process of exotic removal, along with the assistance of park volunteers and other agencies, the park should have the ability to achieve these goals. The park will continually pursue grants for exotic removal as an additional resource to achieve and possibly surpass the annual goals. The park has been able to hire additional staff dedicated to exotic removal, as long as funding is available this will continue. The park will also continue to pursue the assistance of the Florida State Parks AmeriCorps service program members assigned to the park continuing with exotic removal as a priority.

Objective B: Implement control measures on 5 exotic animal species in the park.

Action 1 Removal of feral hogs, 9-band armadillos, coyotes and feral cats.

Action 2 Reinstate removal plan for Cuban tree frogs

Park staff will continue to focus on hog removal focusing on locations where heavy hog activity has been observed along with areas that are both ecologically or culturally sensitive. The park currently has two hog traps, one for LWRPSP and the other for RSRSR. The traps have been extremely successful (sometimes catching up to 24 hogs at a time) a component of this success is to constantly move the traps to different location after 1 to 3 successful trappings. As of April of 2016 the park acquired the services of a private contractor to remove hogs on the RSRSR and LWRPSP properties. Annul goals should be between 150-250 hogs.

Both nine banded armadillos and coyotes will continue to be removed on a passive basis. Feral cats will be removed with the assistance of county animal control. Traps are set at locations within the park boundary where staff are aware of cat activity. The local animal control removes that cats from park property.

In 2004 park staff developed and implemented a Cuban tree frog removal plan. The plan was successful in the removal of 352 individuals. The park would like to reinstate this removal procedure. The 2004 removal was a partial study and there were individuals dedicated to the process. The staff dedication may not be at the same level as the 2004 effort. With that being said the removal goals will be set at 100 to 200 annually.

Cultural Resource Management

Cultural resources are individually unique, and collectively, very challenging for the public land manager whose goal is to preserve and protect them in perpetuity. The DRP will implement the following goals, objectives and actions, as funding becomes available, to preserve the cultural resources found in the Wekiva River Basin State Parks.

Goal: Protect, preserve and maintain the cultural resources of the park.

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. All activities related to land clearing, ground disturbing activities, major repairs or additions to historic structures listed or eligible for listing in the National Register of Historic Places must be submitted to the FDOS, Division of Historical Resources (DHR) for review and comment prior to undertaking the proposed project. Recommendations may include, but are not limited to concurrence with the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effect. In addition, any demolition or substantial alteration to any historic structure or resource must be submitted to the DHR for consultation and the DRP must demonstrate that there is no feasible alternative to removal and must provide a strategy for documentation or salvage of the resource. Florida law further requires that DRP consider the reuse of historic buildings in the park in lieu of new construction and must undertake a cost comparison of new development versus rehabilitation of a building before electing to construct a new or replacement building. This comparison must be accomplished with the assistance of the DHR.

Objective A: Assess and evaluate 53 of 71 recorded cultural resources in the park.

Action 1 Complete 47 assessments/evaluations of archaeological sites.

Action 2 Complete 6 Historic Structures Reports (HSRs) for historic buildings and cultural landscape. Prioritize stabilization, restoration and rehabilitation projects.

The park intends to have 47 recorded sites evaluated and condition assessments updated during the plan period. Park staff will attempt to locate the sites and provide information to include but not limited to any threats to the site's condition such as natural erosion; vehicular damage; horse, bicycle or pedestrian damage; looting; construction including damage from firebreak construction; animal damage; plant or root damage or other factors that might cause deterioration of the site. Site assessments should be documented on appropriate forms and a copy sent to the Division of Historical Resource to be filed in the specific WRBSPs park master files for that site's location. A copy of this information should also be maintained at the park and district offices. The park will prioritize preservation projects identified by the assessments/evaluations. Top priority will be placed on recently registered sites. There are 23 new sites on file between the three parks. There are 3 at LWRPSP, 11 at RSRSR and 9 at WSSP. There are two site that have been recommended to be moved, both at WSSP, the cement funnel and metal gutter. The cement funnel is currently located at the Mill pond site. This structure was associated with Sand lake when it was a borrow pit. When the structure was removed from the Sand Lake location it was dumped at the mill pond site. The park would like to remove the funnel from the Mill Pond Site and try to reconstruct it at Sand lake as an interpretive site for park visitors. This would need assessment for safety environmental impacts and feasibility.

Objective B: Compile reliable documentation for all recorded historic and archaeological resources.

Action 1 Ensure all known sites are recorded or updated in the Florida Master Site File.

Action 2 Complete a predictive model for high, medium and low probability of locating archaeological sites within the park/Conduct Level 1 archaeological survey for all priority areas identified by predictive model or other previous study.

The park has not had a full comprehensive level 1 archaeological survey for all three parks but has had an archaeological predictive model developed (USF 2010). This model provides for high, medium and low areas or probability for the occurrence of pre-historic sites. The model will provide guidance for future development as well as Phase 1 surveys. Any areas targeted for future park development will be priority areas for future surveys.

A Scope of Collections will need to be developed should the park acquire any collection items. An administrative history is needed for the park that will help interpret the history of the park. Oral histories of local historians and park staff need to be done to help document the park's history.

Any newly discovered or undocumented historic or archaeological sites will be surveyed and documented on the appropriate forms. A copy of the document will be submitted to the Division of Historical Resource to be registered and then filed in the specific master files for the appropriate park that site was located. A copy of this information should also be maintained at the park and district offices. For example, in the northern portion of Lower Wekiva River Preserve State Park a number of old tram roads have been opened/restored for hiking and horseback riding in the park. Along these roads the park anticipates locating some new cultural sites based on the historic uses of the park.

The general objective for the management of the cultural resources of the Wekiva River Basin State Parks is to protect, preserve and interpret the prehistoric and historic resources. As the composition of park staff changes over time, efforts should be made to insure that there is always at least one staff member who is a certified archaeological monitor. Management should ensure that park personnel are adequately trained in cultural resource management and establish a park library to support the training. Unit staff will ensure that any ground disturbing activities shall be conducted in accordance with DHR guidelines and monitored by appropriately trained personnel. Management should try to develop professional relationships with area university archaeologists, Water Management District land managers and area law enforcement officials to discuss cultural resource management issues and opportunities.

Objective C: Bring 28 of 71 recorded cultural resources into good condition.

Action 1	Design and implement regular monitoring programs for 53 cultural sites
Action 2	Create and implement a cyclical maintenance program for each cultural resource
Action 3	Survey and document all new cultural site within park boundaries

A cyclical maintenance plan should be developed and implemented to help guide the park with needed preservation of its sites. Park staff should develop and implement a preservation and maintenance plan for all cultural resources. Management measures for cultural resources should include development of a phased plan for managing the currently identified recorded sites in the context of their surroundings. The plan should outline approved methodologies for executing the plan and training staff and volunteers in managing the cultural resources of the park. Management should arrange for a Level I survey in all areas planned for development and utilize development project funds to accomplish the survey. Though only232 site have been listed to be brought into good condition, the number of sites that park staff are capable of surveying is set at 53. For all other sites that cannot be restored the current condition should be maintained and not allowed to further deteriorate if possible. Several cultural sites are metallic and are rusting in the corrosive environment, if some form of preservation is not developed then these artifacts will continue to corrode causing continued deterioration in condition. Shell mounds/middens suffer damage from both native and exotic animals on property. Exotic species should be removed from the area. Native species will need to be assess for the level of damage along with determining if the species is a listed species. If so and the relocation is warranted for the site, the removal process will need to be expedited through the proper permitting process from the Florida Fish and Wildlife Conservation Commission.

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 removing 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.

The Wekiva River Basin State Parks needs to have a full timber analysis conducted before any of the proposed work could be conducted.

Wekiwa Springs State Park has only one location that would require timber management as a component of restoration efforts, the Pine Plantation property. This property is a 333-acre stand of northern slash pines. A forestry consultant will be needed for an official assessment of stage class and basal area. Initially the park would like to start with a pine stand thinning following a forester-recommended management practice. A second thinning would occur 3-4 years later. The replacement stand would consist of longleaf pine.

Rock Springs Run State Reserve had a stand of fully mature sand pines in management zones RKS-051 and RKS-052 removed in 2015. The combined acreage is roughly 50 acres. The procedure was used as an alternative to the use of prescribed fire as a natural process for sand pine removal. The major consideration for choosing timber removal was due to fact that park staff could not burn the management zones safely with the mature sand pine stand.

At Lower Wekiva River Preserve State Park, a timber removal should be considered at the Skinner property for management zone LW-SK02 and LW-SK05. These management zones need a thinning of basal area to occur. This again would require the services of a forestry consultant to conduct a basal area assessment. Again, the park would follow the forester-recommended best management practice. After a wildfire that occurred on property February 2011 the entire pine stand in LW-SK04 was lost. The park should have considered timber removal not long after that fire occurred. There is currently a full stand of dead pines in the zone, this poses major safety issues and smoke management issues for prescribe fire activities.

In addition to the proposed activities above the park should consider the use of timber management is an effective tool for removal of dead or dying pine stands. 2005 there was a wild fire at RSRSR in management zone RKS-027. This was a 136 acre stand of mixed pine species (Long leaf slash and pond pines). After a wildfire that occurred on property February 2011 the entire pine stand in LW-SK04 was lost, 114 acres. The park should have considered timber removal not long after that fire occurred. There is currently a full stand of dead pines in both management zones, this poses major safety issues and smoke management issues for prescribe fire activities.

As a result of a major drought in 2001 and 2002 the WRBSP had a southern pine beetle outbreak in several locations. 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.

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.

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

In the fall of 2002, timber removal 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.

Arthropod Control Plan

All DRP lands are designated as "environmentally sensitive and biologically highly productive" in accordance with Ch. 388 and Ch. 388.4111 Florida Statutes. If a local mosquito control district proposes a treatment plan, the DRP works with the local mosquito control district to achieve consensus. By policy of DEP since 1987, aerial adulticiding is not allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. The DRP does not authorize new physical alterations of marshes through ditching or water control structures. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation.

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 located in the Implementation Component of this management plan.

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 are being managed for the purposes for which they were acquired and in accordance with their approved land management plans. The considered recommendations of the land management review team and updated this plan accordingly.

The Wekiva River Basin State Parks were subject to a land management review on July 2015 The review team made the following determinations:

- The land is being managed for the purpose for which it was acquired.
- 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 Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP). These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide outdoor recreation opportunities for Florida's citizens and visitors.

The general planning and design process begins with an analysis of the natural and cultural resources of the unit, and then proceeds through the creation of a conceptual land use plan that culminates in the actual design and construction of park facilities. Input to the plan is provided by experts in environmental sciences, cultural resources, park operation and management. Additional input is received through public workshops, and through environmental and recreational-user groups. With this approach, the DRP 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 expressed 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 are comprised of three individual parks (from south to north): Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River Preserve State Park. There are three parks located within Lake, Seminole, and Orange Counties, about 20 miles north of Orlando in the central part of the state.

The counties of Lake, Seminole, and Orange have a combined population of approximately 1,865,000 (U.S. Census Bureau 2010). By 2030, the combined population of these three counties is projected to be nearly 2,634,000 (BEBR, University of Florida 2016). For Lake County, 18% of residents identify as black, Hispanic or Latino, or another minority group, while Seminole and Orange County have minority communities that represent 22% and 37% of the total population, respectively (U.S. Census Bureau 2010). Of the three counties, Orange County has the highest working age population (16 to 65) percentage at 71%, followed by Seminole County at 70%, and Lake County at 59%. (U.S. Census Bureau 2010). All three counties are below Florida's average per capita income ($42,737) with Seminole County having the highest of the three at $41,806, then Orange County at $38,007, and Lake County at $35,786 (U.S. Bureau of Economic Analysis 2014).

As designated by Visit Florida, the Wekiva River Basin State Parks are located in the Central Vacation Region. The Central region, which includes Lake, Seminole, and Orange County, is the top domestic tourist destination in Florida. The Central region accounts for 34.7% of domestic visitors traveling to Florida, with the Southeast region coming in second at 17.3% (Visit Florida! 2013). These visitors stimulate the regional economy by spending about $170 per day and a majority stay in the region for over 4 nights (Visit Florida! 2013). Along with tourists from around the United States, the Central region also attracts the largest number of Florida residents traveling for leisure purposes.

There are several outdoor recreation opportunities surrounding the Wekiva River Basin State Parks. The Wekiva-Ocala Greenway connects a series of conservation lands managed by local, state, and federal agencies. From south to north, the greenway comprises Wekiwa Springs State Park, Rock Springs Run State Reserve, Seminole State Forest, Lower Wekiva River Preserve State Park, Hontoon Island State Park, Blue Spring State Park, and extends north through the Ocala National Forest with the Cross Florida Greenway on the northern boundaries of the national forest. Recreation opportunities on these conservation lands include camping, picnicking, wildlife viewing, hiking, biking, and water related activities such as canoeing, kayaking, and fishing. In the state and national forest, hunting is allowed and under the regulatory authority of the Florida Fish and Wildlife Conservation Commission.

Existing Use of Adjacent Lands

The Wekiva River Basin State Parks stretch along the St. Johns and Wekiva rivers in one of the fastest growing regions of the state, with portions of the parks extending into northern Orange County, western Seminole County, and southeastern Lake County.

Wekiwa Springs State Park

The southernmost of the three parks, Wekiwa Springs State Park (WSSP) is less than 15 miles from downtown Orlando. The western portion of WSSP is located within Orange County, while the eastern part of the park that borders the Wekiva River is within Seminole County. Given the proximity to Orlando, the existing land uses surrounding the western and southern borders of WSSP can be described as medium-to-high density suburban residential. The City of Apopka, which is west of the park, is one of the many suburbs of Orlando. In addition to residential housing near the boundaries of WSSP, there are agricultural land uses in operation that include citrus production. Kelly Park, a 237-acre parcel of conservation land managed by Orange County, is adjacent to WSSP and contains the headspring for Rock Springs Run. Rock Springs Run State Reserve bounds the eastern border of WSSP and separates the western portion of WSSP from the smaller part of the park that is contained within Seminole County. This smaller parcel is surrounded by the Markham Woods neighborhood, which is another suburban neighborhood with residential and institutional land uses.

Rock Springs Run State Reserve

In the heart of the Wekiva River Basin State Parks, Rock Springs Run State Reserve (RSRSR) is almost entirely surrounded by conservation lands. The western border of RSRSR is shared with WSSP, and Rock Springs Run creates a natural boundary between the two parks. In the northern portion located within Lake County, the Seminole State Forest and Wekiva River Mitigation Bank are adjacent to the reserve. The Wekiva River Mitigation Bank is a privately owned conservation easement where the owners offer environmental and engineering consulting services that include hydrological/ecological restoration and resource management (Mitigation Resources, LLC 2016). On the eastern side of the reserve, the Wekiva River, as well as the Orange and Seminole County boundary, separates RSRSR and the Wekiva River Buffer Conservation Area; the St. Johns River Water Management District (SJRWMD) owns this conservation area. South of the Wekiva River Buffer Conservation Area and on the southeastern boundary of RSRSR, the Florida Audubon Society owns the 650-acre Sabal Point Sanctuary. Combined with the SJRWMD conservation area, this sanctuary provides resource-based recreational opportunities and protects the confluence of the Wekiva and Little Wekiva rivers. In the portions of RSRSR where the reserve is adjacent to developed areas, these land uses are similar to WSSP in that they are low-to-medium density residential and agricultural uses.

Lower Wekiva River Preserve State Park

In reference to WSSP and RSRSR, the Lower Wekiva River Preserve State Park (LWRPSP) is the northernmost with the southern portion of LWRPSP straddling Lake and Seminole County. The southern piece of LWRPSP that is within Seminole County is adjacent to State Road 46. South of SR 46, Seminole County manages Wilson's Landing, a local park with access to the Wekiva River in addition to other resource-based recreational opportunities. Along with public institutional and residential uses near LWRPSP in northwest Seminole County, the County manages a 1,645-acre Black Bear Wilderness Area adjacent to LWRPSP. The St. Johns River, which also serves as the boundary between Lake and Volusia County, runs along the eastern border of LWRPSP. The land to the east of the St. Johns River is relatively undeveloped and acts as a buffer between the park and medium-to-high density residential housing in the City of Debary. In the northern portion of LWRPSP, the park is bordered by Blue Springs State Park, Hontoon Island State Park, and the Hollywood Pines Tract owned by the Nature Conservancy. Land uses adjacent to the western boundary of LWRPSP consist of low-density residential and agriculture. These land uses fall in between the Seminole State Forest to the west and the Ocala National Forest to the north.

Planned Use of Adjacent Lands

Lake County, in which some portion of each park is located, has the Wekiva River Protection Area incorporated into its future land use plan. As such, a majority of future development around WSSP, RSRSR, and LWRPSP will be low density. Future land use designations adjacent to the parks include rural and agriculture. The rural designation allows for 1 dwelling unit per 5 acres, while there are two agriculture designations that allow for between 1 dwelling unit per 20 acres and 1 dwelling unit per 40 acres (Lake County 2030 Future Land Use 2014). The Mt. Plymouth/Sorrento neighborhood, adjacent a northern portion of WSSP, is the exception to low density development. Within the special community designation, this neighborhood has two distinctions that allow 2 dwelling units per acre and 5.5 dwelling units per acre.

WSSP and RSRSR are located almost entirely within Orange County, although RSRSR is mostly insulated from developable adjacent land given that WSSP borders a majority of the reserve's western boundary. Similar to Lake County, Orange County's future land use plan also has a Wekiva River protection zone. The future land use designations in the immediate vicinity of WSSP include rural 1 (1 DU/acre), rural 5 (1 DU/5 acres), low density residential (4 DU/acre), and low-medium density residential (10 DU/acre). Within Orange County and the joint planning area boundary, the City of Apopka is growing steadily near the western boundary of WSSP. However, around the park boundary the future land use designations retain the City's low-density and rural character.

In Seminole County, future land use designations for properties adjacent to WSSP are suburban estate (1 DU/acre) and planned development. For the planned development designation, high-density development is allowed with a minimum residential density of 20 dwelling units per acre and a maximum of 50 dwelling units per acre. However, a majority of the developments located within this designation has already been built out at high densities, and there are few opportunities for infill development that would increase the density of the residential neighborhoods. In addition to these high-density planned developments, there are pockets of low-density residential designations that allow 4 dwelling units per acre. LWRPSP, the southern tip of which falls within Seminole County, also has these future land use designations surrounding its perimeter.

Along with residential and other land uses that are planned for the adjacent properties surrounding the Wekiva River Basin State Parks, the Wekiva Parkway is a major transportation development being designed and constructed to complete the northwestern segment of the Central Florida Beltway that connects Orlando and neighboring jurisdictions. Beginning at U.S. 441, the Wekiva Parkway will travel north through Apopka before turning east slightly north of Kelly Park. Once the parkway crosses into Lake County, it continues through the Neighborhood Lake portion of WSSP to connect with State Road 46. This segment of the parkway is already completed. Future construction of the Wekiva Parkway will occur along State Road 46 adjacent to the Seminole State Forest, RSRSR, and LWRPSP until it ultimately intersects with Interstate 4.

Florida Greenways and Trails System

The Florida Greenways and Trails System (FGTS) is made up of existing, planned and conceptual non-motorized trails and ecological greenways that form a connected, integrated statewide network. The FGTS serves as a green infrastructure plan for Florida, tying together the greenways and trails plans and planning activities of communities, agencies and non-profit organizations throughout Florida. Trails include paddling, hiking, biking, multi-use and equestrian trails. The Office of Greenways and Trails maintains a priority trails map and gap analysis for the FGTS to focus attention and resources on closing key gaps in the system.

In some cases, existing or planned priority trails run through or are adjacent to state parks, or they may be in close proximity and can be connected by a spur trail. State parks can often serve as trailheads, points-of-interest, and offer amenities such as camping, showers and laundry, providing valuable services for trail users while increasing state park visitation.

There are several trails, both existing and planned, that crisscross through and along the borders of the Wekiva River Basin State Parks. The Florida National Scenic Trail (FNST) is one of eleven nationally designated scenic trails and is approximately 1,300 miles long, stretching from the Big Cypress National Preserve in the Everglades to the Gulf Islands National Seashore south of Pensacola. The FNST traverses through the Ocala National Forest, Seminole State Forest, and the southern tip of Lower Wekiva River Preserve State Park.

Another notable trail that has been designated as a priority land trail by the FGTS is the Seminole Wekiva trail in Seminole County. This paved trail is nearly 14 miles long, and its northern segment is a part of the FNST. Seminole County has proposed to extend the trail north along Longwood Markham Road. The proposed trail would extend from Markham Road, adjacent to Wekiva Springs State Park, north to State Road 46, which forms the southern boundary of LWRPSP. South of Markham Road, the Seminole Wekiva trail branches off to form the Cross Seminole Trail and continues along the FNST. Currently, the Seminole Wekiva Trail ends at a southern trailhead west of Altamonte Springs, but a planned trail extension to the south would continue the trail to the Seminole-Orange County border.

In Orange County, the existing Pine Hill Trail would connect with the proposed southern extension of the Seminole Wekiva Trail. According to the Orange County Trails Master Plan, planned additions to the Pine Hill Trail would allow for the trail to continue south and intersect with the Clarcona/Ocoee Connector Trail. Travelling west, this connector trail would then run into the 22-mile multi-use West Orange Trail. Extending from south of Lake Apopka near Winter Garden to Apopka, the West Orange Trails offers numerous recreational opportunities that include hiking, biking, picnicking, and equestrian activities. Orange County has proposed to extend the West Orange Trail north along County Road 435 to Kelly Park, continuing along the western boundary of Wekiva Springs State Park and the Wekiva Parkway on its way to the Lake-Orange County border. The proposed addition to the West Orange Trail would also extend east along the southern boundary of WSSP with a potential trailhead at the entrance to the state park.

According to the Lake County Trail Master Plan, Lake County has proposed developing the Lake Wekiva Trail. The Lake Wekiva Trail will be a 16.5-mile multi use trail that runs along State Road 46 and will eventually connect with the Seminole Wekiva Trail. From the south, the planned West Orange Connector will link the West Orange Trail in Orange County with the Lake Wekiva Trail. The West Orange Connector will run along the segment of the Wekiva Parkway that travels through WSSP's recently acquired Neighborhood Lakes parcel. Portions of the Lake Wekiva Trail will use sections of State Road 46 that will be abandoned as a result of the construction of the Wekiva Parkway. Through multi-jurisdictional coordination, planned trails in Seminole, Orange, and Lake County will eventually encircle the Wekiva River Basin State Parks, creating region wide recreational opportunities with the state parks as a focal point and hub of activities.

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.

Recreational Resource Elements

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

Land Area

Wekiwa Springs State Park

A majority of the developed recreational use areas at WSSP are located around the park's southern boundary. This area is conducive to recreational uses related to the springhead at Wekiwa Springs and the developed camping areas nearby. Trails traverse through sandhill in the western portion of the park before looping back around toward the developed areas and winding through the hydric hammock and mesic flatwoods that make up large swaths of land on the western banks of Rock Springs Run in the eastern section of WSSP. Trails and other primitive recreational opportunities exist at the Markham Woods, Neighborhood Lakes, and Pine Plantation tracts.

Rock Springs Run State Reserve

The areas adjacent to Rock Springs Run and the Wekiva River are mostly comprised of hydric hammock that does not easily lend itself to recreational activities. However, the flatwoods in the main use areas and the West BMK tract are ideal for equestrian-related activities. Hiking, biking, and primitive camping are also suitable recreational uses in these areas of RSRSR.

Lower Wekiva River Preserve State Park

For LWRPSP, the largest natural communities are floodplain swamp and hydric hammock. These natural communities are not particularly well suited for recreational activities, and most land-based recreation opportunities are concentrated along the western and southwestern boundaries of the park. The mesic flatwoods and sandhill natural communities near Katie's Landing in the southern portion of the park represent areas for recreational opportunities such as hiking, biking, and primitive camping.

Water Area

Wekiwa Springs State Park

The main attraction at WSSP is Wekiwa Springs, a second magnitude spring that maintains a constant temperature of 72 degrees year round. This springhead is ideal for swimming and provides a refreshing experience on hot summer days. The area around Wekiwa Springs is developed with facilities to encourage daylong activities that are meant to complement the swimming area. Other water bodies including Sand Lake and Rock Springs Run encourage water-based recreational uses like fishing and paddling.

Rock Springs Run State Reserve

Although Rock Springs Run and the Wekiva River flow along the boundaries of RSRSR, there are few water-based recreational opportunities at the reserve. The wetland-type natural communities that create a buffer between the water bodies and the rest of the park limit accessibility to areas around the water.

Lower Wekiva River Preserve State Park

The recreational opportunities at LWRPSP are largely directed toward water-based activities. Katie's Landing facilitates access to the Wekiva River and associated paddling trails. Branching off from the Wekiva River, the navigable Blackwater Creek represents an opportunity to expand paddling activities at the park.

Natural Scenery

Wekiwa Springs State Park

The park entrance opens up to the sandhill natural communities and directs visitors to the viewshed around the springhead at Wekiwa Springs. From the campgrounds nearby, visitors can access several different trails that meander through WSSP's diverse natural communities. Hiking, biking, and equestrian trails are offered at WSSP, with some trails being multi-use and others being single use. These trails often traverse through multiple natural communities, giving visitors an opportunity to interpret natural scenery ranging from the expansive views of the sandhill and canopied trails associated with the park's hammocks.

Rock Springs Run State Reserve

Similar to WSSP, RSRSP has large expanses of hydric hammock, mesic flatwoods, and mesic hardwoods natural communities. In addition to these, scrubby flatwoods are concentrated around RSRSR's main recreational use areas. Open pastures, flatwoods extending into the skill, and canopy trails create viewsheds that inspire equestrians, hikers, and bikers alike.

Lower Wekiva River Preserve State Park

For LWRPSP, the largest natural communities are floodplain swamp and hydric hammock. These natural communities are not particularly well suited for recreational activities, and most land-based recreation opportunities are concentrated along the western and southwestern boundaries of the park. Paddling the Wekiva River offers visitors the opportunity to interpret one of the region's most significant natural features.

Significant Habitat

Wekiwa Springs State Park

The star anise, an endangered plant species, relies on WSSP's hydric hammock natural community for habitat. This natural community supports the largest population of star anise in the state. Another imperiled plant species, the giant orchid, can be found near the youth camp facilities at WSSP. In addition to these rare plant species, WSSP provides significant habitat for Florida burrowing owls, gopher tortoises, and Sherman's fox squirrel. WSSP's network of single and multi-use provide excellent opportunities for plant and wildlife viewing. The park is also a part of the Great Florida Birding and Wildlife Trail.

Rock Springs Run State Reserve

In the early 2000s, RSRSR had the largest population of Florida scrub-jays of the three Wekiva River Basin State Parks. Scrub and scrubby flatwood natural communities serve as a crucial habitat for the Florida scrub-jay, a federally-designated threatened species, and of the three parks, RSRSR has the largest acreages of these two natural communities. Although the Florida scrub-jay has not been sighted in the reserve for some years, RSRSR's trails allow visitors to venture out in search of the elusive bird, as well as other wildlife.

Lower Wekiva River Preserve State Park

Given that the park shares an extensive border with the Seminole State Forest, the forest and LWRPSP provide large, contiguous habitat for the Florida black bear. The Wekiva-Ocala Greenway has been a multi-agency effort to improve the wildlife corridor from the Wekiva River Basin State Parks to the Ocala National Forest, with the Florida black bear being one of the biggest potential beneficiaries of such efforts. LWRPSP boasts five active bald eagle nesting sites, and along with its additional wildlife diversity, the park is ideal for wildlife enthusiasts.

Natural Features

Wekiwa Springs State Park

Within WSSP, several natural features represent recreational opportunities for park visitors. Wekiwa Springs is one of the main attractions for the park. Originating at the springhead in the Orange County managed Kelly Park, Rock Springs Run flows along the eastern boundary of WSSP. Accessed by hiking, biking, and equestrian trails, visitors can set up primitive campsites at locations along the run, as well as enjoy the waterway via a paddling trail that continues onto the Wekiva River.

