

Weeki Wachee Springs State Park
Unit Management Plan

Approved Plan

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Recreation and Parks

June 28, 2011

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INTRODUCTION

Weeki Wachee Springs State Park is located in Hernando County (see Vicinity Map). Access to the park is from U.S. Highway 19 and State Road 50 (see Reference Map). The Vicinity Map also reflects significant land and water resources located near the park.

In July 1991, the Governing Board of the Southwest Florida Water Management District (SWFWMD) approved the acquisition of the Weekiwachee Preserve project, consisting of approximately 16,000 acres located along the coastal region of the Hernando and Pasco Counties. To date, over 10,300 acres have been acquired by SWFMWD within the project area. This acreage preserves a rich mosaic of habitats including Weeki Wachee Springs, several miles of Weeki Wachee River frontage, dense hardwood swamps, fresh and saltwater marshes and a variety of upland natural communities.

In 2001, the SWFMWD negotiated a three-party agreement with the City of St. Petersburg, and their lessee, Weeki Wachee Springs, LLC, to purchase 442 acres surrounding the springs. As with the larger Weekiwachee Preserve project, the purpose of this acquisition was primarily for the protection and management of Florida's water resources.

On January 24, 2008, with concurrence of the District, an Asset Purchase Agreement was entered between Weeki Wachee Springs, LLC and the Florida Department of Environmental Protection to bring the Weeki Wachee Springs attraction under management as a unit of Florida's state park system, and on November 1, 2008, the Division of Recreation and Parks and the SWFWMD signed a 50-year lease giving the Division authority to manage the Weeki Wachee Springs attraction and additional SWFWMD land surrounding the attraction. In all, the area leased by SWFWMD to the DRP for management as a unit of the Florida state park system totals 538 acres. In addition, the Trustees of the Internal Improvement Trust Fund leased approximately 32 acres of sovereign submerged land to the DRP on February 17, 2010, to include the Weeki Wachee headsprings and the upper segment of the river in the state park.

PURPOSE AND SIGNIFICANCE OF THE PARK

The original purpose of acquisition by the SWFMWD was to protect the water resources of the state, and, as defined by Governing Board Policy 610-3, to manage the land for water supply, flood protection, water quality, natural systems, public access, recreation and education, biodiversity, archaeological resources and forestland. Weeki Wachee Springs State Park is significant as a unit of Florida's state park system due to Weeki Wachee Springs, a first-magnitude spring and the headwaters of the beautiful spring-fed Weeki Wachee River. In addition to its natural attributes, Weeki Wachee Springs State Park provides for the perpetual preservation of a unique and historic roadside attraction that developed around the spring during the early days of Florida's tourism industry.

Weeki Wachee Springs State Park is classified as a state recreation area in the Division's unit classification system. In the management of state recreation area, emphasis is placed on maximizing the recreational potential of the unit. However, preservation of the park's natural and cultural resources remains important. Depletion of a resource by any recreational activity is not permitted. In order to realize the park's recreational potential the development and maintenance of appropriate park facilities is undertaken with the goal to provide facilities that are accessible, convenient and safe, to support public recreational use or appreciation of the park's natural, aesthetic and educational attributes.

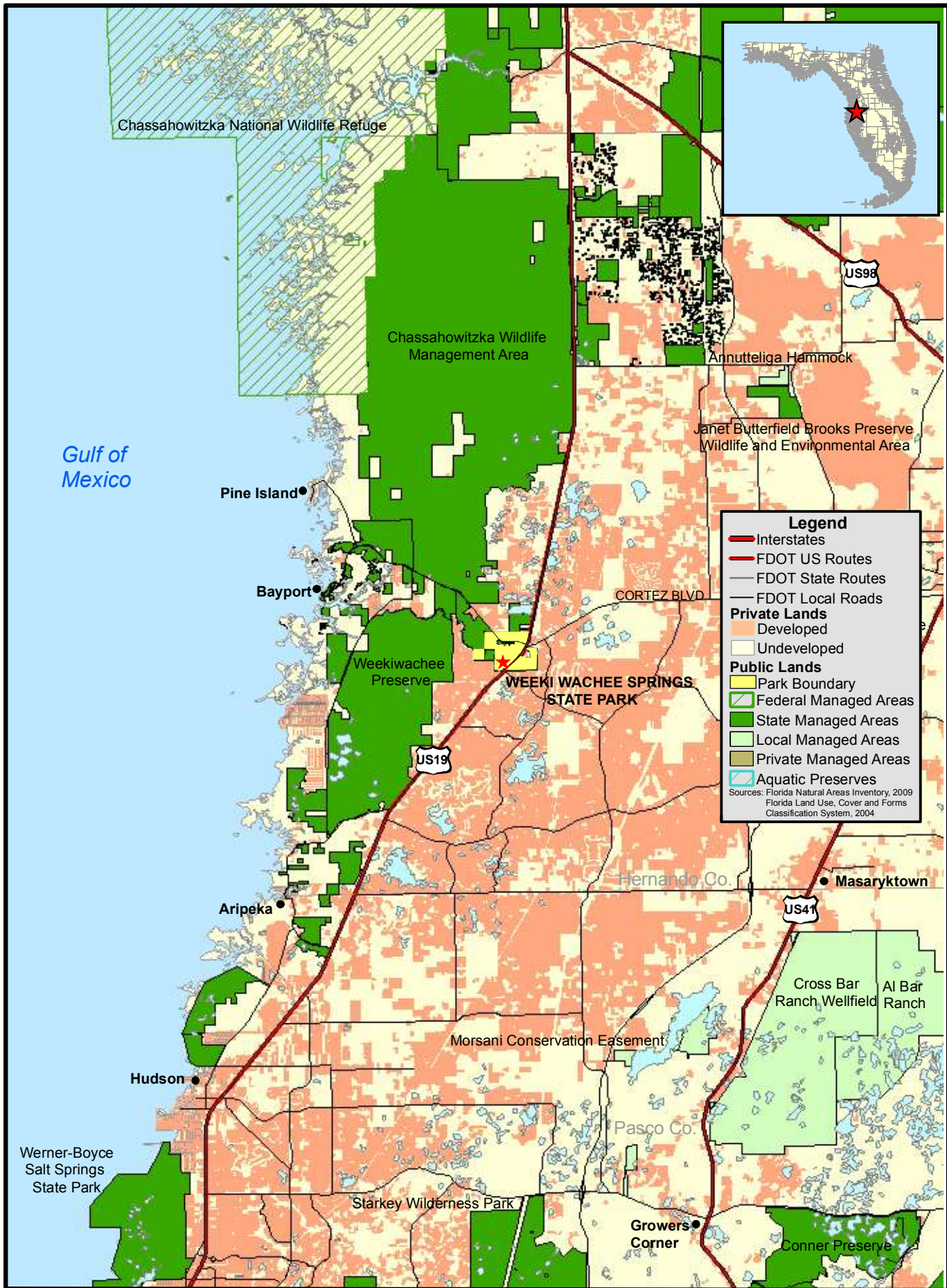
PURPOSE AND SCOPE OF THE PLAN

The mission of the Division is to protect, enhance and interpret the natural and cultural resources contained by the properties the Division manages, while providing high-quality resource based outdoor recreation. The mission of the SWFWMD is to manage water and related natural resources to ensure their continued availability while maximizing environmental, economic and recreational benefits. This plan serves as the basic statement of policy and direction for the management of Weeki Wachee Springs State Park as a unit 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. Final approval of this plan will come from the SWFWMD.

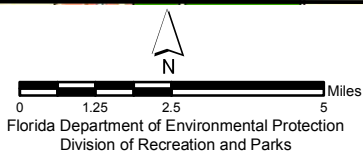
All development and resource alteration proposed in this plan is subject to the granting of appropriate permits, easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies.

The plan consists of two interrelated components: the Resource Management Component and the Land Use Component. The Resource Management Component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management problems and needs are identified, and 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 water resource protection, prescribed burning, exotic species removal, imperiled species management, cultural resource management and restoration of natural conditions.

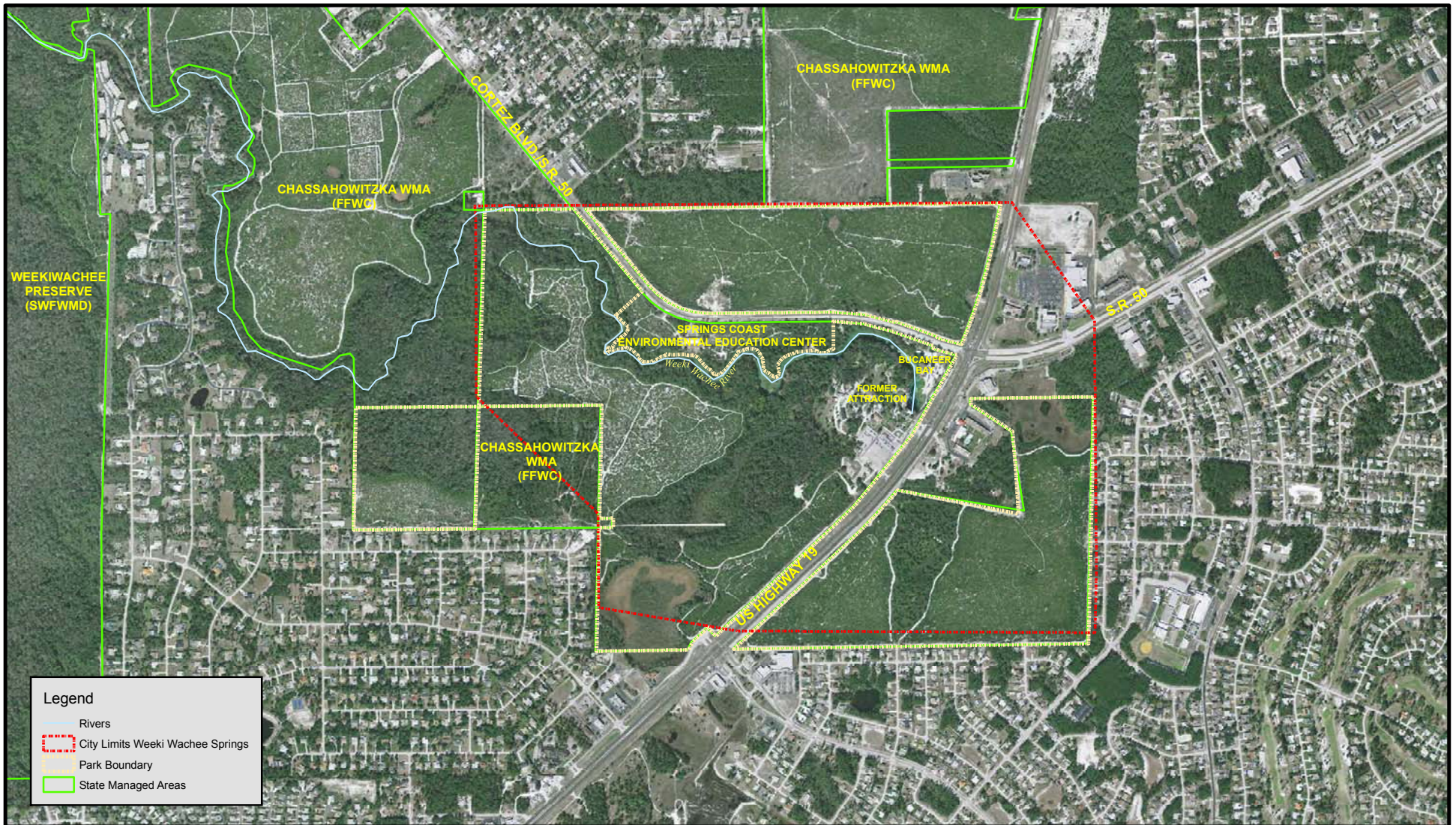
The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resource base of the park, current public uses and existing development, measurable objectives are set to achieve the desired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



WEEKI WACHEE SPRINGS
STATE PARK



VICINITY MAP



MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

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

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

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

Park Management Goals

The following park goals express the Division's long-term intent in managing the state park.

- 1.....Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
- 2.....Restore and maintain the natural communities/habitats of the park.
- 3.....Maintain, improve or restore imperiled species populations and habitats in the park.
- 4.....Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
- 5.....Protect, preserve and maintain the cultural resources of the park.
- 6.....Provide public access and recreational opportunities in the park.
- 7.....Develop 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.

Division staff works closely with staff of the Southwest Florida Water Management District in the management of this property and operation of the Weeki Wachee attraction. Resource management programs are coordinated with appropriate staff of the District as needed to assure that activities are consistent with District resource management policies and objectives.

The Florida Department of Agriculture and Consumer Services (FDACS), Division of Forestry (DOF), assists Division staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FFWCC), assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. Park and FFWCC staff collaborates on resource management activities as needed within those areas of the park that have contiguous management boundaries. In addition, the FFWCC aids the Division with wildlife management programs, including the development and management of Watchable Wildlife programs. The Department of State, Division of Historical Resources (DHR) assists staff to assure protection of archaeological and historical sites.

Public Participation

The Division provided an opportunity for public input to begin the planning process by conducting a public workshop on January 20, 2009. The Division provided additional review by conducting a second public workshop on Tuesday, October 12, 2010 and an Advisory Group meeting on Wednesday, October 13, 2010. The purpose of these meetings was to present the plan to the public and to provide the Advisory Group members the opportunity to review and discuss this plan. Addendum 2 contains the list of Advisory Group members in addition to the Advisory Group Staff Report.

Other Designations

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 not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

In accord with Chapter 258, Florida Statute, the Division of Recreation and Parks (Division) has implemented resource management programs for preserving for all time the representative examples of natural and cultural resources of statewide significance under its administration. This component of the unit plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. The stated management measures in this plan are consistent with the Department's overall mission in ecosystem management. Cited references are contained in Addendum 3.

The Division'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 Division'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 is affected by conditions and occurrences beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program (to assess resource conditions, evaluate management activities and refine management actions), and review of 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 types, burn zones, 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.

RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

Topography

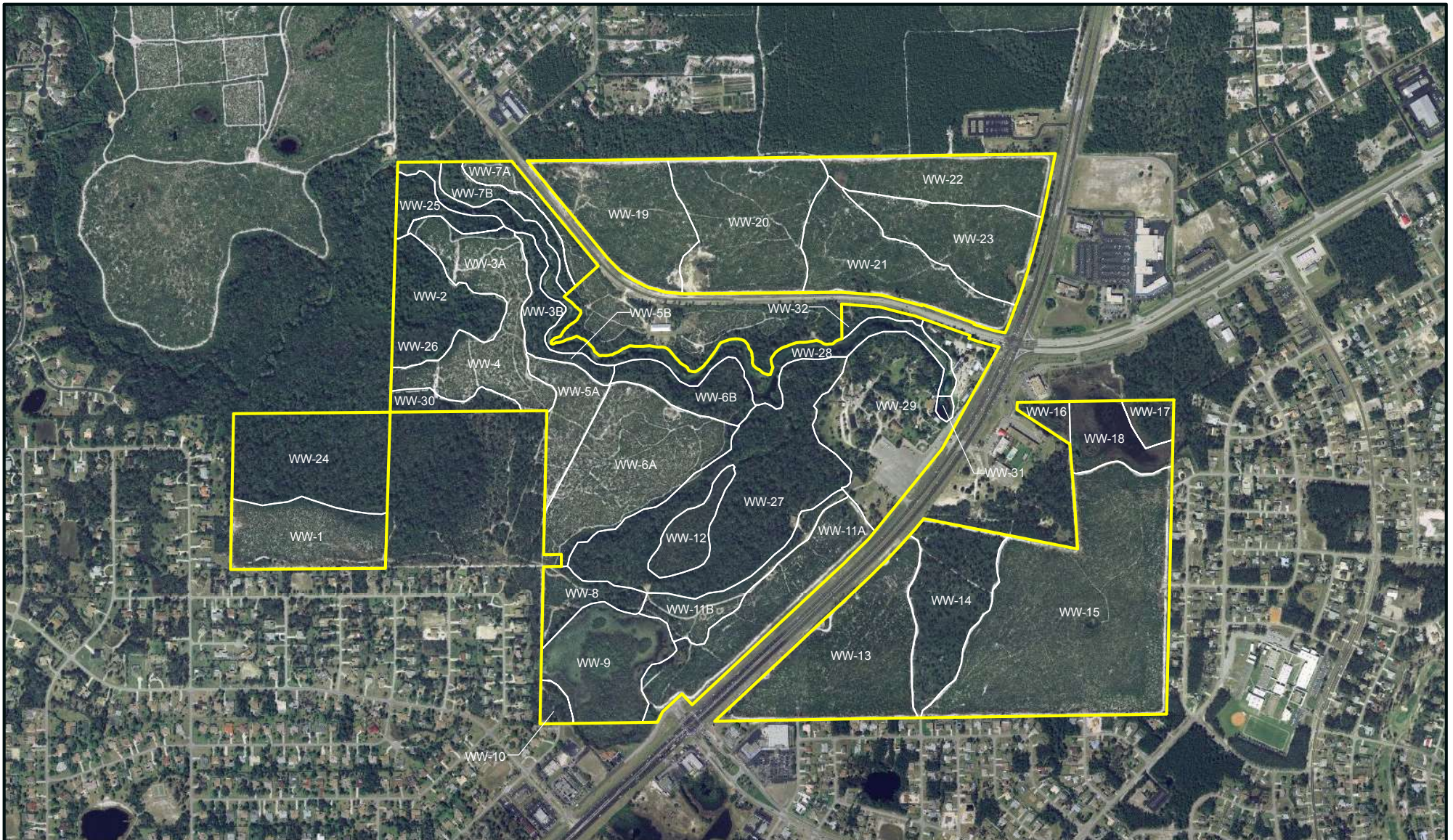
The topography of Weeki Wachee Springs State Park is typical of the local physiography, classified as Gulf Coastal Lowland by White (1970), and more specifically as the Weeki Wachee Dune Field by Brooks (1981). The Weeki Wachee Dune Field is an approximately 32-mile long and 5- to 10-mile wide region characterized as an area of paleo-sand dunes and solution basins with elevations not exceeding 90 feet (Brooks 1981). These ancient dunes form a gently sloping relief in the uplands and nearly level lowlands. The park sits on the western edge of the Weeki Wachee Dune Field near the gradation to the Coastal Swamp or Chassahowitzka Coastal Strip physiographic region.

The topographic relief of the park is the result of changing sea levels during the Pleistocene Epoch that deposited quartz sand and clayey sand as dunes along ancient shorelines. The deposition of these soils resulted in the formation of marine terraces. This same wave action carved out the flat, horizontal coastline that currently supports hammocks and swamps west of the Dune Field.

Elevations in the upland scrub habitat in the park range from just over 70 feet above sea level to less than 20 feet above sea level. The elevations of the lowland hydric hammock habitats are nearly level, ranging from 20 feet to 10 feet above sea level over a much greater distance. The topography drops sharply and variably along the banks of the Weeki Wachee River. The outside bends of the river tend to be much steeper, while sand deposition on the inside of the bends tends to form more shallow slopes.

Alterations have been made to the topography of the park over time, the most severe of which have come from the installation and subsequent improvement of roads immediately adjacent to where the park sits now. The present day highways, U.S. Highway 19 and State Road 50, are clearly visible on 1944 aerials of Weeki Wachee, having been established several decades earlier. Topographic surveys show that U.S. Highway 19 cuts off the northwest side of a small hill that, at over 70 feet above sea level, forms the highest point in the park. Improvements have subsequently altered both the height and width of these roads, severely altering the historic topography in the area.

Sand was brought into the park and placed on the northeast side of the Weeki Wachee River near the mouth of the headspring to form a beach for the opening of the Buccaneer Bay water park in 1982. The sand is of unknown origin and is still present today. There has been some controversy as to the effects of this sand on shoaling observed in the river. As sand was lost from the beach during heavy rain events,



WEEKI WACHEE SPRINGS STATE PARK



MANAGEMENT ZONE MAP

periodic dredging was required to remove the sand from the river and replace it on the beach. The installation of a retaining wall between the beach and the river in 2006 has held the sand in place since then.

A number of roads were laid through the scrub habitat during the early days of the attraction to provide access to a replica of a Seminole Indian village. Some of these roads were topped with concrete, which is presently in a state of crumbling disrepair. It does not appear these roads resulted in topographic alteration.

Geology

The geology in the park is characteristic of that of most of the Springs Coast region, which extends from just south of the Big Bend to about the Anclote River (Noss and Bland 1990). In this region, the subsurface consists of thick layers of underlying limestone and dolomite that were deposited over millions of years in coral reefs. The upper limestone layers are often very near the surface and covered in mostly quartz-derived sandy soils of varying depths.

The formation nearest the surface is the Suwannee Limestone of the Oligocene series, deposited 30 to 37 million years ago. It is characterized as cream to tan, grainy to chalky, and highly fossiliferous. Beneath that lies the Ocala Group of the Eocene series, approximately 300 feet thick, formed of white, soft coquina limestone with hard micritic limestone in the deeper layers. Beneath that is the deepest formation to outcrop in Florida, the Avon Park Formation of the early Eocene. Formed nearly 45 million years ago, it is made up of hard dolomite in the upper layers and softer limestone in the lower layers (Noss and Bland 1990; Jones et al. 1997).

At the surface, Pleistocene era deposits form marine terraces. The Pamlico Terrace is the dominant terrace in western Hernando County. It is characterized by a gently sloping or nearly horizontal surface formed by wave action of an ancient sea (Noss and Bland 1990). The clays and quartz sands deposited on the ancient shoreline are still visible in the gently undulating topography of the region.

The karst features that underlay the Pamlico Terrace dominate the visible geologic landscape. These features are the result of dissolution of the underlying limestone by the action of surface and ground water movement. This movement of water slightly acidified by atmospheric and soil carbonic acid, over time has produced numerous sinkholes, underground drainage systems, and other subterranean conduits between otherwise confining layers. The results of this subterranean dissolution of rock often manifest in very visible surface features like springs, sinks and sinkhole lakes.

The four dominant visible karst features in the park are the two springs, Weeki Wachee Spring and Twin Dees, or Little Spring, a small sinkhole on the main park parcel, and the dry paleo-sink on the parcel east of U.S. Highway 19. The springs are karst openings

to the Upper Floridan aquifer. In this part of the state, the freshwater part of the Floridan aquifer is formed by Suwannee and Ocala limestones and the Avon Park Formation (Knochenmus and Yobbi 2001). No significant surficial aquifer layer is present in this part of the state.

The small sinkhole is a conical surface depression located in the northern section of the main park parcel adjacent to a road. The depression is approximately 1.5 meters deep and 2.5 meters across with Paola sandy substrate and exposed limestone outcrops.

The dry paleo-sink located on the park parcel east of U.S. Highway 19 is about 1.5 miles east of Weeki Wachee Spring. The sides of the sink slope sharply, dropping more than five meters in elevation from the surrounding scrub. To date no hydrogeologic connection has been identified from the dry sink to either Weeki Wachee or Twin Dees Spring.

Soils

According to the Natural Resource Conservation Service (NRCS) there are four soil types represented at Weeki Wachee Springs State Park (see Soils Map). A complete description of soil types can be found in Addendum 4.

Three of the soil types found in the park are classified as poorly drained, depressional soils typical of low lying or hydric habitats. These are designated as Anclote fine sand, Basinger fine sand, depressional, and Myakka fine sand.

The Anclote fine sand is characteristic of the hydric hammock community. The hydro-period of these soils may be anywhere from three to six months. The period of inundation is directly affected by the proximity to water, seasonal rainfall and depth to the underlying bedrock. Potential impacts to this soil type are primarily from erosion. The hydric hammock of the disjunct western parcel of the park is experiencing increased volume and speed of storm-water run-off, creating deep channels in soils that would otherwise experience sheetflow and karst seepage. These channels are obvious during the dry season on the western side of the hammock as deep, linear furrows.

The soils in the marsh surrounding the Twin Dees Spring Run, which meanders from the springhead to the Weeki Wachee River, are subject to fluctuating flows from the spring. Permanent reduction in the flows could lead to changes in the soil. Longer periods of lower water levels and/or fire suppression may be occurring as evidenced by the colonization of the marsh by hardwood trees.

The soils of the hydric hammock bordering the south bank of the Weeki Wachee River are vulnerable to erosion due to boat wakes. Exclusion of motorboats from the upper river would help to prevent erosion to the riverbanks, but would require a cooperative effort. Recreational foot traffic may also lead to increased soil erosion along the river.

The Basinger fine sand, depressional soil type is characteristic of the basin marshes found in the southwestern corner of the park along State Road 19 and in the northeastern corner of the park just south of State Road 50. The hydroperiod of these soils may be anywhere from six to nine months. Studies will need to determine whether run-off from the adjacent highways and urban development contributes sediments and nutrients to the upper soil horizon of both depressional wetlands. The depressional wetland near State Road 50 also receives overflow from the retention pond to the west. The retention pond serves to treat storm-water from commercial development.

The other soil types represented in the park are typical of more upland habitats. The Myakka fine sand soil partially underlies the mesic flatwood ecotone between the hydric hammock around Twin Dees Spring, the marsh and the scrub in the southwest portion of the park. This soil type is not typically subject to inundation. Potential impacts to this soil type would likely come from installation of firebreaks or trails. Prescribed fire planning should not include requiring installation of firebreaks through this ecotonal community.