Rock Springs Run State Reserve

Rock Springs Run flows along the western border of RSRSR, and the confluence of Rock Springs Run and the Wekiva River takes place at the southern tip of the reserve. Two primitive campsites in RSRSR can be accessed by canoe, kayak, or trail. Both in the southern portion of RSRSR, the Indian Mound campsite is located on the eastern side of Rock Springs Run, and the Buffalo Tram campsite is situated along the western shores of the Wekiva River. These campsites can be accessed by the hiking, biking, and equestrian trails in RSRSR or by the paddling trail that originates in WSSP.

Lower Wekiva River Preserve State Park

The Wekiva River and St. Johns River flow within LWRPSP, and the two rivers converge in the southern portion of the park. Along with the Blackwater Creek, these three waterways form the Wekiva River Aquatic Preserve. The goals of the aquatic preserve are to protect the system's ecological integrity, restore areas to their natural condition, and encourage sustainable recreational use (FDEP 2014). In addition to the aquatic preserve designation, the Wekiva River, as well as Rock Springs Run and Blackwater Creek, is classified as a National Wild and Scenic River. Park visitors can interpret this unique river by launching a canoe or kayak at Katie's Landing near the southern entrance to the park.

Archaeological and Historical Features

There are 71 archaeological and 12 historic sites within the boundaries of the Wekiva River Basin State Parks. The park's history spans from the time Native Americans occupied the areas around the springheads, spring runs, and rivers during the full sequence of the Pre-Columbian cultural periods through to the historic periods in which settlers in the early 1800s began to set up farms and homesteads.

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 poor condition or inaccessibility. However, the Markham Woods property presents potential interpretive value. The Pinnie Ridge Cemetery and Oak Grove Missionary Church archaeological sites highlight a once vibrant African American community during the 1880s. Additionally, the gravestone of Anthony Frazier, an African American soldier who fought for the Union during the Civil War, was discovered during the construction of the Wekiva Parkway on the Neighborhood Lakes property. With further investigation and research, these historic sites represent an opportunity for the park to develop interpretive exhibits that explore the African American legacy on the surrounding area.

Rock Springs Run State Reserve

Similar to WSSP, shell middens and lithic waste scatter sites can be found along the banks of Rock Springs Run and the Wekiva River in the interior of the reserve. RSRSR also includes historic sites such as the Ethel House and Ethel Cemetery, the oldest known cemetery in Lake County. However, accessibility issues limit the interpretive opportunities of these sites.

Lower Wekiva River Preserve State Park

Archaeological and historic sites in LWRPSP consist of shell middens, shell mounds, and a former logging trail. Similar to RSRSR, however, these sites are often inaccessible due to high water and heavy vegetation and therefore do not represent interpretive opportunities.

Assessment of Use

All legal boundaries, significant natural features, structures, facilities, roads and trails 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 the Wekiva River Basin State Parks for hunting and gathering foods. 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 possibly the park's largest cypress, pine, and wetland hardwood trees. These activities left elevated tram beds and ditches that have altered the natural hydrology.

Wekiwa Springs State Park

From the 1880s to 1980s, 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 WSSP 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 hunting 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 agriculture, 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 in 2001.

Future Land Use and Zoning

The DRP works with local governments to establish designations that provide both consistency between comprehensive plans and zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation.

In Orange County, WSSP and RSRSR fall within two future land use designations: conservation and parks and recreation. According to the Orange County Comprehensive Plan, conservation refers to lands designated for conserving natural resources, while parks and recreation refers to undeveloped or developed lands for passive and active parks (2015). Additionally, Orange County has also established the Wekiva Protection Area which includes WSSP and RSRSR within its boundary. Regulations within this area are meant to protect natural resources and water quality by promoting Low Impact Development (LID).

For Seminole and Lake County, the future land use designations for WSSP, RSRSR, LWRPSP have different names that essentially achieve the same result. In Seminole County, WSSP and LWRPSP are classified as preservation/managed lands, while in Lake County, WSSP and RSRSR are designated as conservation lands. The conservation classification in Lake County allows permitted activities that shall be limited to resource-based passive recreation (Lake County Comprehensive Plan 2010). The Seminole County preservation/managed lands designation provides discretion to governmental agencies in that the County allows uses and activities in these areas that are consistent with the agency's management plan (Seminole County Comprehensive Plan 2011).

Current Recreational Use and Visitor Programs

Wekiwa Springs State Park

The numerous recreational uses at WSSP include swimming, picnicking, hiking, biking, horseback riding, camping, fishing, and interpretation. The springhead day use area is the most utilized portion of the park because of the swimming area at Wekiwa Springs. Picnicking facilities, play areas, and a paddling launch are around the swimming area, and 60 RV campsites are a short distance from the spring. Single and multi-use trails that accommodate hiking, biking, horseback riding, and paddling can be accessed from the RV campground. North of the campground, Sand Lake offers fishing opportunities, and primitive campsites are provided a short hike from there along Rock Springs Run.

Wekiwa Springs State Park recorded 404,651 visitors in FY 2014/2015. By DRP estimates, the FY 2014/2015 visitors contributed $35,288,694 in direct economic impact, the equivalent of adding 565 jobs to the local economy (FDEP 2015).

Rock Springs Run State Reserve

Recreational uses at RSRSR are largely geared toward equestrian-related activities. The reserve has 17 miles of equestrian trails, in addition to primitive equestrian campsites that include a barn, stable, and horse trailer parking. Several miles of the trails at RSRSR are multi-use trails that encourage hiking and biking along with horseback riding. The Hammock House near the Wekiva River offers park visitors an upscale cabin rental opportunity.

Rock Springs Run State Reserve recorded 9,402 visitors in FY 2014/2015. By DRP estimates, the FY 2014/2015 visitors contributed $867,478 in direct economic impact, the equivalent of adding 14 jobs to the local economy (FDEP 2015).

Lower Wekiva River Preserve State Park

Similar to RSRSR, LWRPSP has several equestrian-related recreational uses that include trails for horseback riding and primitive equestrian campsites. Picnic pavilions are also offered at the day use area. Another popular recreational use at LWRPSP is paddling, and a launch is provided at Katie’s Landing.

Lower Wekiva River Preserve State Park recorded 10,324 visitors in FY 2014/2015. By DRP estimates, the FY 2014/2015 visitors contributed $872,690 in direct economic impact, the equivalent of adding 14 jobs to the local economy (FDEP 2015).

Lower Wekiva River Preserve State Park one of nine Florida State Parks that contains a certified segment of the Florida National Scenic Trail (FNST). Formerly the Florida Trail, the FNST was designated in the park in June 2005, as part of the three-party certification agreement between DRP, the U.S. Forest Service and the Florida Trail Association. As prescribed by the agreement, the DRP and the FTA coordinate all programs and activities related to the trail.

Other Uses

Wekiva Springs State Park

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

Camp Thunderbird was formerly 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 is now managed by Quest Inc. for the same purposes and offers multi-day overnight group camping opportunities. The camp parcel, containing approximately 20 acres, is located near the southeast corner of WSSP.

Rock Springs Run State Reserve

On select weekends between September and January, RSRSR is co-managed with the Florida Fish and Wildlife Conservation Commission for limited hunting. During these times, hunting is allowed only in designated areas, and some trails are closed for visitor safety.

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 Wekiva River Basin State Park all wetlands and floodplain as well as scrub, baygall, hydric hammock, depression marsh, dome swamp, floodplain swamp, floodplain marsh, flatwood/prairie lake, sandhill upland lake, marsh lake, blackwater stream, spring-run stream natural communities, and known imperiled species habitat have been designated as protected zones. The park’s current protected zone is delineated on the Conceptual Land Use Plan.

Existing Facilities

Wekiva Springs State Park

The recreational facilities at WSSP are mostly concentrated around the southern entrance to the park. The park's main attraction, Wekiwa Springs, is a popular swimming area, and complementary facilities such as picnic pavilions, a bathhouse, and playground are congregated near the spring. A canoe and kayak launch is also located just north of the swimming area, with a nearby concessionaire offering canoe and kayak rentals. There are three camping areas in the southern portion of the park: a RV campground, developed group camp, and primitive group camp. The park's single and multi-use trails extend north toward Rock Springs Run, where visitors can meander through the western portion of the park, fish at Sand Lake, or set up camp at one of the primitive campsites along Rock Springs Run. Along with the District 3 Headquarters, support facilities for park administration and operations are situated off the park's main road near the entrance station.

Recreation Facilities

Day Use Area
Swimming Area
Canoe/Kayak Launch
Picnic Pavilion (2)
Restroom
Playground
Concession
Bathhouse

Developed Group Camp Area
Cabins (19)
Bathhouse (2)
Dining Hall
Recreation Hall
Ballfield
Restroom
Office

RV Campground
Campsite (60)
Bathhouse (2)

Primitive Camping
Primitive Youth Campsite (3)
Primitive Campsite (4)

Trails
Hiking/Nature (14 miles)
Biking (9 miles)
Equestrian (8 miles)
Paddling (16 miles)

Support Facilities

District Administration Area
Office Trailer (7)
Ranger Residence (6)
Parking (30 spaces)

Shop Area
Pole Barn
Shop Building (4)
Shed

Rock Springs Run State Reserve

Hiking, biking, and equestrian-related activities are the main recreational uses at RSRSR. Visitors enter the park from State Road 46, and from the entrance station, the network of single and multi-use trails can be accessed. The support facilities are found west of the entrance station, while the barn, stable, horse camp, and other equestrian facilities are to the east of the entrance station. Near the Wekiva River, a four-bedroom house that was a part of the original acquisition of RSRSR has been converted into a resort rental lodge known as the Hammock House. In addition, there are two primitive campsites on the property, although the sites can only be accessed by canoe or kayak. During the times of the year that RSRSR allows hunting, recreational use at certain areas and facilities is restricted.

Recreation Facilities

<u>Trails</u>
Hiking/Nature (14 miles)
Biking (15 miles)
Equestrian (17 miles)
Multi-Use (32 miles)

<u>Equestrian Use Area</u>
Horse Barn
Restroom
Trailer Parking (13 spaces)
Primitive Equestrian Campsite (4)

<u>Lodge Area</u>
Hammock House
Barn

<u>Primitive Campground</u>
Campsite (2)

Support Facilities

<u>Entrance Area</u>
Residence
Volunteer Campsite

<u>Residence/Shop Area</u>
Residence
Shop

Lower Wekiva River Preserve State Park

A majority of the eastern half of LWRPSP is inaccessible due to the floodplain swamp and floodplain marsh natural communities that comprise over 8,000 acres adjacent to the park's waterways. The park can be accessed from State Road 44, and most of the recreational opportunities are clustered around the main park road along the western boundary. This main use area includes a barn and stable for equestrian activities, primitive campsites, and picnic pavilions. In the southern portion of LWRPSP, a canoe and kayak launch is located at Katie's Landing. Access to Katie's Landing is from State Road 46. The support facilities for the park, as well as the office for the Wekiva River Aquatic Preserve, are also located in this area.

Recreation Facilities

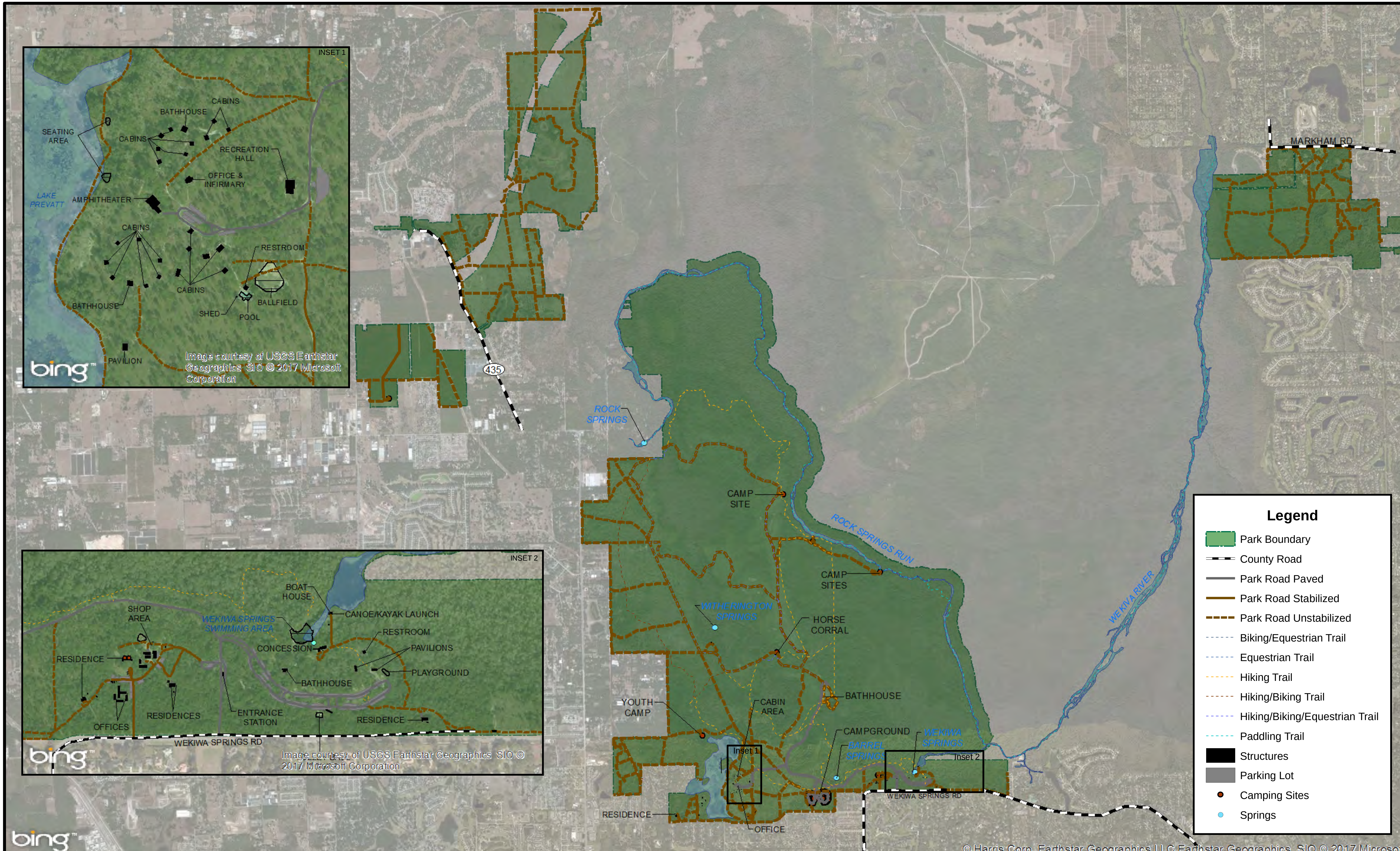
Equestrian Use Area
Stable (2)
Barn
Picnic Pavilion
Bathhouse
Primitive Equestrian Campsite

Trails
Hiking/Nature (7 miles)
Equestrian (15.5 miles)
Paddling (6.5 miles)

Katie's Landing
Canoe/Kayak Launch

Support Facilities

Residence Area
Residence
Volunteer RV Campsite
Vehicle Storage
Office
WSSP Base Map



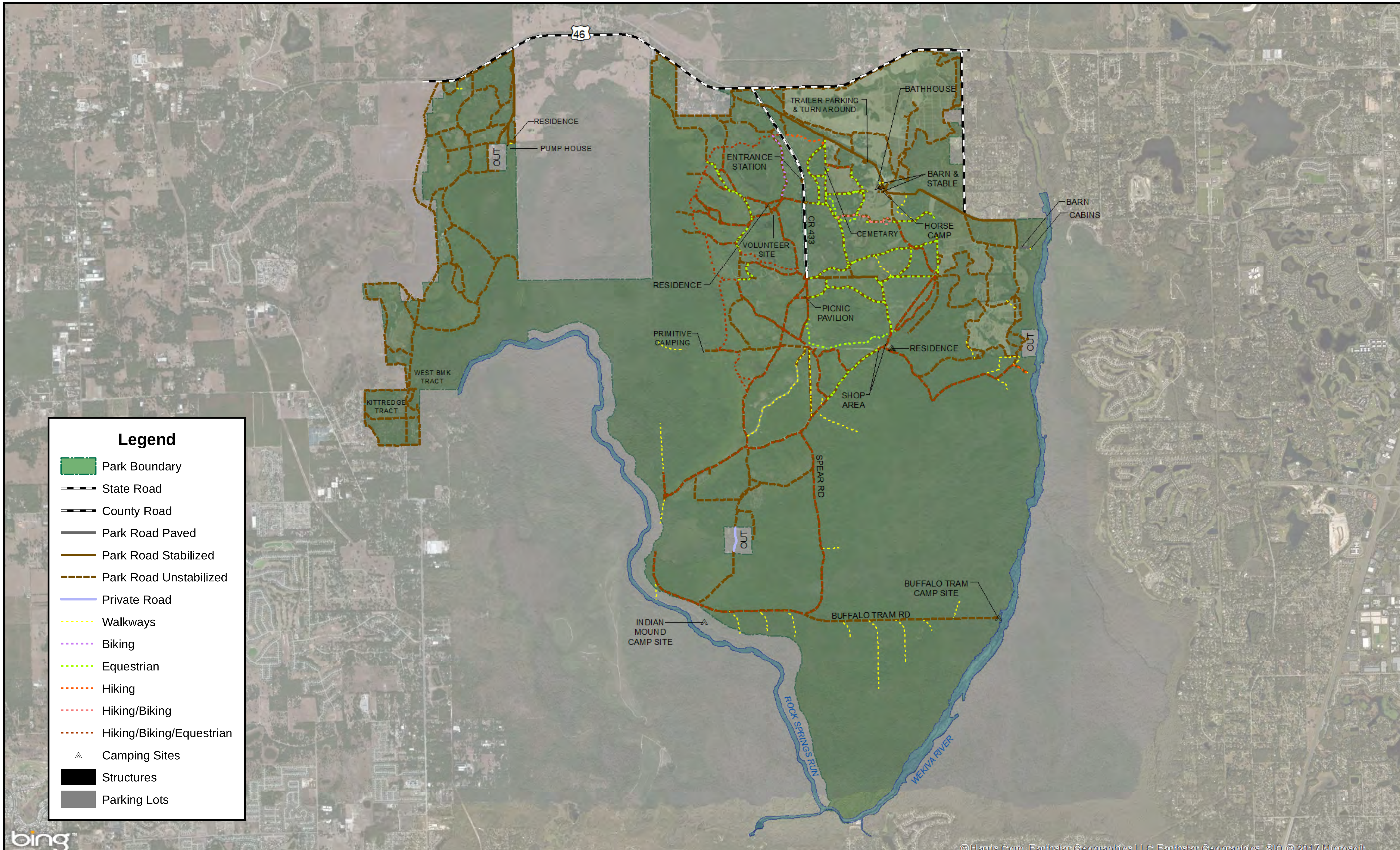
WEKIWA SPRINGS STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

BASE MAP



ROCK SPRINGS RUN STATE RESERVE

N

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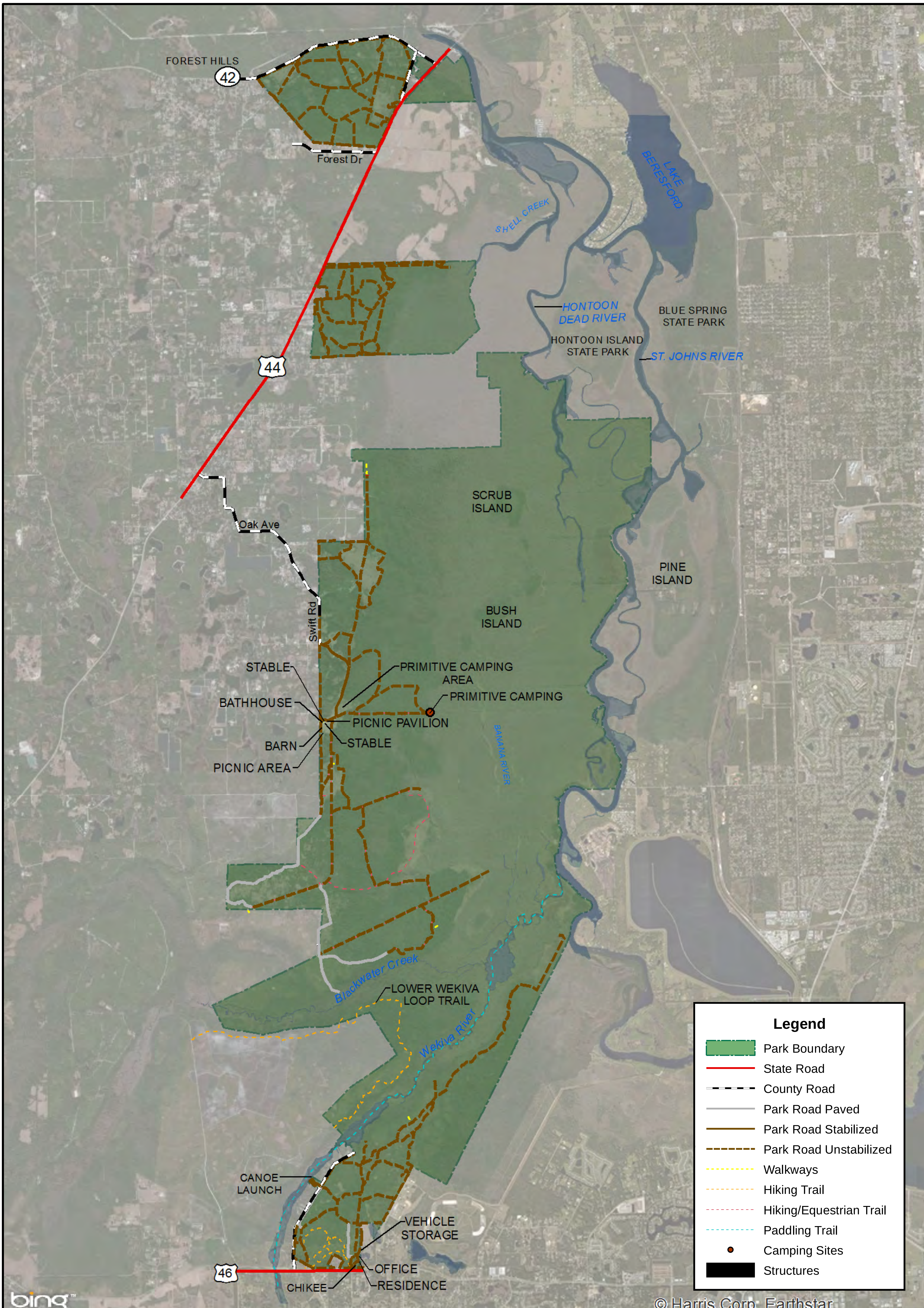
Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

BASE MAP



LOWER WEKIVA RIVER PRESERVE STATE PARK

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Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

BASE MAP

Conceptual Land Use Plan

The following narrative represents the current conceptual land use proposal for this park. The conceptual land use plan is the long-term, optimal development plan for the park, based on current conditions and knowledge of the park's resources, landscape and social setting (see Conceptual Land Use Plan). The conceptual land use plan is modified or amended, as new information becomes available regarding the park's natural and cultural resources or trends in recreational uses, in order to adapt to changing conditions. Additionally, the acquisition of new parkland may provide opportunities for alternative or expanded land uses. The DRP develops a detailed development plan for the park and a site plan for specific facilities based on this conceptual land use plan, as funding becomes available.

During the development of the conceptual land use plan, the DRP assessed the potential impact of proposed uses or development on the park resources and applied that analysis to determine the future physical plan of the park as well as the scale and character of proposed development. Potential resource impacts are also identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal and stormwater management) and design constraints (such as imperiled species or cultural site locations) are investigated in greater detail. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Creation of impervious surfaces is minimized to the greatest extent feasible in order to limit the need for stormwater management systems, and all facilities are designed and constructed using best management practices to limit and avoid resource impacts. Federal, state and local permit and regulatory requirements are addressed during facility development. 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, park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses

Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities in the park.

The existing recreational activities and programs of this state park are appropriate to the natural and cultural resources contained in the park and should be continued. New and improved activities and programs are also recommended and discussed below.

Objective A: Maintain the parks current recreational carrying capacity of 5,108 users per day.

Wekiwa Springs State Park

The recreational carrying capacity of WSSP is 3,220 users per day, and the major recreational activities to be maintained include swimming and camping. The main day use area consists of facilities that complement the recreational use of the springhead and swimming area. A canoe and kayak launch, picnic pavilions, and play space located around the swimming area encourage visitors to spend an extended period of time at the park. Camping is also a popular recreational use for park visitors. WSSP offers several camping options that include a RV campground, primitive youth camp, developed group camping area, and primitive campsites along Rock Springs Run. In addition to swimming and camping activities, the park will continue to maintain its network of trails that provide ample hiking, biking, equestrian, and paddling opportunities.

Rock Springs Run State Reserve

The recreational carrying capacity of RSRSR is 1,220 users per day. In terms of recreational uses, RSRSR has historically been utilized for equestrian-related activities, and equestrian-based recreation will continue to be a focal point for the reserve. Trails, in general, are the main attraction for visitors. In total, RSRSR has 46 miles of trail, and the reserve will continue to maintain these hiking, biking, and equestrian trails. Primitive camping options and a resort rental lodge provide park visitors with an opportunity to explore RSRSR’s trails during the day and then set up camp to stay overnight.

Lower Wekiva River Preserve State Park

The recreational carrying capacity of LWRPSP is 668 users per day. A majority of the park is largely inaccessible due to the floodplain natural communities along the western banks of the Wekiva and St. Johns Rivers. Given this inaccessibility, the recreational uses at LWRPSP are concentrated around the main park entrance off Swift Road and Katie’s Landing in the southern reaches of the park. Equestrian-related and camping activities occur north of the Wekiva River along the western boundary of LWRPSP, while water-related and picnicking activities tend to be the most popular recreational uses of the area around Katie’s Landing.

Objective B: Expand the park's recreational carrying capacity by 734 users per day.

<u>Wekiwa Springs State Park</u>

The recreational carrying capacity of WSSP is proposed to be expanded by 306 users per day. As identified by SCORP, there is a demand for biking, hiking, equestrian, and primitive camping recreational activities in the Central region (FDEP 2013). The Markham Woods, Neighborhood Lakes, and Pine Plantation tracts represent opportunity areas at which the expansion of these types of recreational uses are possible. These tracts, while disconnected from the main WSSP property, are crucial to connecting the park's trail network with trails planned for Lake, Seminole, and Orange County. It will be important for DRP to coordinate with these respective counties to ensure a cohesive effort to develop a well-integrated regional trail system. Along with additional single and multi-use trails, the day use area will be redesigned in order to improve traffic circulation, enhance the access to and viewshed of the swimming area, and better integrate the recreational activities around the springhead at Wekiwa Springs.

<u>Rock Springs Run State Reserve</u>

The recreational carrying capacity of RSRSR is proposed to be expanded by 240 users per day. The portion of the reserve west of the mitigation bank parcel has the potential to be enhanced for increased recreational uses. These uses near the West BMK tract include hiking, biking, and multi-use trails, as well as primitive campsites. Recreational activities in this portion of RSRSR will be conducive to creating connections with the Neighborhood Lakes and Pine Plantation use areas at WSSP, in addition to the Orange County-managed Kelly Park that contains the headspring of Rock Springs Run.

<u>Lower Wekiva River Preserve State Park</u>

The recreational carrying capacity of LWRPSP is proposed to be expanded by 188 users per day. Until the northern Jung and Skinner tract are contiguously linked with the rest of the park, recreational use areas will not be proposed to in these northern sections. As such, the proposed recreational uses will be congregated around Katie's Landing. These activities will include expanded primitive camping opportunities and improved picnicking facilities. In addition, the entrance area near Katie's Landing will be redesigned to increase access to the canoe and kayak launch. An additional paddling trail will also be developed at the Blackwater Creek.

Objective C: Continue to provide the current repertoire of 3 interpretive, educational and recreational programs on a regular basis.

<u>Wekiwa Springs State Park</u>

The Nature Center at WSSP is an interpretive exhibit that educates visitors about the wildlife and historical artifacts at the Wekiva River Basin State Parks. The all-volunteer staff at the Nature Center handle wildlife such as snakes, turtles, and an alligator. Public awareness campaigns like Bear Awareness are showcased for a region in Florida that frequently has human-bear interactions.

<u>Rock Springs Run State Reserve</u>

A concessionaire at RSRSR offers guided horseback trail rides. These tours highlight the miles of trails that are available for equestrian enthusiasts. The horse stable and primitive campsites are complementary facilities that allow park visitors to interpret the natural communities and wildlife at the reserve.

<u>Lower Wekiva River Preserve State Park</u>

The Discover Wekiva festival is held at Katie's Landing in the southern portion of LWRPSP. The festival is a daylong event that includes family-friendly activities such as canoe races and interpretive canoe paddling adventures that allow park visitors to interpret the Wekiva River. In addition to these water-based activities, live animals, guest speakers, music, and food trucks are also a part of the day's festivities.

Objective D: Develop 1 new interpretive, educational and recreational program.

At the Markham Woods tract of WSSP, the Pinnie Ridge Cemetery and Oak Grove Missionary Church were historical sites that once stood on this property and pointed to the existence of a vibrant African-American community from the 1880s. With further investigation, the Markham Woods property could potentially offer an interpretive exhibit that displays the African-American historical legacy in the region.

Proposed Facilities

Capital Facilities and Infrastructure

Goal: Develop and maintain the capital facilities and infrastructure necessary to implement the recommendations of the management plan.

The development concept for the Wekiva River Basin State Parks places emphasis on improving integration between the parks, as well as with the surrounding communities. All three parks currently have several miles of single and multi-use trails that attract visitors from around the Orlando metropolitan area and beyond. In order to leverage these existing assets, it is necessary to develop connections that allow visitors to embark on multi-day trips to explore all of the parks. The three surrounding counties (Lake, Seminole, and Orange) also have ambitious trail master plans that seek to connect with park facilities and create a regional trail network. The DRP should coordinate its efforts with those of the three counties to ensure that park facilities are highlighted as recreational opportunities for users of the regional trail network. Additional park developments will focus on improving access to existing park use areas and increasing recreational use at underutilized areas of the parks.

The existing facilities of this state park are appropriate to the natural and cultural resources contained in the park and should be maintained. New construction, as discussed further below, is recommended to improve the quality and safety of the recreational opportunities, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of improved and new facilities needed to implement the conceptual land use plan for the Wekiva River Basin State Parks:

Objective A: Maintain all public and support facilities in the park.

All capital facilities, trails and roads within the park will be kept in proper condition through the daily or regular work of park staff and/or contracted help.

Objective B: Improve/repair 8 existing facilities and 1.5 miles of road.

Major repair projects for park facilities may be accomplished within the ten-year term of this management plan, if funding is made available. These include the modification of existing park facilities to bring them into compliance with the Americans with Disabilities Act (a top priority for all facilities maintained by DRP). The following discussion of other recommended improvements and repairs are organized by use area within the park.

Wekiwa Springs State Park

Entrance Area: On peak visitation days during the spring and summer months, the entrance area becomes significantly congested. The current park entrance road and turn lane on North Wekiwa Springs Road have a limited amount of space for cars stacking at the entrance. Following the consideration of several different traffic alleviation options, the DRP should work with Orange and Seminole County to extend the right turn lane on North Wekiwa Springs Road. Currently, the turn lane is approximately 200 feet. This plan suggests that the turn lane should be extended by nearly 2,250 feet. Extending the turn lane would allow for an estimated 135 additional cars to stack in the entrance road, while also allowing for cars to leave the line, if desired.

Springhead Area: The day use area around the springhead at WSSP is in need of a redesign that will better integrate the area's recreational uses. This use area is particularly popular for swimming, paddling, and picnicking, but these uses are disconnected from each other. In addition, the viewshed of the springhead is impaired and should be restored in order to fully interpret the second magnitude spring. The redesign of the day use are should also prioritize alleviating traffic congestion and increasing the amount of parking. Determining an alternative location for the concession and education center will be an additional emphasis.

Group Camp/Training Area: The group camp and training area to the west of the RV camping area should be improved during the next ten-year planning cycle. This area can be reserved for large group camp programs, but it is also used for Ranger Academy training and Florida Park Service conferences. As such, a new training/conference facility should be constructed to adequately accommodate these events. In addition, the parking situation should be improved to increase the parking capacity of this area.

Sand Lake Area: The Sand Lake use area is relatively underutilized, and improvements should be made to attract more visitors to this area of the park. First, an open-air multi-use pavilion that supports a wide range of activities including interpretive programs, meetings, and other special events should be developed. Improvements to the existing park drive and parking area will be necessary to accommodate a bus or vehicle drop off and offer parking for approximately 30 cars and 4 buses or RVs. The Sand Lake Trail should be an accessible trail around Sand Lake that includes interpretive panels and overlooks. Trailhead improvements will include additional interpretive panels and orientation signage adjacent to the current parking area to highlight existing hiking, biking and equestrian trails and opportunities for nature study. Additional site enhancements such as native landscaping, benches, trash receptacles, and bike racks should be considered for inclusion.

Rock Springs Run State Reserve

Entrance Area: The main entrance to RSRSR will be relocated to Wekiva River Road, about two miles east of its current location at CR 433. Traveling south on Wekiva River Road, the new park entrance will be half a mile from the Wekiva Parkway currently under development. On RSRSR property, an existing unstabilized park road will be converted into a paved park entrance road. This entrance road will be a mile long and will include a park entrance sign, gate, fencing, and landscaping. The entrance station currently located on CR 433 will also need to be relocated at some place along the new park entrance road. Once the new park entrance road is completed, the drive into the park will foster a sense of arrival at the road's endpoint, the equestrian day use area.

Equestrian Day Use Area: Given the relocation of the park entrance road, the development of a trail hub at the existing equestrian day use area should be explored. This area has facilities such as a barn and stable, restroom, and equestrian campsite, making this use area a natural location for a centralized trail hub that connects with the reserve's existing trails. Additionally, the existing parking situation at the equestrian day use area is on an ad-hoc basis, and there is a need for formalized parking located near these equestrian-related facilities.

Lower Wekiva River Preserve State Park

Equestrian Day Use Area: The existing day use area at LWRPSP is in need of a large picnic pavilion. The pavilion will include between 8 to 12 picnic tables for day use visitors and large parties. Improved wayfinding that allows visitors to navigate the park's trails is also needed.

Katie's Landing: The Katie's Landing use area will be enhanced in order to improve access to the paddling launch and increase visitor use through new recreational facilities. There are low density residential units along the Wekiva River on the north and south side of the Katie's Landing, and Wekiva Park Drive separates Katie's Landing from the southern portion of LWRPSP. As such, it is necessary to improve access to Katie's Landing from the portion of LWRPSP that is on the east side of Wekiva Park Drive. A pedestrian crossing will be implemented from Katie's Landing across Wekiva Park Drive to an existing trailhead as a means to improve access to the paddling launch. The DRP will coordinate with Seminole County to establish such a crossing on the county road. The pedestrian crossing will also facilitate access to the primitive campsites that will be established on the east side of Wekiva Park Drive.

Objective C: Construct 5 new facilities and 18.5 miles of trail.

Wekiwa Springs State Park

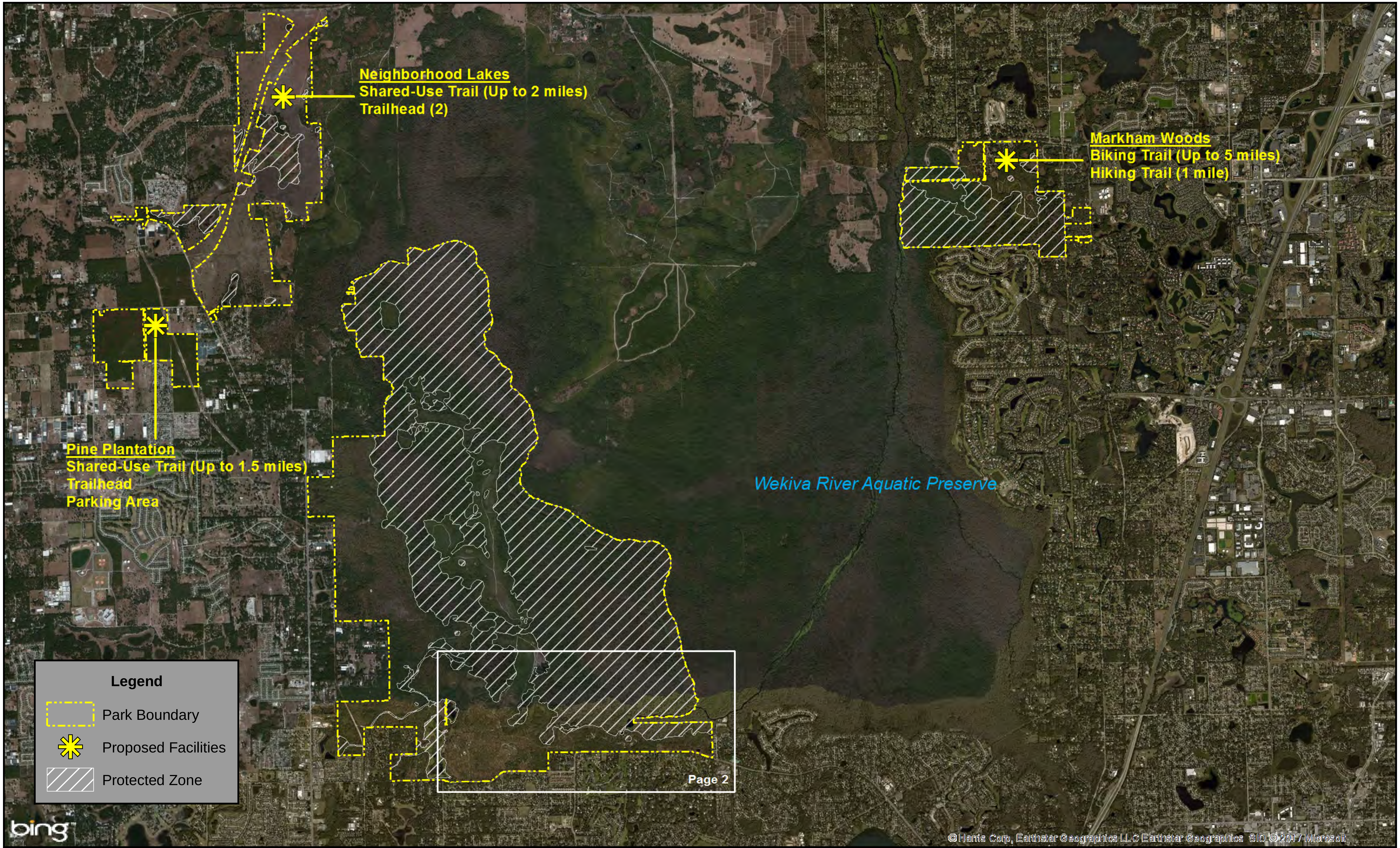
Markham Woods: A trailhead for the Seminole Wekiva Trail is currently located in the northern portion of the Markham Woods use area. Given the demand for off-road biking opportunities, up to five miles of biking trails are proposed for Markham woods. These trails can be multi-use to include hiking and will branch off from the trailhead in the north of the property. Wayfinding signage and trail markers will need to accompany this development. In addition to the multi-use trail, a mile-long hiking trail is proposed for the area around the environmental education center in the eastern portion of the Markham Woods tract.

Neighborhood Lakes: In order to offset the impacts from the construction of the Wekiva Parkway through the Neighborhood Lakes property, a trail corridor easement has been established that will connect the proposed extension of the West Orange trail and the Lake Wekiva trail. This trail corridor runs parallel to the Wekiva Parkway starting in Orange County and ending in Lake County. Two trailheads will connect the corridor, with one in Orange County on CR 435 and another at SR 46 in Lake County. The DRP will coordinate with these two counties on the implementation of the trailheads in order to be consistent with the trail master plans in each county. In Orange County, the West Orange trail will extend north to connect with the trailhead at Neighborhood Lakes, and the Lake County trailhead will be a stop along the Lake Wekiva Trail. While the trail corridor developments will be on the western side of the Wekiva Parkway, another proposal is to develop up to two miles of equestrian and hiking trails on the eastern side of the Parkway. These trails will extend into RSRSR and connect with the proposed trail developments in the reserve.

Pine Plantation: Approximately one and a half miles of multi-use trails are proposed for the eastern portion of the Pine Plantations tract. The trail segments will accommodate hiking and equestrian uses. A trailhead is proposed for the northern portion of Pine Plantation near Haas Road. The trailhead will include regular parking and parking for horse trailers. The DRP will coordinate with Orange County to determine the feasibility of connecting the Pine Plantation's trailhead with the proposed West Orange trail northern extension.

Rock Springs Run State Reserve

West BMK: East of the private mitigation bank on the West BMK portion of RSRSR, there are recreational opportunities that include primitive camping and multi-use trails. With the development of multi-use trails in the Neighborhood Lakes portion of WSSP, it is feasible that recreational use will increase in the western segments of the Wekiva River Basin State Parks. To facilitate this increase in recreational use, up to five miles of multi-use trails (equestrian, biking, and hiking) are proposed for the West



WEKIWA SPRINGS STATE PARK

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Date of aerial; 2011

DRAFT CONCEPTUAL LAND USE PLAN

WEKIWA SPRINGS STATE PARK

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DRAFT CONCEPTUAL LAND USE MAP - PAGE 2

ROCK SPRINGS RUN STATE RESERVE

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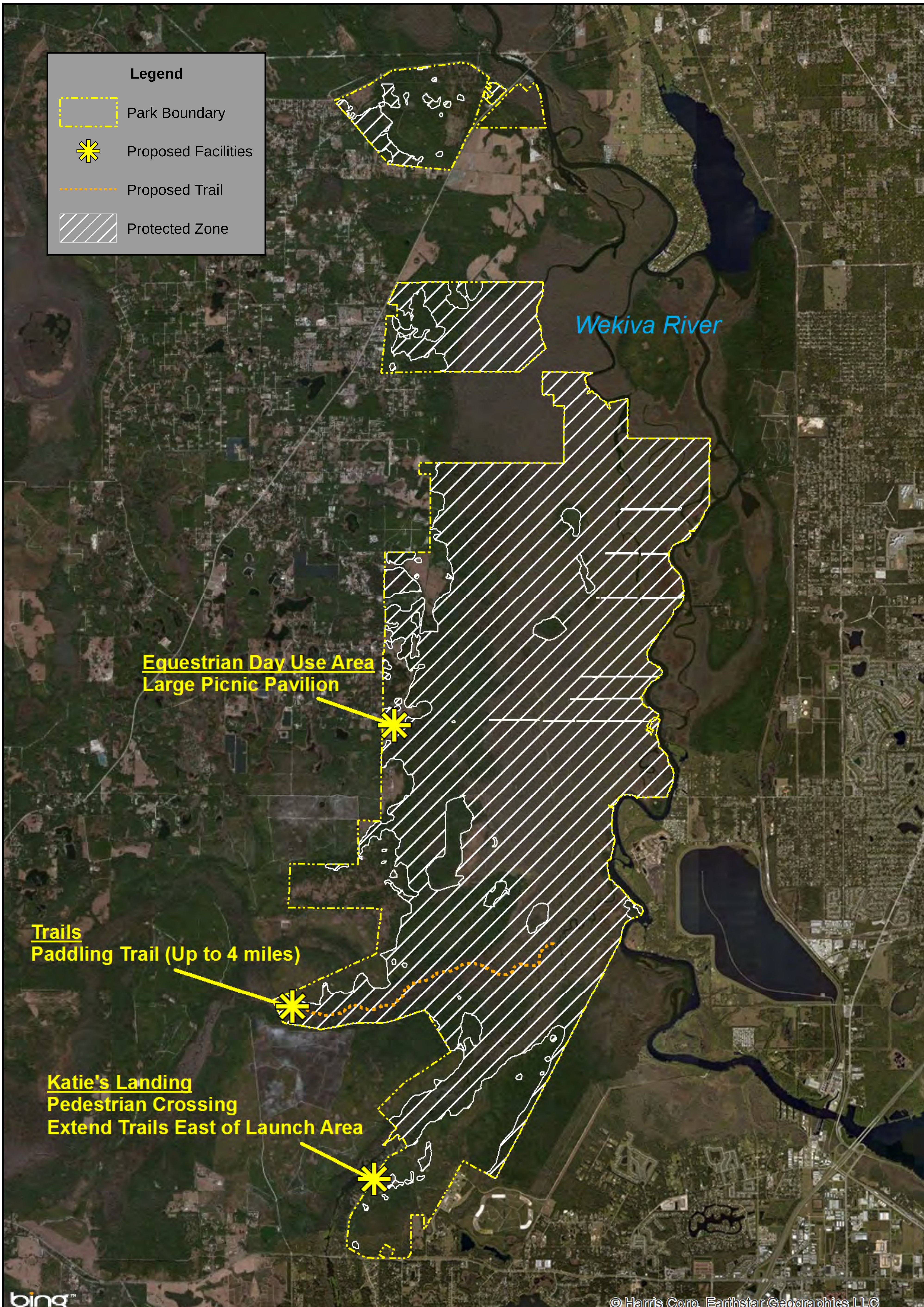
DRAFT CONCEPTUAL LAND USE PLAN



LOWER WEKIVA RIVER
PRESERVE STATE PARK

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DRAFT CONCEPTUAL
LAND USE PLAN

BMK tract of RSRSR. Unstabilized park roads in this area can be converted into multi-use trails, and these trails should connect with the proposed trails in Neighborhood Lakes. The West Orange trail proposed extension will run along the Kittredge tract, and the DRP will coordinate with Orange County to enable trail connectivity. In addition to trails, two primitive campsites that can both accommodate up to ten people each is proposed for the West BMK tract.

Lower Wekiva River Preserve State Park

Trails: Currently, the Katie's Landing canoe and kayak launch is one of the starting points for the Wekiva River paddling trail. Branching off to the west of the Wekiva River, the Blackwater Creek has been discovered to be navigable by canoe or kayak, and it is proposed that four miles of paddling trail be developed on this water body. Paddlers could reach the new paddling trail from the existing Wekiva River paddling trail, or the option of an additional launch from the paved park road to the north of the Blackwater Creek could be explored.

Facilities Development

Preliminary cost estimates for these recommended facilities and improvements are provided in the Ten-Year Implementation Schedule and Cost Estimates (Table 7) located in the Implementation Component of this plan. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist DRP in budgeting future park improvements, and may be revised as more information is collected through the planning and design processes. New facilities and improvements to existing facilities recommended by the plan include:

Wekiwa Springs State Park

Entrance Area
Extend Park Entrance Turn Lane

Group Camp/Training Area
New Training Facility
Improved Parking Area

Neighborhood Lakes
Shared-Use Trail (up to 2 miles)
Trailhead (2)

Springhead Area
Redesign Use Area
Increase Parking

Markham Woods
Biking Trail (up to 5 miles)
Hiking Trail (1 mile)

Pine Plantation
Shared-Use Trail (up to 1.5 miles)
Trailhead

Rock Springs Run State Reserve

Entrance Area
New Park Entrance Road

West BMK
Shared-Use Trail (up to 5 miles)
Primitive Campsite (2)

Equestrian Day Use Area
Trail Hub
Formalized Parking Area

Lower Wekiva River Preserve State Park

Katie's Landing
Pedestrian Crossing
Extend Trails East of Launch Area

Trails
Paddling Trail (up to 4 miles)

Equestrian Day Use Area
Large Picnic Pavilion

Recreational 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 6).

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's carrying capacity as shown in Table 6.

Table 6 -- Recreational Carrying Capacity						
	Existing Capacity*		Proposed Additional Capacity		Future Capacity	
Activity / Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
<u>Wekiwa Springs State Park</u>						
Trails						
Hiking	140	280	10	20	150	300
Biking	90	360	50	200	140	560
Equestrian	64	128	28	56	92	184
Paddling	256	512			256	512
Picnicking	100	200			100	200
Swimming	500	1000			500	1000
Camping						
Primitive	40	40	30	30	70	70
RV Campground	480	480			480	480
Primitive Youth Camp	60	60			60	60
Developed Group Camp	160	160			160	160
TOTAL	**1,890**	**3,220**	**118**	**306**	**2,008**	**3,526**
<u>Rock Springs Run State Reserve</u>						
Trails						
Hiking	140	280			140	280
Biking/Multi-Use	150	600	50	200	200	800
Equestrian	136	272			136	272
Camping						
Primitive	20	20			20	20
Primitive Group Camp			40	40	40	40
Primitive Equestrian	40	40			40	40
Lodge	8	8			8	8
TOTAL	**494**	**1,220**	**90**	**240**	**584**	**1,460**
<u>Lower Wekiva River Preserve State Park</u>						
Trails						
Hiking	70	140			70	140
Equestrian/Multi-Use	124	248			124	248
Paddling	104	208	64	128	168	336
Picnicking	16	32			16	32
Camping						
Primitive			60	60	60	60
Primitive Equestrian	40	40			40	40
TOTAL	**354**	**668**	**124**	**188**	**478**	**856**

*Existing capacity has been revised from approved plan to better follow DRP carrying capacity guidelines.

Optimum Boundary

The optimum boundary map reflects lands considered desirable for direct management by the DRP as part of the state park. These parcels may include public or privately owned land that would improve the continuity of existing parklands, provide the most efficient boundary configuration, improve access to the park, provide additional natural and cultural resource protection or allow for future expansion of recreational activities. Parklands that are potentially surplus to the management needs of DRP are also identified. As additional needs are identified through park use, development, and research, and as land use changes on adjacent property, modification of the park's optimum boundary may be necessary.

Identification of parcels on the optimum boundary map is intended solely for planning purposes. It is not to be used in connection with any regulatory purposes. Any party or governmental entity should not use a property's identification on the optimum boundary map to reduce or restrict the lawful rights of private landowners. Identification on the map does not empower or suggest that any government entity should impose additional or more restrictive environmental land use or zoning regulations. Identification should not be used as the basis for permit denial or the imposition of permit conditions.

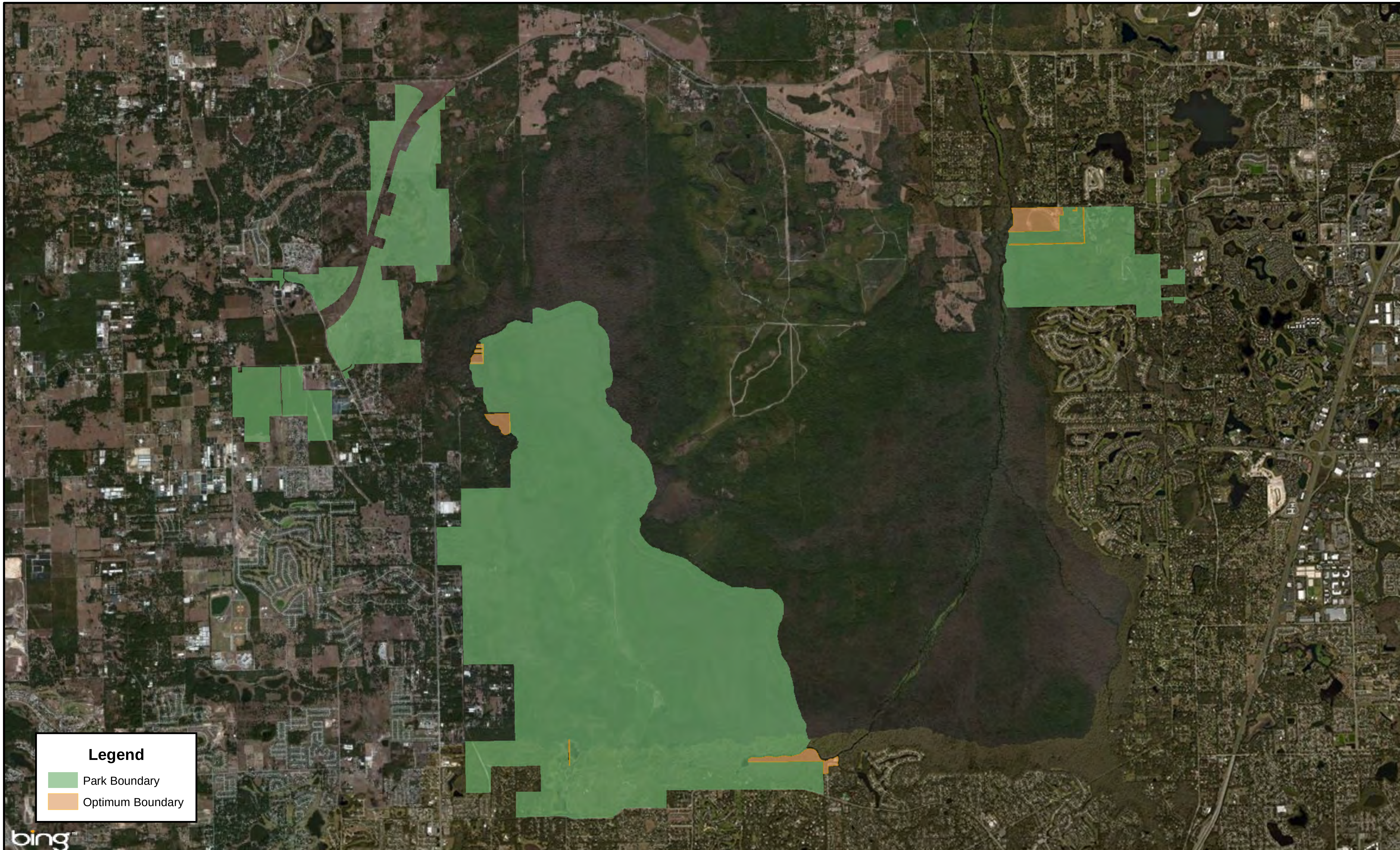
Wekiwa Springs State Park

There are six parcels, totaling approximately 150 acres, identified for the optimum boundary of WSSP. Two of these parcels are in the northwestern portion of the park, near Kelly Park and the springhead for Rock Springs Run. The inclusion of these two parcels on the optimum boundary are for the purposes of spring and waterway protection. Another parcel on the optimum boundary for WSSP is a strip of land to the west of Lake Prevatt and will assist park staff with water quality improvement efforts. To the east of the springhead at Wekiwa Springs, nearly 40 acres has been added to the optimum boundary to ensure the protection of Wekiwa Springs. Two parcels along the Wekiva River at the Markham Woods tract are also identified on the optimum boundary in order to ensure protection of the river while promoting visitor access.