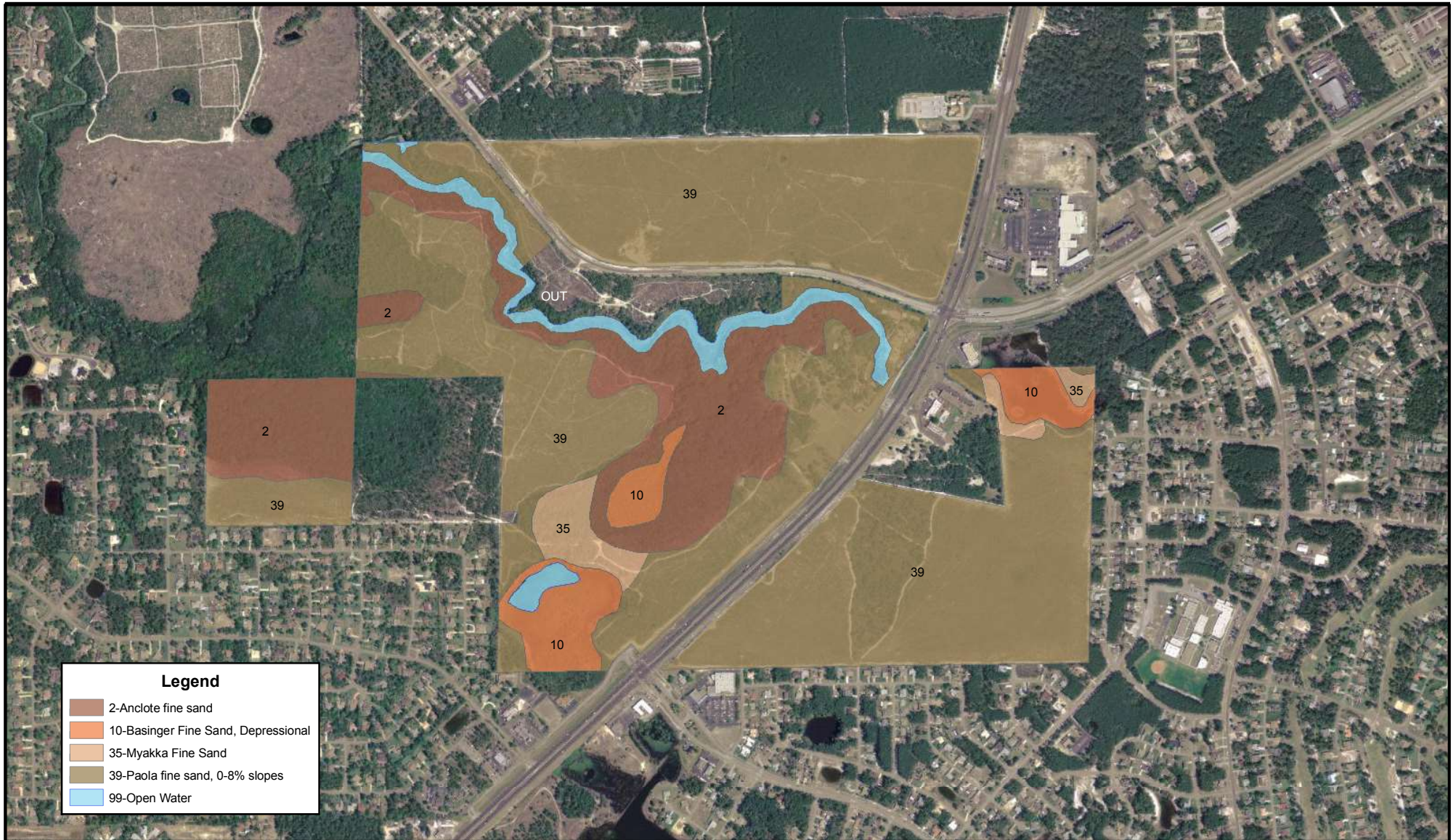
Most of the soil in the park is classified as Paola fine sand, 0 to 8 percent slopes. This soil type is typical of the scrub habitat that covers the majority of the upland part of the park. Erosion is the main concern for this soil type. A major factor contributing to the erosion potential of the scrub are the numerous roads that have been installed both historically and more recently as a part of the restoration and routine management activities of SWFWMD, the previous site manager. An additional concern with the roads is the direction and slope as it relates to conveyance of water. The park road along the buffer on the south side of the river is close to some of the steep slopes to the river. Heavy rain events and continued vehicle use may contribute to erosion of the road. Portions of the northwestern section of the road are as much as 30 centimeters lower than the adjacent vegetated scrub to the south, indicating that loss of soil may already be happening. Monitoring of this portion of the road will be required to quantify any further soil loss. If erosion continues, the road may be restricted to use only as a firebreak. Additional stabilization of the road may also be required.

Minerals






No significant mineral deposits of commercial value are known to occur in the park.

Hydrology

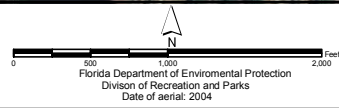
Groundwater. The visible groundwater features of the park consist primarily of the Weeki Wachee headspring and the smaller magnitude Twin Dees or Little Spring. These two springs, together with several smaller springs, including Salt Spring, Mud River Spring, Hospital Hole and Hospital, located much farther downriver, make up the Weeki Wachee Springs Complex (Jones et al. 1997; Champion and Starks 2001). The combined flow of these springs and the tributaries they feed make up the Weeki Wachee River.



Legend

	2-Anclote fine sand
	10-Basinger Fine Sand, Depressional
	35-Myakka Fine Sand
	39-Paola fine sand, 0-8% slopes
	99-Open Water

WEEKI WACHEE SPRINGS STATE PARK



SOILS MAP

Weeki Wachee Spring is one of 33 first magnitude springs in Florida (Florida Springs Task Force, 2000). To be classified as a first magnitude spring, median discharge of water must be at least 100 cubic feet/second (cfs) or 64.6 million gallons of water per day (mgd) (Scott 2004). Discharge data from the 1935-2004 period of record indicate an average discharge of 174 cfs (Heyl 2008) from the main spring. Real-time water level data is readily available from USGS, the Florida Department of Environmental Protection (Department) and the Southwest Florida Water Management District (SWFWMD), and is part of routine water monitoring.

The spring is located approximately 800 feet southwest of the intersection of State Road 50 and U.S. Highway 19. The spring consists of a conical pool that is 165 ft wide east to west and 210 ft wide north to south (Scott 2004). The pool slopes gently down 10 feet to the start of the main vent. From there, the vent forms a north-south trending fracture that narrows at a depth of 185 feet to a small fracture, which is a 20-foot by 3-foot opening (Jones et al. 1997). During periods of peak flow, water can pass through the narrow fracture at 5 miles per hour. Limestone rock is exposed near the vent, but most of the pool is covered by sandy substrate (Scott 2004).

Beyond the fracture, the cave turns to a more horizontal trajectory and forms a room-like tunnel that is 55 feet wide, 28 feet high and 220 feet long (Karst Underwater Research, Inc. 2008). From there the cave continues and divers have been able to map and explore over 6700 feet of subterranean passages.

Twin Dees Spring, located about 0.5 miles southwest of Weeki Wachee Spring is a much smaller third magnitude spring (1-10 cfs average discharge). The pool is 36 feet wide east to west and 75 feet wide north to south. Two vent openings separated by a natural dam make up the spring, giving the pool the appearance of two springs side by side when the spring is not flowing. The main spring vent is in the southwest pool and is about 4 feet in diameter and 50 feet deep (Rosenau 1977). The vent in the northeastern pool is blocked and no longer flows. There is no evidence at this time of any ecological benefit to removing debris blocking the northeast vent since subterranean connection of the two vents appears to compensate for net spring flow. Extensive exploration and mapping of the subterranean caves and passages has to date revealed no hydrogeologic connection between Twin Dees and Weeki Wachee Spring (Karst Underwater Research, Inc. 2008).

There has been little consistent historical collection of discharge data specific to Twin Dees. Discharge reported in December of 1972 and December 1975 by Rosenau (1977) was 7.8 cfs and 14.7 cfs, respectively. Discharge data reported by Scott in March 2004 was 2.7 cfs. Hill collected discharge data regularly between June 2004 and April 2005 for use in testing the performance of three groundwater flow models. During the study period, the lowest recorded average monthly discharge (n=3) of 3.42 cfs was in June 2004, while the highest average monthly discharge (n=2) of 21.15 cfs was recorded in

October 2004 (Hill 2008).

The Weeki Wachee springshed is an approximately 260-mi² region, covering a portion of southern Hernando County and northern Pasco County (Heyl 2008). The primary source of groundwater to the springshed is the Upper Floridan aquifer (UFA) (Champion and Starks 2001). The UFA is largely unconfined in this area of the state due to the absence or very thin presence of an intermediate confining unit (Sepulveda 2002).

Recharge to the UFA is typically high in the central and eastern portions of the Springs Coast region due to the unconfined nature of the aquifer and the frequency of shallow limestone outcrops and surface sediments that contain low levels of potentially confining materials like clay (Champion and Starks 2001). The rate of recharge to the unconfined UFA in this part of the state can be estimated as a function of total area rainfall, evapotranspiration and surface runoff (Sepulveda 2002). Evapotranspiration of groundwater is typically lower further inland due to surface sediment morphology and depth to the potentiometric surface of the aquifer that increases further from the coast (Sepulveda 2002). Surface run-off is influenced by factors such as impermeable surfaces, distance to receiving bodies of water, and substrate morphology.

A positive correlation has been shown to occur between area rainfall and flow at the main headspring (Heyl 2008). The average annual rainfall for Hernando County from 1915 through 2008 has been 55.10 inches/year (SWFWMD 2008). Approximately 57 percent of that annual rainfall occurs during the months of June through September. The highest discharge levels have historically occurred at the main headspring between September and November while the lowest discharge is generally May through July (Heyl 2008). Twin Dees discharge data collected by Hill (2008) reflects a similar trend. The short lag time between rainfall and discharge increases suggests a short residency time of rainfall within the UFA in this area and that the discharge is from rainfall in close proximity to the springs (Champion and Starks 2001). Spring discharge can be estimated using well stage data from the Weeki Wachee Well, located approximately 2.8 miles northeast of the headspring using the following regression model equation (Heyl 2008).

$$Q \text{ (discharge)} = 12.38 * (\text{well stage}) - 47.487$$

KUR research divers use this formula to determine the discharge threshold levels at which divers can enter the vents for both Weeki Wachee and Twin Dees. The discharge at Weeki Wachee must be less than 97cfs to allow divers to swim against the current at the vent and enter the subterranean conduit (Peterson, per. comm.).

The publication of the minimum flows and levels (MFL) for the Weeki Wachee River in 2008 provided a synopsis of changes over time. The goal of the MFL determination is to set the limit of further withdrawals and thus prevent significant harm to water resources or river ecology. There has been a 63 cfs linear decline in discharge since 1960

(Heyl 2008). A number of modeling strategies were applied to determine how much of the decline was attributable to anthropogenic impacts within the springshed compared to climatic factors. The average reduction in discharge due to anthropogenic impacts was estimated to be 17 cfs. Baseline flows for wet season (June 26-October 26) and dry season (April 20-June 25) over the period of record (1984-2004), adjusted for a median pumpage estimate of 12.7 cfs, were determined to be 175 cfs and 157 cfs, respectively (Heyl, 2008). The MFL for the river was set at 90 percent of these baseline levels, limiting withdrawals to no more than 10 percent of baseline flows, adjusted for pumpage (Heyl, 2008). While the MFL applies to the river, it is also intended to protect the spring as the main source of water flow. No MFL for the headspring has been published.

Surface water. The major surface water features of the park are the Weeki Wachee River (Weeki Wachee Springs Run) and the Twin Dees Spring Run. Other surface water features include four basin marshes and a depression marsh.

The Weeki Wachee River flows approximately 7.5 miles to the Gulf of Mexico, but only 1.25 miles of the river are within the boundary of the state park. The primary source of the water in the river is the first magnitude headspring already discussed. When flowing, Twin Dees Spring also contributes surface flow to the river within the park. The river also receives some surface run-off and seepage during periods of heavy rainfall as well as discharge from springs downriver. The surface watershed is estimated to cover 38 square miles of the central portion of western Hernando County (Heyl 2008). Average velocity for the river in the park as reported by Frazer et al. (2006) for the 2003-2005 study period was 0.16m/s. Average depth in the river as measured for the same study period ranged from 0.8 to 2.0 meters deep, with depth within the park boundary averaging less than 1.5m (Frazer et al. 2006).

Anthropogenic impacts to the Weeki Wachee River have been happening for decades. By the early 1940s, areas around the spring had already been cleared for small-scale developments. By the time the underwater attraction officially opened in 1947, much larger areas had been cleared of vegetation in anticipation of future development. The impacts from erosion of the adjacent fine sand soil into the spring and spring run are not known.

Direct developmental impacts to the spring and river have occurred as the result of activities at the historic Weeki Wachee Springs attraction. Two different underwater viewing theaters have been built on the west side of the spring bowl. The original theater, completed in 1947, was replaced in 1960 by the larger theater present today. The Buccaneer Bay water park opened in 1982, situated along the river just northeast of the spring. The water park included waterslides, bumper boats and a white sandy beach to access the swimming area (Vickers 2007). A portion of the east river bank was dredged to form the beach and swimming area, and sand from an outside source was brought in.

A shallow retaining wall was installed to keep the sand up on the beach, but continual erosion of the sand under the wall resulted in the need to dredge the sand out of the river and replace it on the beach. The sand loss was alleviated in 2006 when the retaining wall was replaced with one with a deeper footing (Athanason, pers. comm.).

A sandbag water control structure was installed by attraction staff about 1.1 miles downstream. The date of installation is not known, but it was present in 1968. The structure has since been mostly removed, but portions of the base and edges remain. The presence of the structure appears to have altered water flow enough to cause some sand shoaling on the upstream side and some deep pooling on the downstream side. The impacts from hydrologic alteration appear to be stable and no corrective action is proposed. Manatees, including young calves, have been observed upstream of the structure year round and motor boats are able to pass over it, even during periods of low water.

Urban development much further down river from the state park has had direct impacts on the river. There are several housing developments associated with canals that were dredged to provide fill for the building sites. One such development, Weeki Wachee Retreats, was built in the mid 1960s without applicable permits (SWFWMD 1968). A SWFWMD investigation of the development reported that about 50,000 cubic yards of riverbed sediment had been removed to form a quarter mile channel 10 feet deep and 80 feet wide (SWFWMD 1968).

The steeper slopes of the riverbank within the state park may be susceptible to erosion. Favored recreational stops for boaters along the river are erosion hot spots. There has been some controversy about the source of sand that has formed shoals along the river. A sediment study done in 2003 found imported sand at Buccaneer Bay was too similar to native river sediments to resolve whether it was the source of shoaling sand (Madrid, 2003). Further studies were recommended to monitor changes in shoaling over time and determine the specific factors, such as boat prop wash and overall river flow that are affecting shoaling (Madrid, 2003). The 2006 removal of wooden groins, installed in the 1970s near Weeki Wachee Retreats to mitigate for illegal dredge and fill developments, may have had some affect on river shoaling more recently.

Twin Dees Spring Run is a shallow waterway, approximately 10 feet wide and 1.5 feet deep, that runs 0.2 miles from the headspring to the Weeki Wachee River (Scott 2004). Water flow through the run is intermittent at best as indicated by the available flow data for the headspring already discussed. The headspring is the main source of water in the run, but it also receives surface run-off and likely some seepage flow from the adjacent hydric hammock to the east. The surrounding basin marsh is influenced by surface water from both the spring run as well as the adjacent hydric hammock.

There are three other basin marshes in the park, one located on the parcel east of State

Road 19, one on the south tip of the park adjacent to U.S. Highway 19, and a small marsh on the banks of the river at the west boundary of the park. All the marshes are surface water fed and two are very susceptible to water volume and quality issues because of their proximity to major highways. The eastern marsh is immediately south of State Road 50 and receives run-off from the highway. It also receives overflow from the adjacent water retention pond to the west. The southern marsh receives run-off from State Road 19 to the east and the private and commercial developments to the south and west. The increased elevation of the roads and developed areas has resulted in an increased volume of water flowing into the marshes following rain events. The quality of this run-off is likely affected by sediments and chemicals from roads and lawns. The marsh on the riverbanks is primarily sawgrass and is the result of sediment shoaling at a river bend. The marsh is in good shape aside from the presence of scattered wild taro (*Colocasia esculenta*) plants.

Water quality. The Weeki Wachee Riverine and spring system is classified as an Outstanding Florida Water (OFW). The discharge from the Weeki Wachee headspring is freshwater and not influenced by tidal fluctuations. Average water temperature is 23.9°C. The groundwater is considered hard and alkaline due to the presence of calcium carbonate dissolved from the limestone layers of the UFA. Dissolved oxygen, ammonia and phosphorus levels are low as is typical of groundwater discharge (Frazer et al. 2006).

Nitrate concentrations have been the main water quality concern for Weeki Wachee Spring. A water quality study to quantify declining water quality in 30 Springs Coast springs by Jones et al. (1997) found that nitrate concentrations were increasing across the region with nitrate concentrations in Weeki Wachee showing nitrate levels 50 times higher than background levels. Since then a number of monitoring studies have corroborated this trend (Champion and Starks 2001, Frazer et al. 2001 and 2006, Haber 2005, Cohen et al. 2007; Harrington et al. 2008).

The Florida Department of Environmental Protection Florida Springs Initiative quarterly monitoring data for the sampling period 2001-2008 indicate average nitrate levels in Weeki Wachee to be 0.76 mg/L, as compared to pre-1977 levels of 0.02 mg/L (Hicks et al. 2009; Cohen 2007). These levels have prompted the Florida Department of Environmental Protection to include Weeki Wachee Springs and Weeki Wachee Springs Run in the 2009 Revised Verified List of Impaired Waters, Group 5 Cycle 1 Basins as impaired due to nutrients (FDEP, 2009). The nitrate+nitrite concentration threshold for verification as impaired is >0.6 mg/L. Total Maximum Daily Load (TMDL) development priority for the spring and river is listed as medium, indicating it is planned for 5-10 years from verification listing, resources permitting (FDEP, 2009).

The elevated nitrate levels have contributed heavily to a drastic shift in vegetative composition in the spring. Historical photographs and reports on the spring indicate a

lush growth of desirable submerged macrophytic vegetation, primarily eelgrass (*Vallisneria americana*) and spring tape (*Sagittaria kurziana*). By 2007, the macrophytic vegetation was almost completely gone, having been replaced by a dense mat of the undesirable algae, *Lyngbya wollei*. The algae were removed in 2008 as part of the SWFWMD efforts to restore the spring and improve water quality at the site. The algae have since begun to re-grow rapidly, and a maintenance control plan is being developed.

Nitrogen isotopic data indicate that the majority of the nitrate in the system is inorganic in nature (Jones et al. 1997). Based on land use cover, inorganic sources in the springshed would come primarily from inorganic fertilizers applied to agricultural fields and groves, golf courses, residential lawns, and improved pasture (Jones et al. 1997). Other nitrate sources are organic, most likely from septic tank leachate, livestock waste, other sources of human and animal waste, and algae.

Findings by Stevenson et al. (2007) showed that thick mat of *Lyngbya wollei* algae could become a self-sustaining nitrate source. Data collected from within and below the mat indicate higher levels of nitrate than in the water column above. Possible sources are from nitrate present in the substrate and nitrate build-up from periodic breakdown of algae within the mat. This trend suggests an established *Lyngbya wollei* population can continue to thrive even in the presence of greatly reduced nitrate input from groundwater.

Water quality of stormwater run-off adjacent to the spring has also been a concern. The proximity of the headspring and river to major highways, coupled with decades of intensive use of the headspring environs have increased the potential for contaminants and nutrients to flow directly into the spring and river. Recent projects completed by SWFWMD in 2007 to improve stormwater retention included addition of a stormwater retention pond south of the existing parking lot, and increasing the holding capacity of swales between the major highways and the attraction.

Additional sources of potential stormwater pollution have been identified at the attraction (Stevens 2004). Run-off from a number of roofs, decks and concrete walkways flows directly into the spring or river, the parking lot and roadway to the river from the canoe/kayak rental site has a high potential for erosion, and the swale draining from the pond at the center of the attraction funnels water to the river during heavy rain. Vegetative buffers are lacking between development at the attraction and the spring and river.

Natural Communities

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors, such as climate, geology, soil, hydrology and fire frequency generally determine

the species composition of an area, and that areas which are similar with respect to these factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub--two communities with similar species compositions--generally have quite different climatic environments, and these necessitate different management programs. Physical influences such as fire frequency may vary from FNAI's descriptions for select natural communities in this plan.

Existing and Desired Future Conditions

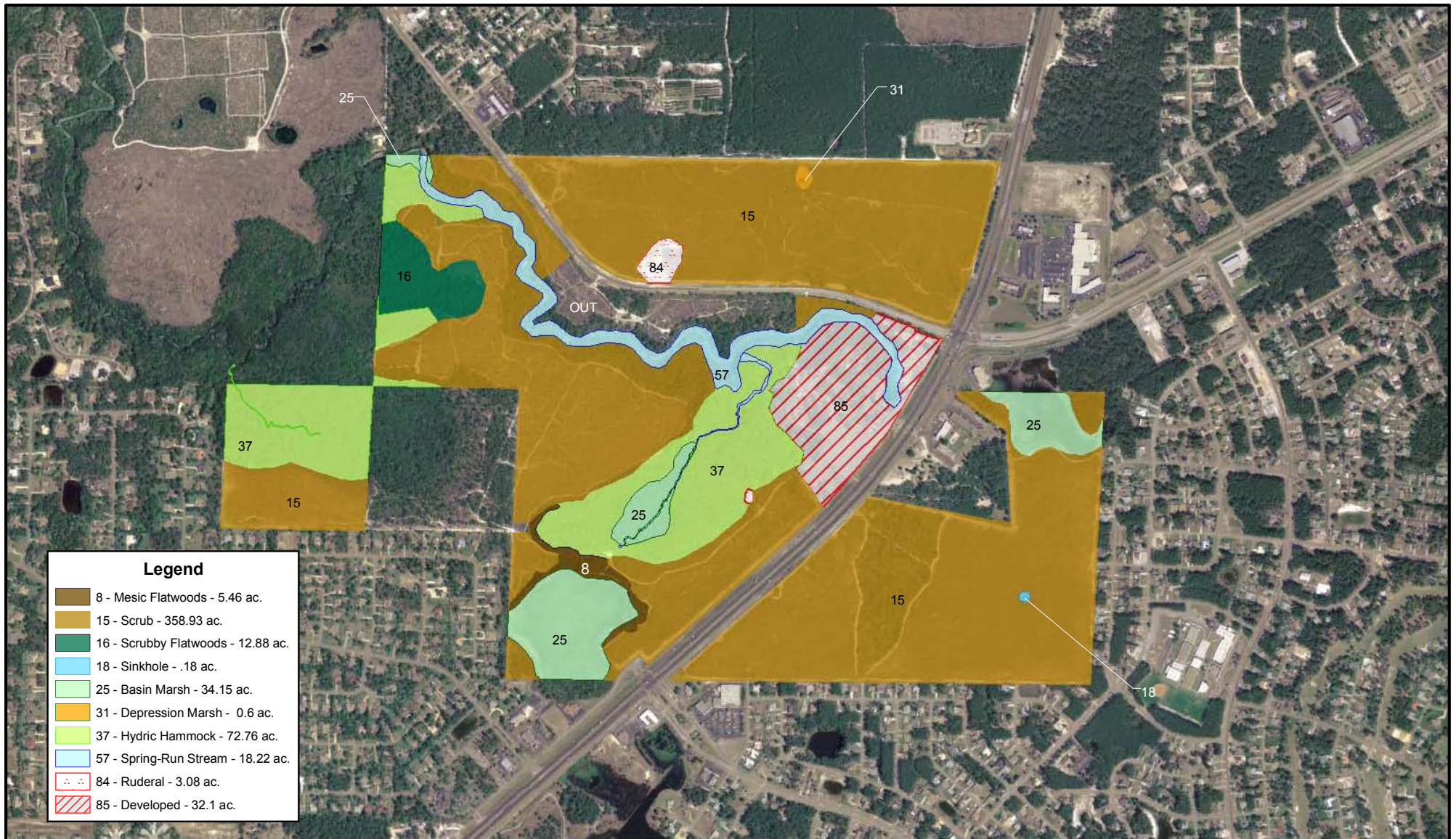
All intact natural communities share certain basic background characteristics and management requirements. These include maintaining the Optimal Fire Return Interval for fire dependant natural communities, minimizing the negative impacts of non-native plant and animal species, maintaining the natural hydrological function including historic water flows and water quality, maintaining the proper vegetative structure that represents the natural diversity of the community, maintaining healthy populations of plant and wildlife species including those that are imperiled or endemic, and maintaining intact ecotones between natural communities across the landscape.

The park contains nine distinct natural communities (see Natural Communities Map) in addition to ruderal and developed areas. One of these community types, aquatic cave, is subterranean so it is not included on the Natural Communities Map. Below is a list of natural communities found within the park. Each description includes a brief narrative describing the current condition, associated plant species found within the natural community, underlying management actions required to maintain each community, and the desired future condition for each community type. The Natural Communities Map is a graphic representation of the existing vegetative conditions in the park at the time this management plan was developed. A list of plants and animals occurring in the unit is contained in Addendum 5.

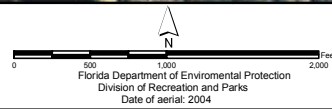
MESIC FLATWOODS

The mesic flatwoods in the park exist primarily as an ecotonal community between the oak scrub and the basin marsh and hydric hammock habitats in the southern portion of the main park parcel. The habitat is characterized by the presence of a saw palmetto (*Serenoa repens*) understory and a sparse canopy of south Florida slash pine (*Pinus elliottii*). Historical aerials from 1944 show sand roads through the area were already present. A tree core analysis would be helpful in determining whether the large pine trees represent old-growth pines.

At present the community is heavily invaded by laurel oak (*Quercus laurifolia*), loblolly



WEEKI WACHEE SPRINGS STATE PARK



NATURAL COMMUNITIES MAP

bay (*Gordonia lasianthus*), and sweetbay magnolia (*Magnolia virginiana*) trees from the adjacent hydric hammock. These trees have shaded the habitat, resulting in decreased species diversity. Restoration of this community will require removal of the large hardwood trees and application of prescribed fire to restore the shrub diversity and herbaceous vegetation. An old paved road through the area should be removed.

Following restorative resource management activities, the mesic flatwoods community should consist of an open canopy of south Florida slash pine and few hardwoods. Saw palmetto and native shrubs should comprise no more than 50 percent of the groundcover, with the remainder consisting of native herbs. The understory should be less than 3 feet in height. Shrub species will likely include saw palmetto, gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), runner oak (*Quercus pumila*), shiny blueberry (*Vaccinium myrsinites*), wax myrtle (*Myrica cerifera*) and American beautyberry (*Callicarpa Americana*). Herbaceous species will likely include crowngrass (*Paspalum* sp.) and threeawn grasses (*Aristida* sp.) and wildflowers like blackroot (*Pterocaulon pycnostachyum*), gayfeathers (*Liatris* sp.), Chapman's goldenrod (*Solidago odora* var. *chapmanii*), and rose-rush (*Lygodesmia aphylla*). The Optimal Fire Return Interval for this community is 1-3 years.

SCRUB

Two sub-types of scrub habitat occur in the park. The most widespread scrub type dominating the upland landscape is early successional oak scrub. It is characterized by deep, well-drained white sand soils, a shrub layer dominated by the xeric oak species *Quercus myrtifolia*, *Q. geminata* and *Q. chapmanii*, and a sparse groundcover with persistent patches of open, bare sand. Up until 2002, the scrub was overgrown. Exclusion of fire for decades had resulted in invasion of the oak scrub by sand pine trees (*Pinus clausa*) and elimination of bare sand areas that are critical to many scrub endemics. In 2002, SWFWMD began restoration of 304 acres of the scrub. The restoration consisted mainly of removing the mature sand pine trees. In addition to timbering, 60 acres were mechanically mowed with a hydro-ax to reduce the height of the scrub oaks. A 94-acre prescribed fire was conducted in September 2004. A 70-foot buffer along the river corridor was left to protect water quality in the river (Barnwell 2004).

Surveys following the restoration showed a positive response by scrub vegetation. The rapid return of scrub endemic species such as Florida rosemary (*Ceratiola ericoides*), Curtiss' milkweed (*Asclepias curtissii*), garberia (*Garberia heterophylla*), and scarlet calamint (*Calaminthe coccinea*) along with numerous other herbaceous grasses and wildflowers was observed (Barnwell 2004). Other species observed in the early successional oak scrub include southern black racer (*Coluber constrictor priapus*), eastern diamondback rattlesnake (*Crotalus adamanteus*), eastern towhee (*Pipilo erythrophthalmus*), and gopher tortoise (*Gopherus Polyphemus*).

Prescribed fire has not yet been applied to the parcels north of State Road 50 and east of U.S. Highway 19. Regrowth of sand pine trees on logged parcels appears to be sporadic. Much of the scrub habitat that underwent logging without burning is currently in early successional condition as indicated by the low stature of the oaks and other scrub shrubs. However, in some areas not burned in 2004 the density of these shrubs is too high to allow establishment or persistence of gap endemic species. These species will continue to persist for the present time in the numerous park roads and fire lines.

Active management of the early successional scrub will likely require application of prescribed fire on a 5 to 15-year interval. Mechanical reduction of vegetation will likely be required in advance of prescribed burning to maintain safe burning conditions while still meeting ecological objectives. The river buffer has been included in the burn zone units of the park and will be burned on an interval appropriate to the habitat conditions. Since no restoration timbering was done within the buffer, some low impact removal of sand pine trees may be required prior to burning. Since the Weeki Wachee River is an Outstanding Florida Water, all resource management activities within the river buffer will be done in accordance with the FDACS Silviculture Best Management Practices (FDACS 1991).