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

Rock Springs Run State Reserve

For RSRSR, there are 10 parcels, nearly 2,000 acres, that have been identified on the optimum boundary. The largest of these parcels the Wekiva River Mitigation Bank property that totals over 1,600 acres. Given the size of this



WEKIWA SPRINGS STATE PARK

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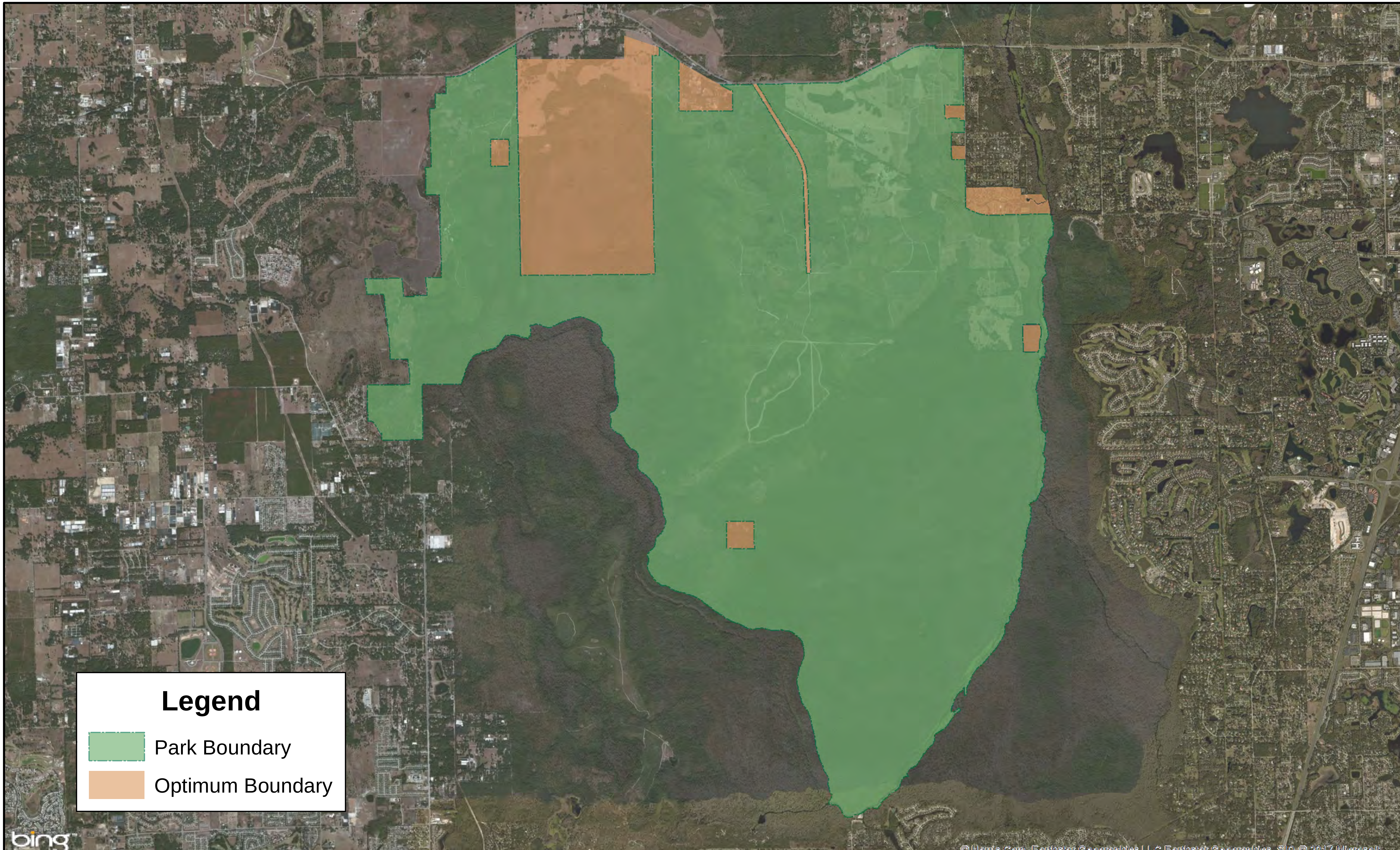
OPTIMUM BOUNDARY MAP



ROCK SPRINGS RUN STATE RESERVE

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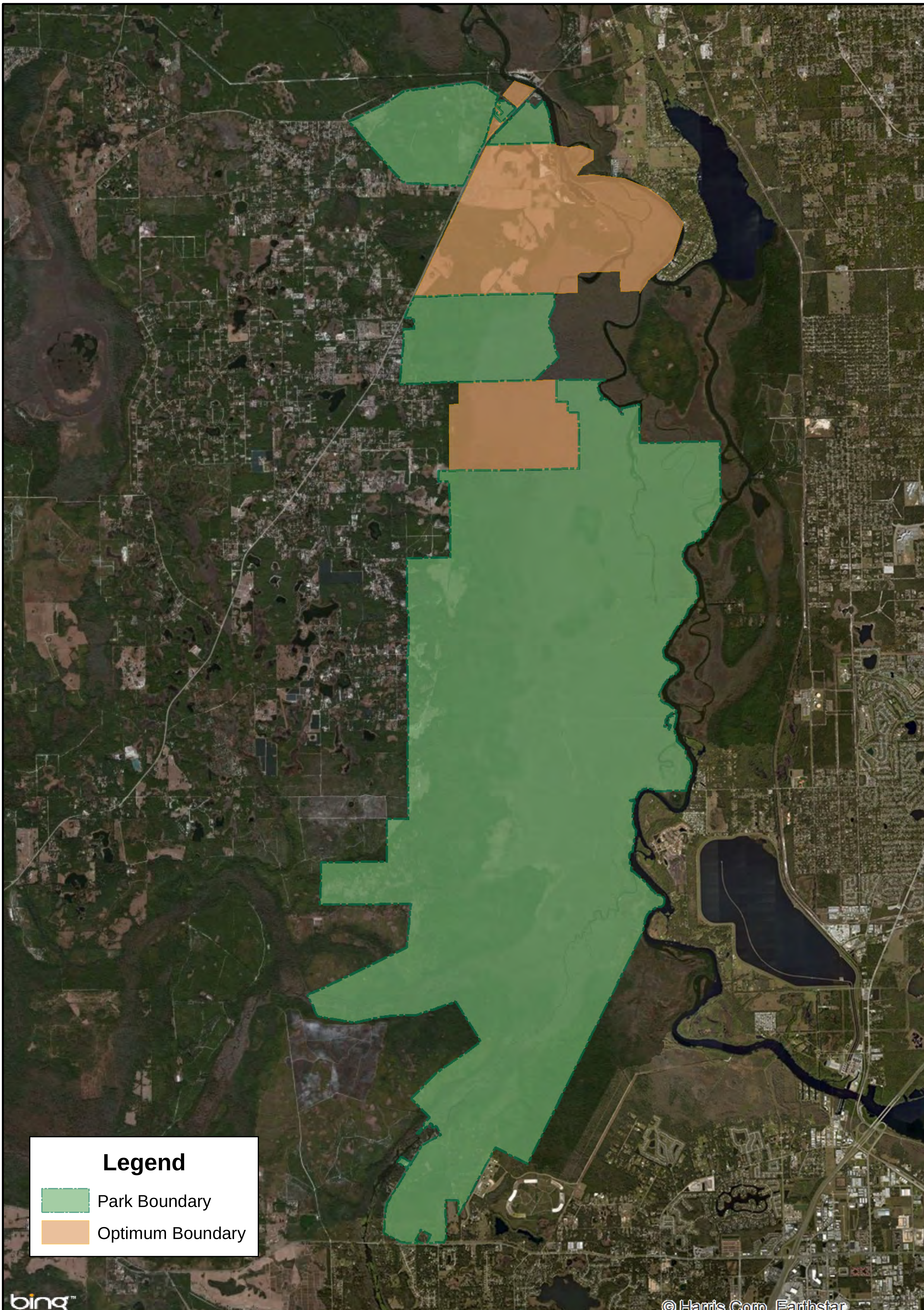
OPTIMUM BOUNDARY MAP



LOWER WEKIVA RIVER
PRESERVE STATE PARK

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OPTIMUM BOUNDARY MAP

property, it is included on the optimum boundary because of important considerations related to habitat connectivity. Along with two smaller parcels on the east and west of the mitigation bank property, these properties would be useful to the park for resource management purposes. Another parcel on the optimum boundary includes the easement dedicated to CR 433. With the development of a new park entrance, this easement is necessary for park staff to manage visitor access to RSRSR. Related to this point, a parcel on the eastern border of the reserve off Wekiva River Road has been identified for the optimum boundary and will facilitate the development of the new park entrance. In addition to other parcels that would be useful for the purposes of resource management, a 100-acre property along the Wekiva River could potentially be used to provide park visitors with access to the river.

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

<u>Lower Wekiva River Preserve State Park</u>

Four parcels totaling approximately 3,400 acres have been identified for the optimum boundary of LWRPSP. These parcels include large swaths of land between the Skinner and Jung tracts in the northern portion of LWRPSP to the west of Hontoon Island State Park. The Skinner and Jung tracts are currently disconnected from the rest of LWRPSP, and adding the properties identified on the optimum boundary would ensure habitat connectivity. Additionally, resource management and the protection of vital waterways such as the St. Johns and Wekiva River are important considerations.

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

IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources. They outline the park's management needs and problems, and recommend both short and long-term objectives and actions to meet those needs. The implementation component addresses the administrative goal for the park and reports on the Division of Recreation and Parks (DRP) progress toward achieving resource management, operational and capital improvement goals and objectives since approval of the previous management plan for this park. This component also compiles the management goals, objectives and actions expressed in the separate parts of this management plan for easy review. Estimated costs for the ten-year period of this plan are provided for each action and objective, and the costs are summarized under standard categories of land management activities.

Management Progress

Since the approval of the last management plan for the Wekiva River Basin State Parks in 2005, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall within three of the five general categories that encompass the mission of the park and the DRP.

Park Administration and Operations

- During the last ten years, park volunteers contributed over 142,724 hours of volunteer service.
- The park's Citizen Support Organization (CSO), the Wekiva Wilderness Trust, Inc., has provided the park with:
    - funding for education, research, and specialty publications
    - specialized equipment for park operations/resource management, including computer and safety equipment, golf carts and other needed equipment
    - funding for new Nature Center
- The CSO has also holds an annual 5/10k race and Plein aire painting week (with formal diner and art auction) at the park to raise funds for some of the items listed above.

Resource Management

Natural Resources

- Prescribed fire management conducted on all three parks = 22,000 acres
- Participated with the district Backlog Abatement Team each year since the project started to assist with burn objectives district wide
- 800 infested acres invasive exotic plants treated on over 2,000 gross acres of parkland
- Restoration of scrub & scrubby-flatwoods:
  - 781 acres in Rock Springs Run State Reserve
  - 2 acres in Lower Wekiva River Preserve State Park
  - 21 acres in Wekiwa Springs State Park
- Natural return of Florida Scrub-jays in restored areas of Rock Springs Run State reserve and Wekiwa Springs.
- Endangered hand fern (*Ophioglossum palmatum* L.) has been located in the hydric hammock in Rock Springs Run State Reserve, only 50 known populations remain in Florida.
- 18 burrowing owl burrows were located on the Neighborhood Lakes property portion of Wekiwa Springs State Park, during a survey after the property was acquired.
- 2012 park basin-wide Bio-blitz, a joint agency and citizens organizations (i.e., Audubon Society, etc.), was conducted to account for and up-date the basin species list
- Over 750 feral hog removed from basin
- New hog trapping contract put in place this year.

Cultural Resources

- 22 new cultural sites have been added to the master site file.
- Site of the Town of Ethel was located in Rock Springs Run State Reserve and studies are ongoing with Florida Public Archaeology Network and the Eastlake Historical Society
- Restoration of the Anthony Frazier gravesite is ongoing with the Sons of Union Veteran’s and Eastlake Historical Society
- Archaeological Resource Sensitivity Modeling completed for parks.

Recreation and Visitor Services

- Wekiwa Springs concessionaire (NSPC)
  - continues to provide rental services for park visitors
  - expanded its food operation during the summer season
  - withdrew its operations from Rock Springs Run State Reserve

- Cactus Jack Trail Rides established new concession at Rock Springs Run State reserve, providing:
  - guided horseback trail rides
  - rental of the Hammock House for vacations and special event
  - limited horse boarding for visitors and campers
  - canoe and kayak rental at Katie's Landing in Lower Wekiva River Preserve State Park
- Volunteers, CSO members and limited park staff provide guided walks and discover hour programs scheduled on Saturdays and Sundays throughout the year at the Nature Center.
- CSO members and volunteers take care of the animals and static displays at the Nature Center; the CSO fully supports the cost of running the Nature Center.
- Park Rangers provide interpretative programs in the park and at local schools on request throughout the year.
- The Youth Camp continues to be a focal point of park operations
  - The Florida Federation of Garden Clubs host an annual camp for children during June and July
  - Ranger Academy is conducted twice a year to acclimate new park service staff to department policies.
  - state and national fire trainings are conducted during the year at the facility by park staff, other state and federal agencies.
  - DEP (central district and FPS) hosts a number of meetings annually at the facility
  - rental of the Youth Camp serves to host many weddings, private events and family gatherings
- The Wekiwa Spring Run, Rock Spring Run and the Wekiva River are Federally listed as part of the National Wild and Scenic River System
- The park is listed as a site on the Great Florida Birding Trail

Park Facilities

- Katie's Landing renovation at Lower Wekiwa River Preserve State park
  - removed several derelict structures from park
  - removed and replaced failing river side walkway with new bulkhead
  - constructed new restroom facility at park
  - constructed structure to protect well head at park
  - stabilized and regraded park drive
- Youth Camp renovations at Wekiwa Springs State Park
  - renovated derelict Seminoli cabin for use by Florida Federation of Garden Club executives, state and division staff.
  - replace roofs on
    - Seminoli and 14 of 28 other cabins
    - Rec Hall

        - South communal restroom
    - repaired leaking dormer windows on dining hall
    - made repairs to pool
    - added ADA access for pool
    - replaced carpet in Rec Hall (2005 and 2015)
- Convert 90% of park residents and infrastructure from septic to sewer in Wekiwa Springs State Park
- Repaired rotted wall structure and interior of high side (site 31-60) campground loop bathroom
- Repaired Spring-Lagoon Bridge
- Repaired Canoe Beach Boardwalk
- ADA lift installed at Spring
- Paved district office driveway
- Stabilized roadway from CR433 to shop at Rock Sparing Run State Reserve
- Replaced perimeter fences at Wekiwa Springs State Park
    - 0.76 mile along Wekiwa Springs Road
    - 1.76 miles along Welch Road
    - 1.6 miles along CR435
- Replace roof on Hammock House (a rental structure) at Rock Springs Run State Reserve.
- Worked with local off-road bicycle group (SORBA) to develop trails at Markham Wood's parcel at Wekiwa Springs State Park.
- Project to repair failing infrastructure at spring in progress
- Project to upgrade campground electric service to 50 Amp in progress

Management Plan Implementation

This management plan is written for a timeframe of ten years, as required by Section 253.034 Florida Statutes. The Ten-Year Implementation Schedule and Cost Estimates (Table 7) summarizes the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A time frame for completing each objective and action is provided. Preliminary cost estimates for each action are provided and the estimated total costs to complete each objective are computed. Finally, all costs are consolidated under the following five standard land management categories: Resource Management, Administration and Support, Capital Improvements, Recreation Visitor Services and Law Enforcement.

Many of the actions identified in the plan can be implemented using existing staff and funding. However, a number of continuing activities and new activities with measurable quantity targets and projected completion dates are identified that cannot be completed during the life of this plan unless additional resources for these purposes are provided. The plan's recommended actions, time frames and cost estimates will guide the DRP's planning and budgeting activities over the period of this plan. It must be noted that these recommendations are based on the information that exists at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that the DRP can adjust to changes in the availability of funds, improved understanding of the park's natural and cultural resources, and changes in statewide land management issues, priorities and policies.

Statewide priorities for all aspects of land management are evaluated each year as part of the process for developing the DRP's annual legislative budget requests. When preparing these annual requests, the DRP considers the needs and priorities of the entire state park system and the projected availability of funding from all sources during the upcoming fiscal year. In addition to annual legislative appropriations, the DRP pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. The DRP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of funds and staff for these purposes, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Table 7 may need to be adjusted during the ten-year management planning cycle.

Table 7
Wekiva River Basin State Parks Ten-Year Implementation Schedule and Cost Estimates

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal I: Provide administrative support for all park functions.		Measure	Planning Period	Estimated Manpower and Expense Cost* (10-years)
Objective A	**Continue day-to-day administrative support at current levels.**	Administrative support ongoing	C	**$315,700**
Objective B	**Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.**	Administrative support expanded	C	**$45,500**
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Conduct/obtain an assessment of the park's hydrological needs.**	Assessment conducted	ST or LT	**$67,000**
Action 1	Formulate a plan for erosion control for multiple locations throughout the park		UFN	$58,500
Action 2	Continue working with county, city, and other local officials along with other agencies to educate businesses and residents within the spring and river basins on the effects of nutrient loading based on fertilizer and septic tank issues		UFN	$8,500
Objective B	**Restore natural hydrological conditions and function to approximately 600 acres of hydric hammock, 130 acres of mesic flatwoods, and 110 acres of wet flatwoods natural communities**	# Acres restored or with restoration underway	UFN	**$201,200**
Action 1	Install 9 low-water crossings or culverts along tram roads and park service roads	# Crossings/culverts installed	UFN	$70,000
Action 2	Rehab 44,939 feet of plow scars at Wekiwa Springs, Lower Wekiva Preserve and Rock Springs Run	# Miles of ditches filled	UFN	$131,200
Objective C	**Restore sheet flow to hydric hammocks and floodplain swamp in Lower Wekiva River Preserve State Park**		**ST, LT**	**$100,900**
Action 1	Preliminary analysis should be conducted to determine the costs and feasibility of filling in the old logging canals off of the St. Johns River into Lower Wekiva Preserve State Park		ST or LT	$58,500
Action 2	Install 6 low-water crossings or culverts along main tram roads within LWRPSP	# Crossings/culverts installed	ST or LT	$42,400
Goal III: Restore and maintain the natural communities/habitats of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Within 10 years have 12,080 acres of the park maintained within optimal fire return interval.**	# Acres within fire return interval target	LT	**$1,027,500**

* 2017 Dollars
ST = actions within 2 years
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C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

Table 7
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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Action 1	Develop/update annual burn plan.	Plan updated	C	$14,200
Action 2	Manage fire dependent communities for ecosystem function, structure and processes by burning between 2,200 -5,900 acres annually, as identified by the annual burn plan.	Average # acres burned annually	C	$909,900
Action 3	Establish 6.5 miles of new fire breaks	# Miles established	ST or LT	$103,400
Objective B	**Conduct habitat/natural community restoration activities on 750 acres of sandhill, 560 acres of mesic/wet flatwoods, and 156 acres of scrub/scrubby flatwoods natural communities.**	# Acres restored or with restoration underway	ST or LT	**$1,924,100**
Action 1	Develop/update site specific restoration plan	Plan developed/updated	ST	$58,400
Action 2	Implement restoration plan	# Acres with restoration underway	LT	$194,700
Action 3	Conduct hardwood removal on 661 acres			$1,671,000
Objective C	**Conduct habitat/natural community improvement activities on 255 acres of sandhill, 425 acres of flatwoods, and 485 acres of scrub/scrubby flatwoods natural communities.**	# Acres improved or with improvements underway	ST or LT	**$4,148,900**
Action 1	Thinning of oaks and other hard woods in each of the three parks, (fuel wood reduction, roller-chopping, and/or mowing) totaling 1,165 acres		ST	$1,765,000
Action 2	Removal of 10-15 year stage class sand pines in sandhill and scrub/scrubby flatwoods natural communities			$192,700
Action 3	Minor roller-chopping/lay down fuels 2 to 3 dozer/tractor widths along 10 miles overgrown edges of management zones			$1,458,000
Action 4	Minor roller-chopping/lay down fuels 1 to 2 dozer/tractor widths along 10 miles overgrown edges of management zones			$733,200
Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continual update baseline imperiled species occurrence inventory lists for plants and animals, as needed.**	continual	C	**$105,300**
Objective B	**Monitor and document 19 selected imperiled animal species in the park.**	# Species monitored	C	**$132,800**
Action 1	Develop monitoring protocols for 3 selected imperiled animal species including Sherman's fox squirrel, Florida mouse, and Florida burrowing owl.	# Protocols developed	ST	$1,200
Action 2	Implement monitoring protocols for 16 imperiled animal species including those listed in Action 1 above and the gopher tortoise, striped newt, gopher frog, Florida scrub-jay, swallow-tail kite, and imperiled wading birds.	# Species monitored	C	$105,300
Action 3	Conduct regular bird surveys at a monthly or quarterly basis			$26,300

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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Objective C	**Monitor and document 10 selected imperiled plant species in the park.**	# Species monitored	C	**$211,800**
Action 1	Develop monitoring protocols for 7 selected imperiled plant species including hand ferns, giant ground orchid, blue flower butterwort, and sand butterfly pea.	# Protocols developed	ST	$1,200
Action 2	Implement monitoring protocols for 7 imperiled plant species including those listed in Action 1 above	# Species monitored	C	$105,300
Action 3	Continue with the monitoring efforts for hooded pitcher-plants, yellow-flowered butterwort and giant ground orchid.			$105,300
Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Annually treat 15-35 acres of exotic plant species in the park.**	# Acres treated	C	**$1,039,300**
Action 1	Annually develop/update exotic plant management work plan.	Plan developed/updated	C	$8,300
Action 2	Implement annual work plan by treating 15-35 acres in park, annually, and continuing maintenance and follow-up treatments, as needed.	Plan implemented		$808,500
Action 3	Conduct surveys of existing infestations along with searching other locations for new infestations			$218,000
Action 4	Continue to participate as board members for the Central Florida Cooperative Invasive Species Management Areas (CISMA)			$4,500
Objective B	**Implement control measures on 5 exotic and nuisance animal species in the park.**	# Species for which control measures implemented	C	**$46,900**
Action 1	Removal of feral hogs, 9-band armadillos, coyotes, and feral cats			$38,500
Action 2	Reinstate removal plan for Cuban tree frogs			$8,400
Goal VI: Protect, preserve and maintain the cultural resources of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Assess and evaluate 53 of 71 recorded cultural resources in the park.**	Documentation complete	LT	**$20,000**
Action 1	Complete 47 assessments/evaluations of archaeological sites. Prioritize preservation and stabilization projects.	Assessments complete	LT, ST	$10,300
Action 2	Complete 6 Historic Structures Reports (HSR's) for historic buildings and cultural landscape. Prioritize stabilization, restoration and rehabilitation projects.	Reports and priority lists completed	LT	$9,700

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Table 7
Wekiva River Basin State Parks Ten-Year Implementation Schedule and Cost Estimates

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Objective B	**Compile reliable documentation for all recorded historic and archaeological sites.**	Documentation complete	LT	**$35,300**
Action 1	Ensure all known sites are recorded or updated in the Florida Master Site File.	# Sites recorded or updated	ST	$9,300
Action 2	Complete a predictive model for high, medium and low probability of locating archaeological sites within the park/Conduct Level 1 archaeological survey for all priority areas identified by predictive model or other previous study.	Probability Map completed	ST	$26,000
Objective C	**Bring 28 of 71 recorded cultural resources into good condition.**	# Sites in good condition	LT	**$57,100**
Action 1	Design and implement regular monitoring programs for 53 cultural sites	# Sites monitored	C	$9,700
Action 2	Create and implement a cyclical maintenance program for each cultural resource.	Programs implemented	C	$21,400
Action 3	Survey and document all new cultural sites within park boundaries	Projects completed	LT, ST	$26,000
Goal VII: Provide public access and recreational opportunities in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain the park's current recreational carrying capacity of 5,108 users per day.**	# Recreation/visitor opportunities per day	C	**$6,450,000**
Objective B	**Expand the park's recreational carrying capacity by 734 users per day.**	# Recreation/visitor opportunities per day	ST or LT	**$927,000**
Objective C	**Continue to provide the current repertoire of 3 interpretive, educational and recreational programs on a regular basis.**	# Interpretive/education programs	C	**$15,000**
Objective D	**Develop 1 new interpretive, educational and recreational programs.**	# Interpretive/education programs	ST or LT	**$7,000**

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Table 7
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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.		Measure	Planning Period	Estimated Manpower and Expense Cost* (10-years)
Objective A	**Maintain all public and support facilities in the park.**	Facilities maintained	C	**$2,550,000**
Objective B	**Expand maintenance activities as existing facilities are improved and new facilities are developed.**	Facilities maintained	C	**$367,000**
Objective C	**Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.**	Plan implemented	ST or LT	**$25,000**
Objective D	**Improve/repair 5 existing facilities and 1.5 miles of road as identified in the Land Use Component.**	# Facilities/Miles of Trail/Miles of Road	LT	**$1,138,000**
Objective E	**Construct 5 new facilites and 18.5 miles of trail as identified in the Land Use Component.**	# Facilities/Miles of Trail/Miles of Road	LT	**$3,700,000**

Summary of Estimated Costs

Management Categories		Total Estimated Manpower and Expense Cost* (10-years)
Resource Management		**$9,118,100**
Administration and Support		**$361,200**
Capital Improvements		**$5,230,000**
Recreation Visitor Services		**$9,949,000**
Law Enforcement Activities	Note: Law enforcement activities in Florida State Parks are conducted by the FWC Division of Law Enforcement and by local law enforcement agencies.	

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ST = actions within 2 years
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C = long term or short term actions that are continuous or cyclical
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Addendum 1—Acquisition History

LAND ACQUISITION HISTORY REPORT

Park Name	Wekiwa Springs State Park
Date Updated	4/13/2016
County	Orange, Lake, and Seminole counties
Trustees Lease Number	Lease No. 2386
Current Park Size	9,503.90 acres
Purpose of Acquisition	The State of Florida acquired Wekiwa Springs State Park to protect and conserve resources which are critically important to the continued viability of an environmental system in the area.

Acquisition History

Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
MDID 2937	4/30/1969	Apopka Sport's Club, Inc.	Trustees of the Internal Improvement Fund of the state of Florida	5944.524	Warranty Deed
MDID 358931	10/3/2008	Project Orlando LLC	Trustees	345.278	Warranty Deed
MDID11686	6/25/1993	The Nature Conservancy	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trutees)	538.562	Sppcial Warranty Deed
MDID 347275	2/28/2007	Barn LLP	Trustees	525.455	Wtrustee's Property Deed
MDID 359921	3/24/2009	Orlando-Orange County Expressway Authority	Trustees	307.159	Special Warranty Deed
MDID 258725	6/25/1993	Seminote Couty, Florida	Trustees	258.725	County Deed
MDID 15308	11/30/1998	Conway D. Kittredge	Trustees	152.837	Warranty Deed
MDID 207	11/1/1994	Dorothy L. Boehme	Trustees	151.301	Warranty Deed
MDID 2940	4/30/1969	Conway D. Kittredge, Inc.	Trustees of Internal Improvement Fund of the state of Florida	102.891	Warranty Deed
MDID 2941	4/30/1969	Conway D. Kittredge, Inc.	Trustees of Internal Improvement Fund of the State of Florida	81.625	Warranty Deed
MDID 12807	11/5/1996	Harry S. Scott Randall E. McCall and Ruth I Crose Trustees…	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trutees)	41.014	Warranty Deed
MDID12806	11/5/1996	Hollis O. McCall and his wife Beverly J. McCall	Trustees	41.014	Warranty Deed
MDID2942	4/21/1971	Loretta M. Edwards	Trustees	40.29	Indenture
MDID 11843	10/24/1991	STS Land Associates, L.P.	Trustees	24.99	Quit-Claim Deed
MDID360208	12/2/2008	Project Orlando L.L.C.	Trustees	14.61	Warranty Deed

Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease No. 2386	9/15/1969	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida	The State of Florida Department ofn Environmental Protection for the use and benefit of Division of Recreation and Parks	99 years	9/14/2068

Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue	Term of the Outstanding Issue
There is no known deed related restriction on use of Wekiwa Springs State Park.			

LAND ACQUISITION HISTORY REPORT

Park Name	Rock Springs Run State Reserve
Date Updated	3/4/2016
County	Orange, Lake and Seminole Counties
Trustees Lease Number	Lease No. 3571
Current Park Size	14,164.82 acres
Purpose of Acquisition	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida has acquired Rock Springs Run State Reserve to conserve, protect and enhance the resoruces of the property.

Acquisition History

Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
MDID 4063	3/10/1983	Delrando, Inc.	Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	7,593.86	Warrnaty Deed
MDID 11841	10/24/1991	STS Associates, L.P.	Trustees	1825.943	Statutory Warranty Deed
MDID 4054	3/21/1990	M. K. Citrus Limited Parnership	Trustees	1750.289	Indenture
MDID 4053	3/21/1990	B.M.K. Ranches, Inc.	Trustees	898.987	Indenture
MDID 2097	3/21/1990	B. M. K. Ranches, Inc.	Trustees	627.661	Indenture
Twelve Different Instruments	various dates	different sellers	Trustees	550.51	Different Instruments
MDID 4064	3/10/1983	Delrando, Inc.	Trustees	351.349	Warrnaty Deed

Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease No. 3571	3/7/2006	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida	State of Florida Department Of Natural Resources	50 years	3/6/2056

Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue	Term of the Outstanding Issue
There is no known deed-related outstanding issue that restricts the use of Rock Springs Run State Reserve			

LAND ACQUISITION HISTORY REPORT

Park Name	Lower Wekiva River Preserve State Park
Date Updated	3/28/2016
County	Lake County and Seminole Couty, FL
Trustees Lease Number	Lease No. 2950
Current Park Size	17,374.83 acres
Purpose of Acquisition	The Board of Trustees of the Internal Improvement Trust Fund of the state of Florida has acquired Lower Wekiva River Preserve State Park to protect and preserve the upland, the submerged lands and water resources in the area.

Acquisition History

Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
MDID 5838	8/7/1995	Sydney J. Roche , Jr. and Kurt E. Grosman	Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	811.93	Warranty Deed
MDID 5839	8/7/1995	Sydney J. Roche , Jr. and Kurt E. Grosman	Trustees	172.031	Warranty Deed
MDID 11586	9/26/1990	St. Johns Water Management District	Trustees	162.462	Fee Simple Deed
MDID 12954	3/20/1997	William V. Beville his wife Nancy J. Bevile	Trustees	51.205	Warranty Deed
MDID 3542	8/19/1976	Barnette Bank of Winter Park	Trustees	24.369	Trusst'e Deed
MDID 15537	11/16/1998	Marie D Francolino and Mary Ann Trojano	Trustees	10.247	Warranty Deed
MDID15538	10/6/1998	Marie D Francolino and Mary Ann Trojano	Trustees	10.017	Warranty Deed

Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease No. 2950	4/4/1977	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida	The State of Florida Department of Natural Resources	99 years	4/3/2076

Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue	Term of the Outstanding Issue
There is no known deed-related issue that affects use of Lower Wekiva River Preserve State Park			

Addendum 2—Advisory Group Members and Report

List

Report

Addendum 3—References Cited

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Addendum 4—Soils Descriptions

Wekiwa Springs State Park – Soil Description

(2S) -Adamsville-Sparr Fine Sands. These soils are level to nearly level and somewhat 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.

(6L) – Anclote, Delray and Hontoon This consists of level, very poorly drained mineral and organic soils that have not been classified because excess water and dense vegetation have made detailed investigations impractical. Swamp occurs as broad drainage ways, or broad, poorly defined streams, as large depressions having no outlets and as large bayheads. The soils are flooded with water all year except during prolonged periods when rainfall is light. Swamp is usually covered with a dense wetland forest. The vegetation usually is wetland hardwoods, cypress, cabbage palms, shrubs, vines, and grasses.

(2) - 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.

(6S) - 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.

(7, 7S) - 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.

(9S) - 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.

(3)- 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.

(4) - 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.

(5) - 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.

(6) - 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.

(15L) – Candler sand, 0 to 5 percent slope The Candler series consists of nearly level to strongly sloping, excessively drained soils that formed in thick beds of sandy marine deposits. These soils occur as broad areas of the sandy uplands. In a representative profile, the surface layer is dark gray sand about 5 inches thick. It is underlain by 62 inches of yellow sand. The next 42 inches is very pale brown sand that is mottled with white and has thin lamellae of yellowish brown loamy sand. Below this is 6 inches of brownish yellow sandy loam.

(18L) - 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.

(10) – Chobee Fine sandy loam, frequently Flooded. This soil is nearly level and very poorly drained. It is on the floodplain of the St. John’s river and its major tributaries.This soil is flooded for very long periods of time following prolonged periods of rain. The slopes are smooth and concaved. They are dominantly less than 1 percent but range to 2 percent. In 90 percent of areas mapped as Chobee fine sandy Loam, frequently flooded Chobee soils and similar soils make up 86 to 99 percent of the mapped areas

Typically this soil has a surface layer of fine black sand sandy loam, about 7 inches thick. The upper part of the subsoil, to a depth of about 17 inches is very dark gray sandy clay loam. The substratum is is to a depth of 50 inches or more and is a dark grey sandy loam.

(13S) - 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.

(12) - 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.

(13) - Felda fine sand This soil is nearly level and poorly drained. It is in low, broad, poorly defined drainageways on the flatwoods. The water table is above the surface for brief periods in low-lying areas after a heavy rain. The slopes are smooth to concave and range from 0 to 2 percent.
Tipically this soil has a surface layer of black fine sand about 4 inches thick. The upper part of the subsurface layerto a depth of about 10 inches is grayish brown fine sand. The power part to about 22 inches is lightr brownish gray fine sands,
In most years a seasonal high water table is within 10 inches of the surface for 2 to 6 months. 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 sutface and subsurface layers, low to moderate in the subsoil and low in the substratum. Naturally fertility and the organic matter content are low.

(14) - 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.

(28) – Florahome fine sand, 0 to 5 percent slope. This soil is nearly level to gently sloping and moderately well drained. It is on the uplands. The slopes are smooth and convex.
In most years, a seasonal high water table is at a depth of 48 to 72 inches for 4 to 6 months and recedes to a depths of 72 inches or more during extended dry periods. The permeability is rapid throughout. The available water capacity is low in the upper part of the surface layer. Natyral fertility is low. The organic content is moderate to moderately low.

(11) – Florindana and Chobee soils, frequently flooded, The soils in this map unit are nearly level and very poorly drained. These soils are on the floodplains of the St. John’s river and its major tributaries. They do not occur in regular repeated patterns. These soils are flooded for very long periods followinh heavy intense rains. Many areas are isolated by meandering stream channels. Excess water ponds in low-lying areas for very long periods after heavy rain, Slopes are smooth to concave and range from 0 to 2 percent.

(16) – Floridana fine sand, frequently flooded. This soil is nearly level and very poorly drained. It is on the floodplains of the St. John’s 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 more than 6 months. Flooding occurs frequently during rainy periods. The duration and extent of flooding are variable and are directly related to the intensity and frequency of the rains. Flooding normally lasts from 1 to 4 months. The permeability is rapid in the surface and subsurface layers, slow in the subsoil, and moderate in the substratum. The available water capacity is in medium in the surface layer and subsoil and is low in the subsurface layer and substratum. Natural fertility and organic matter content are medium.

(17) - 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.

(20) - 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.

(25L, 16S) - 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.

(23) - 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.

(20S) - 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.

(35L) - 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.

(36L) - Myakka and Placid sands, 0 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.

(23S) - 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.

(25) – Okeelanta muck. This soil is nearly level and very poorly drained. It is in freshwater swamps and in drained areas north of Lake Apopka. Undrained areas are ponded for 6 to 9 months or more each year. The slopes are smooth and less than

1 percent.Typically the upper part of the surface layer isblack muck about 9 inches thick. The lower partsto a depth of 25 inches is dark brown muck. Under natural conditions, this soil is ponded for 6 to 9 months or more each year. In most years, a seasonal high water table is at or near the surface.

(26) - 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.

(27) – Ona-urban complex This complex consists of Ona soil that is nearly level and poorly drained and of areas of Urban land. This complex is on the flatwoods. The slopes are smooth and range from 0 to 2 percent. The complex consist of a 53 percent Ona soil and about 40 percent urban land. The individual areas of soil are too mixed or too small to map separately at the scale used for the map. Typically the 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 The Urban land part of this complex is covered by concrete, asphalt, buildings or other impervious surfaces that obscure or alter the soils so that their identification is not feasible.

(40L) - 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.

(24S) - 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.

(31) – Pineda fine sand, frequently flooded. This soil is nearly level and poorly drained. It is on the floodplains. Many areas are isolated by dissectedor meandering stream channels. This soil is flooded for following prolonged, intense rains. The slope is nearly smooth to concave and range from 0 to 2 pecent.

In most years the seasonally high water table is within 10 inches of the surface for 1 to 6 months. Flooding occurs frequently during rainy periods. Flooding normally lasts from 1 to 4 months. Natural fertility and the organic matter content are low.

(46L) - 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.

(47L) - 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.

(48L) - 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.

(34, 27S) - 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.

(28S) - 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.

(51L) – Pompano, Felda and Oklawaha soils, depressional. This is a nearly level to gently sloping, moderately well drained sandy soil. The water table is at a depth of

40 to 60 inches for about 8 months and at a depth of 30 to 40 inches for about 4 months. This soil has very rapid permeability and very low available water capacity and organic matter content in the surface and subsurface horizons. It has an organic stained layer that has moderately rapid permeability and moderate organic content. This soil is very low in natural fertility. The native vegetation usually consists of scrub oaks, scattered pine trees, and a sparse growth of grasses and shrubs.

(50L) - 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.

(37) - 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.

(52L) - 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.

(38) - 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.

(41) - 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.

(42) - 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.

(43) - 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.

(44) - 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.

(46) - 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.

(57) - 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.

(47 31S) - 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.

(54) - 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.

Rock Springs Run State Reserve – Soil Description

(3-O,2L) - 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.

(1-O, 1L) - 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.

(2-O) - 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.

(4L,) - 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.

(3-O)- 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.

(19L) – Bluff and Manatee soils, frequently flooded. This nearly level, very poorly drained, frequently flooded soil is on low terraces bordering the St. Johns River. Natural vegetation must be water tolerant and includes sedges, pickerelweed, cattail and saw grass. Hammock areas include cabbage palms, live oak and cedar. The floodplain marsh and swamp communities along the St. Johns River are dominated by this soil type.

(8-L) – Candler sand, 0 to 5 percent slope The Candler series consists of nearly level to strongly sloping, excessively drained soils that formed in thick beds of sandy marine deposits. These soils occur as broad areas of the sandy uplands. In a representative profile, the surface layer is dark gray sand about 5 inches thick. It is underlain by 62 inches of yellow sand. The next 42 inches is very pale brown sand that is mottled with white and has thin lamellae of yellowish brown loamy sand. Below this is 6 inches of brownish yellow sandy loam.

(4-O) - 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.

(6-O) - 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.

(12L) - 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.

(12-O) - 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.

(13-O, 15-L) – 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.

(14-O) - 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.

(17-O) - 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..

(20-O) - 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.

(25L) - 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.

(23-O) - 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.

(26-L) - Manatee fine sand. Depressional. This is nearly level poorly drained soils that is covered with shallow water during much of the rainy season. The water table isat or near the surface most of the year. During dry periods it may be as deed as 20 inches. Permeability is moderately rapid in the surface layer and moderate in all other layers. The availability of water, fertility and organic content are high to a depth of about 18 inches. The native vegetation in most areas is grass. In some areas it is native hardwood forest with cabbage palms.

(28-L) - 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.

(29-L) - Myakka and Placid sands, 0 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.

(23-S) - 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.

(31-L) - 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.

(32-L) - Oklawaha muck. The Oklawaha series consists of deep, very poorly drained soils that formed in herbaceous organic material and loamy and clayey mineral material. These soils are on floodplain, freshwater marshes, and depressions. Slopes are less than 2 percent. Thickness of the sapric and hemic organic material is 16 to 40 inches. Reaction of the organic material ranges from slightly acid to moderately alkaline. These soils are on flood plains, depressions, and freshwater marshes. These soils are very poorly drained, runoff is very slow, and permeability is slow. Most areas are in natural vegetation of sawgrass, lilies, sedges, cypress, bay, maple, and blackgum.

(26-O) - 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.

(34-L) - Orlando fine sand, 0 to 5 percent slope. 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.

(46-L) – Orsino sand. This moderately well drained, nearly level and gently sloping sandy soil occurs on low flat ridges and low side slopes of sandhills. The water table is 40 to 60 inches below the soil surface in wet seasons and below 60 inches in the dry seasons. The natural vegetation is a forest of sand pine and an understory of scattered saw palmetto.

(35-L) - 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.

(38-L) - Placid sand. Depressional. This is a nearly level, very poorly drained soil. The water table is at the surface most of the year except during extended dry periods where it is within a depth of 15 inches. Shallow water covers many areas for 4 to 6 months in wet seasons. Placid sand is rapidly permeable throughout. It has medium available water capacity, moderately high organic content, and moderate natural fertility to a depth of about 18 inches. Below 18 inches it is low for these above characteristics.

(40-L) - Placid and Myakka sands, depressional. These are nearly level, very poorly drained and poorly drained soils in low, marshy depressions. The water table in these soils is nearer the surface for longer periods than in Myakka sand, and the soil is covered with water for 4 to 6 months in most years. The two soils occur together without regular pattern.

(34-O, 41-L) - 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.

(28-S,) - 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.

(42-L) - 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.

(37-O, 37-L) - 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.

(52L) - 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.

(43-L) - 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.

(41-O) - 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.

(42-O) - 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.

(44-O) - 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.

(44-L) - 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.

(46-O) - 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.

(45-L) - Tavares sand. 0 to 5 percent slope. 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.

(47-O) - 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.

(48-L) - 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.

(53-O) – Wauberg fine sand. This soil is nearly level and poorly drained. It is in low areas on the flatwoods. The slopes are nearly smooth to slightly concave and range from 0 to 2 percent. Typically the upper part of the surface layer of this soil is black fine sand 5 inches thick. In most years , aseasonal high water table is within 12 inches of the surface for a period of about 6 months, and it recedes to a depth of more than 40 inches during extent dry periods.The water table is above the surface for short periods after heavy rain. Natural fertility is low.The organic matter content is moderately low to moderate.

(49-L) - 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.

Lower Wekiva River Preserve State Park – Soil Description

(2-L, 2-S) - 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.

(3-L) - 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.

(17-L) - 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.

(4-L) - 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.

(6-S) - 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.

(4-S) - 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.

(9-S) - 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.

(10-S) - Basinger, Samsula and Hontoon soils, depressional. These soils are nearly level and poorly drained. These soils are in swamps and depressions. The slopes are dominantly less than 2 percent. In most years, the undrained areas are ponded for 6 to 9 months or more. If drained the organic material in the soil initially shrinks and then subsides further as a result of compaxtion and oxidation. The permeability is rapid and the available water capacity is low. The soils are very high in organic material and very low in the sandy parts.

(11-S) – Basinger and Symrna fine sands, depressional. The soils are nearly level and very poorly drained. These soils are in depressions. The slopes are dominantly less than 2 percent. In most years, the undrained areas are ponded for 6 to 9 months or more. The permeability is rapid and the water capacity is low in the surface and subsurface. Natural fertility and the content of organic matter are low.

(10-V) - 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.

(12-L) - 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.

(13 –S) - 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.

(27-L) –Everglades muck. Everglades series consists of very deep, very poorly drained, rapid to very rapidly permeable organic soils in freshwater swamps and marshes that flood for very long periods. They formed in thick deposits of hydrophytic plant remains. They are frequently flooded. Thickness of the organic material is more than 51 inches. Reaction ranges from very strongly acid to slightly alkaline throughout. Very poorly drained; rapid to very rapid permeability. The surface layer may be slightly slower depending on the decomposition of the organic material and degree of wetness.

(15-L) - 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.

(15-S) - 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.

(16-L) - 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.

(25-V) - 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.

(20L, 16S) - 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.

(26L) - Manatee fine sand. Depressional. This is nearly level poorly drained soils that is covered with shallow water during much of the rainy season. The water table isat or near the surface most of the year. During dry periods it may be as deed as 20 inches. Permeability is moderately rapid in the surface layer and moderate in all other layers. The availability of water, fertility and organic content are high to a depth of about 18 inches. The native vegetation in most areas is grass. In some areas it is native hardwood forest with cabbage palms.

(19S) - 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.

(18L) – Martel sandy clay loam. Martel soils are in depressions and sloughs of central Peninsular Florida. Slopes are 1 percent or less. They formed in clayey marine sediments. They are very poorly drained; very slow permeability. Most areas remain in native vegetation and are used for wildlife habitat. The native vegetation is dominated by cypress, sweetgum, pond pine, and water tupelo.

(20L) - 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.

(28L) - 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.

(29L) - Myakka and Placid sands, 0 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.

(31L) - 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.

(46L) - Orsino sand. This moderately well drained, nearly level and gently sloping sandy soil occurs on low flat ridges and low side slopes of sandhills. The water table is 40 to 60 inches below the soil surface in wet seasons and below 60 inches in the dry seasons. The natural vegetation is a forest of sand pine and an understory of scattered saw palmetto

(29L) - 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.

(38L) - Placid sand. Depressional. This is a nearly level, very poorly drained soil. The water table is at the surface most of the year except during extended dry periods where it is within a depth of 15 inches. Shallow water covers many areas for 4 to 6 months in wet seasons. Placid sand is rapidly permeable throughout. It has medium available water capacity, moderately high organic content, and moderate natural fertility to a depth of about 18 inches. Below 18 inches it is low for these above characteristics.

(40L) - Placid and Myakka sands, depressional. These are nearly level, very poorly drained and poorly drained soils in low, marshy depressions. The water table in these soils is nearer the surface for longer periods than in Myakka sand, and the soil is covered with water for 4 to 6 months in most years. The two soils occur together without regular pattern.

(48L) - 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.

(27L) - Pomello sand, 0 to 5 percent slopes. This soil is nearly level to gently sloping and moderately well drained. It is on low ridges and knolls on the flatwoods. In most years the soil has a seasonal high water table at a depth of 36 to 60 inches fro 1 to 4 months. The permeability is rapid in the surface and subsurface layers and moderately rapind in the subsoil and rapid in the substram. The water capacity is very low in the surface and subsurfave layers. Natural fertility and the content of organic matter are very low.

(28L, 28S) - 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.

(43L) - St. Lucie sand. 0 to 5 percent slope 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.

(44L) - 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.

(31S) - 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.

(65V) – Terra Ceia muck. This soil is nearly level and very poorly drained. It is on the floodplains and is frequently flooded for long periods of time following long periods of high intensity rain. The slopes are less that 2 percent. Under natural conditions, this soil has high water table at or above the surface for most of the year except during extended dry periods. The soil is subject to frequent flooding during rainy periods.

(48L) - 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.

(49L) - 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.

Addendum 5—Plant and Animal List

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

ALGAE

Stonewort; Muskgrass	*Chara* spp.	
Stoneworts	*Nitella* spp.	

LICHENS

Tiny button lichen	*Amandinea punctata*	
Brick-spored fire dot lichen	*Brigantiaea leucoxantha*	
Common button lichen	*Buellia stillingiana*	
C-eyelash lichen	*Bulbothrix isidi*	
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*	
Unwhiskered ruffle lichen	*Parmotrema cristiferum*	
Cracked ruffle lichen	*Parmotrema dilatatum*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
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	
	Amblystegium serpens	
	Anomodon attenuatus	
	Atrichium augustatum	
	Bracythecium acuminatum	
	Calymperes erosum	
	Calymperes nashii	
	Campylopus surinamensis	
	Clasmatodon parvulus	
	Climacium americanum	
	Cryphaea filiformis	
	Cryphaea glomerata	
	Cryphea nervosa	
	Cyclodictyon varians	

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

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
	Cololejeunea subcristata	
	Crossotolejeunea bermudiana	
	Euosmolejeunea clausa	
	Euosmolejeunea myriantha	
	Euosmolejeunea polyantha	
	Euosmolejeunea rigidula	
	Frullania brittoniae	
	Frullania cobrensis	
	Frullania eboracensis	
	Frullania inflata	
	Frullania kunzei	
	Frullania obchordata	
	Frullania riojanirensis	
	Frullania riparia	
	Frullania sabaliana	
	Frullania squarrosa	
	Harpalejeunea	
	Lejeunea autoica	
	Lejeunea bermudiana	
	Lejeunea cardotii	
	Lejeunea cladogyna	
	Lejeunea flava	
	Lejeunea laetevirens	
	Lejeunea ulicina	
	Leucolejeunea conchifolia	
	Leucolejeunea unciloba	
	Lophocolea apalachicola	
	Mastigolejeunea auriculata	
	Metzgeria furcata	
	Odontoschizma prostratum	
	Pallavicinia lyellii	
	Phioceros laevis	
	Plagiochila dubia	
	Plagiochila floridana	
	Plagiochila invisa	
	Plagiochila ludoviciana	
	Radula australis	
	Radula complanata	
	Radula floridana	
	Radula obconica	
	Rectolejeunea brittoniae	
	Rectolejeunea phyllobola	
	Riccardia multifida	
	Taxilejeunea obtusangula	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
	HORNWORTS	
	Phaeoceros laevis	
	PTERIDOPHYTES	
Giant leather fern	*Acrostichum danaeifolium*	
Ebony spleenwort	*Asplenium platyneuron*	
Carolina mosquito fern	*Azolla caroliniana*	
Toothed midsorus fern; Swamp fern	*Blechnum serrulatum*	
Southern grape-fern	*Botrychium biternatum*	
Southern wood fern	*Dryopteris ludoviciana*	
Japanese climbing fern*	*Lydodium japonicum*	
Marianna maiden fern*	*Macrothelypteris torresiana*	
Tuberous sword fern*	*Nephrolepis cordifolia*	
Sword fern; Wild Boston fern	*Nephrolepis exaltata*	
Hand fern	*Ophioglossum palmatum*	FS, HH
Stalked adder's-tongue	*Ophioglossum petiolatum*	
Cinnamon fern	*Osmunda cinnamomea*	
Royal fern	*Osmunda regalis* var. *spectabilis*	
Swamp plume polypody	*Pecluma ptilodon*	UMW, FS, HH
Golden polypody	*Phlebodium aureum*	
Bracken fern	*Pteridium aquilinum*	
Tailed bracken	*Pteridium aquilinum* var. *pseudocaudatum*	
Resurrection fern	*Pleopeltis polypodioides* var. *michauxiana*	
Whisk-fern	*Psilotum nudum*	
Widespread maiden fern	*Thelypteris kunthii*	
Hottentot fern; Willdenow's fern	*Thelypteris interrupta*	
Downy maiden fern	*Thelypteris dentata*	
Marsh fern	*Thelypteris palustris* var. *pubescens*	
Shoestring fern	*Vittaria lineata*	
Virginia chain fern	*Woodwardia virginica*	
Netted chain fern	*Woodwardia areolata*	
	GYMNOSPERMS	
Red cedar	*Juniperus silicicola*	
Sand pine	*Pinus clausa*	
Slash pine	*Pinus elliottii*	
Longleaf pine	*Pinus palustris*	
Pond pine	*Pinus serotina*	
Loblolly pine	*Pinus taeda*	
Bald cypress	*Taxodium distichum*	
Florida arrowroot; Coontie	*Zamia pumila*	

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

ANGIOSPERMS

Rosary pea*	*Abrus precatorius*	
Boxelder	*Acer negundo*	
Red maple	*Acer rubrum*	
Sticky jointvetch	*Aeschynomene viscidula*	
Red buckeye	*Aesculus pavia*	
Seminole false foxglove	*Agalinis filifolia*	
Purple false foxglove	*Agalinis purpurea*	
Florida hobblebush; Pipestem	*Agarista populifolia*	
Hammock snakeroot	*Ageratina jucunda*	
Silktree, mimosa*	*Albizia julibrissin*	
Yellow colicroot	*Aletris lutea*	
Golden trumpet*	*Allamanda cathartica*	
Alligatorweed*	*Alternanthera philoxeroides*	
Common ragweed	*Ambrosia artemisiifolia*	
Bastard indigobush	*Amorpha fruticosa*	
Peppervine	*Ampelopsis arborea*	
Blue maidencane	*Amphicarpum muhlenbergianum*	
Pinewoods bluestem	*Andropogon arctatus*	MF, SH
Shortspike bluestem	*Andropogon brachystachyus*	
Purple bluestem	*Andropogon glomeratus* var. *glaucopsis*	
Bushy bluestem	*Andropogon glomeratus*	
Bushy bluestem	*Andropogon glomeratus* var. *pumilus*	
Elliott's bluestem	*Andropogon gyrans*	
Splitbeard bluestem	*Andropogon ternarius*	
Chalky bluestem	*Andropogon virginicus* var. *glaucus*	
Broomsedge bluestem	*Andropogon virginicus* var. *virginicus*	
Green silkyscale	*Anthaenantia villosa*	
Groundnut	*Apios americana*	
Nodding nixie	*Apteria aphylla*	
Coral ardisia*	*Ardisia crenata*	
Jack-in-the-pulpit	*Arisaema triphyllum*	
Wiregrass	*Aristida beyrichiana*	
Corkscrew threeawn	*Aristida gyrans*	
Arrowfeather threeawn	*Aristida purpurascens*	
Bottlebrush threeawn	*Aristida spiciformis*	
Virginia snakeroot	*Aristolochia serpentaria*	
Florida Indian plantain	*Arnoglossum floridanum*	
Switchcane	*Arundinaria gigantea*	
Curtiss' milkweed	*Asclepias curtissii*	SH, SC
Pinewoods milkweed	*Asclepias humistrata*	
Swamp milkweed	*Asclepias incarnata*	
Fewflower milkweed	*Asclepias lanceolata*	
Savannah milkweed	*Asclepias pedicellata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Butterflyweed; Butterfly milkweed	*Asclepias tuberosa*	
Whorled milkweed	*Asclepias verticillata*	
Bigflower pawpaw	*Asimina obovata*	
Smallflower pawpaw	*Asimina parviflora*	
Dwarf pawpaw	*Asimina pygmaea*	
Netted pawpaw	*Asimina reticulata*	
Common asparagus-fern*	*Asparagus setaceus*	
Elliott's aster	*Aster elliottii*	
Whitetop aster; Dixie aster	*Aster tortifolius*	
Big carpetgrass	*Axonopus furcatus*	
Groundsel tree; Sea myrtle	*Baccharis halimifolia*	
Lemon bacopa; Blue waterhyssop	*Bacopa caroliniana*	
Herb-of-grace	*Bacopa monnieri*	
Coastalplain honeycombhead	*Balduina angustifolia*	
Bamboo*	*Bambusa* sp.	
White wild indigo	*Baptisia alba*	
Pineland wild indigo	*Baptisia lecontei*	
Wax begonia; Club begonia*	*Begonia cucullata*	
Tarflower	*Bejaria racemosa*	
Alabama supplejack; Rattan vine	*Berchemia scandens*	
Florida greeneyes	*Berlandiera subacaulis*	
Beggarticks; Romerillo	*Bidens alba*	
Smallfruit beggarticks	*Bidens mitis*	
Crossvine	*Bignonia capreolata*	
False nettle, Bog hemp	*Boehmeria cylindrica*	
Pinquin*	*Bromelia pinquin*	
Rescuegrass*	*Bromus catharticus*	
Paper mulberry*	*Broussonetia papyrifera*	
American bluehearts	*Buchnera americana*	
Densetuft hairsedge	*Bulbostylis ciliatifolia*	
American beautyberry	*Callicarpa americana*	
Grassleaf roseling	*Callisia graminea*	
Florida scrub roseling	*Callisia ornata*	
Manyflowered grasspink	*Calopogon multiflorus*	MF, WF
Pale grasspink	*Calopogon pallidus*	
Tuberous grasspink	*Calopogon tuberosus*	
Florida bellflower	*Campanula floridana*	
Trumpet creeper	*Campsis radicans*	
Bandanna-of-the-everglades	*Canna flaccida*	
Greenwhite sedge	*Carex albolutescens*	
Bromelike sedge	*Carex bromoides*	
Chapman's sedge	*Carex chapmannii*	HH
Longhair sedge	*Carex comosa*	

Common Name	***Scientific Name***	**Primary Habitat Codes (for imperiled species)**
Long's sedge	*Carex longii*	
False hop sedge	*Carex lupuliformis*	
Coastalplain chaffhead	*Carphephorus corymbosus*	
Vanillaleaf	*Carphephorus odoratissimus*	
American hornbeam; Bluebeech	*Carpinus caroliniana*	
Water hickory	*Carya aquatica*	
Pignut hickory	*Carya glabra*	
Chinquapin	*Castanea pumila*	
Sugarberry; Hackberry	*Celtis laevigata*	
Southern sandbur	*Cenchrus echinatus*	
Spadeleaf	*Centella asiatica*	
Sand butterfly pea	*Centrosema arenicola*	SH, SC
Spurred butterfly pea	*Centrosema virginianum*	
Common buttonbush	*Cephalanthus occidentalis*	
Florida rosemary; Sand heath	*Ceratiola ericoides*	
Coontail	*Ceratophyllum demersum*	
Eastern redbud	*Cercis canadensis*	
Partridge pea	*Chamaechrista fasciculata*	
Sensitive pea	*Chamaecrista nictitans* var. *aspera*	
Florida Alicia	*Chapmannia floridana*	
Wooly sunbonnets	*Chaptalia tomentosa*	
Slender woodoats	*Chasmanthium laxum*	
Shiny woodoats	*Chasmanthium nitidum*	
Mexican tea*	*Chenopodium ambrosioides*	
White fringetree; Old-man's beard	*Chionanthus virginica*	
Spotted water hemlock	*Cicuta maculata*	
Camphortree*	*Cinnamomum camphora*	
Purple thistle	*Cirsium horridulum*	
Nuttall's thistle	*Cirsium nuttallii*	
Sour orange*	*Citrus* x *aurantium*	
Jamaica swamp sawgrass	*Cladium jamaicense*	
Swamp leather-flower	*Clematis crispa*	
Satincurls	*Clematis catesbyana*	
Rose glorybower*	*Clerodendrum bungei*	
Bleeding-heart*	*Clerodendrum thomsoniae*	
Atlantic pigeonwings	*Clitoria mariana*	
Browne's savory	*Clinopodium brownei*	
Tread-softly; Finger-rot	*Cnidoscolus stimulosus*	
Carolina coralbead	*Cocculus carolinus*	
Wild taro; Dasheen; Coco yam*	*Colocasia esculenta*	
Dayflower	*Commelina diffusa*	
Whitemouth dayflower	*Commelina erecta*	
Blue mistflower	*Conoclinium coelestinum*	
Canadian horseweed	*Conyza canadensis*	
Spring coralroot	*Corallorhiza wisteriana*	MH, UMW, HH