The second sub-type of scrub known to occur in the park is sand pine scrub. The largest area of sand pine scrub is located on the parcel east of U.S. Highway 19 and appears as a distinctive wedge of dense vegetation in 2004 aerial photographs. The soil is identical, and the shrub layer is nearly identical, to the surrounding early successional oak scrub. The major distinction between the two is the presence of the mature sand pine trees. This area burned in a wildfire in 1976 and the wedge shape is enhanced by the fire plow roads persistent on either side. The fire killed the standing adult pines, but in the absence of prescribed fire since, sand pines have re-established.

Aerial photographs from 1944 and 1951 indicate a mosaic of vegetation in this area, with some presence of canopy trees, presumably sand pine. Photographs of the attraction taken in 1947 and 1948 also show mature sand pines on the parcel east of U.S. Highway 19. In a contiguous vegetative mosaic, fire would be expected to advance in a more natural pattern, consuming only receptive fuels and leaving areas unburned for some time, allowing establishment of mature sand pine scrub pockets in the landscape. Consequently, the historical presence of some climax sand pine community in this area is expected.

Due to the adjacent urban development, the catastrophic conditions of sand pine scrub fires will not permit the burning of this area in its present condition without mechanical removal of sand pines. It is notable that following the sand pine timbering in 2002, sand pines have only recruited in isolated areas within this parcel. In time, the repeated application of prescribed fire should allow the persistence of sand pine scrub pockets only where appropriate throughout the parcel.

Following continued resource management activities in the scrub communities of the park, early successional oak scrub should predominate, and include sand live oak, myrtle oak and Chapman's oak. Saw palmetto, scrub olive (*Osmanthus megacarpus*), Florida rosemary and rusty lyonia (*Lyonia ferruginea*) should also be present. The scrub oak canopy should vary in height from 3 - 8 feet and there should be a variety of oak age classes/heights between different scrub patches. Bare patches of sand supporting imperiled and endemic plant species listed above, should be present. Sand pine should not be dominant in abundance, percent cover or height. Some areas of mature sand pine may persist. The Optimal Fire Return Interval for this community in the park will likely be between five and 15 years.

SCRUBBY FLATWOODS

This habitat type occurs as a small section along the west side of the main park parcel. At present, the habitat is heavily overgrown due to the long absence of fire. The saw palmettos are extremely dense, having long ago crowded out most of the shrubs and groundcover species typical of scrubby flatwoods. Xeric oak species, primarily sand live oak and myrtle oak are present as very tall shrubs, most over three meters tall. In addition, present, as overgrown shrubs are rusty lyonia and scrub wild olive. There are virtually no ground covers species present due to shading. A slash pine canopy of moderate density also occurs over most of the scrubby flatwoods. The needle fall from the pines has created a litter layer up to a meter thick in some areas.

The scrubby flatwoods on the state park is contiguous with that on the adjacent Florida Fish and Wildlife Conservation Commission (FFWCC) parcel. It appears overall to be a small transitional zone between the scrub and hydric hammock. The Paola fine sand soil type and slightly higher elevation have contributed to the establishment of more xeric species.

Park and district staff will work with FFWCC staff to coordinate restoration of the entire scrubby flatwoods zone between the two properties. The adjacent scrub community to the east has been timbered of invading sand pine as well as treated mechanically and burned. Restoration of the scrubby flatwoods will consist of installation of appropriate fire lines, mechanical treatment of the scrub oaks and palmettos to reduce the understory height and density, and application of prescribed fire. Mechanical treatment and application of fire will result in some slash pine mortality that should yield the desired reduction of the canopy density. Following active restoration, application of prescribed fire on a 5 to 8-year interval will maintain shrub height and density to that appropriate for scrubby flatwoods. More comprehensive species assessments will also be done over time.

Following restorative resource management activities in the scrubby flatwoods community, the canopy should be dominated by sparse (1-5 trees per acre) south Florida slash pine. Mature sand pines should be few. The scrub oak mid-story should

consist of myrtle oak, sand live oak, and Chapman's oak, which should vary in height from 3 – 8 feet representing a variety of age classes/heights. Other shrubs should include saw palmetto, rusty lyonia, shiny blueberry and tarflower (*Befaria racemosa*). Groundcover of herbaceous species should be less than 40 percent and bare open sandy patches should be present. The Optimal Fire Return Interval for this community is likely to be 5-8 years.

SINKHOLE

There are two known sinkholes in the park. One, very small sinkhole is located in the northern portion of the main park parcel, just off the park road. It is characterized as a sandy, conical depression with limestone outcrops. Vegetation in the sinkhole is similar to that of the surrounding scrub/hammock ecotone near the river.

The larger sinkhole is located on the park parcel east of U.S. Highway 19 and is large enough to be visible on aerial photography. Historical 1951 aerials show standing water in the sinkhole. Presently, there is no standing water and the bottom is vegetated primarily with buttonbush (*Cephalanthes occidentalis*) and Carolina redroot (*Lachnanthes caroliniana*), indicating the occurrence of some seasonal inundation, or at least saturation. The slopes are vegetated primarily with saw palmetto, gallberry (*Ilex glabra*), and scrubby oaks. There are a number of dead pine trunks on the ground in the sinkhole. These are of unknown age or origin, but may be logging slash debris. The sinkhole is not easily accessible so dumping should not be an issue but it should be monitored for occurrences of invasive exotic plant species.

Hydrological monitoring of the sinkhole is needed. Even though a hydrogeologic connection to Weeki Wachee Spring or Twin Dees Spring has yet to be determined, the monitoring well threshold indicative of flow from Twin Dees Spring may coincide with the presence of standing water in the sinkhole. If surface water is the primary source of water then periods of heavy rain may result in the presence of standing water. If it is determined to hold water for more than 6 months out of year, reclassification as a sinkhole lake may be appropriate.

Management of the sinkhole will be done concurrent with management of the surrounding scrub natural community. The upland vegetation on the slopes will be protected from unnatural disturbance to prevent erosion. Regular application of prescribed fire to the surrounding scrub should carry into the sinkhole and maintain the low stature of the shrubs and saw palmetto that vegetate the sinkhole slopes. The sinkhole will be kept free of invasive exotic plant species.

BASIN MARSH

There are four basin marshes in the park. The first is located on the north side of the parcel east of U.S. Highway 19. The marsh is relatively intact at present with the only known significant impacts being run-off from the adjacent highway and commercial

property. The northern portion of the marsh is not on state park property and receives stormwater from the commercial parking lot. There is little encroachment of hardwoods, likely due to lack of adjacent seed source. The marsh should be burned when the adjacent oak scrub is burned. Florida sandhill cranes (*Grus canadensis pratensis*) have been reported to nest in the marsh (Barnwell, pers. comm.). A survey for sandhill crane nesting will be done prior to any burning in the crane nesting season.

The second basin marsh is located on the south boundary of the main park parcel. It has also been impacted by urban run-off from the adjacent U.S. Highway 19 and urban housing development. The slope down to the marsh is steep on the south side, but is somewhat protected by a berm formed from remnant uplands left undeveloped. The vegetative structure of the marsh is mostly herbaceous on the north and west sides, turning to wooded swamp in the center and to the south and west. Historical aeriels indicate the swamp areas were previously covered by herbaceous vegetation. The exclusion of fire and the altered hydrology of the marsh have likely permitted the establishment of woody species, including red maple (*Acer rubrum*), dahoon holly (*Ilex cassine*), swamp dogwood (*Cornus foemina*), and elderberry (*Sambucus nigra* subsp. *canadensis*). The marsh has been invaded by Chinese tallow (*Sapium sebiferum*) trees, an invasive exotic, on the southwest side. The marsh should be burned as often as the adjacent upland community should, and the invasive trees treated or removed. The seasonal high water line on the hardwoods is very high, indicating deep, standing water during seasonally wet periods. Therefore, fire alone may not eliminate the trees. If this is the case, the area may be managed as basin swamp.

The third basin marsh surrounds the Twin Dees Spring Run and forms the ecotone between the hydric hammock and the spring run. When viewed aerielly the marsh has a drumstick shape that is the result of being wider around braiding in the spring run as it leaves the springhead. As the spring run nears the main river, the marsh gives way to hydric hammock. The herbaceous vegetation of the marsh consists primarily of sawgrass (*Cladium jamaicense*) and patches of marshhay cordgrass (*Spartina patens*). In the absence of fire, the marsh has also been invaded by woody species like Carolina willow (*Salix caroliniana*), red maple, saltbush (*Baccharis glomeruliflora*), and wax myrtle. There is no obvious impact to the marsh from direct anthropogenic hydrologic alteration. However, the hydrologic input to the marsh is dependent on flow from Twin Dees Spring, which is intermittent at best, and from karst seepage off the adjacent uplands. Both of these are dependent on local seasonal rainfall.

Management of the Twin Dees basin marsh will consist of monitoring for occurrence of invasive plant species and the application of prescribed fire on an appropriate interval with the ecological goal of eliminating and preventing further establishment of encroaching hardwood species.

The fourth basin marsh is a sawgrass marsh along low-lying banks of the river at the

western boundary of the park. While marshes designated as basin marsh are typically closed, with little to no water flow in or out, this basin marsh is more open due to proximity to the river. Seasonal water level fluctuation and influence from river flow are the strongest contributors to the dominance of herbaceous species here and prescribed fire is not planned at this time.

Proposed management of the basin marsh communities at the park should result in emergent herbaceous and low shrub species dominant over most of the area, and an open vista. Trees should be few and in the deeper portions of the marshes. There should be little accumulation of dead grassy fuels due to frequent burning; the soil surface will likely be visible through the vegetation when the community is not inundated. Dominant vegetation should include maidencane (*Panicum hemitomum*), cut grass (*Leersia* sp.), sawgrass, pickerel weed (*Pontederia cordata*), arrowheads (*Sagittaria* sp.), buttonbush, St. John's wort (*Hypericum* sp.), and Carolina willow. The Optimal Fire Return Interval for this community is 2-10 years depending on fire frequency of adjacent communities.

DEPRESSION MARSH

The only documented depression marsh is located on the park parcel north of County Road 550. It is a slight depression in the surrounding scrub. To date the hydroperiod is unknown, but the vegetative structure in the marsh is indicative of the presence of some saturated soil for most of the year. The upper reaches of the marsh are dominated by broomsedge, but closer to the center Carolina redroot dominates, which typically has more affinity for saturated soils. The ecotone between the scrub and the marsh is dominated by gallberry and ericaceous shrubs.

Active management of the depression marsh will consist of monitoring for occurrences of invasive exotic plant species, hog activity and application of prescribed fire concurrent with burning the adjacent scrub to prevent encroachment of woody species.

Following regular application of proposed management activities in the depression marsh, emergent herbaceous species should dominate, and there should be an open vista. Trees should be absent. Dominant vegetation should include maidencane, bluestem, pickerel weed, arrowheads and St. John's wort. The Optimal Fire Return Interval for this community is 2-10 years depending on the fire frequency of the adjacent scrub community.

HYDRIC HAMMOCK

Hammock communities that are subject to periodic flooding are considered hydric hammocks. These hammocks often occur associated with springs and karst seepage (FNAI 1990). This climax community type primarily occurs adjacent to the spring-run communities in the park, at elevations less than 20 feet above sea level. The soils are dark, hydric, and may be inundated during the rainy season. Despite the proximity to a

major spring-run river, this community type is not considered a bottomland or floodplain community due to its hydrology. While the flow from Weeki Wachee Spring varies seasonally, the variation is not so much as to regularly overflow the riverbanks and flood the adjacent low-lying land. Rather, the water source of this hammock is groundwater flowing down slope over the underlying limestone, as well as some surface water in the rainy season. The organic sediment is not thick, indicating a shorter hydroperiod than that typical of a swamp community type. The frequency of fire occurring in the hammock is very low. The hydrology, fire frequency and organic matter accumulation justify the classification of this community type as hydric hammock (Ewel 1990).

The underlying karst topography results in lowland depressions or bowls along the course of both the Weeki Wachee Spring run and the Twin Dees Spring Run. While the plant species in the hammocks are similar, the microclimate created by proximity to the spring runs and hammock creeks results in some species variability. Typical plants found in the canopy are cabbage palm (*Sabal palmetto*), laurel oak, sweetgum (*Liquidambar styracifolia*), American elm (*Ulmus Americana*) and sweetbay magnolia. Mid-story species generally consist of elderberry, laurel cherry (*Prunus caroliniana*), swamp bay (*Persea palustris*), wax myrtle (*Myrica cerifera*), and highbush blueberry (*Vaccinium corymbosum*). Groundcover species are typically ephemeral forbs, sedges, and ferns such as lizard tail (*Saururus cernua*), marsh fern (*Thelypteris kunthii*), netted chain fern (*Woodwardia aureolata*), and common blue violet (*Viola sororia*). Southern magnolia (*Magnolia grandiflora*) and red cedar (*Juniperus virginiana*) are also scattered throughout.

In the more hydric parts of the hammock loblolly bay, Virginia willow (*Itea virginica*), royal fern (*Osmunda regalis* var. *spectabilis*), swamp dogwood, jack-in-the-pulpit (*Arisaema triphyllum*), black gum (*Nyssa sylvatica* var. *biflora*) and needlepalm (*Rhapidophyllum hystrix*) can be found. Typical birds include red-bellied woodpecker (*Melanerpes carolinus*), white-eyed vireo (*Vireo griseus*), Carolina wren (*Thryothorus ludovicianus*), and northern cardinal (*Cardinalis cardinalis*).

No active management of the hydric hammock is required other than monitoring for negative impacts such as hydrologic alteration, erosion, invasive exotic plant infestation, anthropogenic impacts and monitoring any species of special concern such as threatened or endangered species. Hydrologic impacts would likely come primarily from alterations to the community's upslope, altering the input of surface water and flow of karst seepage. State park designation insures there will be no such developmental impacts to the globally imperiled scrub habitat upslope of the hydric hammock. Invasive exotic plant species documented in the hydric hammock are skunk vine (*Paederia foetida*), Japanese climbing fern (*Lygodium japonicum*), and various ornamentals escaped from cultivation at the attraction. Most ornamentals are confined to the areas near the attraction and will be eliminated.

Continued management of the hydric hammock will maintain the closed canopy of evergreen and deciduous hardwoods with a variable understory dominated by palms, and sparse to moderate ground cover of grasses and ferns. Typical canopy species should be maintained, including sweetgum, laurel oak, cabbage palm, sweet bay, swamp tupelo, American elm, red maple and other hydrophytic tree species. Vulnerable portions of the hydric hammock will occasionally burn from fires originating in the adjacent upland natural communities. Invasive exotic plant species should not be present.

SPRING RUN STREAM

There are two spring run streams in the park. The most well known is the Weeki Wachee River, with its first magnitude headspring. Lesser known is the spring run stream from Twin Dees Spring.

Only 1.25 miles of the 12-mile long Weeki Wachee River are within the boundary of the state park. The water of the gently winding river runs swift and clear, emanating directly from the Upper Floridan aquifer (UFA) through the main headspring at an average rate of 174 cfs. The substrate is primarily white quartz sand with pockets of silt and organics. The flow in the river varies seasonally with spring discharge and rainfall. The river banks within the park boundary vary from high and steep on the outside bends, to low and often saturated or inundated with water on the inside bends.

Vegetation in the river is primarily submerged aquatic macrophytes and filamentous algae. Southern water nymph (*Najas guadalupensis*), spring tape and eelgrass are common occurrences as well as the occasional occurrence of the invasive hydrilla (*Hydrilla verticillata*). Supplemental plantings of spring tape, eelgrass and emergent aquatic plants were installed in the headspring and upper river as part of the 2008 spring restoration by SWFWMD. The initial infestation of the nuisance algae, *L. wollei*, was removed in 2008, but it continues to persist as re-growth in the headspring and on submerged vegetation in the upper river. West Indian manatee (*Trichechus manatus*), alligator (*Alligator mississippiensis*), striped mullet (*Mugil cephalus*), bluegill (*Lepomis macrochirus*), mangrove snapper (*Lutjanus griseus*), peninsular cooter (*Pseudemys floridana peninsularis*) and Florida red-bellied turtle (*Pseudemys nelsoni*) are present.

The Twin Dees Spring Run is approximately 0.2 miles long and runs from the headspring, in the southwest part of the park, north to the Weeki Wachee River. The character of the spring run is quite different from that of the main river. The flow from the spring is very seasonal and may flow for only a portion of the year. The bottom of the spring run is very shallow, on average less than a meter deep. It is primarily dark, mucky soil in which a person can sink up to the knees, even in the dry season. This indicates karst seepage into the spring run from upslope.

Vegetation in the spring run is sparse, but red-top panicum (*Panicum rigidum*), crinum

lily (*Crinum americanum*), lanceleaf sagittaria (*Sagittaria latifolia*), and smallfruit beggarticks (*Bidens mitis*) are present. Invertebrates such as the native bivalve, *Villosa amygdala* and native apple snail (*Pomacea paludosa*) are also present. Numerous tracks from wading birds and raccoons (*Procyon lotor*) are obvious in the bed of the run in the absence of flow.

Water quality, spring discharge and erosion are continuing threats to the health of the springs and spring runs in the park. Continued maintenance removal of nuisance algae from the spring and upper river will continue to be a priority. Interagency cooperation with federal, state, and local governments will guide region wide water quality and pumpage monitoring and regulation efforts to reduce nutrient loads and discharge impacts to the UFA. Erosion control efforts will center on monitoring of potential areas of high erosion along the river and working with local jurisdictions to limit internal combustion motors in the river. Research is needed to quantify the impacts from cumulative recreational use in the main headspring and set appropriate carrying capacity levels.

These management actions will serve to maintain the flow, clarity and temperature of these perennial watercourses. This will provide optimal light penetration to perpetuate the establishment and spread of native macrophytic vegetation like eelgrass, spring tape and water nymph. The occurrences of the nuisance algae, *Lyngbya wollei*, should continue to be smaller and less frequent. Areas of high flow will continue to have sandy bottoms with organic materials concentrating around fallen trees and limbs and slow moving pools.

AQUATIC CAVE (this natural community is not represented on the natural communities map)

There are two subterranean aquatic caves in the park, associated with the two main springs. The caves are formations that have resulted from dissolution of the upper limestone layer by the movement of water. The caves of both springs have been explored by divers, but not much is known yet about the cave environment. On-going exploration efforts by cave divers will continue to investigate the water chemistry, sedimentation, geology and species of the subterranean caves. Blind cave crayfish (*Cambarus* sp.) have been observed. The aquatic caves will be protected against disturbance and alterations that may affect water flow and microclimate, or that may cause increases in pollution.

RUDERAL

Areas designated as ruderal have been disturbed to the point that no recognizable natural community type exists. Often these sites have been historically cleared for agriculture, developed, or even drained through ditching or dredging. There is a ruderal site at the park north of County Road 550 that is an old trash dumpsite. The trash was removed by SWFWMD in 2002. Recently the site has been used to deposit

spoil from the restoration of Weeki Wachee Spring. No active restoration is planned at this time, but the site should be monitored for invasive plant species like cogon grass.

One other ruderal site is located just southwest of the Weeki Wachee attraction. A cleared square area was the historical location of a structure that housed the captive birds used for live shows. The structure has since been removed. The site will be monitored for encroachment of invasive plant species, but no restoration is planned at this time. The site is small enough that it should re-vegetate on its own.

Both ruderal areas in the park should eventually re-vegetate by seedling recruitment from the adjacent scrub community, and will ultimately be managed as the scrub community already discussed. High priority invasive plant species (EPPC Category I and II species) will be treated as they occur.

DEVELOPED

The only developed area in the park is the historical 27-acre Weeki Wachee Springs attraction. The attraction is the most prominent feature in the public eye and supports the vast majority of visitation to the park. It comprises notable entertainment features such as the Mermaid Theater, amphitheater, Buccaneer Bay Water Park and concessions. While the attraction itself is not ecologically significant, it is a major conduit for public access to the spring and spring run river through the state park. Management activities within the attraction such as landscaping, interpretive programs, and water use have a direct effect on both the adjacent natural communities, primarily the main headspring and spring run river, and the education of visitors to the park.

All activities within the attraction should be carefully evaluated and monitored to ensure they do not detract from the natural and cultural resources of the park. If it is determined that activities are posing a significant threat to natural or cultural resources, corrective action will be taken, which may include limiting certain activities in sensitive areas. The attraction is discussed in detail in the Land Use Component (LUC) section of this plan.

The developed attraction will be managed to minimize its effect on adjacent natural areas. High priority invasive plant species (EPPC Category I and II species) will be removed from the landscaping as well as natural areas that buffer the intact natural communities of the park. Other potential impacts to the adjacent natural communities such as stormwater have been identified and will be addressed in the Resource Management Program section of this component.

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 scrub habitat type in the park is not only imperiled globally and within Florida (G2/S2 - FNAI), it has high potential for the occurrence of imperiled species. A combination of fire suppression and habitat fragmentation due to urbanization has greatly reduced not only the amount of scrub habitat in Florida, but also the quality of the available habitat. The survival of a number of species endemic to the scrub community is dependent on the open sandy gaps and reduction of competing species that result from the cyclical occurrence of fire. Species such as the Florida scrub jay, scrub pinweed and Curtiss' milkweed can become extirpated in the absence of fire.

Significant scrub restoration was done by SWFWMD in 2002 by removing sand pines and reducing climax vegetation height and density using mechanical treatment and prescribed fire. Soon after restoration, field surveys indicated a strong positive response by a number of species. Surveys conducted in June 2003 located more than 100 occurrences of Curtiss' milkweed. Curtiss' milkweed (Endangered-FL) is a scrub endemic documented as rare and occurring patchily in the dry, sterile white sands of peninsular Florida scrubs (Ward 1979). Herbarium records indicate that Curtiss' milkweed was documented near Weeki Wachee Spring by John K. Small in 1922 (Putz and Minno 1995). Positive responses of imperiled plant species were also noted in post restoration surveys by SWFWMD for garberia (Threatened-FL) and scrub pinweed (Threatened-FL) (Barnwell 2004). Habitat condition will be monitored as an indicator of the general status of endemic, threatened and/or endangered scrub plants. Additional species-specific monitoring will be conducted as necessary in conjunction with resource management activities, primarily prescribed burning and mechanical treatment.

While Florida scrub jays are not currently known to occur in the park, they have been historically documented. An adult jay was last seen in 2006 in the eastern portion of the main park parcel, near U.S. Highway 19, by SWFWMD staff (Barnwell, pers. comm.). The closest known occurrence of scrub jays is in the city of Hudson, about 14 miles south of Weeki Wachee in a residential development. Birds have also been documented in eastern Hernando County in the Richloam tract of the Withlacoochee State Forest (FFWCC). Continued maintenance of the scrub through application of prescribed fire and mechanical treatment where needed should ensure habitat conditions suitable to imperiled scrub species, both plant and animal.

Gopher tortoises (FL-threatened) have been well documented in the park. A burrow survey conducted by SWFWMD following scrub restoration efforts found 35 burrows (Barnwell 2004). One concern noted by Barnwell was that 16 burrows occurred within 100 feet of major highways or residential neighborhoods, which could result in higher incidents of tortoise mortality. Since 2004, SWFWMD has documented and mapped over 100 active or inactive burrows. It is highly improbable that any burrows are

currently present in the heavily overgrown scrubby or mesic flatwoods communities, as few herbaceous species have persisted. Restoration of the flatwoods communities should benefit the gopher tortoise population since the density of desirable herbaceous species is typically higher in mesic flatwoods than scrub.

West Indian manatees have been documented in the Weeki Wachee River. Employees of Weeki Wachee Spring's attraction have observed manatees consistently in the spring during the winter months. Manatees typically number about six to seven, but can number up to as many as 13 (Athanson, pers. comm.). The United States Fish and Wildlife Service (USFWS) has designated Weeki Wachee Spring as a Primary warm water refuge site due to the constant temperature of groundwater from the main headspring, consistent use of the spring and river by manatees, and the location of the spring relative to other thermal refuge sites (USFWS 2007). The freshwater and macrophytic vegetation make the river a year-round refuge.

The factors influencing manatee numbers in the spring are not well understood. One concern for manatees in the headspring is the lack of submerged aquatic vegetation for manatees to feed on. Historical photos of performers in the spring basin clearly show a thick carpet of vegetation, most likely spring tape (*Sagittaria kurziana*) and eelgrass (*Vallisneria americana*). Currently the spring basin has very little macrophytic vegetation. Up until 2008, a dense growth of undesirable algae, primarily *Lyngbya wollei*, smothered the bottom, likely preventing the growth and establishment of aquatic plants. A restoration effort, begun in 2008 by SWFWMD, to remove the fouling algae and sediments and replant native vegetation has been completed.

A 2006 survey to determine the accessibility of major Florida springs to manatees found that accumulation of sand near the mouth of the spring pool, presumably from Buccaneer Bay, may create a hindrance to manatee passage and should be monitored (Taylor 2006). The source of excess or shifting sand throughout the river has not been definitively attributed to Buccaneer Bay (Madrid 2003). Historical 1944 aerials, as well as old attraction photographs, show a large sandy area clearly visible at the mouth of the headspring. However, since upland vegetation had already been cleared up slope, the source of the sand is questionable. A site visit by FFWCC and Nature Conservancy staff in July 2009 to determine what, if any, improvements to the Weeki Wachee River may be needed to improve manatee access to the headspring found no obvious impediments to access present at that time. Corrective actions will be taken to eliminate any future impediments to manatee use of the upper river or headspring. The effects of the cumulative impacts of decades of development and high use near the headspring on manatees have not been monitored and may never really be known.

Recreational use of the Weeki Wachee River has the potential to negatively impact manatees. Two incidents of manatee mortality due to collision with watercraft have been documented at the confluence of the Mud River and the Weeki Wachee River, in

1998 and 2004 (FFWCC-FWRI).

American alligators regularly occur on the river and occasionally in the headspring. No special management action is called for at this time, but monitoring for any negative interactions between alligators and recreational users is needed. Florida black bears have not been documented on the state park property, but they have been well documented on the adjacent Weeki Wachee Preserve and Chassahowitzka Wildlife Management Area (Kelly et al. 1997). The state park is within the documented primary range of the Chassahowitzka subpopulation of the Florida black bear (FFWCC 2009). Park staff should coordinate with FFWCC on management actions that may impact the Chassahowitzka subpopulation. Southern bald eagles have been observed at the park and a nest has been documented in the park south of the river.