Common Name	***Scientific Name***	**Primary Habitat Codes (for imperiled species)**
Florida tickseed	*Coreopsis floridana*	
Flowering dogwood	*Cornus florida*	
Swamp dogwood; Stiff dogwood	*Cornus foemina*	
May haw; May hawthorn	*Crataegus aestivalis*	
Yellowleaf hawthorn	*Crataegus flava*	
Michaux's hawthorn	*Crataegus michauxii*	
Slender scratchdaisy	*Croptilon divaricatum*	
Lanceleaf rattlebox	*Crotalaria lanceolata*	
Smooth rattlebox*	*Crotalaria pallida*	
Rabbitbells	*Crotalaria rotundifolia*	
Showy rattlebox*	*Crotalaria spectabilis*	
Silver croton; Healing croton	*Croton argyranthemus*	
Woolly croton; Hogwort	*Croton capitatus*	
Rushfoil; Michaux's croton	*Croton michauxii*	
Colombian waxweed*	*Cuphea carthagenensis*	
Florida scrub roseling	*Cuthbertia ornata*	
Roseling	*Cuthbertia* sp.	
Leafless swallowwort	*Cynanchum scoparium*	
Bermudagrass*	*Cynodon dactylon*	
Jointed flatsedge	*Cyperus articulatus*	
Umbrella plant*	*Cyperus involucratus*	
Pinebarren flatsedge	*Cyperus ovatus*	
Feay's prairieclover	*Dalea feayi*	
Summer farewell	*Dalea pinnata* var. *pinnata*	
Cowitch vine; Climbing hydrangea	*Decumaria barbara*	
Western tansymustard	*Descurainia pinnata*	
Florida ticktrefoil	*Desmodium floridanum*	
Zarzabacoa comun*	*Desmodium incanum*	
Slimleaf ticktrefoil	*Desmodium tenuifolium*	
Dixie ticktrefoil*	*Desmodium tortuosum*	
Threeflower ticktrefoil	*Desmodium triflorum*	
Velvetleaf ticktrefoil	*Desmodium viridiflorum*	
Variable witchgrass	*Dichanthelium commutatum*	
Cypress witchgrass	*Dichanthelium dichotomum*	
Cypress witchgrass	*Dichanthelium ensifolium*	
Dwarf cypress witchgrass	*Dichanthelium ensifolium* var. *breve*	
Cypress witchgrass	*Dichanthelium ensifolium* var. *unciphyllum*	
Erectleaf witchgrass	*Dichanthelium erectifolium*	
Openflower witchgrass	*Dichanthelium laxiflorum*	
Eggleaf witchgrass	*Dichanthelium ovale*	
Hemlock witchgrass	*Dichanthelium portoricense*	
Carolina ponysfoot	*Dichondra caroliniensis*	
Longleaf crabgrass	*Digitaria gracillima*	
Poor joe; Rough buttonweed	*Diodia teres*	
Virginia buttonweed	*Diodia virginiana*	

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Air-potato*	*Dioscorea bulbifera*	
Common persimmon	*Diospyros virginiana*	
Pink sundew	*Drosera capillaris*	
Drymary; West Indian Chickweed*	*Drymaria cordata*	
Southern wood fern	*Dryopteris ludoviciana*	
Oblongleaf twinflower	*Dyschoriste oblongifolia*	
Coast cockspur	*Echinochloa walteri*	
Common water-hyacinth*	*Eichhornia crassipes*	
Baldwin’s spikerush; roadgrass	*Eleocharis baldwinii*	
Slim spikerush	*Eleocharis elongata*	
Carolina elephantsfoot	*Elephantopus carolinianus*	
Tall elephantsfoot	*Elephantopus elatus*	
Carolina scalystem	*Elytraria caroliniensis* var. *caroliniensis*	
Florida tasselflower*	*Emilia fosbergii*	
Florida butterfly orchid	*Encyclia tampensis*	
Earpod tree*	*Enterolobium contortisiliquum*	
Green-fly orchid	*Epidendrum conopseum*	
Golden pothos*	*Epipremnum pinnatum*	
Elliott’s lovegrass	*Eragrostis elliottii*	
Purple lovegrass	*Eragrostis spectabilis*	
Coastal lovegrass	*Eragrostis virginica*	
American burnweed; Fireweed	*Erechtites hieracifolia*	
Oakleaf fleabane	*Erigeron quercifolius*	
Prairie fleabane	*Erigeron strigosus*	
Early whitetop fleabane	*Erigeron vernus*	
Loquat*	*Eriobotrya japonica*	
Tenangle pipewort	*Eriocaulon decangulare*	
Dogtongue wild buckwheat	*Eriogonum tomentosum*	
Fragrant eryngo	*Eryngium aromaticum*	
Baldwin's eryngo	*Eryngium baldwinii*	
Coralbean; Cherokee bean	*Erythrina herbacea*	
Wild coco	*Eulophia alta*	WF, FS, HH
American strawberrybush	*Euonymus americanus*	
White thoroughwort	*Eupatorium album*	
Dogfennel	*Eupatorium capillifolium*	
Yankeeweed	*Eupatorium compositifolium*	
Queen-of-the-meadow; Joepyeweed	*Eupatorium fistulosum*	
Roundleaf thoroughwort	*Eupatorium rotundifolium*	
Lateflowering thoroughwort	*Eupatorium serotinum*	
Saltmarsh fingergrass	*Eustachys glauca*	
Pinewoods fingergrass	*Eustachys petraea*	
Slender flattop goldenrod	*Euthamia caroliniana*	
Green ash; Pumpkin ash	*Fraxinus pennsylvanica*	
Carolina ash; Water ash;		

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Pop ash	*Fraxinus caroliniana*	
Southern umbrellasedge	*Fuirena scirpoidea*	
Elliott's milkpea	*Galactia elliottii*	
Soft milkpea	*Galactia mollis*	
Eastern milkpea	*Galactia regularis*	
Hairy bedstraw	*Galium pilosum*	
Stiff marsh bedstraw	*Galium tinctorium*	
Oneflower bedstraw	*Galium uniflorum*	
Pennsylvania cudweed	*Gamochaeta pensylvanica*	
Garberia	*Garberia heterophylla*	SH, SC, SCF
Southern beeblossom	*Gaura angustifolia*	
Dwarf huckleberry	*Gaylussacia dumosa*	
Blue huckleberry	*Gaylussacia frondosa* var. *tomentosa*	
Yellow jessamine	*Gelsemium sempervirens*	
Sweet everlasting; Rabbit tobacco	*Gnaphalium obtusifolium*	
Loblolly bay	*Gordonia lasianthus*	
Rough hedgehyssop	*Gratiola hispida*	
Bearded skeletongrass	*Gymnopogon ambiguus*	
Chapman's skeletongrass	*Gymnopogon chapmanianus*	
Toothpetal false reinorchid	*Habenaria floribunda*	
Longhorn false reinorchid	*Habenaria quinqueseta*	
Waterspider false reinorchid	*Habenaria repens*	
American witchhazel	*Hamamelis virginiana*	
English ivy*	*Hedera helix*	
White gingerlily*	*Hedychium coronarium*	
Innocence; Roundleaf bluet	*Hedyotis procumbens*	
Southeastern sneezeweed	*Helenium pinnatifidum*	
Carolina frostweed	*Helianthemum carolinianum*	
Pinebarren frostweed	*Helianthemum corymbosum*	
Stiff sunflower	*Helianthus radula*	
Sweet tanglehead*	*Heteropogon melanocarpus*	
Queen-devil	*Hieracium gronovii*	
Coastalplain hawkweed	*Hieracium megacephalon*	
Innocence; Roundleaf bluet	*Houstonia procumbens*	
Waterthyme; Hydrilla*	*Hydrilla verticillata*	
Floating marshpennywort	*Hydrocotyle ranunculoides*	
Manyflower marshpennywort	*Hydrocotyle umbellata*	
Indian swampweed*	*Hygrophila polysperma*	
Coastalplain spiderlily	*Hymenocallis crassifolia*	
Spring-run spiderlily	*Hymenocallis rotata*	
Roundpod St. John's-wort	*Hypericum cistifolium*	
Peelbark St. John's-wort	*Hypericum fasciculatum*	
Pineweeds; Orangegrass	*Hypericum gentianoides*	
St. Andrew's-cross	*Hypericum hypericoides*	
Dwarf St. John's-wort	*Hypericum mutilum*	

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Myrtleleaf St. John's-wort	*Hypericum myrtifolium*	
Atlantic St. John's-wort	*Hypericum tenuifolium*	
Fourpetal St. John's-wort	*Hypericum tetrapetalum*	
Sandweed; Yellow stargrass	*Hypoxis* sp.	
Common yellow stargrass	*Hypoxis curtissii*	
Fringed yellow stargrass	*Hypoxis juncea*	
Clustered bushmint; Musky mint	*Hyptis alata*	
Tropical bushmint*	*Hyptis mutabilis*	
Carolina holly; Sand holly	*Ilex ambigua* var. *ambigua*	
Dahoon holly	*Ilex cassine*	
Large gallberry	*Ilex coriacea*	
Inkberry; Gallberry	*Ilex glabra*	
Scrub holly	*Ilex opaca* var. *arenicola*	
American holly	*Ilex opaca* var. *opaca*	
Yaupon holly	*Ilex vomitoria*	
Yellow anisetree	*Illicium parviflorum*	MH, WF, HH
Cogongrass*	*Imperata cylindrica*	
Carolina indigo	*Indigofera caroliniana*	
Hairy indigo*	*Indigofera hirsuta*	
Oceanblue morningglory	*Ipomoea indica*	
Largeroot morningglory*	*Ipomoea macrorhiza*	
Man-of-the-earth	*Ipomoea pandurata*	
Saltmarsh morningglory	*Ipomoea sagittata*	
Dixie iris; Prairie iris	*Iris hexagona*	
Virginia iris	*Iris virginica*	
Virginia willow	*Itea virginica*	
Leathery rush	*Juncus coriaceus*	
Soft rush	*Juncus effusus* spp. *solutus*	
Shore rush; Grassleaf rush	*Juncus marginatus*	
Lesser creeping rush	*Juncus repens*	
Needlepod rush	*Juncus scirpoides*	
Chandelier plant*	*Kalanchoe delagoensis*	
Virginia saltmarsh mallow	*Kosteletzkya virginica*	
Sandspur; Ratany	*Krameria lanceolata*	
Virginia dwarfdandelion	*Krigia virginica*	
Shortleaf spikesedge*	*Kyllinga brevifolia*	
Carolina redroot	*Lachnanthes caroliniana*	
Whitehead bogbutton	*Lachnocaulon anceps*	
Woodland lettuce	*Lactuca floridana*	
Grassleaf lettuce	*Lactuca graminifolia*	
Lantana; Shrubverbena*	*Lantana camara*	
Nodding pinweed	*Lechea cernua*	SC
Hairy pinweed	*Lechea mucronata*	
Piedmont pinweed	*Lechea torreyi*	

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Southern cutgrass; Clubhead cutgrass	*Leersia hexandra*	
Little duckweed	*Lemna obscura*	
Duckweed	*Lemna* sp.	
Lion's-ear; Coastal doghobble	*Leucothoe axillaris*	
Christmas candlestick*	*Leonotis nepetifolia*	
Valdivia duckweed	*Lemna valdiviana*	
Virginia pepperweed	*Lepidium virginicum*	
Hairy lespedeza	*Lespedeza hirta*	
Coastal doghobble	*Leucothoe axillaris*	
Slender gayfeather	*Liatris gracilis*	
Fewflower gayfeather	*Liatris pauciflora*	
Piedmont gayfeather	*Liatris secunda*	
Shortleaf gayfeather	*Liatris tenuifolia*	
Shortleaf gayfeather	*Liatris tenuifolia* var. *quadriflora*	
Gopher apple	*Licania michauxii*	
Catesby's lily; Pine lily	*Lilium catesbaei*	
Canadian toadflax	*Linaria canadensis*	
Florida yellow flax	*Linum floridanum*	
Sweetgum	*Liquidambar styraciflua*	
Smallflower halfchaff sedge	*Lipocarpha micrantha*	
Tuliptree; Yellow poplar	*Liriodendron tulipifera*	
Cardinalflower	*Lobelia cardinalis*	
Glade lobelia	*Lobelia glandulosa*	
Downy lobelia	*Lobelia puberula*	
Bay lobelia	*Lobelia feayana*	
Coral honeysuckle	*Lonicera sempervirens*	
Anglestem primrosewillow	*Ludwigia leptocarpa*	
Peruvian primrosewillow*	*Ludwigia peruviana*	
Creeping primrosewillow	*Ludwigia repens*	
Shrubby primrosewillow	*Ludwigia suffruticosa*	
Skyblue lupine	*Lupinus diffusus*	
Southern watergrass	*Luziola fluitans*	
Taperleaf waterhorehound	*Lycopus rubellus*	
Rose-rush	*Lygodesmia aphylla*	
Fetterbush	*Lyonia lucida*	
Rusty staggerbush	*Lyonia ferruginea*	
Coastalplain staggerbush	*Lyonia fruticosa*	
Maleberry	*Lyonia ligustrina* var. *foliosiflora*	
Catclawvine*	*Macfadyena ungius-cati*	
Wild bushbean*	*Macroptilium lathyroides*	
Southern magnolia	*Magnolia grandiflora*	
Sweetbay	*Magnolia virginiana*	
Southern crabapple	*Malus angustifolia*	
Florida milkvine	*Matelea floridana*	MH, UMW, XH, SHF, HH

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Angularfruit milkvine	*Matelea gonocarpos*	MH, UMW, SHF, HH
Sandhill spiny-pod	*Matelia pubiflora*	SH
Axilflower	*Mecardonia acuminata*	
Chinaberrytree*	*Melia azedarach*	
Rose Natalgrass*	*Melinis repens*	
Creeping cucumber	*Melothria pendula*	
Noyau vine*	*Merremia dissecta*	
Shade mudflower	*Micranthemum umbrosum*	
Florida Keys hempvine	*Mikania cordifolia*	
Climbing hempvine	*Mikania scandens*	
Sensitive brier	*Mimosa quadrivalvis* var. *angustata*	
Florida sensitive brier	*Mimosa quadrivalvis* var. *floridana*	
Partridgeberry; Twinberry	*Mitchella repens*	
Lax hornpod	*Mitreola petiolata*	
Carolina bristlemallow	*Modiola caroliniana*	
Balsampear*	*Momordica charantia*	
Spotted beebalm	*Monarda punctata*	
Indianpipe	*Monotropa uniflora*	
Red mulberry	*Morus rubra*	
Southern bayberry; Wax myrtle	*Myrica cerifera*	
Parrot feather watermilfoil*	*Myriophyllum aquaticum*	
Southern waternymph	*Najas guadalupensis*	
Sacred bamboo; Heavenly bamboo*	*Nandina domestica*	
European watercress*	*Nasturtium officinale*	
Florida beargrass	*Nolina atopocarpa*	MF, WF
Crowpoison; False garlic	*Nothoscordum bivalve*	
Spatterdock; Yellow pondlily	*Nuphar advena*	
American white waterlily	*Nymphaea odorata*	
Big floatingheart	*Nymphoides aquatica*	
Swamp tupelo	*Nyssa sylvatica* var. *biflora*	
Whitetop aster; Pinebarrens aster	*Oclemena reticulata*	
Clustered mille graines	*Oldenlandia uniflora*	
Woodsgrass; Basketgrass	*Oplismenus hirtellus*	
Pricklypear	*Opuntia humifusa*	
Goldenclub; Neverwet	*Orontium aquaticum*	
Wild olive	*Osmanthus americanus*	
Common yellow woodsorrel	*Oxalis corniculata*	
Pink woodsorrel*	*Oxalis debilis* var. *corymbosa*	
Butterweed	*Packera glabella*	
Sewervine*	*Paederia cruddasiana*	
Skunkvine*	*Paederia foetida*	
Feay's palafox	*Palafoxia feayi*	
Coastalplain palafox	*Palafoxia integrifolia*	
Beaked panicum	*Panicum anceps*	

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Maidencane	*Panicum hemitomon*	
Panic grass	*Panicum longifolium*	
Guineagrass*	*Panicum maximum*	
Torpedograss*	*Panicum repens*	
Redtop panicum	*Panicum rigidulum*	
Paronychia	*Paronychia* sp.	
Virginia creeper; Woodbine	*Parthenocissus quinquefolia*	
Egyptian paspalidium	*Paspalidium geminatum*	
Bull crowngrass	*Paspalum boscianum*	
Field paspalum	*Paspalum laeve*	
Bahiagrass*	*Paspalum notatum*	
Water paspalum	*Paspalum repens*	
Thin paspalum	*Paspalum setaceum*	
Vaseygrass*	*Paspalum urvillei*	
Purple passionflower	*Passiflora incarnata*	
Yellow passionflower	*Passiflora lutea*	
Corkystem passionflower	*Passiflora suberosa*	
Buckroot	*Pediomelum canescens*	
White arrow arum; Spoonflower	*Peltandra sagittifolia*	
Green arrow arum	*Peltandra virginica*	
Elephantgrass; Napiergrass*	*Pennisetum purpureum*	
Manyflower beardtongue	*Penstemon multiflorus*	
Red bay	*Persea borbonia* var. *borbonia*	
Silk bay; scrub bay	*Persea borbonia* var. *humilis*	
Swamp bay	*Persea palustris*	
Savannah panicum	*Phanopyrum gymnocarpon*	
Golden polypody	*Phlebodium aureum*	
Florida false sunflower	*Phoebanthus grandiflorus*	
Senegal date palm*	*Phoenix reclinata*	
Oak mistletoe	*Phoradendron leucarpum*	
Red chokeberry	*Photinia pyrifolia*	
Common reed	*Phragmites australis*	
Turkey tangle fogfruit; Capeweed	*Phyla nodiflora*	
Cutleaf groundcherry	*Physalis angulata*	
Husk tomato	*Physalis pubescens*	
American pokeweed	*Phytolacca americana*	
Wild pennyroyal	*Piloblephis rigida*	
Blueflower butterwort	*Pinguicula caerulea*	DM, FPLK,
Yellow butterwort	*Pinguicula lutea*	
Small butterwort	*Pinguicula pumila*	
Blackseed needlegrass	*Piptochaetium avenaceum*	
Florida needlegrass	*Piptochaetium avenacioides*	
Pitted stripeseed	*Piriqueta cistoides* spp. *caroliniana*	
Water-lettuce*	*Pistia stratiotes*	
Narrowleaf silkgrass	*Pityopsis graminifolia*	

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Resurrection fern	*Pleopeltis polypodioides* var. *michauxiana*	
Stinking camphorweed	*Pluchea foetida*	
Rose camphorweed	*Pluchea baccharis*	
Sweetscent	*Pluchea odorata*	
Rosy camphorweed	*Pluchea rosea*	
Yew plum pine*	*Podocarpus macrophyllus*	
Rose pogonia; Snakemouth orchid	*Pogonia ophioglossoides*	DM, WF
Showy milkwort	*Polygala grandiflora*	
Orange milkwort	*Polygala lutea*	
Candyroot	*Polygala nana*	
Yellow milkwort	*Polygala rugelii*	
Coastalplain milkwort	*Polygala setacea*	
Showy milkwort	*Polygala violacea*	
King Solomon's seal	*Polygonatum biflorum*	
Largeflower jointflower	*Polygonella fimbriata* var. *robusta*	
Tall jointweed	*Polygonella gracilis*	
Denseflower knotweed	*Polygonum glabrum*	
Hairy smartweed	*Polygonum hirsutum*	
Dotted smartweed	*Polygonum punctatum*	
Bog smartweed	*Polygonum setaceum*	
Rustweed; Juniperleaf	*Polypremum procumbens*	
Pickerelweed	*Pontederia cordata*	
Chickasaw plum	*Prunus angustifolia*	
Carolina laurelcherry	*Prunus caroliniana*	
Black cherry	*Prunus serotina* var. *serotina*	
Flatwoods plum; Hog plum	*Prunus umbellata*	
Wild coffee	*Psychotria nervosa*	
Shortleaf wild coffee	*Psychotria sulzneri*	
Common hoptree; Wafer ash	*Ptelea trifoliata*	
Blackroot	*Pterocaulon pycnostachyum*	
Giant orchid	*Pteroglossaspis ecristata*	SH, PP
Mock bishopsweed; Herbwilliam	*Ptilimnium capillaceum*	
Carolina desertchicory	*Pyrrhopappus carolinianus*	
Chapman's oak	*Quercus chapmanii*	
Spanish oak; Southern red oak	*Quercus falcata*	
Sand live oak	*Quercus geminata*	
Bluejack oak	*Quercus incana*	
Scrub oak	*Quercus inopina*	
Turkey oak	*Quercus laevis*	
Laurel oak; Diamond oak	*Quercus laurifolia*	
Sand post oak	*Quercus margaretta*	
Dwarf live oak	*Quercus minima*	
Myrtle oak	*Quercus myrtifolia*	
Water oak	*Quercus nigra*	
Running oak	*Quercus pumila*	

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Small post oak	*Quercus stellata* var. *margaretta*	
Virginia live oak	*Quercus virginiana*	
Needle palm	*Rhapidophyllum hystrix*	
Pale meadowbeauty	*Rhexia mariana*	
Nuttall's meadowbeauty	*Rhexia nuttallii*	
Fringed meadowbeauty	*Rhexia petiolata*	
Swamp azalea	*Rhododendron viscosum* var. *serrulatum*	
Winged sumac	*Rhus copallinum*	
Brownhair snoutbean	*Rhynchosia cinerea*	
Doubleform snoutbean	*Rhynchosia difformis*	
Michaux's snoutbean	*Rhynchosia michauxii*	
Least snoutbean	*Rhynchosia minima*	
Dollarleaf	*Rhynchosia reniformis*	
Baldwin's beaksedge	*Rhynchospora baldwinii*	
Starrush whitetop	*Rhynchospora colorata*	
Shortbristle horned beaksedge	*Rhynchospora corniculata*	
Swampforest beaksedge	*Rhynchospora decurrens*	
Fascicled beaksedge	*Rhynchospora fascicularis*	
Fernald's beaksedge	*Rhynchospora fernaldii*	
Gray's beaksedge	*Rhynchospora grayii*	
Pinebarren beaksedge	*Rhynchospora intermedia*	
Narrowfruit horned beaksedge	*Rhynchospora inundata*	
Sandyfield beaksedge	*Rhynchospora megalocarpa*	
Southern beaksedge	*Rhynchospora microcarpa*	
Bunched beaksedge	*Rhynchospora microcephala*	
Millet beaksedge	*Rhynchospora miliacea*	
Mingled beaksedge	*Rhynchospora mixta*	
Fragrant beaksedge	*Rhynchospora odorata*	
Tropical Mexican clover*	*Richardia brasiliensis*	
Rough Mexican clover*	*Richardia scabra*	
European watercress*	*Rorippa nasturtium-aquaticum*	
Swamp rose	*Rosa palustris*	
Sand blackberry	*Rubus cuneifolius*	
Sawtooth blackberry	*Rubus pensilvanicus*	
Blackeyed Susan	*Rudbeckia hirta*	
Carolina wild petunia	*Ruellia caroliniensis*	
Ciliate wild petunia	*Ruellia ciliosa*	
Britton's wild petunia; Mexican bluebell*	*Ruellia simplex*	
Heartwing dock; Hastateleaf dock	*Rumex hastatulus*	
Swamp dock	*Rumex verticillatus*	
Dwarf palmetto; Bluestem palm	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
Shortleaf rosegentian	*Sabatia brevifolia*	
Coastal rosegentian	*Sabatia calycina*	

Common Name	***Scientific Name***	**Primary Habitat Codes (for imperiled species)**
Largeflower rosegentian	*Sabatia grandiflora*	
Sugarcane plumegrass	*Saccharum giganteum*	
American cupscale	*Sacciolepis striata*	
Leafless beaked ladiestresses	*Sacoila lanceolata* var. *lanceolata*	
Smallflower mock buckthron	*Sageretia minutiflora*	
Bulltongue arrowhead	*Sagittaria lancifolia*	
Broadleaf arrowhead	*Sagittaria latifolia*	
Carolina willow	*Salix caroliniana*	
Florida willow	*Salix floridana*	SRST
Lyreleaf sage	*Salvia lyrata*	
Water spangles*	*Salvinia minima*	
American elder; Elderberry	*Sambucus canadensis*	
Pineland pimpernel	*Samolus valerandi* spp. *parviflorus*	
Canadian blacksnakeroot	*Sanicula canadensis*	
Bowstring hemp*	*Sansevieria hyacinthoides*	
Popcorntree; Chinese tallowtree *	*Sapium sebiferum*	
White twinevine	*Sarcostemma clausum*	
Hooded pitcherplant	*Sarracenia minor*	
Sassafras	*Sassafras albidum*	
Lizard's tail	*Saururus cernuus*	
Little bluestem	*Schizachyrium scoparium*	
Florida feathershank	*Schoenocaulon dubium*	
Giant bulrush; California bulrush	*Schoenoplectus californicus*	
Cuban bulrush*	*Scirpus cubensis*	
Giant bulrush; Drooping bulrush	*Scirpus lineatus*	
Tall nutgrass; Whip nutrush	*Scleria triglomerata*	
Fringed nutrush	*Scleria ciliata* var. *ciliata*	
Woolgrass	*Scirpus cyperinus*	
Littlehead nutrush	*Scleria oligantha*	
Netted nutrush	*Scleria reticularis*	
Tall nutgrass; Whip nutrush	*Scleria triglomerata*	
Sweetbroom; Licoriceweed	*Scoparia dulcis*	
Florida scrub skullcap	*Scutellaria arenicola*	
Helmet skullcap	*Scutellaria integrifolia*	
Common groundsel	*Senecio vulgaris*	
Coffeeweed; Sicklepod*	*Senna obtusifolia*	
Coffee senna	*Senna occidentalis*	
Saw palmetto	*Serenoa repens*	
Danglepod	*Sesbania herbacea*	
Giant bristlegrass	*Setaria magna*	
Yellow bristlegrass; Yellow foxtail	*Setaria parviflora*	
Piedmont blacksenna	*Seymeria pectinata*	