Table 1 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 Division 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 1: Imperiled Species Inventory

Common and <i>Scientific Name</i>	Imperiled Species Status				Management Actions	Monitoring Level
	FWCC	USFWS	FDACS	FNAI		
PLANTS						
Curtiss' milkweed <i>Asclepias curtissii</i>			LE		1,2,7, 10	Tier 5
Florida jointtail grass <i>Coelorachis tuberculosa</i>			LT		1, 2, 4, 10	Tier 1
Garberia <i>Garberia heterophylla</i>			LT		1,2,7, 10	Tier 5
Nodding pinweed <i>Lechea cernua</i>			LT	G3/S3	1,2,7, 10	Tier 5
Cardinal flower <i>Lobelia cardinalis</i>			LT		2, 4, 9	Tier 1
Atamasco-lily <i>Zephyranthes atamasca</i>			LT		2, 10	Tier 1

Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWCC	USFWS	FDACS	FNAI		
REPTILES						
American alligator <i>Alligator mississippiensis</i>	LS	T(S/A)		G5/S4	2,4,10,13	Tier 2
Gopher tortoise <i>Gopherus polyphemus</i>	LT			G3/S3	1,2,6,7,8,10,13	Tier 4
BIRDS						
Florida scrub-jay <i>Aphelocoma coerulescens</i>	LT	LT		G2/S2	1,2,8,10,13	Tier 2
Limpkin <i>Aramus guarauna</i>	LS			G5/S3	2,4,8,10,13	Tier 1
Snowy egret <i>Egretta thula</i>	LS			G5/S3	2,4,8,10,13	Tier 1
Southeastern American kestrel <i>Falco sparverius paulus</i>	LT			G5T4/S3	1, 2, 8, 10, 13	Tier 1
Florida sandhill crane <i>Grus canadensis pratensis</i>	LT			G5T2T3/S2S3	1,2,4,8,10,13	Tier 2
Southern bald eagle <i>Haliaeetus leucocephalus</i>	LT	LT		G5/S3	2,4,8,10,13	Tier 4
Wood stork <i>Mycteria americana</i>	LE	LE		G4/S3	2,4,8,10,13	Tier 1
Osprey <i>Pandion haliaetus</i>	LS			G5/S3S4	2,4,8,10,13	Tier 1
MAMMALS						
West Indian Manatee <i>Trichechus manatus</i>	LE	LE		G2/S2	2,4,9,10,12,13	Tier 3

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.

Exotic 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.

In some cases, native vegetation may also pose management problems or nuisances within state parks. A nuisance plant is an individual native species whose presence or abundance creates special management problems. Examples of native plants that have been documented as nuisance species include cattail (*Typha* sp.), cabbage palm and salt bush (*Baccharis* sp.). Conditions that can result in the occurrence of nuisance plants include hydrologic alterations, increased nutrient levels, ground disturbance and fire

exclusion. Nuisance plants are dealt with on a case-by-case basis. The Division will consult and coordinate with appropriate federal, state and local agencies for management of imperiled species that are considered a threat or problem.

The invasive exotic plant problem at the park has two aspects, one being the problem in the intact natural communities of the park and the other being the developed park attraction. At present, the most problematic invasive exotic species in the intact natural communities are skunk vine and air-potato (*Dioscorea bulbifera*) in the uplands and wild taro in the main headspring and spring run. The developed attraction has scattered invasive plant species planted in the landscaping. The peripheral areas of the attraction, primarily where they buffer the natural communities are infested with invasive plants. Species like giant reed (*Arundo donax*), air-potato, skunk vine, wild taro, elephant ear (*Xanthosoma sagittifolium*), wedelia (*Sphagneticola trilobata*), Japanese loquat (*Eriobotrya japonica*), and American evergreen (*Syngonium podophyllum*) have escaped cultivation or spread from landscape debris to form often dense patches and spread over the adjacent native plants. Other invasive plant species are present as scattered or localized occurrences, such as cogon grass (*Imperata cylindrica*), torpedo grass (*Panicum repens*), and Chinese tallow.

The only nuisance plant species documented in the park is the blue-green algae, *Lyngbya wollei*. Dense mattes of this alga formed in the headspring because of increased nitrate levels in groundwater flowing from the spring. The SWFWMD restoration of the main spring removed the primary infestation of *L. wollei* as well as provided for contractor treatment of invasive exotics on the south bank of the river east of the tour boat dock. Since the initial removal work, SWFWMD staff and park staff and volunteers have worked diligently to keep the algal growth at maintenance levels.

No formal exotic plant management plan has been developed for the park to date. However, several strides in invasive exotic plant eradication and maintenance have been made in advance of the development of a park specific plan. Park staff, volunteers, and district staff have worked cooperatively to do follow-up treatment on the south river bank, removing wild taro and treating skunk vine, bamboo (*Bambusa* sp.), banana trees (*Musa* sp.), and giant reed that were threatening to re-infest the area. SWFWMD staff has done initial treatment of the Chinese tallow trees in the southern basin marsh.

A park specific exotic plant treatment plan will be developed for the park following more intensive surveys and GPS mapping of infested sites. Treatment priority will be given to occurrences of invasive plants in the intact natural communities that can be quickly brought under control as well as those that threaten rare plant or animal species. In the developed attraction area, treatment priority will be given to species already in maintenance condition, followed by those demonstrating the highest potential to spread to adjacent natural communities.

Table 2 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive, exotic plant species found within the park. FLEPPC compiles invasive species lists that are revised every two years. Professional botanists and others perform exhaustive studies to determine invasive exotic plants that should be placed on the lists. Invasive exotic plants are termed Category I when they are altering native plant

Table 2: Inventory of FLEPPC Category I and II Exotic Plant Species

Common and Scientific Name	FLEPPC Category	Distribution	Resource Management Zone
PLANTS			
Coral ardisia <i>Ardisia crenata</i>	I	1	WW-24
Camphortree <i>Cinnamomum camphora</i>	I	1	WW-29
Wild taro <i>Colocasia esculenta</i>	I	3 6	WW-31 WW-28
Air-potato <i>Dioscorea bulbifera</i>	I	3, 4 5	WW-27 WW-29
Cogon grass <i>Imperata cylindrica</i>	I	2	WW-5A, WW-20, WW-21, WW-29
Japanese climbing fern <i>Lygodium japonicum</i>	I	1	WW-27
Chinaberry <i>Melia azedarach</i>	II	2	WW-29
Red natalgrass <i>Melinis repens</i>	I	2	WW-1, WW-11A, WW-23
Skunk vine <i>Paederia foetida</i>	I	2, 3, 4	WW-24, WW-27, WW-8, WW-11B, WW-29, WW-25,
Torpedograss <i>Panicum repens</i>	I	2 6	WW-31 WW-28
Fountaingrass <i>Pennisetum setaceum</i>	II	2	WW-29
Chinese ladder brake <i>Pteris vittata</i>	II	2	WW-29
Chinese tallow tree <i>Sapium sebiferum</i>	I	2	WW-29
Wedelia <i>Sphagneticola trilobata</i>	II	2, 3, 5	WW-27, WW-29
American evergreen <i>Syngonium podophyllum</i>	II	3	WW-27, WW-29
Elephantear <i>Xanthosoma sagittifolium</i>	II	2 3	WW-27 WW-29

communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused. Category II invasive exotics have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. The table also identifies relative density for each species and the management zones in which they are known to occur. An explanation of the codes is provided following the table.

Distribution Categories (FNAI):

- 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, the Division actively removes exotic animals from state parks, with priority being given to those species causing the 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 raccoons, gray squirrels, venomous snakes and alligators. Nuisance animals are dealt with on a case-by-case basis. The Division will consult and coordinate with appropriate federal, state and local agencies for management of imperiled species that are considered a threat or problem.

There are no known problem animal species in the park now. Hogs (*Sus scrofa*) have a high potential to occur since they are well documented on the adjacent Chassahowitzka

Wildlife Management Area. The avenues for entrance onto the state park are limited by existing fences and narrow corridors of connectivity. Alligators have been observed in the river, but are not normally considered nuisances.

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.

Special Natural Features

The most significant special natural features in the park are the first magnitude Weeki Wachee Spring and associated spring run river. Not only do they provide critical wildlife habitat, but also the cool, clear water and physical beauty have made the spring and river favorite recreational destinations for generations. The headspring has been heavily developed over the years. The uniquely constructed underwater theater built into the side of the headspring offers visitors a one-of-a-kind opportunity to view the inside of the spring bowl, as well as the wildlife that depend on it. The upper portions of the river, downstream from the headspring, are mostly undeveloped and offer boaters and paddlers a vision of natural Florida that is not commonly found in this part of the state.

Cultural Resources

This section addresses the cultural resources present in Weeki Wachee Springs State Park that may include archaeological sites, historic buildings and structures, cultural landscapes and collections. The Florida Department of State 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 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 Unit 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. The following is a summary of the FMSF inventory and the related evaluation of significance.

Description and Assessment:

Weeki Wachee Springs State Park is located on the grounds of the former Weeki Wachee Park attraction, one of Florida's best-known roadside tourist destinations. Since 1947, Weeki Wachee's world famous mermaids and mermen have attracted thousands of tourists to watch their fabulous underwater shows full of elaborate choreography and clever underwater stunts.

The area around Weeki Wachee was first inhabited by prehistoric and historic Native Americans and later by early settlers who were attracted by the beauty of the clear spring waters. By the 1920s, the Florida land boom reached the area, and real estate speculators jumped at the prospect of developing Weeki Wachee as a resort. However, the stock market crash of 1929 dashed these initial development plans. Weeki Wachee would remain largely a popular, local swimming area until the mid-1930s when businessman and writer Hall Smith visited the spring.

Smith was so impressed with the spring that in the late 1930s, he met with Newt Perry, a former Navy frogman and swim instructor who had managed water shows at Wakulla Springs and Silver Springs, to discuss development of Weeki Wachee. Once again, development plans were delayed with the arrival of World War II. However, Smith and Perry remained in contact during the war, and by 1946, their plans came to fruition when they and a group of investors entered into a 30-year lease with the City of St. Petersburg to begin development of Weeki Wachee right away. On October 12, 1947, the first underwater theater was opened to the public.

Perry's pioneering efforts in the development of underwater performance coupled with an expertise in photography and cinematography honed during the years he had worked at Wakulla Springs and Silver Springs soon made Weeki Wachee a popular roadside tourist attraction. He developed a system of air locks and air hoses that allowed performers to stay underwater for long periods as well as regulate their movements up and down in the spring as they performed. These innovations allowed for the creation of elaborate underwater ballets and the performance of popular stunts and illusions, such as smoking a cigarette and drinking a soda under water.

The popularity of the Weeki Wachee continued to grow, and mermaid shows became more choreographed and technically and physically challenging. By the late 1950s, the attraction was acquired by ABC Productions, and a new mermaid theater was constructed in 1959-60 to meet the needs of these production quality shows. Weeki Wachee also hosted many popular entertainers and served as a backdrop for several television and film productions that often used Weeki Wachee performers as extras.

However, by the early 1970s, many roadside attractions began to experience declining visitation due to the expansion of the interstate highway system and the opening of Walt Disney World in Orlando in 1971. Weeki Wachee was no exception. Although the park would continue to operate and offer a variety of mermaid shows, bird shows, a water park and other programs, its popularity waned as more and more people traveled to larger scale attractions such as Disney World. Although Weeki Wachee was still recognized as a quintessential Florida roadside tourist attraction, it no longer enjoyed the magnitude of popularity it had obtained by the 1960s.

Twelve historic structures are recorded in the FMSF. All are associated with the development of the Weeki Wachee tourist attraction from the late 1950s until the early 1970s. The most significant of these structures is the 1959-60 Weeki Wachee Spring Mermaid Theater (8HE391), designed by architect Robert Collins. This structure, which replaced the 1947 underwater theater, features an underwater diving tube that allows performers to enter the spring underwater and large glass windows designed specifically to highlight underwater performances. Notable architectural features are a scalloped roof (currently built up and covered with composite shingles) and an elaborate interior tile mosaic of underwater scenes.

The remaining 11 structures are remnant decorative or support structures of the Weeki Wachee attraction. The mermaid wall and the Adagio Statue (relocated in 1978 from a fountain in front of the mermaid wall to its present location) were designed to enhance the front entrance to the park and to entice passing tourists on U.S. Highway 19. The maintenance shop, prop shed and greenhouse provided necessary support functions for the attraction, while the cottages provided housing for Weeki Wachee performers and staff.

Most of the park's collection contains objects associated with the Weeki Wachee tourist attraction and the mermaids. The collection constitutes approximately 100 to 125 cubic feet of archival material. Some of these items have remained on park grounds since its days as an attraction, but many items were saved from destruction by former mermaids and staff and then donated back to the park. The majority of the archival material is film, photographs and slides. A few historic documents, props and costumes also are included in the collection.

Although Weeki Wachee is best known as a 20th century tourist attraction, there are several recorded archaeological sites in the area around the springs. Within the boundaries of the park, there are six archeological sites recorded on the FMSF.

The Weekiwachee mound (8HE12) is the most prominent of the six archaeological sites in the park. This sand burial mound is located about 180 meters north of the spring and is currently roped off and marked by signage. Analysis of pottery from the mound indicated construction during the Safety Harbor period (AD 900 – 1650), the terminal pre-contact and initial contact cultural period. More intriguing was the presence of Spanish glass beads, dating from the earliest known period of European contact, interred in the mound with Native American burials. There may be a village site associated with the mound that has since been obscured by development. The Weekiwachee mound is one of three important Safety Harbor sites in this region that along with prehistoric artifacts contained a significant number of European beads. At all three sites glass beads were found with aboriginal burials, indicating contact with the Spanish during the early 16th century (c. 1525 AD -1550 AD).

The remaining five sites, Berkley 1 (8HE31), Pond A Site (8HE365), River Country (8HE436), U.S. Highway 19/State Road 50 Intersection (8HE490), and Weeki Wachee Pond #1 (8HE572), are scatters of prehistoric artifacts, or a combination of prehistoric and historic artifacts. The park needs to have an archaeological predictive model created to guide future development and survey work.

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. Every significant historical or cultural resource's significance derives from historical contexts. Evaluation will result in a designation of NR (National Register eligible), LS (locally significant), NE (not evaluated) or NS (not significant).

Weeki Wachee's historic structures are significant for several reasons. Weeki Wachee was one of Florida's premier tourist attractions prior to the opening of Walt Disney World in 1971. Weeki Wachee is one of only a few remaining pre-Disney attractions which still exist within the state and is unique among remaining Florida tourist attractions for having remained in continuous operation since its inception in 1947. Its creator, Newt Perry, advanced techniques in underwater swimming and performance by introducing the use of air hoses and airlocks and made significant contributions in the development of underwater photography and cinematography. The first underwater theater (built in 1947 and demolished in 1960) and the current mermaid theater (built in 1959-60) were both considered engineering marvels of their time. The current mermaid theater is also significant for its architecture that combines elements specific to its underwater function with unique decorative features designed to enhance its location within the spring as well as highlight mermaid performances. Of the eleven remaining pre-1971 structures in the park, eight have been determined eligible for the National Register of Historic Places by the Division of Historic Resources. These structures include the Adagio Statue (8HE658), the mermaid wall (8HE659), the four employee cottages (8HE649-652), and the two managers' cottages (8HE653, 8HE654). The employee and manager cottages as a group have been determined to constitute a small residential district within the attraction which provides glimpses into what working and living in Weeki Wachee in the 1960's would have been like.

As an important site of the Safety Harbor period, the Weekiwachee mound (8HE12) may be eligible for listing on the National Register of Historic Places although at present it has not been evaluated by the State Historic Preservation Officer for significance. Berkley 1 (8HE31) and Weeki Wachee Pond #1 (8HE572) are ineligible for listing on the National Register of Historic Places. Pond A Site (8HE365), River Country (8HE436) and U.S. Highway 19/State Road 50 Intersection (8HE490) have not been evaluated for eligibility.

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.

All of the identified archeological sites in the park are in fair condition. Although past development of the Weeki Wachee attraction damaged many of these sites, they appear to be stable at this time. Current threats to the sites are park development and visitors; particular care must be taken to monitor any ground-disturbing activities, particularly those that are occurring near the Weekiwachee mound and the springs.

Almost all of the historic structures are in fair condition. The only exception is the former Weeki Wachee maintenance shop, which is in poor condition.

The collections are currently stored in several places and are in fair to poor condition. Historic films, photographs, slides and paper archives are currently stored in an air-conditioned room in the administration building. Some of the films are under refrigeration. A few historic costumes still exist and are located in the mermaid theater in a poorly climate-controlled area. Several historic props are located in an un-air-conditioned maintenance building and on the park grounds in the Garden of the Stars. None of the collections is housed within humidity-controlled environments.

The historic films are the most critically threatened items in the Weeki Wachee collection and need immediate attention. As these films have been stored under a variety of conditions over the years, they are in varying degrees of deterioration. Some of the films have been refrigerated to slow the process of their decline, but they may be lost forever if they are not properly treated by a professional film conservator within the near future.

The historic costumes and props are also important, as there are very few of these items still in existence. Many of these remnants of the Weeki Wachee attraction have been lost or destroyed. The costumes and the props that is currently stored in the maintenance building need to be in an air-conditioned, insect-free, low humidity environment to assure their preservation. The props, which are currently on display in the Garden of the Stars, need to be evaluated as to their condition and conservation needs and to determine whether relocation to an interior or covered location is necessary for preservation purposes.

Desired Future Condition

All significant archaeological sites, historic structures and objects within the park that represent Florida's cultural periods or significant historic events or persons are preserved in perpetuity, protected from physical threats and interpreted to the public.

General Management Measures

All of the historic buildings listed in Table 3 are used for day-to-day operations of the park and/or use of park visitors. Many of these buildings were used for operational functions and are very simple and utilitarian in their design.

Notable exceptions are the mermaid theater, the mermaid wall and the Adagio Statue. The mermaid theater has been identified specifically for interpretation as an historic building and shall be managed using the Secretary of the Interior's Standards for Restoration. Restoration involves retaining materials from the most significant time in a property's history, while allowing removal of materials from other periods. The Adagio statue and mermaid wall shall be managed using the Secretary of the Interior's Standards for Preservation. Preservation focuses on retaining all historic fabric through conservation, maintenance and repair. The four employee cottages and two manager cottages will be managed using the Secretary of the Interior's Standards for Rehabilitation. Rehabilitation acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

All of the archaeological sites listed in Table 3 shall be managed using preservation treatments. Preservation includes protection from damage from resource management, natural causes, construction or human damage including looting. 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 3 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.

Currently, the park has no organized collections management program. A Scope of Collection Statement needs to be developed, as well as a collection management assessment, an inventory or catalog, housekeeping manual, and a record keeping system. At present, the park collections are stored in several locations on site. The buildings are climate controlled for heat and cold and some historical film is stored in refrigeration, but no other specific climate control measures for collection preservation have been instituted. Pest control is presently limited to standard pest control used for routine site maintenance, with nothing specific to the park collections. No park staff is

currently trained in collection management or preservation.

Table 3: Cultural Sites Listed in the Florida Master Site File

Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
8HE12 Weekiwachee	Safety Harbor, Ad 900-1650	Site	NE	F	P
8HE31 Berkeley 1	Weeden Island, Ad 450-1000	Site	NS	F	P
8HE365 Pond A Site	Prehistoric Lacking Pottery	Site	NE	F	P
8HE391 Weeki Wachee Spring Mermaid Theater (Building 26)	Modern (Post 1950)	Structure	NR	F	RS
8HE436 River Country	Archaic, 8500- 1000 B.C.	Site	NE	F	P
8HE490 Us19/Sr50 Intersection	Prehistoric Lacking Pottery	Site	NE	F	P
8HE572 Weeki Wachee Pond #1	Prehistoric Lacking Pottery	Site	NE	F	P
8HE659 Weeki Wachee Mermaid Wall	Modern (Post 1950)	Structure	NR	F	P
8HE658 Weeki Wachee Adagio Statue	Modern (Post 1950)	Structure	NR	F	P
8HE655 Utility & Storage Building (Building 9)	Modern (Post 1950)	Structure	NS	P	R
8HE656 Prop Building (Building 10)	Modern (Post 1950)	Structure	NS	F	R
8HE657 Greenhouse	Modern (Post 1950)	Structure	NS	F	R
8HE649 Employee Cottage 1 (Building 20)	Modern (Post 1950)	Structure	NR	F	RH

Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
8HE650 Employee Cottage 2 (Building 21)	Modern (Post 1950)	Structure	NR	F	RH
8HE651 Employee Cottage 3 (Building 22)	Modern (Post 1950)	Structure	NR	F	RH
8HE652 Employee Cottage 4 (Building 23)	Modern (Post 1950)	Structure	NR	F	RH
8HE653 Manager Cottage 1 (Building 13)	Modern (Post 1950)	Structure	NR	F	RH
8HE654 Manager Cottage 2 (Building 14)	Modern (Post 1950)	Structure	NR	F	RH

Significance

NRL=National Register listed
 NR =National Register eligible
 LS =Locally Significant
 NE =Not Evaluated
 NS =Not Significant

Condition

G=Good
 F=Fair
 P=Poor

Recommended Treatment

RS =Restoration
 RH =Rehabilitation
 ST =Stabilization
 P =Preservation
 R =Removal
 U =Undetermined

RESOURCE MANAGEMENT PROGRAM

Management Needs and Problems

- The highest priority resource management need is that of the main headspring. The two biggest issues at present are the water quality and cumulative use. The documented increase in nitrate in the water flowing from the spring and the continual accumulation of fouling algae species such as *Lyngbya wollei* in the spring basin are serious ecological concerns that will require a regional approach to address. The effects of cumulative recreational use in the spring basin and at the adjacent Buccaneer Bay water park will require monitoring and careful consideration with reference to how they impact the overall health of the spring and the species that dependent on it.
- Concurrent to the management of the headspring is the management of the spring run river. Recreational use in the river by boats and paddlers has gone on for generations. As the demand for access to the river will likely continue to increase, careful consideration will be required to adjust carrying capacities and recommend vessel type use restrictions if needed. Boat prop disturbance of the river bottom has been documented as a possible source of sand shoaling throughout the river (Madrid 2003). The variable width of the river, limited sight distance and rate of water flow, especially in the rainy season, require that recreational users be vigilant as to safety and consideration of other users as well as wildlife. The effects of river use will have to be monitored as to impacts to wildlife such as manatee and corrective action taken as necessary.
- Restoration of the upland natural communities in the park that was initiated by the SWFWMD will require active management to maintain. The critical steps of removing the invading sand pines and initiating some prescribed burning were completed in 2002. However, sand pines have grown back in some areas and will continue to increase in size and density without continued application of prescribed fire or repeated mechanical removal.
- Initiation of restoration of the scrubby flatwoods natural community is needed. This community is contiguous with that on the adjacent FFWCC managed parcel to the west so restoration will be most successful if coordinated between the two agencies. Mechanical treatment will be required initially followed by application of prescribed fire at an interval appropriate to the vegetative responses.
- Prescribed fire will be required to maintain the early successional oak scrub habitat of the park as well as the basin marsh communities. The disjunct parcels, separated by major highways and with adjacent urban development, will present particularly stringent challenges to prescribed burning at the park.

- Treatment and control of invasive exotic and nuisance plant species is needed. The approach to these species at the park will require a two-fold strategy. Firstly, the management of invasive exotic and nuisance species within the 27-acre attraction will be done by the implementation of a comprehensive landscape plan. This landscape plan will provide for the removal of invasive exotic plant species already in the landscape and replacement with native species or non-native species that are not known to have invasive potential. Any introduction of non-native plant species to the park will require approval by SWFWMD. Proper disposal of non-native landscape waste off-site will greatly reduce the possibility of spread into natural areas. Secondly, the management of invasive exotics and nuisance species within the natural communities of the park will require a more traditional approach. Invasive and nuisance species will need to be identified, mapped and treated on a regular schedule appropriate to the life cycle of the individual species. To date, skunk vine, air potato, wild taro and *Lyngbya* algae are the most problematic species documented. Park staff will require training in the identification and treatment of invasive plant species.
- Continued monitoring of the hydrology and water quality of the headspring and river will be required. Monitoring wells maintained by USGS and SWFWMD provide up-to-date water level data and water chemistry data. A number of studies over the last decade have documented water quality changes over time. Additional monitoring and interagency cooperation will be required to aid management and vegetative restoration of the headspring.
- Stormwater run-off from adjacent highways needs to continue to be addressed. Major improvements in stormwater handling were done by SWFWMD in 2007. The narrow swales between the highways and river have been reported by park staff as insufficient to contain the run-off during heavy rainfall events. It has been reported that during heavy rainfall, water often flows from the roads, down the slope and into the river.
- A comprehensive species inventory for the park is needed. Since beginning management of the site in November 2008, FPS staff has been compiling inventory lists based on SWFWMD staff observations, field observations and research reports. However, a seasonal, in-depth inventory is needed.
- Management of the urban interface of the three disjunct parcels will require additional monitoring. Impacts typical to the urban interface such as illegal ATV access, illegal dumping of landscape waste, trash dumping and feeding wildlife have been well-documented occurrences. Regular communication with residential neighbors, appropriate signage and additional patrols by staff and law enforcement will be required to curb illegal activity.

Special Management Considerations

Chapters 253 and 259, Florida Statutes, require an assessment of the feasibility of managing timber in land management plans for parcels greater than 1,000 acres if the lead agency determines that timber management is not in conflict with the primary management objectives of the land. The feasibility of harvesting timber at this park during the period covered by this plan was considered in context of the Division's statutory responsibilities and an analysis of the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish old-growth characteristics to the degree practicable, with the exception of those communities specifically managed as early successional. A timber management analysis was not conducted for this park since the total acreage (538 acres) is below the 1,000-acre threshold established by statute. Timber management will be re-evaluated during the next revision of this management plan.

Special management consideration will be required for the attraction portion of the park. The historical portion of the attraction is highly significant as a representation of the Florida roadside attraction culture of the pre-1960s era in the state. As collective ecological conscience and environmental awareness has evolved both locally and globally, the earlier physical alterations made to the site are now recognized as impermissible by current standards. The integration of past management with current management of the park will require careful balancing of natural and cultural resource preservation and recreation.

The downstream affects of impacts to groundwater on a region-wide scale are becoming better understood. A commitment to interagency cooperation at every level, as well as continued public awareness, to reverse negative impacts in the Weeki Wachee watershed will be critical to management of the water quality within the park.

The park has been designated as environmentally sensitive and biologically highly productive in notifications to the local mosquito control district and the Florida Department of Agriculture and Consumer Services. Because of this designation, if there is a need for mosquito control at the park, an Arthropod Management Plan must be developed in coordination with the local mosquito control district

Management Measures and Objectives

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

In the discussion below, measurable objectives have been identified for each of the Division's management goals specific to Weeki Wachee Springs State Park. The Implementation Component of this plan consolidates these goals and objectives and documents the specific actions that have been identified to achieve the objectives and, ultimately, to achieve the broader management goals of the park. Please refer to the Implementation Component for the projected actions and measures for progress, the target year for completion and the estimated costs of each action and objective for the park.

Natural Resources

Hydrological Management

Goal: Protect water quality and quantity in the park, restore hydrology 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: Conduct/obtain an assessment of the park's hydrological restoration needs.

Regular water monitoring networks have been established for flow, water quality and water chemistry. Park staff will continue to coordinate with these interagency efforts to stay up to date with current trends and adjust management actions where appropriate. In addition, staff will work with federal, state and local agencies to continue regional efforts to improve water quality through regulation and education.

The loss of sand at Buccaneer Bay that has plagued the attraction in the past has been mostly stopped by installation of a more effective retaining wall. However, sand shoaling at the base of the waterslides as well as along the course of the river continues to be an issue. Staff will continue to monitor and analyze the movement of sand from the development into the river and take action if monitoring determines that negative impacts are occurring.

Coordination with researchers and agency experts will be required to design and implement a long-term plan to monitor the growth rate and coverage of the *Lyngbya wollei* algae in the headspring. The goals of monitoring will be to quantify the coverage of periphyton in the spring, the impacts of that coverage, the recovery rate of the algae,

and potential response of algae growth to changes in water quality, primarily any reductions in nitrate levels.

Objective: Assess the impact of stormwater run-off and erosion from adjacent highways, on-site development and recreational use.

Stormwater run-off from adjacent development into the spring and river has been an ongoing problem. A 2004 assessment of the attraction site, pinpointed a number of areas that will require attention to improve water quality in the headspring and river (Stevens 2004). Several of the improvements have been made by SWFWMD by installation of a water retention pond adjacent to the parking lot and improving water retention swales adjacent to U.S. Highway 19 and State Road 50.

A culvert under the U.S. Highway 19 highway that empties at the northwest corner of the parcel east of U.S. Highway 19 has created a deep washout. SWFWMD staff report the washout occurred during the heavy rain events of the 2004 hurricane season. Attempts to restore the site using groundcover cloth and rip rap have not been successful. Coordination with Florida Department of Transportation (FDOT) should be done to explore options for altering the point of discharge for the culvert. Methods of restoration and stabilization of the site should be studied and implemented.

Currently, the stormwater run-off from roofs, concrete walkways and use areas in the park flow directly into the river. Improvements such as gutter diversions, planted swales and walkway drainage need to be investigated and implemented. Stormwater diversion and highly erosive areas such as the parking lot and walkway from the kayak/canoe rental office to the river and the use area north of the river need to be addressed.

One historic park road through the mesic flatwoods is identifiable by remnant concrete and curbs for a distance. The concrete has been partially covered by topsoil, but is present just below the soil surface. This roadbed holds surface water following rain and could be affecting movement of surface water to or between the basin marsh and the hydric hammock. Restoration of the mesic flatwoods will include removal of the concrete and re-grading of the road to historical elevations.

Critical erosion areas tend to occur along the river at sites regularly visited by recreational users. Within the state park, there are only a few small spots that show signs of foot traffic. A high use area accessible from the adjacent Chassahowitzka Management Area is just outside the downstream boundary of the park. Other areas with high erosion potential will be noted and monitored and corrective action taken if monitoring determines that negative impacts are occurring. Additional training will be provided to tour boat operators at the attraction to help watch for and monitor areas of concern.

Objective: Determine the appropriate recreational carrying capacity for the main headspring and upper Weeki Wachee River.

The cumulative effects, seasonality and long-term impacts of the current development and use of the main headspring are poorly understood. In particular, additional information on the condition of both the biotic and abiotic environment of the spring is needed. The recreational use of the upper river by motor boats and paddle craft will likely continue to increase. Research is needed to determine the recreational carrying capacity of the main headspring and upper river that would allow the maximum level of public access and recreational enjoyment while preventing damage to the river bottom and shoreline, impacts to wildlife or hindrances to wildlife access. DRP staff will coordinate the design and implementation of the recreational use study with staff of the SWFWMD. Public workshops will be included in the study process to assure that the local community is well informed and thoroughly involved in the study and in any subsequent recommendations on management of the upper segment of the river and the headsprings. Based on the results of the study, a range of potential management actions may be considered to adjust recreational carrying capacities, recommend vessel-type use restrictions or establish minimum water levels for the operation of tour boats, as needed, on the portion of the river managed by the DRP.

Objective: Partner with federal, state and local agencies, private non-profits and volunteer groups to educate the public in and around the Weeki Wachee springshed about water quality and quantity protection.

Public awareness of the actions that can be taken both by individuals as well as by the collective local community will be a critical component in restoring the health of the spring. Proactive outreach in the park and throughout the community through education and interpretation will be done to promote this awareness.

Natural Communities Management

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

As discussed above, the Division 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 Florida Department of Agriculture and Consumer Services (FDACS), Division of Forestry (DOF). Wildfire suppression activities in the park are coordinated with the DOF.

Objective: Within 10 years, have 279 acres of the park maintained within the optimum fire return interval.

There are 351 acres of scrub natural community at the park that will require application of prescribed fire every 5-15 years. The scrub is a mosaic of microhabitats, dominated by early successional oak, but also includes species requiring longer fire return intervals to persist like Florida rosemary and sand pine. A rigid fire return interval will not initially be set for the scrub. Rather, an integrated approach of monitoring species responses to fire over time, both initial and long-term, will guide the fire interval. The final and likely variable fire return interval will be based largely on the rate of recovery of oak shrubs with respect to size and density as well as acorn mast production.

The 12.67-acre scrubby flatwoods community will require the application of prescribed fire every 5-8 years. This community is in a highly degraded state due to years of fire suppression. Once restored, the climax species composition will determine the specific fire return interval. The 5.46-acre mesic flatwoods community is also in a degraded state due to lack of prescribed fire. Once restored, prescribed fire will be applied every 1-3 years.

The wetland fire dependent communities should ideally be burned when the adjacent upland communities burn. However, the largest basin marshes are on the edges of the park boundary, so special consideration will need to be given to the urban interface setting. This will likely require burning them separately from the upland community. Every effort will be made to get fire into the ecotonal fringes of the marshes. The 0.6-acre depression marsh on the north boundary of the north parcel will be burned along with the adjacent scrub.

A number of species, both plant and animal, depend on the positive effects of application prescribed fire. The flush of new vegetative growth that emerges following fire is critical to gopher tortoises, especially young tortoises. The open sandy gaps that are maintained by regular burning are critical to the persistence of many vegetative species that gopher tortoises and other animals depend on as well as imperiled species like Curtiss' milkweed and scrub pinweed. Herbaceous species in the wetland pyric communities require prescribed fire to control the encroachment of wetland hardwoods. Without fire, these marsh communities would likely succeed to swamp.

The pyric communities at the park have been divided into burn zones based on existing roads and firebreaks, proximity to the urban interface, proximity to non-pyric or un-

restored natural communities, and overall species composition. These zones have been incorporated into the Management Zone map for the park. Any additional fire lines will need to be installed carefully to ensure they pose no potential for increased upland erosion into the adjacent hydric hammock as well as to ensure preservation of ecotones. There are presently many remnant roads from historical use and previous restoration work, especially on the main park parcel. Careful consideration will be given prior to installation of any additional mineral fire breaks/roads. A mineral soil firebreak will be maintained around the entire upland perimeter of the park to facilitate resource management activities and prevent the spread of wildfire on or off the property.

Mechanical treatment will likely be required to reduce fuels and create a safer prescribed fire environment. Mature sand pines will be logged, or removed with chainsaw crews or mechanical treatment, where necessary for safe burning. Some hardwoods will need to be removed using chainsaw crews and equipment where appropriate. Any use of equipment will require careful evaluation to ensure that there will be no ground disturbance or vegetation removal that might increase erosion or negatively impact surface hydrology.

The dense urban interface surrounding most of the park will present a particular challenge to both prescribed burning and any mechanical treatment required prior to burning. The primary concern will be for smoke impacts. The parcels of the park are all adjacent to major roads and two parcels are adjacent to housing developments. Close coordination with partners such as DOF, SWFWMD, Hernando County, FFWCC and area residents will be required to conduct burns safely and to educate the public as to the ecological and wildfire prevention benefits of prescribed burning at the park.

Table 4 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 4: Prescribed Fire Management

Natural Community	Acres	Optimal Fire Return Interval (Years)
Scrub	359	5-15
Basin marsh	33.2	2-10
Scrubby flatwoods	12.9	5-8
Mesic flatwoods	5.5	1-3
Depression marsh	0.6	2-10
Annual Target Acreage	20-55	

The park is partitioned into burn zones, and burn prescriptions are implemented on the prescribed burn cycle for each zone (see Management Zones Map). 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 10-year management plan.

The annual burn plan for the park will take into consideration the current habitat conditions and target fire return intervals, any mechanical treatment required prior to prescribed burning, and available staffing, funding, and equipment resources. The annual target burn acreage for the park will be 20-55 acres.

In order to track fire management activities, the Division 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/ experience, backlog, if burn objectives have been met, etc. The database is also used for annual burn planning which allows the Division 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 Communities Restoration: In some cases, the reintroduction and maintenance of natural processes is not enough to reach the desired future conditions for a natural community, and restoration programs are required. Restoration of altered natural communities to healthy, fully functioning ones often requires substantial efforts that 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 recovering degraded natural communities to desired future condition, including the re-establishment of natural processes, biodiversity, ecological functions, vegetation structure and physical characters.

Examples that would qualify as natural communities' 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, small-scale vegetation management and so forth.

Following are the natural community/habitat management, maintenance, and restoration actions are recommended to create the desired future conditions in the mesic flatwoods and scrubby flatwoods communities at Weeki Wachee Springs State Park.

Objective: Conduct natural community improvement activities on 1-5 acres of the mesic flatwoods and scrubby flatwoods communities per year to produce desired condition and conduct necessary follow-up management activities.

The mesic and scrubby flatwoods communities have been fire suppressed long enough that fire alone could not be used to restore the diversity and physical vegetative structure. The scrubby flatwoods community is a 12.9-acre area located on the western edge of the main park parcel. The majority of this community is visible on the Resource Management Zone Map as WW-2. Restoration will involve mechanical treatment of hardwood trees, overgrown shrubs and saw palmetto in conjunction with fire. Supplemental planting may also be required to restore biodiversity. Monitoring for the response of species abundance and distribution will be done. Every effort will be made to work with FFWCC staff to coordinate restoration of the scrubby flatwoods contiguous on the adjacent parcel.

The mesic flatwoods community is a 5.5-acre area located near the southwestern corner of the main park parcel. The distribution of this community has resulted in its inclusion in a portion of four separate burn zones, WW-6A, WW-8, WW-11B and WW-11A, on the Management Zone Map. Management activities will involve mechanical treatment of hardwood trees, overgrown shrubs and saw palmetto in conjunction with fire. Supplemental planting may also be required to restore biodiversity. Monitoring plant species abundance and distribution will be done to evaluate management success.

Natural Communities Improvement: 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: Maintain and improve the restored condition of the headspring and upper spring run stream natural community by performing maintenance removal of the nuisance algae, *L. wollei*.

A major area designated for improvement in the 2004 report by SWFWMD was restoration of the spring basin. Years of build-up of the blue-green *Lyngbya wollei* algae had resulted in layers of dead algae and sediment in the spring. This build-up presumably eliminated and prevented the re-establishment of native submergent macrophytic vegetation. An aggressive restoration project was begun in 2008 to remove the sediment and algae from the spring and re-plant desirable native vegetation. The project extended to the south bank of the river where invasive species were removed and natives replanted.

In the spring of 2008, it became apparent that the *Lyngbya* algae were coming back much faster than anticipated. Plastic fencing installed around the perimeter of the spring basin to prevent manatees from eating the new plantings before they became established was trapping and holding mattes of the floating algae. In an effort to

maintain the restoration of the spring, park staff is working in close coordination with SWFWMD to develop a maintenance algae removal program. The goal of the program is to recruit and train volunteer divers to remove the fouling algae from the spring while protecting desirable native vegetation and the spring itself. The removal will be done routinely to prevent growth of the algae and to prevent impacts to desirable vegetation, animals or invertebrates.

Natural Communities Maintenance: Maintenance is considered any activity that helps to maintain or monitor the natural communities currently in desired condition. Specific actions relating to prescribed burning and exotic species control will be discussed in the corresponding sections.

Objective: Annually monitor erosion on park roads in the scrub natural community and take corrective action if monitoring determines that negative impacts are occurring.

The Paola fine sands of the scrub habitat in the park are highly susceptible to erosive processes when denuded of vegetation. Roads closest to the river are already showing some signs of erosion. Rivulets on the surfaces of roads and exposed slopes are obvious following even moderate rain events. Existing roads should be evaluated for current condition and closed to use except as firebreaks if the potential for erosion is high. Continued monitoring for erosion should be done on regularly traveled park roads and steps taken to prevent further erosion where it occurs. If installation of any new roads or firebreaks is needed, the surface hydrology, topography and surrounding vegetation will be carefully evaluated to ensure there is no potential for erosion.

Imperiled Species Management

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

The Division maintains healthy 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, Division staff consulted with staff of the FFWCC's Bureau of Imperiled Species Management or its 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, Division staff consulted with FDACS. Data collected by the FFWCC, USFWS, 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 Division'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: Monitor and document three selected imperiled animal species in the park.

Gopher tortoise burrow mapping was initiated by SWFWMD. Continued mapping of burrows will be done with a GPS in conjunction with resource management activities such as prescribed burning and natural community restoration. Burrow maps will be used to assess the density of the gopher tortoise population at the park as well as to assess the response of gopher tortoises to resource management activities. Documentation of impacts to gopher tortoises or their burrows from activities such as dumping and unauthorized access to the park will be done.

Monitoring of West Indian manatee occurrences in the river and the main headspring will be done to provide baseline population data, document use of the headspring as a thermal refuge, and measure response by manatees to management actions such as spring restoration and sand movement. The establishment of a steady food source in the warm water refuge of the main headspring for manatees because of the spring restoration may contribute to higher numbers of manatees in the winter months. Sand movement should be monitored around the head of the river to ensure there are no blockages to manatee passage. Any maintenance dredging of sand related to activities at the attraction should be done outside of the winter months of peak manatee occurrence. Daily monitoring of manatees in the headspring should be done November through April in coordination with FFWCC staff. Other recommendations of the West Indian Manatee Recovery Plan will be followed as appropriate (USFWS 2001).

Florida scrub-jays have not been documented in the park since 2006, but the possibility of immigration to the park because of continued natural systems management is possible. To accomplish monitoring needs, park staff will collaborate with knowledgeable volunteers, with organizations such as The Nature Conservancy's Jay

Watch program or with a local Audubon chapter. Monitoring will focus on the restored early successional oak scrub habitats in the park. If scrub-jays immigrate to the park, more specific management actions will be addressed at that time and a scrub-jay management plan will be developed.

Objective: Monitor and document the habitat conditions of three selected imperiled plant species in the park.

The three imperiled plant species currently documented in the park, *Garberia heterophylla*, *Asclepias curtissii* and *Lechea cernua*, occur in the scrub natural community. Monitoring for these three imperiled species will be done because of scrub habitat condition. Specific GPS mapping of *G. heterophylla* is not considered a need at this time due to the abundance of the species on site. Any new occurrences of *A. curtissii* and *L. cernua* will be documented and mapped via GPS as these species are less common and more dependent on open sandy gaps for persistence. Inventory will be especially critical following management actions that may affect the occurrence or distribution of these imperiled plant species. For example, monitoring will be done for scrub species following application of prescribed fire. The presence or absence of imperiled species within natural communities will guide management actions.

Objective: Continue comprehensive multi-taxa species surveys.

The development of species lists takes considerable time in the field by knowledgeable observers. Park staff will collaborate with professionals, volunteers, citizen organizations and researchers for assistance. Collection of herbarium specimens for the FPS District 4 herbarium will be coordinated with plant species assessments.

Exotic Species Management

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

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 and predatory insects. If left unchecked, invasive exotic plants and animals alter the character, productivity and conservation values of the natural areas in state parks.

The Division 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: Annually treat one to five acres of invasive exotic plant species in the park.

To prioritize invasive exotic plant species control efforts, an invasive exotic plant survey will be completed. Much of the park has already been surveyed in the course of routine resource management activities and in conjunction with other surveying. Any areas not

covered will be surveyed, and any invasive exotic species found will be documented and mapped via GPS. Based on species, location and density, a comprehensive removal plan will be drafted. An annual invasive exotic plant species work plan will be completed to meet changing conditions over time. A method of tracking and reporting invasive exotic species control efforts will also be included in the plan.

All invasive exotic plant species data will be submitted regularly to the Florida Natural Areas Inventory (FNAI) Invasive Species Database (FLInv) for inclusion with statewide data.

Some invasive exotic plant control efforts were begun at the park by SWFWMD. To continue these efforts, the exotic plant management plan will be used to guide exotic and nuisance plant control. A priority will be to provide training to park staff in identification of invasive exotic and nuisance species, the importance of treating and removing these species, and methods of effective control. The latter can be done concurrent with developing the control plan. At present, the most commonly occurring invasive exotic plant species known in the natural areas of the park are skunk vine, cogon grass, wild taro and air-potato.

Objective: Continue implementation of the landscape plan for the Weeki Wachee Springs attraction.

The current landscaping of the 27-acre attraction presents a particular challenge in light of the usual Division policy of removing vegetation from state parks that is exotic to Florida, as well as vegetation planted outside of its historical geographic provenance. In order to maintain the attraction in a manner consistent with the 1950-1960s eras, it will be necessary to emulate the cultural landscape from that era. To that end, a landscape plan for the historic portion of the Weeki Wachee Springs attraction has been drafted. The plan will involve removal of species currently in the landscape that are documented as invasive exotics (FLEPPC 2009) and re-planting with native species and exotic species not documented as having invasive potential.

Cultural Resource Management

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 Division of Recreation and Parks is implementing the following goals, objectives and actions, as funding becomes available, to preserve the cultural resources found in Weeki Wachee Springs State Park.

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. Managers of state lands must coordinate

any land clearing or ground disturbing activities with the Department of State, Division of Historical Resources (DHR) to allow for review and comment on the proposed project. Recommendations may include, but are not limited to approval of 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 effects. Projects such as additions, exterior alterations or related new construction regarding historic structures eligible for listing in the National Register of Historic Places must also be submitted to DHR for review and comment.

Objective: Assess and evaluate 15 of 18-recorded cultural resources in the park within the planning period.

Cultural resource assessment and evaluation priority will be given to the sites that are determined to be impacted by visitor use or the changing needs of the park. The Mermaid Theater is a high priority due to the high use as well as the preservation treatment designation. In addition, considered high priorities are the four mermaid cottages, the two manager cottages, the mermaid wall and the Adagio Statue.

Assessments and evaluations will examine the current condition of each site and will address any threats to the site's condition from park use and visitor use, as well as natural processes. A priority schedule of preservation, stabilization and maintenance will be developed based on the assessments and evaluations.

The pre-1971 historic structures need to be documented. This documentation will review in detail the condition and changes to the original buildings. Nine historic structure reports will be completed concurrent with the assessment and evaluation of the respective structures. The reports will also provide recommendations for needed repairs.

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

The park has not had a comprehensive archaeological survey, and an archaeological predictive model needs to be developed. This model will indicate sites with high, medium and low probabilities for the occurrence of pre-historic resources. The model will provide guidance for future development as well as Phase 1 surveys.

A Scope of Collections needs to be developed to guide acquisition of collection items. An administrative history is needed for the park that will help interpret the history of the park. Oral histories from former Weeki Wachee mermaids and other staff familiar with the earlier days of the Weeki Wachee attraction, as well as park staff, need to be recorded to help document the park's history.

The park needs to develop and implement a monitoring plan to include yearly condition assessments of the parks cultural resources. Subsequently, the FMSF should be updated as needed.

Objective: Bring eight of 18-recorded cultural resources into good condition within the planning period.

Following evaluation and assessment of the recorded cultural resources, sites not considered to be in good condition will be brought into good condition, or selected for demolition. The good condition state of each site will be relative to the management treatment designated in Table 3. A cyclical maintenance plan should be implemented to help guide the park with needed repairs for all its buildings. The rehabilitation of the park's historic buildings should be implemented in the order of priority established by the historic structures reports and the results of annual monitoring. All of the buildings in the park are used for day-to-day operations and/or by park visitors. The mermaid theater has been identified specifically for interpretation as an historic building and shall be managed using the Secretary of the Interior's Standards for Restoration. The Adagio statue and mermaid wall shall be managed using the Secretary of the Interior's Standards for Preservation. All other National Register eligible buildings within the park shall be managed using the Secretary of the Interior's Standards for Rehabilitation.

Research Needs

Natural Resources

Any research or other activity that involves the collection of plant or animal species on park property requires a collecting permit from the Department. Additional permits from the FFWCC, the FDACS or the USFWS may also be required.

- Research on the influence of karst on the visible natural features of the park.
- Continue monitoring of water quality and flow in both Weeki Wachee and Twin Dees as follow-up
- Continued monitoring of hydrologic resources such as the paleo sink on the parcel east of U.S. Highway 19
- Research on cumulative impacts of use in the headspring and spring run river to determine if any updates to the current recreational carrying capacity are needed
- Research and monitoring of spring restoration efforts
- Research on the response of *Lyngbya wollei* to disturbance from restoration and maintenance removal

Cultural Resources

- Analysis of the paint layers on park props to determine the historical paint colors in preparation for refurbishment.
- Collection of oral histories from previous Weeki Wachee mermaids and staff.

Resource Management Schedule

A priority schedule for conducting all management activities based on the purposes for which these lands were acquired, and to enhance the resource values, is contained in the Implementation Component of this management plan.

LAND USE COMPONENT

INTRODUCTION

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

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

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

EXTERNAL CONDITIONS

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

Weeki Wachee Springs State Park is located in the City of Weeki Wachee Springs in Hernando County about 22 miles north of Tampa in the west central part of the state. Hernando County is one of nine counties that comprise the 980,000-acre stretch of Florida's coastline referred to as the "Nature Coast." The Nature Coast is known as a sanctuary for Florida's rare plant and animal species, as well as its important cultural resource sites, long stretches of pristine coastline and beautiful freshwater springs and rivers.

To the west the park is contiguous with a portion of the 33,919-acre Chassahowitzka Wildlife Management Area (WMA) managed by the Florida Fish and Wildlife

Conservation Commission (FFWCC) and the 11,206 acre Weekiwachee Preserve owned by the Southwest Florida Water Management District (SWFWMD). An additional portion of the Chassahowitzka WMA is adjacent to the park's northern boundary. The Chassahowitzka National Wildlife Refuge (over 31,000 acres) administered by the U.S. Fish and Wildlife Service (USFWS) is located approximately eight miles to the northwest. A parcel of SWFWMD land south of State Road 50 and contiguous with the north central park boundary is leased to the Hernando County School Board for the Springs Coast Environmental Education Center. Additional SWFWMD land is within 15 miles of the park and includes Annutteliga Hammock (2,200 acres) to the north and Starkey Wilderness Preserve (18,000 acres) to the south. Recreation provided on these state and federal lands includes hiking, biking, horseback riding, hunting, fishing, camping, picnicking, boating, canoeing, kayaking and bird watching. The WMA even offers a unique 8-mile self-guided driving tour that interprets the management area's habitats and history.

Further west and along the Weeki Wachee River, are two county parks, managed by the Hernando County Parks and Recreation Department. Rogers Park provides a swimming beach, a playground, picnic areas and a canoe launch. Bayport Park, located at the confluence of the Weeki Wachee River and the Gulf of Mexico, has been recently renovated and expanded. This park now provides two boat ramps, a fishing pier and a new boardwalk. Both parks are potential destinations for extended paddling trips from within the park, are often used by canoe and kayak outfitters to pick up customers.

Within the two planning regions surrounding the park, Florida's Comprehensive Outdoor Recreation Plan, identifies 17 resource based recreation activities that will have measurable needs by the year 2020 (Florida Department of Environmental Protection, 2008). Of these, bicycling (paved trail and off-road), fishing, hiking, horseback riding, RV/trailer camping, tent camping, picnicking, visiting cultural sites and nature study are activities that could be compatible with the park. The park has the potential to become a hub within the existing local network of resource-based recreational activities. Staff of the Division will collaborate with the SWFWMD, Hernando County, FFWCC and the USFWS to link the park to the recreational programs of nearby public lands to enhance public recreational opportunities.

Existing Use of Adjacent Lands

Residential, commercial and conservation land uses surround the park. Conservation lands lie adjacent to the park along its western boundary and along a portion of its northern boundary. Housing developments abut the park along the northern, southern and eastern boundaries. A hotel is located across U.S. Highway 19 directly to the east of the former attraction, and a shopping center is located at the northeast corner of the U.S. Highway 19 and State Road 50 intersection. These two major highways bisect the park and separate the eastern and northern portions of the park from the primary acreage around the former attraction. The two highways also affect park resources by altering

the natural surface drainage and by accumulating and concentrating stormwater runoff. Traffic noise is clearly audible in the portions of the park adjacent to these highways and nearby commercial development is visible from several locations within the former attraction. Residential development located along the boundaries of the park's fire-dependent communities will complicate the park's prescribed fire management program and the management of exotic plant species along the park boundary.

Planned Use of Adjacent Lands

In 2007, the population of the Tampa-St. Petersburg-Clearwater Metropolitan Area that includes Hernando County was estimated at 2,733,678. More specifically, the estimated population of Hernando County and its three surrounding counties (Citrus, Pasco and Sumter) is approximately 826,000 persons. By the year 2020, this multi-county population is estimated to grow by nearly 20 percent, to approximately 1,068,000. The Weeki Wachee Springs and Hernando County Comprehensive Plans identify residential, conservation and commercial future land uses near the park. Residential development will be allowed to the south, east and west of the park and commercial development will continue along the corridor of U.S. Highway 19. Privately owned undeveloped properties near the park will likely be developed to their maximum allowable densities. This will create a moderately dense suburban landscape interspersed with public conservation land surrounding the park. In order to protect water quality, water-dependent habitat and existing scenic vistas, Hernando County has established a Riverine Protection Ordinance within their Land Development Code. The code language identifies specific guidelines and standards for development and management within one mile of either side of the edge of the Weeki Wachee River. The goals and objectives of the Hernando County Comprehensive Plan also recognize the importance of undeveloped natural areas for the health and quality of life of its citizens and seek "to provide for the protection of natural coastal, riverine and wetland ecosystems, and valuable habitats, in order to preserve the existing high environmental quality in Hernando County" (Hernando County, 2007.). Division staff should continue to participate in the review of all proposed amendments to the Comprehensive Plan proposed zoning changes and development plans within the vicinity of the park to ensure that protection of park resources is given appropriate consideration.

PROPERTY ANALYSIS

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

Recreation Resource Elements

This section assesses the unit's recreation resource elements those physical qualities that, either singly or in certain combinations, supports the various resource-based

recreation activities. Breaking down the property into such elements provides a means for measuring the property's capability to support individual recreation activities. This process also analyzes the existing spatial factors that either favor or limit the provision of each activity.

Land Area

The park contains nine distinct upland and wetland natural communities. Scrub is the primary upland natural community type. Scrub dominates the entire park parcel that lies north of State Road 50, the parcel lying east of U.S. Highway 19, and a significant portion of the main parcel that includes the former attraction. The remaining uplands of the main park parcel contain the developed areas of the former attraction and small areas of mesic flatwoods and scrubby flatwoods that grade into hydric communities associated with the Weeki Wachee River and Twin Dees Spring. While the rolling, sandy hills of the scrub provide interesting terrain, the often hot, dry conditions and lack of shade make scrub less desirable for recreational activities such as horseback riding, camping and picnicking. In addition, scrub soils are susceptible to erosion that could lead to resource impacts from activities such as off-road biking. In light of the natural community composition, appropriate recreational activities in the undeveloped portions of the park would include nature observation, interpretive trails; interpretive overlooks, general hiking, and primitive camping.

Water Area

From the main headspring, the Weeki Wachee River meanders nearly 6 miles to its confluence with the Gulf of Mexico. Approximately 1.25 miles of the river is contained within the park boundary. The clear spring-fed waters of the river and its first-magnitude headspring, Weeki Wachee Springs, are the primary scenic attraction of the park. The headspring basin is on average about 190 ft. wide and gradually slopes to a depth of about 10 ft. near the start of the main vent. The river is relatively wide and of moderate depth. The shoreline is well vegetated, and the riverbank is high and steep at many locations. Where the shoreline is low, it is regularly inundated and receives some impact from boat, canoe and kayak landings. The "Twin Dees" spring and spring-run stream is small, narrow and intermittently flowing. The spring itself is also shallow, less than three feet deep and characterized by dark mucky soil. With the exception of Twin Dees Spring, swimming, canoeing and kayaking are recreational activities that are appropriate to the existing condition of the headspring and Weeki Wachee River. Potential impacts from these activities can be addressed through interpretive signage to educate visitors on appropriate behaviors to protect park resources.

Natural Scenery

The scenery of the park along the Weeki Wachee River and at panoramic viewpoints located atop the rolling hills of the scrub community will be attractive to most visitors. The scrub community is currently undergoing ecological restoration. Evidence of restoration activities such as mechanical tree thinning, and prescribed fire management will be visible to park visitors for the near future.