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Gum bully	*Sideroxylon lanuginosum*	
Tough bully	*Sideroxylon tenax*	
Starry rosinweed	*Silphium asteriscus*	
Narrowleaf blueeyed grass	*Sisyrinchium angustifolium*	
Earleaf greenbrier	*Smilax auriculata*	
Saw greenbrier	*Smilax bona-nox*	
Cat greenbrier; Wild Sarsaparilla	*Smilax glauca*	
Blueridge carrionflower	*Smilax lasioneuron*	
Laurel greenbrier	*Smilax laurifolia*	
Sarsaparilla vine	*Smilax pumila*	
Jackson vine; Lanceleaf greenbrier	*Smilax smallii*	
Bristly greenbrier; Hogbrier	*Smilax tamnoides*	
Coral greenbrier	*Smilax walteri*	
American black nightshade	*Solanum americanum*	
Tropical soda apple*	*Solanum viarum*	
Pinebarren goldenrod	*Solidago fistulosa*	
Chapman's goldenrod	*Solidago odora* var. *chapmanii*	
Seaside goldenrod	*Solidago sempervirens*	
Spiny sowthistle*	*Sonchus asper*	
Lopsided Indiangrass	*Sorghastrum secundum*	
Johnsongrass*	*Sorghum halepense*	
Sand cordgrass	*Spartina bakeri*	
Woodland false buttonweed	*Spermacoce remota*	
Creeping oxeye*	*Sphagneticola trilobata*	
Spring ladiestresses	*Spiranthes vernalis*	
Smutgrass*	*Sporobolus indicus*	
Pineywoods dropseed	*Sporobolus junceus*	
Florida hedgenettle; Florida betony	*Stachys floridana*	
Sweet shaggytuft	*Stenandrium dulce*	
Crowpoison; Osceola's plume	*Stenanthium densum*	
Queensdelight	*Stillingia sylvatica*	
Pineland scalypink	*Stipulicida setacea*	
Coastalplain dawnflower	*Stylisma patens*	
Carolina false vervain	*Stylodon carneum*	
Sidebeak pencilflower	*Stylosanthes biflora*	
Scaleleaf aster	*Symphyotrichum adnatum*	
Climbing aster	*Symphyotrichum carolinianum*	
Walter’s aster	*Symphyotrichum walteri*	
Yellow hatpins	*Syngonanthus flavidulus*	
American evergreen*	*Syngonium podophyllum*	
Bald-cypress	*Taxodium distichum*	
Scurf hoarypea	*Tephrosia chrysophylla*	
Florida hoarypea	*Tephrosia florida*	

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Wood sage; Canadian germander	*Teucrium canadense*	
Alligatorflag; Fireflag	*Thalia geniculata*	
Carolina basswood	*Tilia americana* var. *caroliniana*	
Bartram's airplant	*Tillandsia bartramii*	
Ballmoss	*Tillandsia recurvata*	
Southern needleleaf	*Tillandsia setacea*	
Florida airplant	*Tillandsia simulata*	
Spanish moss	*Tillandsia usneoides*	
Giant air-plant; Giant wild pine	*Tillandsia utriculata*	MF, SH, UMW, WF, FS, HH
Eastern poison ivy	*Toxicodendron radicans*	
Poison sumac	*Toxicodendron vernix*	
Bluejacket; Ohio spiderwort	*Tradescantia ohiensis*	
Forked bluecurls	*Trichostema dichotomum*	
Eastern gamagrass	*Tripsacum dactyloides*	
Southern cattail	*Typha domingensis*	
American elm	*Ulmus americana*	
Caesarweed*	*Urena lobata*	
Paragrass*	*Urochloa mutica*	
Florida yellow bladderwort	*Utricularia floridana*	
Leafy bladderwort	*Utricularia foliosa*	
Floating bladderwort	*Utricularia inflata*	
Little floating bladderwort	*Utricularia radiata*	
Zigzag bladderwort	*Utricularia subulata*	
Highbush blueberry	*Vaccinium corymbosum*	
Darrow's blueberry	*Vaccinium darrowii*	
Shiny blueberry	*Vaccinium myrsinites*	
Deerberry	*Vaccinium stamineum*	
Tapegrass; American eelgrass	*Vallisneria americana*	
Common mullein*	*Verbascum thapsis*	
Wand mullein*	*Verbascum virgatum*	
White crownbeard; Frostweed	*Verbesina virginica*	
Tall ironweed	*Vernonia angustifolia*	
Giant ironweed	*Vernonia gigantea*	
Water speedwell*	*Veronica anagallis-aquatica*	
Walter's viburnum	*Viburnum obovatum*	
Florida vetch	*Vicia floridana*	
Pygmy flower vetch	*Vicia minutiflora*	
Early blue violet	*Viola palmata*	
Common blue violet	*Viola sororia*	
Summer grape	*Vitis aestivalis*	
Florida grape	*Vitis cinerea* var. *floridana*	
Muscadine	*Vitis rotundifolia*	
Calloose grape	*Vitis shuttleworthii*	
Chinese wisteria*	*Wisteria sinensis*	

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Columbian watermeal	*Wolffia columbiana*	
Arrowleaf elephantear*	*Xanthosoma sagittifolium*	
Tallow wood; Hog plum	*Ximenia americana*	
Coastalplain yelloweyed grass	*Xyris ambigua*	
Shortleaf yelloweyed grass	*Xyris brevifolia*	
Carolina yelloweyed grass	*Xyris caroliniana*	
Elliott’s yelloweyed grass	*Xyris elliottii*	
Fringed yelloweyed grass	*Xyris fimbriata*	
Savannah yelloweyed grass	*Xyris flabelliformis*	
Richard’s yelloweyed grass	*Xyris jupicai*	
Oriental false hawksbeard*	*Youngia japonica*	
Spanish bayonet; Aloe yucca*	*Yucca aloifolia*	
Adam's needle	*Yucca filamentosa*	
Florida arrowroot; Coontie	*Zamia pumila*	
Hercules-club	*Zanthoxylum clava-herculis*	
Soldier's orchid; Lawn orchid*	*Zeuxine strateumatica*	
Annual wild rice; Indian rice	*Zizania aquatica*	
Viperina	*Zornia bracteata*	

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

INVERTEBRATES

PORIFERA

Freshwater sponge.................. *Spongillidea* sp.

CNIDARIA

Colonial hydroid...................... *Cordylophora lacustris*
Hydroid.................................. *Hydra* sp.

WORMS

Oligochaete............................*Bratislavia unidentata*
Naiad worm............................*Dero botrytis*
Naiad worm............................*Dero digitata*
Naiad worm............................*Dero pectinata*
Naiad worm............................*Dero trifida*
Leech ....*Desserobdella phalera*
Segmented worm....................*Eclipidrilus palustris*
Worm ....*Haber speciosus*
Leech ....*Helobdella stagnalis*
Leech ....*Helobdella triserialis*
Worm ....*Ilyodrilus templetoni*
Worm ....*Limnodrilus hoffmeisteri*
Worm ....*Lumbriculus variegates*
Worm ....*Mooreobdella tetragon*
Naiad worm............................*Nais communis* complex
Naiad worm............................*Nais elinguis*
Naiad worm............................*Nais variabilis*
Segmented worm....................*Pristina* sp.
Worm ....*Varichaetadrilus angustipenis*

MUSSELS/SNAILS

Peninsula amnicola.................. *Amnicola dalli*
Wekiwa hydrobe .... *Aphaostracon monas*..................................SRST, ACV
Florida apple snail .... *Pomacea paludosa*
Purple-throated campeloma ..... *Campeloma floridense*
Asian clam* .... *Corbicula fluminea*
Mussel.................................. *Corbicula manilensis*
Mussel.................................. *Elliptio* sp.
Wekiwa siltsnail .... *Floridobia wekiwae*..................................SRST, ACV
Ancylid .... *Laevapex* sp.
Peninsula ancylid .... *Laevapex peninsulae*
Malaysian trumpet snail* .... *Melanoides tuberculata*
Fawn melania .... *Melanoides turricula*
Mussel* .... *Planorbella duryi*
Mesa ram's-horn..................... *Planorbella scalaris*

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Serrate crownsnail	*Pyrgophorus platyrachis*	
Striated fingernailclam	*Sphaerium striatinum*	
Iridescent liliput mussel	*Toxoplasma paulus*	
Smooth-rib hydrobe	*Tryonia aequicostata*	
Paper pondshell	*Utterbackia imbecilis*	
Florida rainbow mussel	*Villosa amygdale*	
Banded mysterysnail	*Viviparus georgianus*	
SPIDERS/SCORPIONS/TICKS/MITES		
Crab-like spiny-orb weaver	*Gasteracantha cancriformis*	
Brown widow spider*	*Latrodectus geometricus*	
Southern black widow spider	*Latrodectus mactans*	
Orchard orb weaver spider	*Leucauge venusta*	
Arachnid	*Mexecheles hawaiiensis*	
Arachnid	*Micrathena gracilis*	
Arachnid	*Misumenoides formosipes*	
Golden-silk spider	*Nephila clavipes*	
Green lynx spider	*Peucetia viridans*	
Regal jumping spider	*Phidippus regius*	
Abbot purseweb spider	*Sphodros abboti*	
Jumping spider	*Thiodina puerperal*	
Hentz striped scorpion	*Centruroides hentzi*	
Vinegaroon	*Idiogaryops paludis*	
Giant vinegaroon	*Mastigoproctus giganteus*	
Lone-star tick	*Amblyomma americanum*	
Gopher tortoise tick	*Amblyomma tuberculatum*	
American dog tick (wood tick)	*Dermacentor variabilis*	
Black-legged tick (deer tick)	*Ixodes scapularis*	
Common rodent mite	*Androlaelaps fahrenholzi*	
House dust mite	*Dermatophagoides* sp.	
Water mite	*Hydrodroma* sp.	
Water mite	*Lebertia* sp.	
Water mite	*Piona* sp.	
Chigger	*Eutrombicula cinnabaris*	
Gray fox chewing louse	*Felicola quadraticeps*	
Chigger	*Trombicula* sp.	
ISOPODS		
Florida cave isopod	*Caecidotea hobbsi*	ACV
Asellid isopod	*Caecidotea racovitzai australis*	
Isopod	*Cassidinidea ovalis*	
Hobbs' cave amphipod	*Crangonyx hobbsi*	ACV
Amphipod	*Gammarus* cf. *tigrinus*	
Amphipod	*Hyalella* sp.	
Silverfish	*Lepisma saccharina*	
Isopod	*Lirceus* sp.	

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SHRIMP		
Eastern grass shrimp	*Palaemonetes paludosus*	
Shrimp	*Palpomyia-Sphaeromias* group	
CRAYFISH		
Orlando cave crayfish	*Procambarus acherontis*	ACV
Crayfish	*Procambarus fallax*	
Crayfish	*Procambarus geodytes*	
MILLIPEDES/CENTIPEDES (DIPLOPODA/CHILOPODA)		
Florida ivory millipede	*Chicobolus spinigerus*	
North American millipede	*Narceus americanus*	
TRUE BUGS/CICADAS/APHIDS/HOOPERS		
Leafhopper sp.	*Acutalis tartarea*	
Leafhopper sp.	*Archasia belfragei*	
Treehopper sp.	*Carynota maculata*	
Treehopper sp.	*Crytolobus ovatus*	
Treehopper sp.	*Stictocephala lutea*	
Treehopper sp.	*Vanduzea triguttata*	
Water treader	*Mesovelia mulsanti*	
Stinkbug sp.	*Mormidea lugens*	
Red bay psyllid	*Trioza magnoliae*	
BEETLES		
Eyed click beetle	*Alaus oculatus*	
Blind click beetle	*Alaus myops*	
Ambrosia beetle sp	*Ambrosiodmus lecontei*	
Wood boring beetle sp	*Buprestis maculipennis*	
Tiger beetle	*Cicindela punctulata*	
Bark beetle sp	*Cryptocarenus seriatus*	
Thomas's oak borer	*Derobrachus thomasi*	
Bark beetle sp.	*Dryoxylon onoharaensum*	
Scrub beetle	*Gerstaekeria hubbardi*	
Harlequin flower beetle	*Gymnetis caseyi*	
Bark beetle sp.	*Hylastes salebrosus*	
Eastern five-spined ingraver	*Ips grandicollis*	
Pine sawyer beetle	*Monochamus carolinensis*	
Whirlabout	*Polites vibex*	
Palm weevil	Rhynchophorus cruentatus	
Ox beetle	*Staegus antacus*	
Bark-gawing beetle sp.	*Temnoscheila virescens*	
Fruit-tree pinhole borer	Xyleborinus saxesenii	
Red ambrosia beetle*	*Xyleborus glabratus*	
Ambrosia beetle sp.	Xyleborus pubescens	

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Ambrosia beetle sp.	Xylosandrus amputates	
Asian ambrosia beetle*	Xylosandrus crassiusculus	
Arrowhead borer	Xylotrechus sagittatus sagittatus	
FLEAS		
Cat flea	*Ctenocephalides felis*	
GRASSHOPPERS/CRICKETS/WALKING STICKS		
Walkingstick	*Anisomorpha buprestoides*	
Long-headed toothpick grasshopper	*Achurum carinatum*	
Brown winter grasshopper	*Amblytropidia mystecca*	
Linear winged grasshopper	*Aptenopedes sphenarioldes*	
Southern yellow-winged grasshopper	*Arphia granulata*	
Cave cricket	*Ceuthophilus* sp.	
Handsome Florida grasshopper	*Eotettiz signatus*	
Obscure slantfaced grasshopper	*Eritettix obscurus*	
Round-winged spurthroated grasshopper	*Melanoplus rotundipennis*	
Eastern lubber	*Romalea microptera*	
Mole cricket	*Scapteriscus vicinus*	
American bird-wing grasshopper	*Schistocerca americana*	
Ridgeback sand grasshopper	*Spharagemon cristatium*	
Admirable grasshopper	*Syrbula admirabilis*	
DAMSELFLIES		
Variable dancer	*Argia fumipennis*	
Ebony jewelwing	*Calopteryx maculata*	
Sparkling jewelwing	*Calopteryx dimidiata*	
Blue damselfly	*Enallgma civile*	
Smoky rubyspot	*Hetaerina titia*	
Fragile forktail	*Ischnura posita*	
Duckweed firetail	*Telebasis byersi*	
DRAGONFLIES		
Common green darner	*Anax junius*	
Comet darner	*Anax longipes*	
Two-striped forceptail	*Aphylla williamsoni*	
Amanda’s pennant	*Celithemis amanda*	
Halloween pennant	*Celithemis eponia*	
Regal darner	*Coryphaeschna ingens*	
Black-shouldered spinyleg	*Dromogomphus spinosus*	
Damselfly	*Enallagma* sp.	

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Prince baskettail	*Epitheca princeps*	
Blue dragonlet	*Erythrodiplax minuscula*	
Eastern pondhawk	*Erythemis simplicicollis*	
Sandhill clubtail	*Gomphus cavillaris*	
Blackwater clubtail	*Gomphus dilatatus*	
Cypress clubtail	*Gomphus minutus*	
Twilight darner	*Gynacantha nervosa*	
Golden-winged skimmer	*Libellula auripennisi*	
Bar-winged skimmer	*Libellula axilena*	
Slaty skimmer	*Libellula incesta*	
Needham's skimmer	*Libellula needhami*	
Great blue skimmer	*Libellula vibrans*	
Hyacinth glider	*Miathyria marcella*	
Eastern pondhawk	*Pachydiplax longipennis*	
Eastern amberwing	*Perithemis tenera*	
Carolina saddlebags	*Tramea carolina*	
Red saddlebags	*Tramea onusta*	
MANTIDS		
Grizzled mantid	*Gonatista grisea*	
Little Yucatan mantid	*Mantoida maya*	
Carolina mantid	*Stagmomantis carolina*	
COCKROACHES & TERMITES		
Florida wood cockroach	*Eurycotis floridana*	
American cockroach	*Periplaneta americana*	
Smokybrown cockroach	*Periplaneta fuliginosa*	
FLIES		
Midge	*Ablabesmyia rhamphe*	
Midge	*Bezzia/Palpomyia* complex	
Non-biting midge	*Chironomus* spp.	
Non-biting midge	*Cladopelma* spp.	
Non-biting midge	*Cladotanytarsus* cf. *daviesi*	
Midge	*Cricotopus bicinctus*	
Midge	*Cricotopus* sp.	
Non-biting midge	*Cryptochironomus* sp.	
Square-gilled mayfly	*Caenis diminuta*	
Midge	*Culicoides edeni*	
Midge	*Culicoides haematopotus*	
Midge	*Culicoides insignis*	
Midge	*Culicoides stellifer*	
Midge	*Culicoides torreryae*	
Midge	*Culicoides venustus*	
Spottedwinged antlion	*Dendoleon obsoletus*	
Lawn midge	*Dicrotendipes modestus*	

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Lawn midge	*Dicrotendipes neomodestus*	
Midge	*Einfeldia natchitocheae*	
Non-biting midge	*Glyptotendipes* spp.	
Mayfly	*Heptagenia flavescens*	
Midge	*Larsia decolorata*	
Louse fly	*Lipoptena mazamae*	
Coconut mealybug	*Nipaecicus nipae*	
Non-biting midge	*Paralauterborniella nigrohalteralis*	
Love bug	*Plecia nearctica*	
Midge	*Polypedilum flavum*	
Midge	*Polypedilum halterale* group	
Midge	*Polypedilum scalaenum* group	
Midge	*Polypedilum tritum*	
Non-biting midge	*Pseudochironomus* sp.	
Non-biting midge	*Pseudosmittia* sp.	
Striped horse fly	*Tabanus lineola*	
Non-biting midge	*Tanytarsus* sp.	
Midge	*Thienemanniella* sp.	
Crane fly	*Tipula abdominalis*	
Midge	*Tribelos jucundum*	
Mayfly	*Tricorythodes albilineatus*	
Midge	*Zavreliella marmorata*	
CADDISFLIES		
Caddisfly	*Cernotina* sp.	
Caddisfly	*Nectopsyche pavida*	
longhorned caddisfly	*Oecetis parva*	BST, SRST
Caddisfly	*Oecetis persimilis*	
MOTHS		
Luna moth	*Actias luna*	
Polyphemus moth	*Antheraea polyphemus*	
Io moth	*Automeris io*	
Common wood-nymph	*Cercyonis pegala*	
Yellow-collared scape moth	*Cisseps fulvicollis*	
Southern skipperling	*Copaeodes minimus*	
Gemmed satyr	*Cyllopsis gemma*	
Imperial moth	*Eacles imperialis*	
Sphinx moth	*Enyo lugubris*	
Tent caterpillar moth	*Malacosoma americanum*	
Little wood satyr	*Megisto cymela*	
Plume moth	*Oidaematophorus balanotes*	
Oleander moth	*Syntomeida jucundissima*	
BUTTERFLIES		
Gulf fritillary	*Agraulis vanilla*	

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Lace-winged roadside-skipper	*Amblyscirtes aesculapius*	
White peacock	*Anartia jatrophae*	
Delaware skipper	*Anatrytone logan*	
Least skipper	*Ancyloxpha numitor*	
Monk skipper	*Asbolis capucinus*	
Great southern white	*Ascia monuste*	
Hackberry emperor	*Asterocampa celtis*	
Tawny emporer	*Asterocampa clyton*	
Sachem	*Atalopedes campestris*	
Great purple hairstreak	*Atlides halesus*	
Delaware skipper	*Atrytone logan*	
Pipevine swallowtail	*Battus philenor*	
Polydamas swallowtail	*Battus polydamas*	
Brazilian skipper	*Calpodes ethlius*	
Red-banded hairstreak	*Calycopis cecrops*	
Southern dogface butterfly	*Colias cesonia*	
Orange sulphur	*Colias eurytheme*	
Queen butterfly	*Danaus gillippus*	
Monarch or milkweed butterfly	*Danaus plexippus*	
Southern pearly eye	*Enodia portlandia*	
Florida pearly eye	*Enodia portlandia floralae*	MH, FS, HH
Silver-spotted skipper	*Epargyreus clarus*	
Sleepy duskywing	*Erynnis brizo*	
Horace's duskywing	*Erynnis horatius*	
Juvenal's duskywing	*Erynnis juvenalis*	
Zarucco duskywing	*Erynnis zarucco*	
Palmetto skipper	*Euphyes arpa*	
Berry's skipper	*Euphyes berryi*	DM, FM, FS, FPLK, MLK,
Palatka skipper	*Euphyes pilatka*	
Dun skipper	*Euphyes vestris*	
Variegated fritillary	*Euptoieta claudia*	
Barred sulphur butterfly	*Eurema daira*	
Barred yellow	*Eurema daira daira*	
Little yellow butterfly	*Eurema lisa*	
Sleepy orange	*Eurema nicippe*	
Zebra swallowtail	*Eurytides marcellus*	
Zebra longwing butterfly	*Heliconius charitonius*	
Ceraunus blue	*Hemiargus ceraunus*	
Carolina satyr	*Hermeuptychia sosybius*	
Dotted skipper	*Hesperia atalus*	
Eastern Meske's skipper	*Hesperia meskei straton*	SH, ABF, PI, PSI, UC
Fiery skipper	*Hylephila phyleus*	
Cassius blue	*Lepotes cassius*	
Clouded skipper	*Lerema accius*	
Eufala skipper	*Lerodea eufala*	
Viceroy	*Limenitis archippus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Red-spotted purple	*Limenitis arthemis*	
Puss caterpillar	*Megalopyge opercularis*	
Yucca giant-skipper	*Megathymus yuccae*	
Little wood satyr	*Megisto cymela*	
Viola's wood satyr	*Megisto viola*	
Neamathla skipper	*Nastra neamathla*	
Dainty sulphur	*Nathalis iole*	
Twin-spot skipper	*Oligoria maculata*	
Ocola skipper	*Panoquina ocola*	
Giant swallowtail	*Papilo cresphontes*	
Eastern tiger swallowtail	*Papilio glaucus*	
Palamedes swallowtail	*Papilio palamedes*	
American swallowtail	*Papilio polyxenes*	
Spicebush swallowtail	*Papilio troilus*	
White M hairstreak	*Parrhasius m-album m-album*	
Orange-barred sulphur	*Phoebis philea*	
Cloudless sulfur	*Phoebis sennae*	
Phaon cresent butterfly	*Phyciodes phaon*	
Pearl crescent	*Phyciodes tharos*	
Tawny-edged skipper	*Polites themistocles*	
Whirlabout	*Polites vibex*	
Question mark butterfly	*Polygonia interrogationis*	
Checkered white butterfly	*Pontia protodice*	
Buckeye butterfly	*Precis coenia*	
Byssus skipper	*Problema byssus*	
White checkered-skipper	*Pyrgus albescens*	
Common checkered-skipper	*Pyrgus communis*	
Tropical checkered-skipper	*Pyrgus oileus*	
Oak hairstreak	*Satyrium favonius*	
Gray hairstreak	*Strymon melinus*	
Southern cloudywing	*Thorybes bathyllus*	
Confused cloudywing	*Thorybes confusis*	
Northern cloudywing	*Thorybes pylades*	
Dorantes longtail	*Urbanus dorantes*	
Long-tailed skipper	*Urbanus proteus*	
Red admiral butterfly	*Vanessa atalanta*	
American lady butterfly	*Vanessa virginiensis*	
Northern broken-dash	*Wallengrenia egeremet*	
Southern broken-dash	*Wallengrenia otho*	
BEES & WASPS		
European honey bee*	*Apis mellifera*	
Gall wasp	*Callirhytis cornigera*	
Velvet ant	*Dasymutilla occidentalis*	
Eastern yellow jacket	*Vespula maculifrons*	
Southern yellow jacket	*Vespula squamosa*	

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

ANTS

Ant	*Aphaenogaster ashmeadi*	
Ant	*Aphaenogaster carolinensis*	
Ant	*Aphaenogaster flemingi*	
Ant	*Aphaenogaster fulva*	
Ant	*Aphaenogaster lamellidens*	
Florida harvester ant	*Aphaenogaster treatae*	
Ant	*Brachymyrmex depilis*	
Ant	*Brachymyrmex obscurior*	
Florida carpenter ant	*Camponotus floridanus*	
Ant	*Camponotus castaneus*	
Ant	*Camponotus impressus*	
Ant	*Camponotus nearcticus*	
Carpenter ant	*Camponotus socius*	
Ant	*Cardiocondyla emeryi**	
Ant	*Crematogaster ashmeadi*	
Ant	*Crematogaster cerasi*	
Ant	*Crematogaster lineolata*	
Ant	*Crematogster minutissima*	
Ant	*Crytopone gilva*	
Ant	*Cyphomyrmex rimosus**	
Ant	*Discothyrea testacea*	
Ant	*Dorymyrex bossuta*	
Ant	*Dorymyrmex bureni*	
Ant	*Eurhopalothrix floridana*	
Ant	*Forelius pruinosis*	
Ant	*Formica pallidefulva*	
Ant	*Hypoponera opaciceps*	
Ant	*Hypoponera opacior*	
Cornfield ant	*Lasius alienus*	
Ant	*Leptogenys manni*	
Ant	*Myrmecina americana*	
Army ant	*Neivamyrmex opacithorax*	
Ant	*Nylanderia arenivaga*	
Ant	*Nylanderia bourbonica**	
Ant	*Nylanderia concinna*	
Ant	*Nylanderia faisonensis*	
Ant	*Nylanderia longicornis**	
Ant	*Nylanderia wojciki*	
Black house ant	*Ochetellus glaber**	
Ant	*Odontomachus brunneus*	
Ant	*Pheidole dentata*	
Ant	*Pheidole dentigula*	
Ant	*Pheidole floridana*	
Ant	*Pheidole obscurithorax**	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Ant	*Pheidole moerens**	
Ant	*Pheidole morrisi*	
Florida harvester ant	*Pogonomyrmex badius*	
Ant	*Proceratium silaceum*	
Ant	*Pseudomyrmex gracilis**	
Ant	*Pseudomyrex ejectus*	
Ant	*Solenopsis abdita*	
Ant	*Solenopsis carolinensis*	
Ant	*Solenopsis geminata*	
Ant	*Solenopsis globularia*	
Red imported fire ant*	*Solenopsis invicta**	
Ant	*Solenopsis nickersoni*	
Ant	*Solenopsis picta*	
Ant	*Solenopsis tennesseensis*	
Ant	*Stigmatomma pallipes*	
Ant	*Strumigenys angulata*	
Ant	*Strumigenys eggersi**	
Emma's bow-jawed pygmy snapping ant	*Strumigenys emmae**	
Ant	*Strumigenys laevinasis*	
Miniature trap-jaw ant	*Strumigenys louisianae*	
Ant	*Strumigenys margaritae**	
Miniature trap-jaw ant	*Strumigenys membranifera**	
Ant	*Strumigenys ornata*	
Ant	*Strumigenys pulchella*	
Miniature trap-jaw ant	*Strumigenys rogeri**	
Ant	*Strumigenys talpa*	
Ant	*Temnothorax pergandei*	
Ant	*Temnothorax texanus*	
Ant	*Trachymyrmex septentrionalis*	
Ant	*Xenomyrmex floridanus*	

FISH

DASYATIDAE

Atlantic stingray	*Dasyatis sabina*	
Sea lamprey	*Petromyzon marinus*	

LEPISOSTEIDAE

Longnose gar	*Lepisosteus osseus*	
Florida gar	*Lepisosteus platyrhincus*	

AMIIDAE

Bowfin	*Amia calva*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
ANGUILLIDAE		
American eel	*Anguilla rostrata*	
CYPRINIDAE		
Golden shiner	*Notomigonus chrysoleucas*	
Ironcolor shiner	*Notropis chalybaeus*	
Dusky shiner	*Notropis cummingsae*	
Taillight shiner	*Notropis maculatus*	
Coastal shiner	*Notropis petersoni*	
Bluenose shiner	*Notropis welaka*	
Pugnose minnow	*Opsopoeodus emiliae*	
Sailfin shiner	*Pteronotropsis hypselopterus*	
Metallic shiner	*Pteronotropis metallicus*	
Bluenose shiner	*Pteronotropsis welaka*	BST, SRST
CATOSTOMIDAE		
Lake chubsucker	*Erimyzon sucetta*	
ATHERINOPSIDAE		
Brook silverside	*Labidesthes sicculus*	
ICTALURIDAE		
Snail bullhead	*Ameiurus brunneus*	
White catfish	*Ameiurus catus*	
Yellow bullhead	*Ameiurus natalis*	
Brown bullhead	*Ameiurus nebulosus*	
Walking catfish*	*Clarias batrachus*	
Channel catfish	*Ictalurus punctatus*	
Tadpole madtom	*Noturus gyrinus*	
Speckled madtom	*Noturus leptacanthus*	
LORICARIIDAE		
Orinoco sailfin catfish*	*Pterygoplichthys multiradiatus*	
Vermiculated sailfin catfish*	*Pterygoglichthys disjunctivus*	
CALLICHTHYIDAE		
Brown hoplo*	*Hoplosternum littorale*	
ESOCIDAE		
Chain pickerel	*Esox niger*	
APHREDODERIDAE		
Pirate perch	*Aphredoderus sayanus*	
CLUPEIDAE		
Gizzard shad	*Dorosoma cepedianum*	

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

CYPRINODONTIDAE
Golden topminnow .... *Fundulus chrysotus*
Marsh killfish .... *Fundulus confluentus*
Seminole killifish .... *Fundulus seminolis*
Bluefin killifish .... *Lucania goodei*
Rainwater killifish .... *Lucania parva*

POECILIIDAE
Western mosquitofish* .... *Gambusia affinis*
Eastern mosquitofish .... *Gambusia holbrooki*
Least killifish .... *Heterandria formosa*
Sailfin molly .... *Poecilia latipinna*

CENTRARCHIDAE
Everglades pygmy sunfish .... *Elassoma evergladei*
Bluespotted sunfish .... *Enneacanthus gloriosus*
Redbreast sunfish .... *Lepomis auritus*
Warmouth .... *Lepomis gulosus*
Bluegill .... *Lepomis macrochirus*
Dollar sunfish .... *Lepomis marginatus*
Redear sunfish .... *Lepomis microlophus*
Spotted sunfish .... *Lepomis punctatus*
Largemouth bass .... *Micropterus salmoides*
Black crappie .... *Pomoxis nigromaculatus*

CICHLIDAE
Blue tilapia* .... *Oreochromis aureus*

PERCIDAE
Brown darter .... *Etheostoma edwini*
Swamp darter .... *Etheostoma fusiforme*
Blackbanded darter .... *Percina nigrofasciata*

MUGILIDAE
Striped mullet .... *Mugil cephalus*

AMPHIBIANS

PLETHODONTIDAE
Dwarf salamander .... *Eurycea quadridigitata*
Southeastern slimy salamander. *Plethodon grobmani*

SALAMANDRIDAE
Striped newt .... *Notophthalmus perstriatus*....MF, SH, SC, SCF, DM, FPLK, SULK

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Peninsula newt	*Notophthalmus viridescens piaropicola*	
SIRENIDAE		
Lesser siren	*Siren intermedia*	
Greater siren	*Siren lacertina*	
AMPHIUMIDAE		
Two-toed amphiuma	*Amphiuma means*	
PELOBATIDAE		
Eastern spadefoot	*Scaphiopus holbrookii*	
BUFONIDAE		
Oak toad	*Anaxyrus quercicus*	
Southern toad	*Anaxyrus terrestris*	
LEPTODACTYLIDAE		
Greenhouse frog*	*Eleutherodactylus planirostris*	
HYLIDAE		
Florida cricket frog	*Acris gryllus dorsalis*	
Southern cricket frog	*Acris gryllus gryllus*	
Green treefrog	*Hyla cinerea*	
Pine woods treefrog	*Hyla femoralis*	
Barking treefrog	*Hyla gratiosa*	
Squirrel treefrog	*Hyla squirella*	
Cuban treefrog*	*Osteopilus septentrionalis*	
Southern spring peeper	*Pseudacris crucifer*	
Florida chorus frog	*Pseudacris nigrita verrucosa*	
Little grass frog	*Pseudacris ocularis*	
RANIIDAE		
Florida gopher frog	*Lithobates capito aesopus*	SC, SCF, DM, FPLK, SULK
Bullfrog	*Lithobates catesbeianus*	
Bronze frog	*Lithobates clamitans*	
Pig frog	*Lithobates grylio*	
Florida leopard frog	*Lithobates sphenocephala*	
Southern leopard frog	*Lithobates utricularia*	
MICROHYLIDAE		
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*	

REPTILES

CROCODYLIDAE

Common Name	***Scientific Name***	**Primary Habitat Codes (for imperiled species)**
American alligator	*Alligator mississippiensis*	MANY PALSTRINE, LACUSTRINE, RIVERINE
KINOSTERNIDAE		
Striped mud turtle	*Kinosternon bauri*	
Florida mud turtle	*Kinosternon subrubrum steindachneri*	
Loggerhead musk turtle	*Sternotherus minor minor*	
Common musk turtle	*Sternotherus odoratus*	
TESTUDINIDAE		
Gopher tortoise	*Gopherus polyphemus*	MF, SH, SC, SCF, ABF, DV, PP, PI, PSI, UC
EMYDIDAE		
Florida chicken turtle	*Deirochelys reticularia chrysea*	
Florida redbelly turtle	*Pseudemys nelsoni*	
Peninsula cooter	*Pseudemys peninsularis*	
Florida box turtle	*Terrapene carolina bauri*	
Eastern box turtle	*Terrapene carolina carolina*	
Red-eared slider*	*Trachemys scripta elegans*	
CHELYDRIDAE		
Florida snapping turtle	*Chelydra serpentina*	
TRIONYCHIDAE		
Florida softshell	*Apalone ferox*	
GEKKONIDAE		
Indo-Pacific gecko*	*Hemidactylus garnotii*	
African house gecko*	*Hemidactylus mabouia*	
POLYCHRIDAE		
Green anole	*Anolis carolinensis carolinensis*	
Brown anole*	*Anolis sagrei sagrei*	
PHRYNOSOMATIDAE		
Southern fence lizard	*Sceloporus undulatus undulatus*	
AMPHISBAENIDAE		
Florida worm lizard	*Rhineura floridana*	
ANGUIDAE		
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*	
Eastern glass lizard	*Ophisaurus ventralis*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
TEIIDAE		
Six-lined racerunner	*Aspidoscelis sexlineata*	
SCINIDAE		
Peninsula mole skink	*Eumeces egregius onocrepis*	
Southeastern five-lined skink	*Eumeces inexpectatus*	
Broad-headed skink	*Plestiodon laticeps*	
Sand skink	*Plestiodon reynoldsi*	SC
Ground skink	*Scincella lateralis*	
COLUBRIDAE		
Florida scarlet snake	*Cemophora coccinea coccinea*	
Southern black racer	*Coluber constrictor priapus*	
Southern ringneck snake	*Diadophis punctatus punctatus*	
Eastern indigo snake	*Drymarchon corais couperi*	SH, SC, SCF
Eastern mud snake	*Farancia abacura abacura*	
Rainbow snake	*Farancia erytrogramma erytrogramma*	
Eastern hognose snake	*Heterodon platyrhinos*	
Common kingsnake	*Lampropeltis getula*	
Eastern kingsnake	*Lampropeltis getula getula*	
Scarlet kingsnake	*Lampropeltis trianglulum elapsoides*	
Eastern coachwhip	*Coluber flagellum*	
Florida water snake	*Nerodia fasciata pictiventris*	
Brown water snake	*Nerodia taxispilota*	
Rough green snake	*Opheodrys aestivus*	
Yellow rat snake	*Pantheropsis alleghaniensis*	
Corn snake	*Pantherophis guttata*	
Florida pine snake	*Pituophis melanoleucus mugitus*	SH, SC, SCF
Striped crayfish snake	*Regina alleni*	
Pine woods snake	*Rhadinaea flavilata*	
North Florida swamp snake	*Seminatrix pygaea pygaea*	
Short-tailed snake	*Stilosoma extenuatum*	SH, SC, XH
Central Florida crowned snake	*Tantilla relicta neilli*	
Peninsula ribbon snake	*Thamnophis sauritus sackeni*	
Eastern garter snake	*Thamnophis sirtalis sirtalis*	
ELAPIDAE		
Eastern coral snake	*Micrurus fulvius fulvius*	
VIPERIDAE		
Florida cottonmouth	*Agkistrodon piscivorus conanti*	
Eastern diamondback rattlesnake	*Crotalus adamanteus*	
Dusky pigmy rattlesnake	*Sistrurus miliarius barbouri*	

BIRDS

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

GREBES

Horned grebe .... *Podiceps auritus*
Pied-billed grebe .... *Podilymbus podiceps*

PELICANS

American white pelican .... *Pelecanus erythrorhynchos*
Brown pelican .... *Pelecanus occidentalis*..............................CULK, MLK

CORMORANTS

Double-crested cormorant .... *Phalacrocorax auritus*

DARTERS

Anhinga .... *Anhinga anhinga*

BITTERNS & HERONS

Great blue heron..................... *Ardea herodias*
Great egret .... *Ardea alba*
American bittern .... *Botaurus lentiginosus*
Cattle egret* .... *Bubulcus ibis*
Green heron .... *Butorides striatus*
Little blue heron...................... *Egretta caerulea*.... DM, FS, CULJK, FPLK, MLK, BST, SRST
Snowy egret.......................... *Egretta thula*.... DM, FS, CULJK, FPLK, MLK, BST, SRST
Tricolored heron...................... *Egretta tricolor*.... DM, FS, CULJK, FPLK, MLK, BST, SRST
Black-crowned night-heron....... *Nycticorax nycticorax*
Yellow-crowned night-heron ..... *Nyctanassa violaceus*

STORKS

Wood stork .... *Mycteria americana*.... DM, FS, CULJK, FPLK, MLK, BST, SRST

IBISES

White ibis.............................. *Eudocimus albus*.................CULK, MLK, BST, SRST
Glossy ibis............................. *Plegadis falcinellus*

SPOONBILLS

Roseate spoonbill .... *Ajaia ajaja*...CULK, MLK

DUCKS & GEESE

Wood duck .... *Aix sponsa*
American wigeon .... *Anas americana*
American black duck .... *Anas rubripes*
Mottled duck .... *Anas fulvigula*

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Blue-winged teal	*Anas discors*	
Northern pintail	*Anas acuta*	
Green-winged teal	*Anas crecca*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Hooded merganser	*Lophodytes cucullatus*	
Common merganser	*Mergus merganser*	
Red-breasted merganser	*Mergus serrator*	
VULTURES, HAWKS, KITES, EAGLES		
Sharp-shinned hawk	*Accipiter striatus*	
Cooper's hawk	*Accipiter cooperii*	
Red-shouldered hawk	*Buteo lineatus*	
Short-tailed hawk	*Buteo brachyurus*	MF, SH, SC, MH, UMW, WF, FS, HH
Red-tailed hawk	*Buteo jamaicensis*	
Turkey vulture	*Cathartes aura*	
Northern harrier	*Circus cyaneus*	
Black vulture	*Coragyps atratus*	
Swallow-tailed kite	*Elanoides forficatus*	MF, MH, UMW, WF, FS, HH
White-tailed kite	*Elanoides leucurus*	DM, FPLK, ABF, PI, PSI
Merlin	*Falco columbarius*	Many
Peregrine falcon	*Falco peregrinus*	Many
Southeastern American kestrel	*Falco sparverius paulus*	MF, SH, ABF, PI, PSI
Eastern American kestrel	*Falco sparverius sparverius*	
Mississippi kite	*Ictinia mississippiensis*	
Bald eagle	*Haliaeetus leucocephalus*	
Osprey	*Pandion haliaetus*	
PHEASANTS & ALLIES		
Northern bobwhite	*Colinus virginianus*	
Wild turkey	*Meleagris gallopavo*	
RAILS		
American coot	*Fulica americana*	
Common moorhen	*Gallinula chloropus*	
Purple gallinule	*Porphyrula martinica*	
Sora	*Porzana carolina*	
King rail	*Rallus elegans*	
Virginia rail	*Rallus limicola*	
LIMPKIN		
Limpkin	*Aramus guarauna*	BST, SRST
CRANES		

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Sandhill crane	*Grus canadensis*	
Florida sandhill crane	*Grus canadensis pratensis*	DM, FPLK, MLK, ABF, PI, PSI
PLOVERS		
Semipalmated plover	*Charadrius semipalmatus*	
Killdeer	*Charadrius vociferus*	
STILTS		
Black-necked stilt	*Himantopus mexicanus*	
SANDPIPERS		
Spotted sandpiper	*Actitis macularia*	
Western sandpiper	*Calidris mauri*	
Least sandpiper	*Calidris minutilla*	
Common snipe	*Gallinago gallinago*	
Short-billed dowitcher	*Limnodromus griseus*	
American woodcock	*Scolopax minor*	
Lesser yellowlegs	*Tringa flavipes*	
Greater yellowlegs	*Tringa melanoleuca*	
Solitary sandpiper	*Tringa solitaria*	
GULLS & TERNS		
Herring gull	*Larus argentatus*	
Laughing gull	*Larus atricilla*	
Ring-billed gull	*Larus delawarensis*	
Bonaparte's gull	*Larus philadelphia*	
Least tern	*Sterna antillarum*	
Caspian tern	*Sterna caspia*	
Forster's tern	*Sterna forsteri*	
Royal tern	*Sterna maxima*	
DOVES		
Rock pigeon*	*Columba livia*	
Common ground-dove	*Columbina passerina*	
Eurasian collared-dove*	*Streptopelia decaocto*	
Mourning dove	*Zenaida macroura*	
CUCKOOS		
Yellow-billed cuckoo	*Coccyzus americanus*	
Black-billed cuckoo	*Coccyzus erythropthalmus*	
OWLS		
Florida burrowing owl	*Athene cunicularia floridana*	ABF, PSI
Great horned owl	*Bubo virginianus*	
Eastern screech-owl	*Otus asio*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Barred owl	*Strix varia*	
Barn owl	*Tyto alba*	
GOATSUCKERS		
Chuck-will's-widow	*Caprimulgus carolinensis*	
Whip-poor-will	*Caprimulgus vociferus*	
Common nighthawk	*Chordeiles minor*	
SWIFTS		
Chimney swift	*Chaetura pelagica*	
HUMMINGBIRDS		
Ruby-throated hummingbird	*Archilochus colubris*	
KINGFISHERS		
Belted kingfisher	*Ceryle alcyon*	
WOODPECKERS		
Northern flicker	*Colaptes auratus*	
Pileated woodpecker	*Dryocopus pileatus*	
Red-headed woodpecker	*Melanerpes erythrocephalus*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Downy woodpecker	*Picoides pubescens*	
Hairy woodpecker	*Picoides villosus*	
Yellow-bellied sapsucker	*Sphyrapicus varius*	
TYRANT FLYCATCHERS		
Eastern wood-pewee	*Contopus virens*	
Alder flycatcher	*Empidonax alnorum*	
Yellow-bellied flycatcher	*Empidonax flaviventris*	
Least flycatcher	*Empidonax minimus*	
Acadian flycatcher	*Empidonax virescens*	
Great crested flycatcher	*Myiarchus crinitus*	
Eastern phoebe	*Sayornis phoebe*	
Eastern kingbird	*Tyrannus tyrannus*	
SHRIKES		
Loggerhead shrike	*Lanius ludovicianus*	
VIREOS		
Yellow-throated vireo	*Vireo flavifrons*	
White-eyed vireo	*Vireo griseus*	
Red-eyed vireo	*Vireo olivaceus*	
Philadelphia vireo	*Vireo philadelphicus*	
Blue-headed vireo	*Vireo solitarius*	

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

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

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Hooded warbler	*Wilsonia citrina*	
Canada warbler	*Wilsonia canadensis*	
TANAGERS		
Scarlet tanager	*Piranga olivacea*	
Summer tanager	*Piranga rubra*	
CARDINALS		
Northern cardinal	*Cardinalis cardinalis*	
GROSBEAKS		
Painted bunting	*Passerina ciris*	
Indigo bunting	*Passerina cyanea*	
Blue grosbeak	*Guiraca caerulea*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
SPARROWS AND ALLIES		
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*	
Henslow's sparrow	*Ammodramus henslowii*	
LeConte's sparrow	*Ammodramus leconteii*	
Grasshopper sparrow	*Ammodramus savannarum*	
Savannah sparrow	*Passerculus sandwichensis*	
Fox sparrow	*Passerella iliaca*	
Bachman's sparrow	*Peucaea aestivalis*	
Eastern towhee	*Pipilo erythrophthalmus*	
Vesper sparrow	*Pooecetes gramineus*	
Swamp sparrow	*Melospiza georgiana*	
Song sparrow	*Melospiza melodia*	
Chipping sparrow	*Spizella passerina*	
Field sparrow	*Spizella pusilla*	
White-throated sparrow	*Zonotrichia albicollis*	
White-crowned sparrow	*Zonotrichia leucophrys*	
ICTERIDS		
Red-winged blackbird	*Agelaius phoeniceus*	
Bobolink	*Dolichonyx oryzivorus*	
Rusty blackbird	*Euphagus carolinus*	
Baltimore oriole	*Icterus galbula*	
Orchard oriole	*Icterus spurius*	
Brown-headed cowbird	*Molothrus ater*	
Boat-tailed grackle	*Quiscalus major*	
Common grackle	*Quiscalus quiscula*	
Eastern meadowlark	*Sturnella magna*	
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	
FINCHES		

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
American goldfinch	*Carduelis tristis*	
Purple finch	*Carpodacus purpureus*	
OLD WORLD SPARROWS		
House sparrow*	*Passer domesticus*	

MAMMALS

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
DIDELPHIDAE		
Virginia opossum	Didelphis virginiana	
SORICIDAE		
Northern short-tailed shrew	*Blarina brevicauda*	
Least shrew	*Cryptotis parva*	
TALPIDAE		
Eastern mole	*Scalopus aquaticus*	
VESPERTILIONIDAE		
Seminole bat	*Lasiurus seminolus*	
Eastern pipistrelle	*Pipistrellus subflavus*	
DASYPODIDAE		
Nine-banded armadillo*	*Dasypus novemcinctus*	
LEPORIDAE		
Eastern cottontail	*Sylvilagus floridanus*	
Marsh rabbit	*Sylvilagus palustris*	
SCIURIDAE		
Southern flying squirrel	*Glaucomys volans*	
Gray squirrel	*Sciurus carolinensis*	
Sherman's fox squirrel	*Sciurus niger shermani*	SH, MF, PP, SHF
GEOMYIDAE		
Southeastern pocket gopher	*Geomys pinetis*	
CRICETIDAE		
Eastern harvest mouse	*Reithrodontomys humulis*	
Cotton mouse	*Peromyscus gossypinus*	
Florida mouse	*Podomys floridanus*	SH, SC, SCF
Golden mouse	*Ochrotomys nuttalli*	
Marsh rice rat	*Oryzomys palustris*	
Hispid cotton rat	*Sigmodon hispidus*	
MURIDAE		

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Round-tailed muskrat	*Neofiber alleni*	
Eastern woodrat	*Neotoma floridana*	
Black rat*	*Rattus rattus*	
CANIDAE		
Red fox*	*Vulpes vulpes*	
Gray fox	*Urocyon cinereoargenteus*	
Coyote*	*Canis latrans*	
Feral dog*	*Canis familiaris*	
URSIDAE		
Florida black bear	*Ursus americanus floridanus*	Many
PROCYONIDAE		
Raccoon	*Procyon lotor*	
MUSTELIDAE		
River otter	*Lutra canadensis*	
Striped skunk	*Mephitis mephitis*	
FELIDAE		
Feral cat*	*Felis catus*	
Bobcat	*Lynx rufus*	
SUIDAE		
Feral pig*	*Sus scrofa*	
CERVIDAE		
White-tailed deer	*Odocoileus virginianus*	

TERRESTRIAL

Beach Dune....BD
Coastal Berm....CB
Coastal Grassland....CG
Coastal Strand....CS
Dry Prairie....DP
Keys Cactus Barren....KCB
Limestone Outcrop....LO
Maritime Hammock....MAH
Mesic Flatwoods....MF
Mesic Hammock....MEH
Pine Rockland....PR
Rockland Hammock....RH
Sandhill....SH
Scrub....SC
Scrubby Flatwoods....SCF
Shell Mound....SHM
Sinkhole....SK
Slope Forest....SPF
Upland Glade....UG
Upland Hardwood Forest....UHF
Upland Mixed Woodland....UMW
Upland Pine....UP
Wet Flatwoods....WF
Xeric Hammock....XH

PALUSTRINE

Alluvial Forest....AF
Basin Marsh....BM
Basin Swamp....BS
Baygall....BG
Bottomland Forest....BF
Coastal Interdunal Swale....CIS
Depression Marsh....DM
Dome Swamp....DS
Floodplain Marsh....FM
Floodplain Swamp....FS
Glades Marsh....GM
Hydric Hammock....HH
Keys Tidal Rock Barren....KTRB
Mangrove Swamp....MS
Marl Prairie....MP
Salt Marsh....SAM
Seepage Slope....SSL
Shrub Bog....SHB
Slough....SLO
Slough Marsh....SLM
Strand Swamp....STS

Wet Prairie .... WP

LACUSTRINE

Clastic Upland Lake .... CULK
Coastal Dune Lake .... CDLK
Coastal Rockland Lake .... CRLK
Flatwoods/Prairie .... FPLK
Marsh Lake .... MLK
River Floodplain Lake .... RFLK
Sandhill Upland Lake .... SULK
Sinkhole Lake .... SKLK
Swamp Lake .... SWLK

RIVERINE

Alluvial Stream .... AST
Blackwater Stream .... BST
Seepage Stream .... SST
Spring-run Stream .... SRST

SUBTERRANEAN

Aquatic Cave .... ACV
Terrestrial Cave .... TCV

ESTUARINE

Algal Bed .... EAB
Composite Substrate .... ECPS
Consolidated Substrate .... ECNS
Coral Reef .... ECR
Mollusk Reef .... EMR
Octocoral Bed .... EOB
Seagrass Bed .... ESGB
Sponge Bed .... ESPB
Unconsolidated Substrate .... EUS
Worm Reef .... EWR

MARINE
Algal Bed ....MAB
Composite Substrate ....MCPS
Consolidated Substrate ....MCNS
Coral Reef ....MCR
Mollusk Reef.. MMR
Octocoral Bed .... MOB
Seagrass Bed .... MSGB
Sponge Bed...MSPB
Unconsolidated Substrate..MUS
Worm Reef..MWR

ALTERED LANDCOVER TYPES

Abandoned field .... ABF
Abandoned pasture .... ABP
Agriculture ....AG
Canal/ditch ....CD
Clearcut pine plantation .... CPP
Clearing CL
Developed...DV
Impoundment/artificial pond .... IAP
Invasive exotic monoculture...IEM
Pasture - improved...PI
Pasture - semi-improved..PSI
Pine plantation.. PP
Road ....RD
Spoil area ....SA
Successional hardwood forest .... SHF
Utility corridor ....UC

MISCELLANEOUS
Many Types of Communities ....MTC
Overflying ....OF

Addendum 7—Cultural Information

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, '*Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at:
http://www.flheritage.com/preservation/compliance/guidelines.cfm

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at: http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

* * *

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

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

Phone: (850) 245-6425

Toll Free: (800) 847-7278
Fax: (850) 245-6435

The criteria to be used for evaluating eligibility for listing in the National Register of Historic Places are as follows:

1) Districts, sites, buildings, structures, and objects may be considered to have significance in American history, architecture, archaeology, engineering, and/or culture if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
- **a)** are associated with events that have made a significant contribution to the broad patterns of our history; and/or
- **b)** are associated with the lives of persons significant in our past; and/or
- **c)** embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
- **d)** have yielded, or may be likely to yield, information important in prehistory or history.

2) Ordinarily cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the *National Register*. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:
- **a)** a religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
- **b)** a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- **c)** a birthplace or grave of an historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- **d)** a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; ora reconstructed building, when it is accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and no other building or structure with the same association has survived; or a property primarily commemorative in intent, if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- **e)** a property achieving significance within the past 50 years, if it is of exceptional importance.

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features that convey its historical, cultural or architectural values.

Stabilization is defined as the act or process of applying measures designed to reestablish a weather resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Addendum 8—Timber Management Analysis

Addendum 9—Land Management Review

Memorandum

Florida Department of
Environmental Protection

November 13, 2009

TO: Marianne Gengenbach, Program Administrator
Division of State Lands

PW for PS

FROM: Parks Small, Chief, Bureau of Natural and Cultural Resources
Division of Recreation and Parks

Albert Gregory, Chief, Office of Park Planning AG
Division of Recreation and Parks

SUBJECT: Response to Draft Land Management Review (LMR)
Wekiva River Basin State Parks

The Land Management Review draft report provided to DRP determined that management of Wekiva River State Parks by the Division of Recreation and Parks met the two tests prescribed by law. Namely, the review team concluded that the land is being managed for the purposes for which it was acquired and in accordance with the land management plan.

Below are Additional Recommendations and Checklist Findings (items the LMR determined should be further addressed in the management plan update) of the draft LMR report, with our Manager's Response to each. The responses were prepared via a coordinated effort of the park, district office, and our offices.

The team recommends that continued effort be made to increase burning in the flatwoods to achieve stated desired future conditions. (VOTE: 7+, 0-)
Managing Agency Response: Agree; DRP will continue to decrease the fire return interval in flatwoods communities where appropriate to achieve restoration and maintenance goals.

The team recommends that the DRP increase efforts to treat invasive exotic species. (VOTE: 7+, 0-)
Managing Agency Response: Agree; DRP will continue to investigate funding sources to obtain funds needed to meet this recommendation.

The recent diminished funding and increased acreage and visitation has impacted the ability for the staff to continue resource management activities. The team recommends that additional funding and staffing be allocated. (VOTE: 7+, 0-)
Managing Agency Response: Agree; If it is determined that additional staff and funding are needed at the time of the next unit management plan revision, it will be included in the plan. However, no new staff or funding can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Funding is determined annually by the Florida Legislature and funds are allocated to the 160 state parks according to priority needs.

The team recommends that DRP develop a plan of management for the pasture areas and other disturbed areas. (VOTE: 7+, 0-)
Managing Agency Response: Agree; DRP will continue to focus on intact natural communities at the park while formulating plans for restoration of pasture and disturbed areas. Some or all of these disturbed sites may have a role in future development of the park for visitor use which will be evaluated in the next unit management plan revision.

The team recommends that DRP investigate reactivation of land use proceeds for restoration of natural areas. (VOTE: 7+, 0-)
Managing Agency Response: Agree; The funds within the land use proceeds accounts of the basin parks are very important to the operation and resource management of the parks.

Discussion in the management plan regarding Natural Communities, specifically Scrub. (FR)
Managing Agency Response: Disagree; Each natural community is described on pages 21-36 of the unit management plan (UMP) and includes a description of the Scrub community. The map that is included with the UMP illustrates the boundaries and locations of the natural communities of the park. The park will continue to get portions of the scrub mechanically treated in order to reduce fuel heights and initiate safe and effective burning.

Discussion in the management plan regarding Listed Species, specifically Giant Orchids. (PR)
Managing Agency Response: Agree; Although the giant orchid is listed on the designated species list for the parks, little was known about its habitat requirements and distribution within the parks in order for a detailed section to be written in the listed species section of the UMP. For the UMP update, information and discussion on the giant orchid will be included in the listed species section.

Discussion in the management plan regarding Resource Management, specifically Frequency. (FR)
Managing Agency Response: Agree; DRP has always included general community descriptions along with the condition of those communities in the natural communities section of the plan, but has not always identified specific fire return intervals for each management zone of the park in the plan. Each year, an annual burn plan is developed for all the management zones in the park. This plan contains specific information such as, the target fire return interval, mechanical treatment needs, prescription needs, etc. Within in the new DRP UMP boilerplate, DRP will now include target fire return intervals for each community type within the plan.

Discussion in the management plan regarding Restoration of Ruderal Areas, specifically Pasture Restoration. (FR)
Managing Agency Response: Agree; DRP identifies a description and the need for pasture restoration within the UMP on pages 63 and 70 as well as some cost estimates in Addendum 6. These sections call for a pasture restoration plan to be developed which would spell out the details of the restoration. Once this plan is developed, then restoration can begin on these areas. More specific goals/objectives will be developed during the UMP process.

Discussion in the management plan regarding Management Resources, specifically Equipment, Staff and Funding. (FR)
Managing Agency Response: Agree; If it is determined that additional staff and funding are needed at the time of the next unit management plan revision, it will be included in the plan. However, no new staff or funding can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Funding is determined annually by the Florida Legislature and funds are allocated to the 160 state parks according to priority needs.

GK

CC: Larry Fooks, Chief, Bureau of Parks District 3
Cliff Maxwell, Assistant Chief, Bureau of Parks District 3
Warren Poplin, Park Manager, Wekiva River Basin State Parks
Jason Depue, Environmental Specialist, Bureau of Parks District 3