Significant Habitat

The Weeki Wachee River and its headspring provide an important refuge for the West Indian manatee. As many as 13 manatees have been observed in the headspring during the winter months. Park lands also provide important habitat for the Florida gopher tortoise and potentially the Florida Black Bear, which has been well documented on the adjacent Weekiwachee Preserve and Chassahowitzka Wildlife Management Area. Over time and with regular fire management, scrub-dependent animal species such as the Florida scrub jay may expand into the park. Populations of endemic scrub plant species such as *Garberia*, nodding pinweed and Curtiss' milkweed are now present within the park as the result of recent restoration activities undertaken by the SWFWMD. Numerous species of wading birds are also common along the river. Opportunities for wildlife viewing and observing the native flora of Florida are excellent.

Natural Features

The Weeki Wachee Spring and the Weeki Wachee River are the outstanding natural features of the park. There are two sinkholes located within the eastern portion of the park across US Highway 19. These sinkholes are significant natural features that will require special management and protection.

Archaeological and Historical Features

The remaining buildings and other remnants of the former attraction are an important representation of tourism development in Florida during the mid-Twentieth Century. The Mermaid Theater with its dramatic underwater views of the spring basin is of particular architectural significance. The uplands surrounding Weeki Wachee Spring were also inhabited by Florida's prehistoric and historic Native Americans as well as early Florida settlers. Archaeological sites at Weeki Wachee have provided evidence of contact between early Spanish explorers and Florida's indigenous people. Interpretation of both the prehistoric and historic uses of the property will be featured in park programs to inform the public about these protected resources.

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

Prehistoric use of the land surrounding the spring was significant, and is indicated by several archaeological sites, including a burial mound. The Seminole Indians named the spring Weeki Wachee, which means "little spring," or "winding river." Before the acquisition and development as a tourist attraction, Weeki Wachee Springs was a popular local destination for swimming, fishing and hunting.

In the 1940s, Newton Perry, a former U.S. Navy frogman, developed a method of

breathing underwater with an air hose connected to a compressor. He perfected this idea with experiments at Weeki Wachee Springs and proceeded to construct a showplace to capitalize on the entertainment values of the setting and the public fascination with mermaids. The first show at Weeki Wachee Springs opened on October 13, 1947. Young women performed underwater ballet in the spring, observed by paying guests from an 18-seat underwater theater constructed into the side of the spring bowl. The mermaid shows at Weeki Wachee Springs remained one of the country's top tourist attractions through the 1970s. Buccaneer Bay Water Park was added to the attraction in 1982.

Future Land Use and Zoning

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

According to the City of Weeki Wachee Springs Future Land Use (FLU) Map the current FLU designations for Weeki Wachee Springs State Park includes Tourist, Commercial Infill, Residential, Community Commercial and Nature Preserve. The Tourist designation covers all of the existing developed areas. Areas identified for future development, are included within either the Commercial Infill or the Residential FLU categories. Current park zoning includes Recreational Planned Development Project (REC.P.D.P), General Highway Commercial Planned Development Project (G.H.C.P.D.P), Residential Planned Development Project (RES.P.D.P) and Nature Preservation District (N.P.D). Additionally park lands are included within a Riverine Protection Area established by the City of Weeki Wachee Springs and subject to the Riverine Protection Ordinance established by Hernando County. Typical park uses and facilities are compatible with current zoning however; specific development standards may be applicable to future park development.

Current Recreational Use and Visitor Programs

Swimming, canoeing, kayaking and picnicking have been the main recreational uses of the property. Visitors also enjoy the famous mermaid performances, posing with the mermaids for portraits, attending bird and animal shows and special events such as art and craft fairs, holiday celebrations and visits by celebrities. The main spring can be viewed from observation decks, and from inside the unique underwater Mermaid Theater. Viewing of wildlife in the spring, particularly the manatees that visit during winter months, is a popular activity for visitors. SCUBA diving access to the main spring has been provided on a limited basis, through arrangements with a number of local dive instructors. Buccaneer Bay is a developed swimming area located on the north side of the river just below the headspring. The swimming area attracts large crowds of swimmers during the summer months, many of whom are residents in the local area. In addition to the swimming area, Buccaneer Bay contains waterslides and a

kiddy pool. Visitors can also take a short float on rental tubes to a take out point approximately 700 feet downstream from the swimming area. Scenic boat tours are offered from a dock on the south side of the river within the former attraction. Further downstream, beyond these developed areas, canoeing, kayaking and motor boating are all popular activities. The park provides a canoe and kayak launch point on the south side of the river, just beyond the boat docks.

The recreational opportunities and programming provided at Weeki Wachee Springs State Park make a significant economic contribution to the surrounding area. By Division estimates, FY 2008/2009 visitors contributed \$ 4,787,241 million in direct economic impact and the equivalent of 96 jobs to the local economy (Florida Department of Environmental Protection, 2009).

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 Weeki Wachee Springs State Park, the majority of the undeveloped portions of the park have been included within protected zones and delineated on the Conceptual Land Use Plan. This includes the scrub, the hydric hammock, the Twin Dees Spring and spring-run stream, the basin marsh, and the sinkholes. The Protected zones encompass approximately 400 acres or almost 75 percent of the park.

Existing Facilities

Recreation Facilities

Existing recreational facilities are located in close proximity to one another and within the developed areas of the former attraction. Facilities associated with the former attraction include the Admission Building, the 400-seat Mermaid Theater, the Riverside Theater, a 500-seat stadium, Observation Decks, a Gift Shop, Snack Bar, Restaurant, Boat Dock, formal garden and a short nature trail. In addition, a Banquet Hall can be used for weddings and other special events. The Buccaneer Bay area is a short walk from the main entry and provides seasonal access to waterslides, concession buildings, a bathhouse, picnic shelters, a volleyball court and a kiddy pool. Access to the existing canoe/kayak launch and outfitter concession is via a service road from main parking area.

Support Facilities

The main parking area along U.S. Highway 19 serves the entire park. Park operations

are supported by an administrative building, a warehouse, a prop shed, a shade house, two on-site residences, which are used by the park manager and assistant park manager, and four small cottages that were previously used as residences by staff of the former attraction. The park shop is located in a portion of the building that is also used for the canoe/kayak concession. There are also existing service roads within both the developed and undeveloped areas of the park. All support facilities are in fair condition. The following is a list of park recreation and support facilities (* denotes structures built before 1970):

Existing Facilities

Recreation Facilities

Former Attraction Area

Admission building	Restaurant
Wooden bridge	Gift shop and snack bar
Wooden arbor	Mermaid photo spot
Spring overlooks (wood decks)	500-seat Stadium
Mermaid Theater*	Boat dock
Snack bar	“Riverside Theater”
Banquet Hall	Mermaid Wall and Adagio sculpture*

Buccaneer Bay Day Use Area

Water slides (5 slides in 2 structures)

Kiddy pool

Pirates Pub beverage bar
 Concession Building (Restroom/locker room and snack bar)
 Picnic shelters (3)

Tube launch and landing

Floating dock
 Lifeguard office

Canoe/Kayak Launch Area

Canoe/kayak launch

Support Facilities

Administrative Building
 Prop shed*
 Warehouse
 Shade house*
 Shop building with
 Canoe/kayak concession*
 Residences (2)*
 Service Roads
 Cottages (4)*

CONCEPTUAL LAND USE PLAN

The following section presents the current conceptual land use plan for this park. The conceptual land use plan (see Conceptual Land Use Plan) may be amended to address new information regarding the park's natural or cultural resources, changes in recreational usage, or as new land is acquired. A detailed development plan for the park and a site plan for specific facilities will be developed based on this conceptual land use plan, as funding becomes available.

During the development of the management plan, the Division assesses the potential impacts of proposed uses or development on park resources and applies that analysis to decisions on the physical plan of the park as well as the scale and character of proposed development. Potential impacts are more thoroughly 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 designated species or cultural site locations) are more thoroughly investigated. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Stormwater management systems are designed to minimize impervious surfaces to the greatest extent feasible, and all facilities are designed and constructed using best management practices that limit resource impacts. Federal, state and local permit and regulatory requirements are met during the final design and facility development. All new park facilities are consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, the park staff monitors the surrounding conditions to ensure that resource impacts remain within acceptable levels.

Potential Uses

Public Access and Recreational Opportunities

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

In managing public use and facilities at the park, the Division has the opportunity to preserve a unique example of Florida's early tourism industry. There will be some modification to existing recreational activities and programs as necessary and appropriate to maintain the natural and cultural resources contained within the park. New and/or improved activities and programs are also recommended and discussed in further detail below.

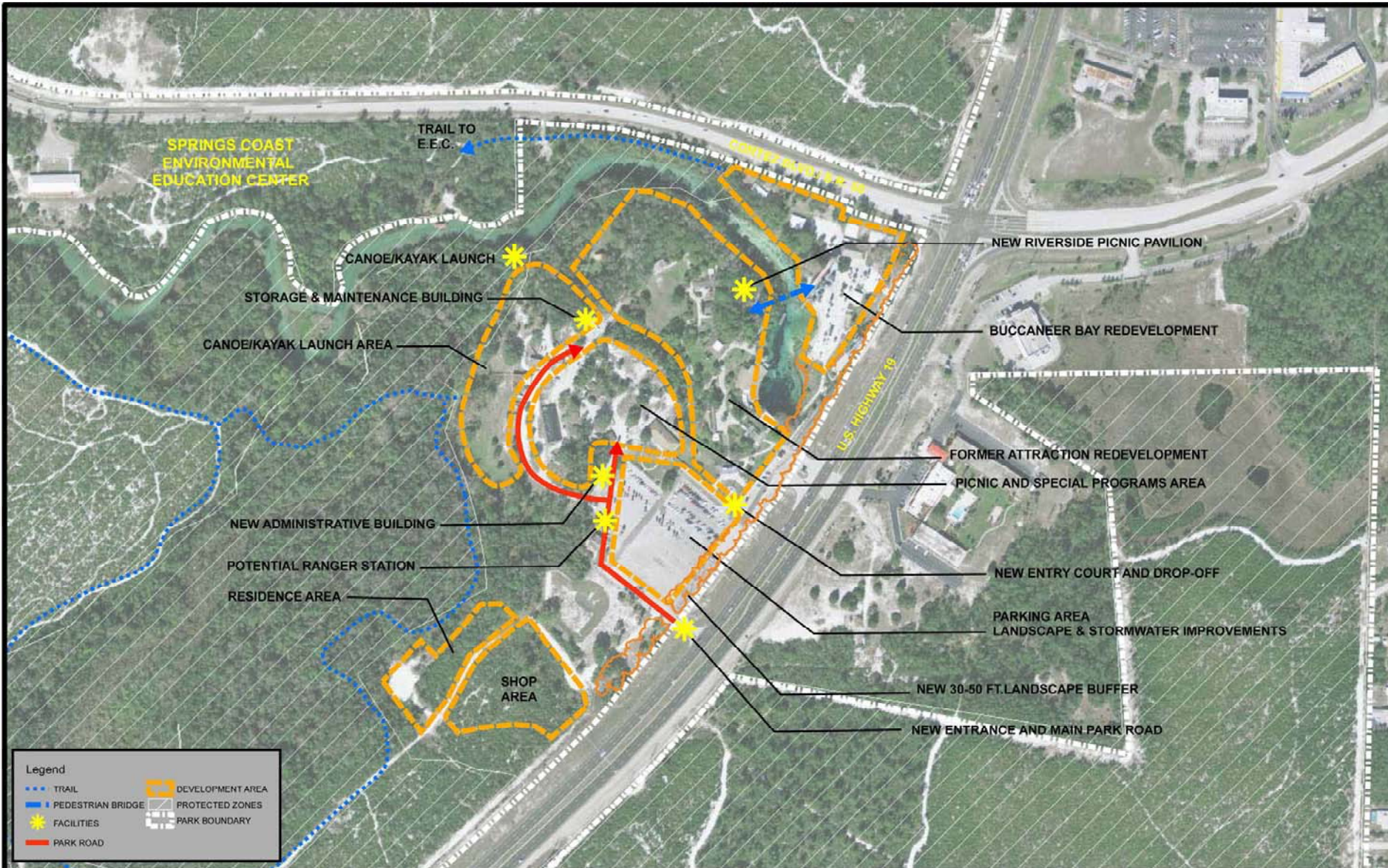
Proposed improvements focus on providing additional hiking and picnicking opportunities, in addition, convenient access to the Weeki Wachee River, redevelopment of the swimming area and former attraction, and achieving the full potential of interpretive programming at the park. When implemented, the potential uses and proposed facilities in this plan will allow more visitors to experience paddling on the Weeki Wachee River while providing greater opportunities for picnicking,



WEEKI WACHEE SPRINGS STATE PARK


CONCEPTUAL LAND USE PLAN
SHEET 1 OF 2

0 300 600 1,200 Feet
 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF RECREATION AND PARKS
 OFFICE OF PARK PLANNING



WEEKI WACHEE SPRINGS STATE PARK

CONCEPTUAL LAND USE PLAN
SHEET 2 OF 2


 0 100 200 300 400 500 600
 FL DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF RECREATION AND PARKS
 OFFICE OF PARK PLANNING

hiking and nature observation, and provide expanded opportunities to learn about the natural and cultural resources of the park.

Objective: Maintain the park's current recreational carrying capacity of 1,510 users per day.

The former attraction and Buccaneer Bay provide important recreation opportunities for the Hernando County region. The current swimming, paddling, picnicking and interpretive activities of the park are appropriate to the resources of the property and should continue. Over time, elements of the former attraction and Buccaneer Bay will be redesigned and renovated to upgrade facilities, improve universal accessibility and provide greater water quality protection for the spring and the river.

Objective: Expand the park's recreational carrying capacity by 176 users per day.

Additional picnicking, an extended interpretive trail, general hiking trails and primitive camping are the additional recreational elements proposed for the park.

Objective: Continue to develop and expand the park's interpretive programs.

An interpretive master plan for the park is needed. Interpretive programs will primarily focus on three topics; the history of Florida's roadside attractions; the famous Weeki Wachee mermaids and mermaid performances; and the first magnitude Weeki Wachee Springs. Information on the protection and management of park resources will be included as part of all interpretive programming.

Proposed Facilities

Capital Facilities and Infrastructure

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

Those facilities that are compatible with the natural and cultural resources of the park will be maintained. New construction, and facility improvements as discussed further below, are recommended to enhance the quality and safety of recreational opportunities, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of improved renovated and/or new facilities needed to implement the conceptual land use plan for the park:

Objective: 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 or contracted help.

Objective: Improve and repair existing facilities to promote safety, protect park resources and improve operations.

Former attraction: The Division's first priority in the management of the park is to address the large backlog of repair, maintenance needs and regulatory compliance issues that affect most of the park's buildings and infrastructure. Over the next several

years, the Division's development and repair budgets for the park will be focused on repairs and renovations to address deteriorated conditions, building code violations, ADA issues and safety hazards. Division staff has systematically assessed the condition and repair needs of the park, and has developed a priority list of repair projects. Approximately \$6 million of additional repair and renovation needs have been identified, including approximately \$3.5 million for the restoration and renovation of the historic Mermaid Theater.

Four remaining elements of the former attraction date from the pre-1970 era: the Mermaid Wall, which was part of the original entrance to the tourist attraction; the Mermaid Statue that now stands above the entrance area fountain; the Mermaid Theater, which, in its original form, sported an iconic clamshell roof; and a formal garden known as "The Garden of the Stars." These remnants of the attraction's heyday will be preserved and rehabilitated, and adapted to appropriate uses or, to the extent possible, restored to previous conditions as part of the park's cultural resource management program.

Division staff has developed a conceptual landscape master plan that seeks to introduce visitors to the colorful, "tropical" ambiance common in Florida's mid-20th Century tourist attractions. The redesigned landscape will improve the aesthetic appeal of the entire area and is intended to retain the "roadside attraction" character of the original and preserve and restore, the historic "Garden of the Stars." Equally important, the landscape master plan is designed to maximize the use of native plant material and minimize the use of water, fertilizer and pesticides in order to protect water quality. The landscape itself will serve to interpret environmentally sensitive landscape management techniques for the park's visitors. Hernando County Utilities is in the process of upgrading a nearby wastewater treatment facility to facilitate the distribution and use of reclaimed water for non-potable uses such as landscape irrigation. Hernando County Utilities is interested in working with the Division, to develop demand for the use of reclaimed water within the park and access to reclaimed water for irrigation purposes will be available as early as 2012.

Over the long-term, gradual redevelopment of the former attraction will occur in order to provide greater access and enjoyment of the river and spring, and improved interpretation of Weeki Wachee's famous mermaids and mermaid performances. Redevelopment of the former attraction and Buccaneer Bay will first require the development and approval of a master plan that thoroughly considers interpretative programming, recreational activities, special events, pedestrian circulation, accessibility, natural viewsheds and potential impacts to natural and cultural resources. Redevelopment projects currently identified include improvements to the existing spring overlooks at either side of the mermaid theater, construction of a "Mermaid Museum," and construction of a free-span pedestrian bridge across the river to provide greater access to Buccaneer Bay. The Division will consider the possibility of

incorporating the use of solar power as well as other sustainable construction methods and technologies as part of the redevelopment effort.

Buccaneer Bay: Complete redevelopment is proposed for Buccaneer Bay. The concession, restroom and locker room building should be replaced with a standard park concession building that provides adequate space for both a bathhouse and concession. Redevelopment should also reduce the amount of impervious surface, and improve accessibility and pedestrian circulation. New picnic shelters are needed to replace the existing shelters. Three medium, 10-table shelters and one large group shelter capable of supporting groups of 100 or more are needed. Currently the park offers a catering service for large special events and group picnics. A freestanding cooking shelter that would support the catering operation is also proposed. The popular volleyball area should remain in place, but improvements are needed to avoid the erosion of sand from this area toward the spring run. A children's playground with a shaded seating area for parents should be included in the redevelopment.

The Division has analyzed and evaluated the costs and resource impacts involved with repairing and maintaining the existing water slides. At least one waterslide, known as "the Pirates Plunge" should be removed when funding is available. The other water slides will remain, until these structures can no longer be economically maintained in a safe and serviceable condition. In addition, safety and accessibility upgrades should be made to the existing kiddy pool. However, the desired long-term condition is to phase out all of the existing water park elements and create a simpler, more resourced-based swimming area, typical to those provided in other parks.

During heavy rainfall events, stormwater impacts have been regularly observed within Buccaneer Bay. These impacts may be associated with the recent widening of the intersection of U.S. Highway 19 and State Road 50. These impacts have also been identified as a resource management concern due to their potential effect on the water quality in the spring. Site planning for the proposed redevelopment of Buccaneer Bay will prioritize improved stormwater management. Additional priorities will include providing universally accessible facilities and the ability for individuals, small groups and large groups to use the picnic facilities at the same time. Landscape improvements should be designed to direct the circulation of users, enhance stormwater management and enhance shade using native trees, shrubs and groundcovers.

Canoe/Kayak Launch Area: The condition of the existing canoe and kayak launch should be evaluated. Increased use of the launch area may require additional stabilization to prevent erosion and siltation. Improved vehicular access and a drop-off for visitors to use the canoe and kayak launch is also proposed. This would be a short unpaved access road with a turn around at the terminus that is accessible from the main park road and adjacent parking areas.

Objective: Construct new facilities that provide additional recreational opportunities, protect park resources, and facilitate park operations.

Former attraction: One of the Division's primary challenges at the park is creating a park from what was once a roadside attraction. Originally, the attraction was located close to the highway in order to entice passing motorists. Today, direct proximity to the highway means traffic noise, unsightly views and stormwater impacts; all of which detract from the park visitor experience. The original automobile entrance from U.S. Highway 19 will be closed and a new entrance and main park drive created along the southern edge of the current parking area. This will allow for the installation of a much-needed vegetated buffer of native trees and shrubs along the park's highway road frontage. In conjunction with the creation of a new entrance and park drive, additional improvements will be made to the existing parking area, including the installation of interior landscape islands, and a pervious parking surface. Construction of a ranger station along the new drive would also create a visitor entry experience that is more typical for a park. The proposed ranger station should be located at an appropriate distance along the park drive to provide necessary stacking space.

Picnicking is a traditional park activity. Improving access to the Weeki Wachee River and providing greater opportunities for picnicking is one of the primary goals of this plan. The Riverside Theater will be dismantled and the animal and bird shows relocated near the underutilized grandstand. A new Riverside picnic area will be created that includes one large 10-table picnic pavilion that can be used by visitors for picnicking and for special events like weddings.

Canoe/Kayak Launch and New Picnic and Special Programs Area: The buildings that currently provide park support functions are to be relocated as discussed below. Removal of these structures will improve visual and physical access to the Weeki Wachee River. Proposed redevelopment will create a new picnic and special programs area, and improve the function of the current canoe and kayak launch area. Three medium picnic shelters, three small picnic shelters, a small restroom, a new concession building and distributed parking for up to 50 vehicles are recommended. The final site plan for this area should also facilitate special events and interpretive programming.

Proposed redevelopment in this area of the park will require the documentation and possible demolition of three structures associated with the 1960's era attraction. These include the old dive shop building (currently the outfitter concession), the prop storage building and the greenhouse. In order to provide room for up to four temporary volunteer RV sites, it will be necessary to remove the greenhouse. Volunteers have become an important and critical element of any park operation. Providing volunteer RV sites has allowed many parks to recruit and retain talented and dedicated seasonal volunteers.

The two residences will remain in use as temporary staff residences. Eventually, both residences and the four small cottages may be used for interpretative exhibits, classroom space or other park-related uses. Division staff will continue to consult with the Division of Historic Resources regarding rehabilitation of these potentially significant structures.

Trails: A new trailhead should be included and new interpretive trails developed to link the canoe launch area to the remaining natural areas of the park and the former attraction. Along these trails, visitors will be able to experience a variety of natural community types, variable natural terrain, observe native flora and fauna and enjoy scenic overlooks. The interpretive trail is proposed as a boardwalk through the hydric hammock that will link to general hiking trails in the western portion of the park and the primitive campsite. The interpretive would to the south and loop back through the hydric hammock include an overlook at the Twin Dees spring and then head north to make an eventual return to the canoe launch area. General hiking trails in western portion of the park will permit visitors to experience Florida's unique scrub habitat and scenic views of the Weeki Wachee River. Park staff will also work with the adjacent Springs Coast Environmental Education Center to provide safe pedestrian access to the park for environmental education activities.

Camping Facilities: One primitive camping area is proposed in the western portion of the park. Two potential locations are identified on the Conceptual Land Use Plan. Both sites are connected to an existing service road. The northernmost location is close to the river and within a slightly disturbed area at the edge of hydric hammock. The alternate site is located near the top of a ridge and at the disturbed edge of the scrubby flatwoods. A picnic table and a fire ring are the only facilities recommended at either site. Campers will be expected to follow Leave No Trace principles of outdoor ethics to minimize impacts to this area.

Support Facilities

Administrative, Shop and Residence Areas: The existing residences and support facilities are in poor condition and haphazardly arranged across a large area. As funding becomes available, these facilities should be demolished and new support facilities constructed in the two support areas identified on the Conceptual Land Use Plan. One support area is located south of the main parking area within a disturbed area of scrub and hydric hammock. Support facilities proposed for this location include two standard residences, a 4-bay shop, an enclosed 3-bay prop storage building, a flammable storage building and a mechanical systems building. An additional residence and a 3-bay equipment shelter, should be located in the large disturbed area of the park parcel on the north side of State Road 50. The old 70s era administration building, is undersized and poorly located. Demolishing this building will provide an improved picnic and interpretive area. Construction of a new administrative office building and associated parking would better meet the needs of the modern park

operation. The new administration building should be constructed adjacent to the main parking area, in the general location identified on the Conceptual Land Use plan.

Facilities Development

Preliminary cost estimates for these recommended facilities, improvements are provided in the Ten-Year Implementation Schedule, and Cost Estimates (Table 6) 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 the Division 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:

Former Attraction

Landscape renovation
Riverside Picnic Pavilion (1)
Safety and code compliance upgrades to existing facilities
Relocate automobile entrance and construct new park drive

Buccaneer Bay

Concession/Bathhouse
Picnic shelters (3)
Pavilion
Cooking shelter
Small playground
Kiddy pool safety improvements

Canoe Launch and Picnic Area

Picnic shelters (5)
Restroom
Canoe/kayak concession
Parking (40 cars)

Support Facilities

Administrative Building
Landscape and stormwater improvements to main parking area.
Shop (4-bay)
Equipment shelter (4-bay)
Enclosed storage building (3-bay)
Mechanical systems building (2-bay)
Flammable storage building
Small ranger station
Residences (3)
Volunteer RV Sites (4)

Existing Use and 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 5).

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 5. As a former tourist attraction, Weeki Wachee Springs was extensively developed and received high levels of recreational use. In determining the proposed carrying capacity Weeki Wachee Springs State Park, the Division sought a balance between historical visitation patterns and current carrying capacity guidelines. Additional research will be conducted to determine the appropriate carrying capacity for the park, particularly for activity sites within the headspring and spring-run stream. The carrying capacity guidelines presented in Table 5 may be revised once this research is complete.

Optimum Boundary

As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency. At this time, no lands are considered surplus to the needs of the park and no additional lands have been identified as desirable for addition to the park.

Table 5: Existing Use And Optimum Carrying Capacity						
Activity/Facility	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
	One Time	Daily	One Time	Daily	One Time	Daily
Attraction	795	795			795	795
Trails						
Nature			10	40	10	40
Hiking			10	20	10	20
Picnicking			56	112	56	112
Picnicking/Swimming						
Buccaneer Bay	435	435			435	435
Boating						
Canoeing/kayaking	140	280			140	280
Camping						
Primitive Campsite			4	4	4	4
TOTAL	1,370	1,510	80	176	1,450	1,686

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's progress toward achieving resource management, operational and capital improvement goals and objectives since the park was acquired. 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 acquisition of Weeki Wachee State Park in 2008, significant work has been accomplished and progress made towards meeting the Division's management objectives for the park. These accomplishments are detailed under general categories that represent the mission of the park and the Division.

Park Administration and Operations

- Park volunteers and members the park's Citizen Support Organization (CSO) contributed over 2,600 volunteer hours to the park. The CSO has also held several fundraising events to help support the park. Volunteers have been actively improving the park's landscape by providing regular landscape maintenance. At least six volunteers are dedicated to providing assistance with land management and facility maintenance
- The famous Weeki Wachee Mermaids have made special promotional appearances at aquariums throughout the United States and abroad. These appearances provide great publicity for the State of Florida, and the Florida State Park System.
- Effective as of July 1, 2009 the park received 15 new FTE positions to help support park operations, resource management and recreational services.

Resource Management

Natural Resources

- Park staff completed prescribed fire preparation on nearly 75 acres. This includes installation and maintenance of perimeter fire lines.
- At least two full time staff and two OPS staff are completing fire management training, and an additional two staff will complete training by the fall of 2010.
- An annual exotic plant removal plan has been developed. Current interpretive programming regarding exotic plants species is being evaluated and updated as necessary.

- Park staff treated approximately 2.5 acres for invasive exotic plant species. This included eradication of wild taro within a prominent drainage in the former attraction and the subsequent planting of native plant species such as cypress and blue flag iris. Additional treatment for exotic plant species has occurred along the river near the headspring.
- Park staff is in the process of acquiring the necessary permits to continue removal of *Lynghya* within the headspring and river.

Cultural Resources

- Park staff is in the process of moving the current collection of photos, film, and other archival material into a separate secure location so that each item can be inventoried, cataloged and conserved.
- Park staff connected with the local community in an effort to locate former props from mermaid performances or other items from the former attraction and oral history interviews.
- Park staff will soon begin the interpretive planning process to establish new visitor programs concerning cultural resources.

Recreation and Visitor Services

- The park now operates the canoe/kayak concession and provides improved service to visitors who wish to access the river for paddling activities.
- The park also now operates a diver program that issues dive permits for the spring.
- Two new camps have been developed for park visitors including a Mermaid Camp for adults and a Junior Ranger camp.
- The park was recently the site for a local “Envirothon” event in which over 500 school students participated.

Park Facilities

- Over \$580,000 has been provided for necessary repairs during the first year of management by the Division.
- Roof replacement of 19 buildings has been completed.
- A new curtain, new video equipment and ADA handrails have been added to the Mermaid Theater. In addition, a proposal to replace the theater’s A/C system is currently under bid.
- Engineering has been completed to install an ADA passenger lift at the boat dock and an additional tour boat has been purchased to reduce visitor wait times and serve as a replacement boat when necessary.
- ADA renovations have been completed for the restroom at Buccaneer Bay and repairs have been completed to the existing waterslides.
- All facilities are in the process of being painted and building interiors are being painted and repaired as needed.

MANAGEMENT PLAN IMPLEMENTATION

This management plan is written for a timeframe of ten years. The Ten-Year Implementation Schedule with Cost Estimates (Table 6) summarizes the management goals, objectives and actions that are recommended for implementation over this period. 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 actions have been identified that are unlikely to be carried out during the life of this plan unless additional resources are provided. The ten-year Implementation Schedule and Cost Estimates table therefore includes both “funded” and “unfunded” needs.

The administration of the state park is an ongoing cost that will likely increase in the future as additional programs and responsibilities are assigned, among other factors. These administrative costs include a variety of activities, such as the administration of personnel, the management of vendors and contractors for all the park’s supply and service needs and the coordination of the park’s Citizen Support Organization, to name a few.

The plan’s recommended actions, time frames and cost estimates will guide the Division’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 degree of adaptability and flexibility must be built into this process to ensure that the Division 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 Division’s annual legislative budget requests. When preparing these annual requests, the Division 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 Division pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. The Division’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 6 may need to be adjusted during the ten-year management planning cycle.

Table 6
 Weeki Wachee Springs State Park Ten-Year Implementation Schedule and Cost Estimates
 Sheet 1 of 4

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	Total Manpower and Expense Cost* (10 Years)
Objective A	Continue day-to-day administrative support at current levels.	Administrative support ongoing	C	\$752,373.00
Objective B	Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.	Administrative support expanded	UFN	\$87,648.00
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Conduct/obtain an assessment of the park's hydrological restoration needs.	Assessment conducted	C	\$28,600.00
Action 1	Continue interagency monitoring of water flow, quantity and chemistry in Weeki Wachee Spring and River.	Program ongoing	C	\$15,900.00
Action 2	Monitor river shoaling and movement of sand in and around Buccaneer Bay.	Monitoring ongoing	C	\$4,200.00
Action 3	Monitor the growth rate and coverage of <i>Lyngbya wollei</i> algae in the headspring.	Monitoring ongoing	C	\$8,500.00
Objective B	Assess the impact of stormwater run-off and erosion from adjacent highways, on-site development and recreational use.	Assessment ongoing	C	\$57,600.00
Action 1	Collaborate with SWFWMD and FDOT to analyze and address stormwater impacts to the park from US 19 and SR 50.	Collaboration ongoing	C	\$31,500.00
Action 2	Improve stormwater management for approximately 25 acres of developed area within the Weeki Wachee Springs attraction and support areas.	# Acres with treatment	UFN	\$23,000.00
Action 3	Document and monitor critical erosion areas on the river and take corrective action if needed.	# of sites documented	C	\$3,100.00
Objective C	Determine the appropriate recreational carrying capacity for the main headspring and upper Weeki Wachee River	Sudy complete	LT	\$25,000.00
Action 1	Conduct study to determine the appropriate recreational carrying capacity.	Sudy complete	UFN	\$25,000.00
Objective D	Partner with government agencies, private non-profits and volunteer groups to educate the public about water quality and quantity protection in the Weeki Wachee springshed.	Partnerships ongoing	C	\$9,700.00
Action 1	Develop partnerships with government agencies, non-profit organizations, and volunteer groups.	Partnerships ongoing	ST	\$9,700.00

* 2010 Dollars
 ST = actions within 2 years
 LT = actions within 10 years
 C = long term actions that are continuous or cyclical
 UFN = unfunded need

Table 6
 Weeki Wachee Springs State Park Ten-Year Implementation Schedule and Cost Estimates
 Sheet 2 of 4

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 III: Restore and maintain the natural communities/habitats of the park.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Within 10 years have 279 acres of the park maintained within optimal fire return interval.	# Acres burned	C	\$30,900.00
Action 1	Develop/update annual burn plan	Plan updated	C	\$16,000.00
Action 2	Manage fire dependent communities for ecosystem function, structure and processes by burning between 20-55 acres annually as identified by the annual burn plan.	# acres maintained	C	\$27,500.00
Action 3	Document and monitor species response to fire management within scrub community.	Documentation and monitoring underway	C	\$3,400.00
Objective B	Conduct natural community improvement activities on 1-5 acres of the mesic flatwoods and scrubby flatwoods communities per year to produce desired condition and conduct necessary follow-up management activities.	# Acres restored or with restoration underway	LT	\$20,440.00
Action 1	Conduct mechanical treatment activities to thin trees, reduce shrub height, and/or reduce palmetto density as necessary	# Acres treated	LT	\$7,700.00
Action 2	Implement prescribed burning	# Acres burned	LT	\$9,240.00
Action 3	Supplement with additional native plantings as necessary	# Acres planted	LT	\$2,000.00
Action 4	Monitor results of management activities	Monitoring complete	LT	\$1,500.00
Objective C	Maintain and improve the restored condition of the headspring and upper spring-run stream natural communities by performing maintenance removal of the nuisance algae, L. wollei.	# Acres restored or with restoration underway	LT	\$53,500.00
Action 2	Develop and implement a maintenance algae removal program	Program developed	ST	\$53,500.00
Objective D	Annually monitor erosion on park roads in the scrub natural community and take corrective action if monitoring determines that negative impacts are occurring.	Monitoring underway	C	\$4,000.00
Action 1	Document park roads and firebreaks currently exhibiting signs of erosion that will require annual monitoring.	Documentation complete	ST	\$2,500.00
Action 2	Asses the location, slope, and potential for erosion before installing any additional roads or firebreaks.	Assesment ongoing	C	\$1,500.00
Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Develop and update baseline imperiled species occurrence inventory lists for plants and animals, as needed.	List developed	C	\$12,211.68
Objective B	Monitor and document 3 selected imperiled animal species in the park.	# Species monitored	C	\$26,000.00
Action 1	Implement monitoring protocols for 3 imperiled animal species including Florida scrub jay, the West Indian manatee, and the Florida gopher tortoise.	# Species monitored	C	\$26,000.00
Objective C	Monitor and document the habitat conditions of 3 selected imperiled plant species in the park.	# Species monitored	C	\$7,200.00
Action 1	Implement monitoring protocols for 3 imperiled plant species including Curtis' milkweed, Garberia, and Nodding	# Species monitored	C	\$7,200.00
Objective D	Continue comprehensive multi-taxa species surveys.			\$14,500.00
Action 1	Consistently monitor for plant and animal species occurrences at the park and report to the district office for inclusion in district database.	# Species monitored	C	\$14,500.00

* 2010 Dollars
 ST = actions within 2 years
 LT = actions within 10 years
 C = long term actions that are continuous or cyclical
 UFN = unfunded need

Table 6
 Weeki Wachee Springs State Park Ten-Year Implementation Schedule and Cost Estimates
 Sheet 3 of 4

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 V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Annually treat 1-5 acres of exotic plant species in the park.	# Acres treated	C	\$26,800.00
Action 1	Develop overall, park wide annual exotic plant removal plan.	Plan completed	ST	\$16,000.00
Action 2	Implement exotic plant management annual work plan.	Plan Updated	C	\$6,300.00
Action 3	Provide training to park staff in invasive plant identification and treatment methods.	Training implemented	ST	\$4,500.00
Objective B	Continue implementation of the landscape plan for the Weeki Wachee Springs attraction.	Plan implemented	LT	\$37,500.00
Action 1	Remove invasive plant species from the existing landscape and replace with appropriate native and non-invasive species.	# Acres treated	ST	\$37,500.00
Goal VI: Protect, preserve and maintain the cultural resources of the park.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Assess and evaluate 15 of 18 recorded cultural resources in the park.	Documentation complete	LT	\$105,796.00
Action 1	Complete 6 assessments/evaluations of archaeological sites. Prioritize preservation and stabilization projects.	Assessments complete	LT	\$796.00
Action 2	Complete 9 Historic Structures Reports (HSR's) for historic buildings and cultural landscape. Prioritize stabilization, restoration and rehabilitation projects.	Reports and priority lists completed	UFN	\$105,000.00
Objective B	Compile reliable documentation for all recorded historic and archaeological sites.	Documentation complete	LT	\$13,238.00
Action 1	Complete a predictive model for high, medium and low probability of locating archaeological sites within the park.	Probability Map completed	ST	\$6,689.00
Action 2	Conduct 10 oral history interviews of former mermaids	Interviews complete	LT	\$3,600.00
Action 3	Develop and adopt a Scope of Collections Statement.	Document completed	ST	\$2,249.00
Action 4	Develop and implement an annual monitoring plan for cultural resources.	# Sites monitored	ST	\$700.00
Objective C	Bring 9 of 18 recorded cultural resources into good condition.	# Sites in good condition	UFN	\$3,600,000.00
Action 1	Create and implement cyclical maintenance program for each cultural resource.	Checklists implemented	UFN	\$100,000.00
Action 2	Restore Mermaid Theater to original 1960s condition	Restoration Complete	UFN	\$3,500,000.00
Goal VII: Provide public access and recreational opportunities in the park.		Measure	Planning Period	Total Manpower and Expense Cost* (10 Years)
Objective A	Maintain the park's current recreational carrying capacity of 1,510 users per day.	# Recreation/visitor opportunities per day	C	\$1,880,993.00
Objective B	Expand the park's recreational carrying capacity by 176 users per day.	# Recreation/visitor opportunities per day	UFN	\$219,260.00
Objective C	Continue to develop and expand the park's interpretive programs	# Interpretive/education programs	C	\$5,000.00
Action 1	Develop Interpretive Master Plan.	Plan implemented	UFN	\$5,000.00

* 2010 Dollars
 ST = actions within 2 years
 LT = actions within 10 years
 C = long term actions that are continuous or cyclical
 UFN = unfunded need

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	Total Manpower and Expense Cost* (10 Years)
Objective A	Maintain all public and support facilities in the park.	Facilities maintained	C	\$4,514,238.00
Objective B	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	C	\$200,000.00
Objective C	Improve and repair existing facilities to promote safety, protect park resources and improve operations as identified in the Land Use Component	# Facilities/Miles of Trail/Miles of Road	UFN	\$1,765,000.00
Objective D	Construct new facilities that provide additional recreational opportunities, protect park resources, and facilitate park operations as identified in the Land Use Component	# Facilities/Miles of Trail/Miles of Road	UFN	\$7,083,050.00
Summary of Estimated Costs				
	Management Categories	Estimated Cost		
	Resource Management	\$4,072,985.68		
	Administration and Support	\$840,021.00		
	Capital Improvements	\$9,048,050.00		
	Recreation Visitor Services	\$6,619,491.00		
	Law Enforcement Activities**			
	**Law enforcement activities in Florida State Parks are conducted by the DEP Division of Law Enforcement and by local law enforcement agencies.			

* 2010 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term actions that are continuous or cyclical
UFN = unfunded need

Addendum 1 – Acquisition History

Weeki Wachee Springs State Park Acquisition History

Sequence of Acquisition

On January 24, 2008, the State of Florida Department of Environmental Protection's (DEP), Division of Recreation and Parks (DRP) purchased Weeki Wachee Springs Attraction, now commonly referred to as "Weeki Wachee Springs State Park," for \$170,000. This Attraction included live Mermaid Show, Buccaneer Bay Water Park and Wilderness River Cruise. On November 1, 2008, the DRP leased a 538.36-acre property, on which the Attraction is located, from Southwest Florida Water Management District (SWFWMD) under a 50 (fifty) -year term that will end on October 31, 2058.

On February 17, 2010, the DRP entered into a 25-year sovereignty submerged lands lease agreement, with the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (BOT File No. 270345153). The purpose of this submerged lands lease agreement was to authorize the DRP to operate structures related to Weeki Wachee Springs Attraction such as several observation decks, mermaid amphitheater, two water slides, water intake and outfall pipes associated with the water slides, tour boat dock, floating swim platform, roped buoys marking channels and canoe/kayak launch, and to incorporate the submerged land of the headsprings and the upper Weeki Wachee River in the DRP management responsibility for the state park.

According to the SWFWMD lease, the DRP manages Weeki Wachee Springs State Park only for the conservation and protection of natural and historical resources and for public outdoor recreation that is compatible with the conservation and protection of this property.

Title of Interest

SWFWMD holds fee simple title to Weeki Wachee Springs State Park.

Special Conditions on Use

Weeki Wachee Springs State Park is designated single-use to provide resource-based public outdoor recreation and other park related uses. Uses such as water resource development projects, water supply projects, storm-water management projects, and linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in the Unit Management Plan of this park) are not consistent with the management purposes of the park.

Outstanding Reservations

There are no outstanding rights, reservations and encumbrances that apply to Weeki Wachee Springs State Park.

Weeki Wachee Springs State Park Acquisition History

Addendum 2 – Advisory Group Members and Report

Weeki Wachee Springs State Park Advisory Group Members

Butch Mallett, Forester
Florida Division of Forestry
12460 Chelsey Road
Brooksville, Florida 34613

Chad Allison, Biologist
Chassahowitzka WMA
Florida Fish and Wildlife
Conservation Commission
17260 Necklace Warbler Rd.
Brooksville, Florida 34614

Toby Brewer, Manager
Weeki Wachee Springs State Park
6131 Commercial Way
Spring Hill, Florida 34606

Will Miller, Land Use & Protection
Manager
Southwest Florida WMD
2379 Broad Street
Brooksville, FL 34604-6899

Daniel Oliver
Nature Coast Soil & Water
Conservation District
10296 Eglin Blvd.
Springhill, FL 34608

Mr. John Druzbeck, Chairman
Hernando County Commissioners
20 North Main St.
Brooksville, Florida 34601

Linda Vanderveen, President
Hernando County Audubon Society
4327 Bessemer Rd.
Brooksville, Florida 34602

Brett Hemphill, President
Karst Underwater Research Group
37248 Orange Blossom Lane
Dade City, Florida 33525

Kurt Zuelsdorf
Kayak Nature Paddling Club
6201 9th Avenue S.
Gulfport, Florida 33707

Sonny Vergara, President
Friends of Weeki Wachee
5075 White Road
Brooksville, Florida 34602

Barbara Wynns (Former Mermaid)
7305 Tropical Dr.
Weeki Wachee, Florida 34607

Cheryl Paradis, Lead Teacher
Springs Coast Environmental Ed.
Center
9170 Cortez Blvd.
Weeki Wachee, Florida 34607

Sue Rupe, Tourism Coordinator
Hernando County Tourism Bureau
30305 Cortez Boulevard
Brooksville, Florida 34602

Denise Tenuto (adjacent landowner)
18431 Floralton Dr.
Spring Hill, FL 34610

Weeki Wachee Springs State Park Advisory Group Members

Weeki Wachee Springs State Park Advisory Group Staff Report

The appointed Advisory Group met to review the draft management plan update for Weeki Wachee Springs State Park at the Banquet Hall within the park on Wednesday, October 12, 2010. Mr. Oliver and Mr. Vergara did not attend the meeting. Division staff attending included Valinda Subic, Toby Brewer, Elizabeth Gandy and Sine Murray.

Staff began the meeting by giving a brief synopsis of the comments received at the public workshop and the procedures used to conduct the Advisory Group review of the draft management plan. Staff then opened the meeting to questions and comments regarding the management plan.

SUMMARY OF ADVISORY GROUP COMMENTS

Mr. Hemphill was complimentary about the plan. He inquired about the timeframe for providing access to the surrounding natural areas of the park via hiking trails and boardwalks although he mentioned that while the scrub may be hot for hiking during most of the year. He suggested two nearby parks, Lettuce Lake Park and Crystal Springs as good examples of how to integrate boardwalks into the wetter cooler areas of hammock. Mr. Hemphill stressed the valuable opportunity the park presents for environmental education especially for school-age children. The park could hold educational programming and displays in the Mermaid Theater as a compliment to the Mermaid shows that would help visitors understand the importance of aquifer recharge areas and the unique karst topography.

Mr. Zuseldorf agreed with Mr. Hemphill that park has a lot to offer in terms of potential for environmental education. He thought the plan was great and that Florida has a great state park system. He suggested the plan might include language regarding the integration of solar power into park buildings. He thought there might be the potential to use park buildings to demonstrate solar technology. Mr. Zuseldorf suggested phasing in electric tour boats and creating a “non-combustible engine” zone along the river within the park boundary. He also recommended improving the park’s recycling program, providing visitor education about recycling, and using either recyclable or compostable take-away products at the park concessions.

Ms. Wynns stated that she is “thrilled with where the park is heading.” She also thought the underwater theater provided a great venue for environmental education. As a former Mermaid, Ms. Wynns thought it would also be important to point out the unique connection between the spring, and the historic mermaid performances. She has observed a deterioration of the water quality and ecology of Weeki Wachee Spring and expressed concern about the impacts of fertilizers and other pollutants on the health of the spring. Ms. Wynns also thought that the tour boats cause water quality and noise issues along the river and that these issues should be addressed.

Ms. Vanderveen stated that she was pleased with the relatively low impact nature of the plan. She commented on the uniqueness of the first magnitude Weeki Wachee Spring. Ms. Vanderveen was unaware of the extent of natural area now within the state

Weeki Wachee Springs State Park Advisory Group Staff Report

park and stated that the local Audubon Society would like to conduct field trips at the park. She expressed some concern over dogs on the hiking trails as dogs can disturb bird populations. She also inquired about the possible reintroduction of the Florida scrub jay and that resource management should compliment the needs of this species. Ms. Vanderveen is also active in the local chapter of the Native Plant Society and expressed interest in working with the park to schedule an exotic plant removal workday.

Ms. Paradis was impressed with the plan. She encouraged further partnership between the park and the Springs Coast Environmental Education Center to improve access to the springhead. She liked the proposed trail in the Land Use Component that linked the Education Center with the park. She commented that the current tour boat is large and the dual motors stir up the river bottom. However, the tour boat is a great interpretive opportunity. In general, she thought that the plan should contain some language that would address potential improvements to the tour boat operations. Ms. Paradis also noted increasing use of the river by kayakers and suggested that the park do a better job of staggering the launch times of groups of kayakers. She also expressed support of the proposed network of hiking trails, interpretive strategies that might make use of audio tours and continuation of the algae removal program.

Mr. Allison recognized that there is obvious alignment between the resource management goals and objectives stated in the unit plan and those of the Chassahowitzka Wildlife Management Area. He inquired about the ability to collaborate on resource management activities to use volunteers effectively for land management activities. He also expressed interest in interagency cooperation regarding public outreach on the use of prescribed fire. He recommended that the plan include additional language on the potential presence of the Florida black bear as parklands provide an important buffer for adjacent conservation areas that support the current bear population.

Mr. Mallett acknowledged the success of the recent algae removal and clean up, but regrets the gradual loss of underwater grasses and the decline of the water quality in the spring. Mr. Mallett also commented that as a forester he is concerned with the over "vilification of sand pine." He mentioned that sand pine is actually valuable timber and is a natural component of scrub. He suggested researching different approaches to sand pine removal, ones that would promote habitat creation but leave some stands of sand pines in place.

Mr. Miller noted that the northern and eastern portions of the park contain no recreational resource elements. He requested some clarification regarding the Conceptual Land Use Plan and the identified locations of proposed residences and shop areas. Mr. Miller also felt the that Optimum Boundary map should indicate proposed acquisition of the two parcels adjacent to the park boundary, currently managed by Florida Fish and Wildlife Conservation Commission (FFWCC). Additionally, he

Weeki Wachee Springs State Park Advisory Group Staff Report

suggested that consideration be given to the impact of the big boats on the river and that the plan should consider establishing a minimum water level that would be required for the boats to operate.

Ms. Tenuto felt that the plan was very comprehensive and that efforts toward interagency cooperation were evident. As a member of the park's citizen support organization (CSO), she also believed that the plan would help prioritize volunteer and fundraising projects. She agreed that public properties should set an example of sustainability by participating in recycling programs and developing strategies for the use of solar power. Ms. Tenuto expressed support for the proposed vegetative buffer along US19 and inquired about the proposed relocation of the entrance.

Commissioner Druzbeck stated that his family has had a long relationship with the park over the years and that the water access the park provides for the general population is a phenomenal asset to Hernando County. He fully supported the development of trails within the natural areas of the park and stated that he could provide some assistance in addressing the use of fertilizers and other policies that could improve water quality at the county level.

He also offered to provide assistance to the park with developing a recycling program and mentioned that the County is pursuing an economic development strategy that would focus on solar technology. Hernando County is also promoting the use of reclaimed water for irrigation and that the current project would place service lines within the near vicinity of the park. Commissioner Druzbeck also asked that due consideration be given to elderly residents when planning the relocation of the park entrance.

Ms. Rupe liked the plan and was particularly pleased with the overall vision to draw inspiration for redevelopment from the park's 1960s era. She was impressed with the expansion of the recreational opportunities particularly the primitive campsites. She mentioned that future expansion of camping within the park would be popular as the tourism board gets frequent inquiries about camping opportunities in the area. Ms. Rupe also suggested that there be further emphasis on the interpretation of the park's cultural assets including the prehistory of the park and the Weekiwachee Mound.

Summary of Written Comments

Mr. Zuelsdorf provided written comments that documented what he expressed during the meeting.

Mr. Mallet also provided written comments to clarify what he expressed during the meeting. He believes that current strategies for sand pine removal could be improved and that all of the agencies involved with managing the area's scrub should get together to develop a long-term, landscape approach to this problem.

STAFF RECOMMENDATION

Suggestions received from the Advisory Group meeting resulted in revisions to the draft management plan. The Resource Management Component now contains updated language concerning the Chassahowitzka subpopulation of the Florida black bear, and the need to assess the potential effects of motorized tour boats on the spring Run stream. Assessments of all of the various recreational uses within the upper spring- may result in the establishment of minimum water levels types of activities. In the Land Use Component, additional discussion was included regarding the opportunity to utilize alternative energy sources such as solar power, reclaimed water for landscape irrigation, and further improvement of the park's recycling program as part of park redevelopment efforts.

The staff recommends approval of the proposed management plan for Weeki Wachee Springs State Park as presented, with the following changes:

RESOURCE MANAGEMENT COMPONENT

Revised language contained within the Imperiled Species section of the Resource Management Component as follows:

Imperiled Species

The state park is within the documented primary range of the Chassahowitzka subpopulation of the Florida black bear (FFWCC 2009). Park staff should coordinate with FFWCC on management actions that may impact the Chassahowitzka subpopulation.

Hydrological Management

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

Objective: Determine the appropriate recreational carrying capacity for the main headspring and upper Weeki Wachee River.

The cumulative effects, seasonality and long-term impacts of the current development and use of the main headspring and upper spring-run are poorly understood. In particular, additional information on the condition of both the biotic and abiotic environment of the spring is needed. The recreational use of the upper river by motor boats and paddle craft will likely continue to increase. Research is needed to determine the recreational carrying capacity of the main headspring and upper-river in order to prevent damage to the river bottom and shoreline and to prevent any hindrances to wildlife access. *Careful consideration will be required to adjust recreational carrying capacities, recommend vessel-type use restrictions, or establish minimum water levels for tour boat operations if needed.*

LAND USE COMPONENT

The addition of the following text to the Conceptual Land Use Plan regarding the use of reclaimed water for irrigation purposes and the incorporation of sustainable building practices as part of the redevelopment effort:

Capital Facilities and Infrastructure

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

Objective: Improve and repair existing facilities to promote safety, protect park resources and improve operations.

Former attraction:

Division staff has developed a conceptual landscape master plan that seeks to introduce visitors to the colorful, “tropical” ambiance common in Florida’s mid-20th Century tourist attractions. The redesigned landscape will improve the aesthetic appeal of the entire area and is intended to retain the “roadside attraction” character of the original and preserve and restore, the historic “Garden of the Stars.” Equally important, the landscape master plan is designed to maximize the use of native plant material and minimize the use of water, fertilizer and pesticides in order to protect water quality. The landscape itself will serve to interpret environmentally sensitive landscape management techniques for the park’s visitors. *Hernando County Utilities is in the process of upgrading a nearby wastewater treatment facility to facilitate the distribution and use of reclaimed water for non-potable uses such as landscape irrigation. Hernando County Utilities is interested in working with the Division, to develop demand for the use of reclaimed water within the park and access to reclaimed water for irrigation purposes will be available as early as 2012.*

Over the long-term, gradual redevelopment of the former attraction will occur in order to provide greater access and enjoyment of the river and spring, and improved interpretation of Weeki Wachee’s famous mermaids and mermaid performances. Redevelopment of the former attraction and Buccaneer Bay will first require the development and approval of a Master Site Plan that thoroughly considers interpretative programming, recreational activities, special events, pedestrian circulation, accessibility, natural viewsheds and potential impacts to natural and cultural resources. Redevelopment projects currently identified include improvements to the existing spring overlooks at either side of the mermaid theater, construction of a “Mermaid Museum,” and construction of a free-span pedestrian bridge across the river to provide greater access to Buccaneer Bay. *The Division will consider the possibility of incorporating the use of solar power as well as other sustainable construction methods and technologies as part of the redevelopment effort.*

Weeki Wachee Springs State Park Advisory Group Staff Report

Notes on Advisory Group Composition

Florida Statutes Chapter 259.032 Paragraph 10(b) establishes a requirement that all state land management plans for properties greater than 160 acres will be reviewed by an advisory group:

“Individual management plans required by s. 253.034(5), for parcels over 160 acres, shall be developed with input from an advisory group. Members of this advisory group shall include, at a minimum, representatives of the lead land managing agency, co-managing entities, local private property owners, the appropriate soil and water conservation district, a local conservation organization, and a local elected official.”

Advisory groups that are composed in compliance with these requirements complete the review of State park management plans. Additional members may be appointed to the groups, such as a representative of the park’s Citizen Support Organization (if one exists), representatives of the recreational activities that exist in or are planned for the park or representatives of any agency with an ownership interest in the property. Special issues or conditions that require a broader representation for adequate review of the management plan may require the appointment of additional members. The Division’s intent in making these appointments is to create a group that represents a balanced cross-section of the park’s stakeholders. Decisions on appointments are made on a case-by-case basis by Division of Recreation and Parks staff.

November 15, 2010

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Addendum 4 – Soil Descriptions

Weeki Wachee Springs State Park Soil Descriptions

(2) Anclote fine sand - This is a poorly drained soil in depressional areas. Slopes are usually concave and less than 2 percent.

Typically, the surface layer is black fine sand about 7 inches thick. The subsurface layer is very dark gray fine sand about 7 inches thick. Below that is fine sand. The upper 6 inches of it is grayish brown, the next 10 inches is light brownish gray, and the next layer is gray to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Basinger soils, depressional, and Delray, Floridana, and Pompano soils. Also included are similar soils that have a thin surface layer of muck. Included soils make up about 15 percent of any mapped area.

In most years, under natural conditions, the water table is above the surface for 3 to 6 months during wet seasons and recedes to a depth of more than 20 inches during dry seasons. This soil has medium available water capacity to a depth of about 14 inches and low available water capacity below this depth. Permeability is rapid throughout. Internal drainage, however, is slow because it is impeded by a shallow water table. Natural fertility and organic matter content are high to a depth of about 14 inches and low below this depth.

Natural vegetation consists of cypress, cabbage palms, bay, and pond pine. Grasses include maidencane, giant cutgrass, low panicums, sand cordgrass, and other perennial grasses.

(10) Basinger fine sand, depressional - This is a poorly drained soil in depressional areas in the flatwoods. It also is along the edges of lakes. Slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 7 inches thick. The subsurface layer is light gray sand about 18 inches thick. The subsoil is mixed dark brown and gray fine sand about 11 inches thick. To a depth of 80 inches or more is light gray fine sand.

Included with this soil in mapping are small areas of Anclote, Delray, Floridana, and Pompano soils. Also included are similar soils that have a thin organic surface layer and similar soils that have a black surface layer 10 to 14 inches thick. Many areas mapped as this soil in the Richloam Wildlife Management Area have a 10-14 inch thick black surface layer. Included soils make up about 25 percent of any mapped area.

This soil is covered with standing water for periods of 6 -9 months or more in most years. Natural fertility is low, and response to fertilization is moderate. The internal drainage is naturally slow, and response to artificial drainage is rapid. This soil has low available water capacity.

Weeki Wachee Springs State Park Soil Descriptions

A large acreage is in natural vegetation of bay, cypress, pop ash, cabbage palm, and water oaks. Other areas are covered with maidencane, St. Johnswort, water lilies, pickerelweed, and other plants that tolerate wetness.

(35) Myakka fine sand - This is a nearly level, poorly drained soil in broad areas in the flatwoods. Slopes are smooth to concave and range from 0 to 2 percent.

Typically the surface layer is black fine sand about 5 inches thick. The subsurface layer is light gray fine sand about 20 inches thick. The subsoil is weakly cemented fine sand about 17 inches thick. The upper 4 inches is very dark grayish brown, the next 5 inches is very dark gray, and the lower 8 inches is dark reddish brown. The next layer is light brownish gray fine sand to a depth of about 50 inches and light gray fine sand below.

Included with this soil in mapping are similar soils that differ from Myakka fine sand by having a black surface layer more than 8 inches thick. Also included are small areas of Adamsville, Basinger, Eau Gallie, and Pompano soils. Limestone boulders, 2 to 6 feet in diameter, are in some areas of this soil at a depth of about 16 percent of any mapped area.

The water table is at a depth of less than 10 inches for 1 to 4 months in most years and recedes to a depth of more than 40 inches during very dry seasons. Myakka soils have medium available water capacity in the subsoil but very low available water capacity in the other layers. Permeability is rapid in the surface layer and substratum and moderate or moderately rapid in the subsoil. These soils have slow internal drainage and slow runoff. Natural fertility is low.

The natural vegetation is longleaf and slash pines with an understory of saw-palmetto, runner-oak, inkberry, wax myrtle, huckleberry, pineland three-awn, and scattered fetter bushes.

(39) Paola fine sand, 0-8 percent slopes - This is an excessively drained, nearly level to sloping soil on high ridges and hillsides in the sandhill areas of the county. Slopes are smooth to concave.

Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer is white fine sand to a depth of about 26 inches. The subsoil is brownish yellow fine sand with a few tongues of white fine sand from the subsurface layer mixed in. Very pale brown fine sand extends to a depth of 80 inches, and white fine sand extends to a depth of 99 inches or more.

Included with this soil in mapping are small areas of Astatula, Candler, and Tavares soils. In most places included soils make up less than 10 percent of any mapped area.

Weeki Wachee Springs State Park Soil Descriptions

The water table is below a depth of 72 inches. Paola soils have very low availability water capacity and very low natural fertility. Permeability is very rapid throughout the profile.

Few areas of this soil have been cleared. The native vegetation consists of sand pine, scrub live oak, scattered turkey and bluejack oaks, and an undergrowth of scattered saw-palmetto, creeping dodder, rosemary, cacti, mosses, and lichens.

Weeki Wachee Springs State Park Soil Descriptions

Addendum 5 – Plant and Animal List

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
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PTERIDOPHYTES

Southern wood fern.....	Dryopteris ludoviciana	
Scouring rush.....	Equisetum hyemale var. affine	
Japanese climbing fern *	Lygodium japonicum	
Cinnamon fern.....	Osmunda cinnamomea	
Royal fern	Osmunda regalis var. spectabilis	
Golden polypody	Phlebodium aureum	
Resurrection fern.....	Pleopeltis polypodioides	
Tailed bracken	Pteridium aquilinum var. pseudocaudatum	
Whisk fern	Psilotum nudum	
Chinese ladder brake **	Pteris vittata	
Widespread maiden fern	Thelypteris kunthii	
Marsh fern	Thelypteris palustris var. pubescens	
Netted chain fern	Woodwardia areolata	
Virginia chain fern	Woodwardia virginica	

GYMNOSPERMS

Red cedar	Juniperus virginiana	
Sand pine.....	Pinus clausa	
Slash pine.....	Pinus elliottii	
Oriental arborvitae**	Platycladus orientalis	
Yew plum-pine*	Podocarpus macrophyllus	
Pond-cypress.....	Taxodium ascendens	
Bald-cypress.....	Taxodium distichum	

ANGIOSPERMS

MONOCOTS

Yellow colicroot.....	Aletris lutea	
Broomsedge bluestem	Andropogon virginicus	
Jack in the pulpit	Arisaema triphyllum	
Wire grass.....	Aristida stricta var. beyrichiana	
Hillsborough threeawn.....	Aristida purpurascens var. tenuispica	
Bottlebrush threeawn.....	Aristida spiciformis	
Variegated giant reed **	Arundo donax 'Variegata'	
Sprenger's asparagus fern **	Asparagus aethiopicus	
Cast iron plant*.....	Aspidistra elatior	
Big carpetgrass	Axonopus furcatus	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Capillary hairsedge.....	<i>Bulbostylis ciliatifolia</i>	
Long's sedge.....	<i>Carex longii</i>	
Coastal sandbur.....	<i>Cenchrus spinifex</i>	
Jamaican sawgrass.....	<i>Cladium jamaicense</i>	
Florida jointtail grass.....	<i>Coelorachis tuberculosa</i>	25
Wild taro*	<i>Colocasia esculenta</i>	
Common dayflower*	<i>Commelina diffusa</i>	
Seven-sisters.....	<i>Crinum americanum</i>	
Bermudagrass **	<i>Cynodon dactylon</i>	
Fragrant flatsedge	<i>Cyperus odoratus</i>	
Air-potato*	<i>Dioscorea bulbifera</i>	
Coastal lovegrass	<i>Eragrostis virginica</i>	
Pinewoods fingergrass.....	<i>Eustachys petraea</i>	
Cogon grass*	<i>Imperata cylindrica</i>	
Redroot	<i>Lachnanthes caroliniana</i>	
Big blue lilyturf**	<i>Liriope muscari</i>	
Monkeygrass**.....	<i>Liriope spicata</i>	
Red natalgrass*	<i>Melinis repens</i>	
Southern water nymph.....	<i>Najas guadalupensis</i>	
Golden club.....	<i>Orontium aquaticum</i>	
Beaked panicum.....	<i>Panicum anceps</i>	
Maidencane.....	<i>Panicum hemitomon</i>	
Torpedograss*.....	<i>Panicum repens</i>	
Redtop panicum.....	<i>Panicum rigidulum</i>	
Bahiagrass *	<i>Paspalum notatum</i> var. <i>saurae</i>	
Vaseygrass*	<i>Paspalum urvillei</i>	
Fountaingrass**	<i>Pennisetum setaceum</i>	
Water lettuce	<i>Pistia stratiotes</i>	
Nun's orchid*.....	<i>Phaius tancarvilleae</i>	
Split-leaf philodendron **	<i>Philodendron bipinnatifidum</i>	
Needle palm.....	<i>Rhapidophyllum hystrix</i>	
Lady palm **	<i>Rhapis excelsa</i>	
Shortbristle horned beaksedge	<i>Rhynchospora corniculata</i>	
Narrow fruit horned beaksedge... ..	<i>Rhynchospora inundata</i>	
Sandyfield beaksedge.....	<i>Rhynchospora megalocarpa</i>	
Cabbage palm.....	<i>Sabal palmetto</i>	
Sugarcane plumegrass	<i>Saccharum giganteum</i>	
Common arrowhead	<i>Sagittaria latifolia</i>	
Springtape	<i>Sagittaria kurziana</i>	
Three square bulrush	<i>Schoenoplectus pungens</i>	
Fewflower nutrush	<i>Scleria ciliata</i> var. <i>pauciflora</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Tall nutgrass.....	<i>Scleria triglomerata</i>	
Tall nutgrass.....	<i>Scleria verticillata</i>	
Saw palmetto	<i>Serenoa repens</i>	
Giant bristlegrass	<i>Setaria magna</i>	
Yellow bristlegrass.....	<i>Setaria parviflora</i>	
Narrowleaf blue-eyed grass	<i>Sisyrinchium angustifolium</i>	
Earleaf greenbrier.....	<i>Smilax auriculata</i>	
Saw greenbrier.....	<i>Smilax bona-nox</i>	
Saw-brier	<i>Smilax glauca</i>	
Laurel greenbrier	<i>Smilax laurifolia</i>	
Wild sarsaparilla	<i>Smilax pumila</i>	
Johnsongrass*	<i>Sorghum halapense</i>	
Sand cordgrass	<i>Spartina bakeri</i>	
Peace lily**	<i>Spahtiphyllum wallissii</i>	
Smutgrass *	<i>Sprobolus indicus</i>	
St. Augustinegrass	<i>Stenotaphrum secundum</i>	
American evergreen*.....	<i>Syngonium podophyllum</i>	
Bartram's airplant	<i>Tillandsia bartramii</i>	
Ballmoss.....	<i>Tillandsia recurvata</i>	
Spanish moss	<i>Tillandsia usneoides</i>	
Purpletop tridens	<i>Tridens flavus</i>	
Purple sandgrass.....	<i>Triplasis purpurea</i>	
Fakahatcheegrass	<i>Tripsacum dactyloides</i>	
American eelgrass.....	<i>Vallisneria americana</i>	
Elephantear*.....	<i>Xanthosoma sagittifolium</i>	
Adam's needle.....	<i>Yucca filamentosa</i>	
Atamasco-lily.....	<i>Zephyranthes atamasca</i>	85
Bitter ginger**	<i>Zingiber zerumbet</i>	

DICOTS

Red maple.....	<i>Acer rubrum</i>	
Hammock snakeroot	<i>Ageratina jucunda</i>	
Pepper vine	<i>Ampelopsis arborea</i>	
Curtiss' milkweed	<i>Asclepias curtissii</i>	15
Scarlet milkweed *	<i>Asclepias curassavica</i>	
Coral ardisia *	<i>Ardisia crenata</i>	
Largeflower pawpaw	<i>Asimina obovata</i>	
Fern-leaf yellow false foxglove.....	<i>Aureolaria pedicularia</i> var. <i>pectinata</i>	
Silverling.....	<i>Baccharis glomeruliflora</i>	
Groundsel bush.....	<i>Baccharis halimifolia</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Herb-of Grace	<i>Bacopa monnieri</i>	
Rattan vine	<i>Berchemia scandens</i>	
Tarflower	<i>Befaria racemosa</i>	
Common beggarticks	<i>Bidens alba</i> var. <i>radiata</i>	
Smallfruit beggarticks	<i>Bidens mitis</i>	
False nettle.....	<i>Boehmeria cylindrica</i>	
Red spiderling	<i>Boerhavia diffusa</i>	
Scarlet calamint	<i>Calaminthe coccinea</i>	
Straggler daisy *	<i>Calypocarpus vialis</i>	
American beautyberry	<i>Callicarpa americana</i>	
Trumpet vine	<i>Campsis radicans</i>	
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>	
Spadeleaf	<i>Centella asiatica</i>	
Buttonbush.....	<i>Cephalanthus occidentalis</i>	
Florida rosemary	<i>Ceratiola ericoides</i>	
Night-flowering jessamine*	<i>Cestrum nocturnum</i>	
Partridge pea.....	<i>Chamaecrista fasciculata</i>	
Maryland goldenstar.....	<i>Chrysopsis mariana</i>	
Water hemlock.....	<i>Cicuta maculata</i>	
Camphortree **	<i>Cinnamomum camphora</i>	
Nuttall's thistle	<i>Cirsium nuttallii</i>	
Atlantic pigeonwings	<i>Clitoria mariana</i>	
Canadian horseweed.....	<i>Conyza canadensis</i>	
Swamp dogwood.....	<i>Cornus foemina</i>	
Michaux's croton.....	<i>Croton michauxii</i>	
Whitetassles	<i>Dalea carnea</i>	
Climbing hydrangea.....	<i>Decumaria barbara</i>	
Western tansymustard.....	<i>Descurainia pinnata</i>	
Tick-clover *	<i>Desmodium incanum</i>	
Threeflower ticktrefoil *.....	<i>Desmodium triflorum</i>	
Carolina ponysfoot	<i>Dichondra caroliniensis</i>	
Common persimmon	<i>Diospyros virginiana</i>	
American burnweed.....	<i>Erechtites hieracifolia</i>	
Oakleaf fleabane.....	<i>Erigeron quercifolius</i>	
Loquat*.....	<i>Eriobotrya japonica</i>	
Dog's-tongue wild-buckwheat.....	<i>Eriogonum tomentosum</i>	
Coralbean	<i>Erythrina herbacea</i>	
Dogfennel	<i>Eupatorium capillifolium</i>	
Mohr's thoroughwort.....	<i>Eupatorium mohrii</i>	
Carolina ash	<i>Fraxinus caroliniana</i>	
Cottonweed.....	<i>Froelichia floridana</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Garberia	<i>Garberia heterophylla</i>	15
Southern beeblossom	<i>Gaura angustifolia</i>	
Blue huckleberry	<i>Gaylussacia frondosa</i> var. <i>tomentosa</i>	
Yellow jessamine.....	<i>Gelsemium sempervirens</i>	
Loblolly bay	<i>Gordonia lasianthus</i>	
Florida scrub pinweed	<i>Helianthemum nashii</i>	
Manyflower Marshpennywort	<i>Hydrocotyle umbellata</i>	
Peelbark St. John's-wort.....	<i>Hypericum fasciculatum</i>	
Fourpetal St. John's-wort.....	<i>Hypericum tetrapetalum</i>	
Musky mint	<i>Hyptis alata</i>	
Carolina holly	<i>Ilex ambigua</i>	
Dahoon holly	<i>Ilex cassine</i>	
Large gallberry	<i>Ilex coriacea</i>	
Gallberry	<i>Ilex glabra</i>	
Hairy indigo *	<i>Indigofera hirsuta</i>	
Trailing indigo *	<i>Indigofera spicata</i>	
Tievine.....	<i>Ipomoea cordatotriloba</i>	
Saltmarsh morning glory.....	<i>Ipomoea sagittata</i>	
Virginia willow.....	<i>Itea virginica</i>	
Nodding pinweed	<i>Lechea cernua</i>	15
Deckert's pinweed	<i>Lechea deckertii</i>	
Virginia pepperweed	<i>Lepidium virginicum</i>	
Shortleaf gayfeather.....	<i>Liatris tenuifolia</i>	
Gopher apple	<i>Licania michauxii</i>	
Canada toadflax	<i>Linaria canadensis</i>	
Sweetgum.....	<i>Liquidambar styraciflua</i>	
Rose rush	<i>Lygodesmia aphylla</i>	
Cardinal flower	<i>Lobelia cardinalis</i>	57
Coral honeysuckle	<i>Lonicera sempervirens</i>	
Creeping primrosewillow	<i>Ludwigia repens</i>	
Skyblue lupine.....	<i>Lupinus diffusus</i>	
Rusty staggerbush	<i>Lyonia ferruginea</i>	
Coastalplain staggerbush	<i>Lyonia fruticosa</i>	
Fetterbush.....	<i>Lyonia lucida</i>	
Southern magnolia.....	<i>Magnolia grandiflora</i>	
Sweetbay.....	<i>Magnolia virginiana</i>	
Black medick *	<i>Medicago lupulina</i>	
Chinaberrytree **	<i>Melia azedarach</i>	
White sweetclover *	<i>Melilotus alba</i>	
Climbing hempvine.....	<i>Mikania scandens</i>	
Wax myrtle.....	<i>Myrica cerifera</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Swamp tupelo.....	<i>Nyssa sylvatica</i> var. <i>biflora</i>	
Pricklypear	<i>Opuntia humifusa</i>	
Piedmont leatherroot.....	<i>Orbexilum lupinellus</i>	
Scrub wild olive.....	<i>Osmanthus megacarpus</i>	
Common yellow woodsorrel	<i>Oxalis corniculata</i>	
Skunk vine*	<i>Paederia foetida</i>	
Coastalplain palafox.....	<i>Palafoxia integrifolia</i>	
Virgina creeper	<i>Parthenocissus quinquefolia</i>	
Red bay	<i>Persea borbonia</i>	
Silk bay	<i>Persea borbonia</i> var. <i>humilis</i>	
Swamp bay	<i>Persea palustris</i>	
Oak mistletoe	<i>Phoradendron leucarpum</i>	
Turkey tanglefoot fogfruit.....	<i>Phyla nodiflora</i>	
Carry-me-seed*	<i>Phyllanthus amarus</i>	
Mascarene island leafflower*	<i>Phyllanthus tenellus</i>	
Walter’s groundcherry	<i>Physalis walteri</i>	
Pokeweed	<i>Phytolacca americana</i>	
Pennyroyal	<i>Piloblephis rigida</i>	
Pitted stripeseed	<i>Piriqueta cistoides</i> subsp. <i>caroliniana</i>	
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>	
Virginia plantain	<i>Plantago virginica</i>	
Camphorweed	<i>Pluchea camphorata</i>	
Painted leaf.....	<i>Poinsettia cyathophora</i>	
October flower	<i>Polygonella polygama</i>	
Large flower jointweed	<i>Polygonella robusta</i>	
Carolina laurelcherry	<i>Prunus caroliniana</i>	
Black cherry.....	<i>Prunus serotina</i>	
Blackroot.....	<i>Pterocaulon pycnostachyum</i>	
Firethorn**	<i>Pyracantha koidumii</i>	
Chapman’s oak.....	<i>Quercus chapmanii</i>	
Sand live oak.....	<i>Quercus geminata</i>	
Laurel oak.....	<i>Quercus laurifolia</i>	
Myrtle oak	<i>Quercus myrtifolia</i>	
Water oak	<i>Quercus nigra</i>	
Running oak.....	<i>Quercus pumila</i>	
Virginia live oak	<i>Quercus virginiana</i>	
Wild radish *	<i>Raphanus raphanistrum</i>	
Winged sumac	<i>Rhus copallinum</i>	
Tropical Mexican clover *	<i>Richardia brasiliensis</i>	
Rough Mexican clover *	<i>Richardia scabra</i>	
Swamp rose.....	<i>Rosa palustris</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Plants

Common Name	Scientific Name	Primary Habitat (for designated species)
Sawtooth blackberry.....	<i>Rubus argutus</i>	
Heartwing dock.....	<i>Rumex hastatulus</i>	
Coastalplain willow.....	<i>Salix caroliniana</i>	
Lyreleaf sage	<i>Salvia lyrata</i>	
Elderberry.....	<i>Sambucus nigra</i> subsp. <i>canadensis</i>	
Chinese tallow*.....	<i>Sapium sebiferum</i>	
Lizardtail	<i>Saururus cernua</i>	
Florida bully.....	<i>Sideroxylon reclinatum</i>	
Tough bully.....	<i>Sideroxylon tenax</i>	
Pinebarren goldenrod	<i>Solidago fistulosa</i>	
Chapman's goldenrod.....	<i>Solidago odora</i> var. <i>chapmanii</i>	
Roughfruit scaleseed	<i>Spermolepis divaricata</i>	
Wedelia*.....	<i>Sphagneticola trilobata</i>	
Florida betony.....	<i>Stachys floridana</i>	
Common chickweed*	<i>Stellaria media</i>	
Climbing aster	<i>Symphyotrichum carolinianum</i>	
Common dandelion *	<i>Taraxacum officinale</i>	
Eastern poison ivy	<i>Toxicodendron radicans</i>	
American elm	<i>Ulmus americana</i>	
Chinese elm **	<i>Ulmus parviflora</i>	
Sparkleberry.....	<i>Vaccinium arboreum</i>	
Highbush blueberry	<i>Vaccinium corymbosum</i>	
Shiny blueberry	<i>Vaccinium myrsinites</i>	
Deerberry.....	<i>Vaccinium stamineum</i>	
Wand mullein*	<i>Verbascum virgatum</i>	
Sandpaper vervain.....	<i>Verbena scabra</i>	
White crownbeard	<i>Verbesina virginica</i>	
Walter's viburnum.....	<i>Viburnum obovatum</i>	
Sweet viburnum**.....	<i>Viburnum odoratissimum</i>	
Common blue violet.....	<i>Viola sororia</i>	
Muscadine.....	<i>Vitis rotundifolia</i>	
Oriental false hawksbeard *	<i>Youngia japonica</i>	

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Animals

Common Name	Scientific Name	Primary Habitat (for all species)
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MOLLUSKS

Florida applesnail	Pomacea paludosa.....	57
Florida rainbow	Villosa amygdala	57

FISH

Crevalle jack.....	Caranx hippos.....	57
Mosquitofish	Gambusia affinis.....	57
Bluegill	Lepomis macrochirus.....	57
Redear sunfish.....	Lepomis microlophus.....	57
Spotted sunfish.....	Lepomis punctatus.....	57
Mangrove snapper.....	Lutjanus griseus	57
Florida largemouth bass	Micropterus salmoides floridanus.....	57
Striped mullet	Mugil cephalus	57
Atlantic needlefish	Strongylura marina.....	57

AMPHIBIANS

Greenhouse frog.....	Eleutherodactylus p. planirostris.....	85
Cuban treefrog.....	Osteopilus septentrionalis.....	85

REPTILES

Crocodylians

American alligator	Alligator mississippiensis	57
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Turtles

Florida softshell turtle	Apalone ferox.....	57
Florida snapping turtle	Chelydra serpentina osceola	57
Gopher tortoise.....	Gopherus polyphemus	8, 15
Ornate diamondbacked terrapin..	Malaclemys terrapin macrospilota.....	57
Peninsula cooter	Pseudemys floridana peninsularis	57
Florida redbelly turtle	Pseudemys nelsoni.....	57

Lizards

Green anole	Anolis carolinensis	15
Six-lined racerunner	Cnemidophorus sexlineatus sexlineatus	8, 15
Southern fence lizard	Sceloporus undulatus undulatus	15

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Animals

Common Name	Scientific Name	Primary Habitat (for all species)
Snakes		
Brahminy blind snake*	<i>Ramphotyphlops braminus</i>	15
Southern black racer	<i>Coluber constrictor priapus</i>	15, 85
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	15
Corn snake	<i>Elaphe guttata guttata</i>	15
BIRDS		
Cormorants		
Double-crested cormorant	<i>Phalacrocorax auritus</i>	57
Herons and Bitterns		
Great egret	<i>Ardea alba</i>	57
Little blue heron	<i>Egretta caerulea</i>	57
Snowy egret	<i>Egretta thula</i>	57
Storks		
Wood stork	<i>Mycteria americana</i>	37, 57, OF
Cranes		
Florida sandhill crane	<i>Grus canadensis pratensis</i>	25
Ducks and Geese		
Muscovy duck	<i>Cairina moschata</i>	85
Mottled duck	<i>Anas fulvigula</i>	57
Hawks, Eagles and Kites		
Red-tailed hawk	<i>Buteo jamaicensis</i>	37, OF
Red-shouldered hawk	<i>Buteo lineatus</i>	OF
Bald eagle	<i>Haliaeetus leucocephalus</i>	15, 57
Osprey	<i>Pandion haliaetus</i>	OF
Vultures		
Turkey vulture	<i>Cathartes aura</i>	57, OF
Black vulture	<i>Coragyps atratus</i>	57, OF
Turkey and Quail and Fowl		
Northern bobwhite	<i>Colinus virginianus</i>	8, 15
Wild turkey	<i>Meleagris gallopavo</i>	85
Indian peafowl**	<i>Pavo cristatus</i>	85

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Animals

Common Name	Scientific Name	Primary Habitat (for all species)
Limpkin		
Limpkin	<i>Aramus guarauna</i>	57
Gulls		
Ring-billed gull.....	<i>Larus delawarensis</i>	OF
Laughing gull	<i>Larus atricilla</i>	OF
Doves		
Common ground-dove	<i>Columbina passerina</i>	8, 15
Mourning dove.....	<i>Zenaida macroura</i>	MTC
Owls		
Barred owl.....	<i>Strix varia</i>	37
Goatsuckers		
Common nighthawk	<i>Chordeiles minor</i>	37, OF
Woodpeckers		
Pileated woodpecker	<i>Dryocopus pileatus</i>	MTC
Red-bellied woodpecker.....	<i>Melanerpes carolinus</i>	MTC
Downy woodpecker	<i>Picoides pubescens</i>	MTC
Flycatchers		
Eastern phoebe	<i>Sayornis phoebe</i>	MTC
Great crested flycatcher	<i>Myiarchus crinitus</i>	85
Vireos		
White-eyed vireo.....	<i>Vireo griseus</i>	8, 15, 37
Blue-headed vireo	<i>Vireo solitarius</i>	8, 15, 37
Jays and Crows		
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	15
American crow	<i>Corvus brachyrhynchos</i>	8, 85, OF
Fish crow	<i>Corvus ossifragus</i>	OF
Blue jay.....	<i>Cyanocitta cristata</i>	MTC
Titmice		
Tufted titmouse	<i>Baeolophus bicolor</i>	MTC
Carolina chickadee.....	<i>Poecile carolinensis</i>	15
Wrens		

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Animals

Common Name	Scientific Name	Primary Habitat (for all species)
Carolina wren	<i>Thryothorus ludovicianus</i>	MTC
Gnatcatchers and Kinglets		
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	MTC
Thrushes		
Eastern bluebird	<i>Sialia sialis</i>	15
American robin.....	<i>Turdus migratorius</i>	MTC
Thrashers		
Gray catbird	<i>Dumetella carolinensis</i>	MTC
Northern mockingbird.....	<i>Mimus polyglottos</i>	MTC
Waxwings		
Cedar waxwing	<i>Bombycilla cedrorum</i>	OF
Warblers		
Prairie warbler	<i>Dendroica discolor</i>	8, 15, 37
Yellow-throated warbler.....	<i>Dendroica dominica</i>	8, 15, 37
Pine warbler	<i>Dendroica pinus</i>	8, 15, 37
Northern parula	<i>Parula americana</i>	8, 15, 37
Sparrows		
Eastern towhee	<i>Pipilo erythrophthalmus</i>	8, 15
Chipping sparrow	<i>Spizella passerina</i>	8, 15
Meadowlarks, Blackbirds and Orioles		
Red-winged blackbird.....	<i>Agelaius phoeniceus</i>	25
Common grackle.....	<i>Quiscalus quiscula</i>	MTC
Cardinals, Grosbeaks, and Buntings		
Northern cardinal	<i>Cardinalis cardinalis</i>	MTC
Finches		
House finch*.....	<i>Carpodacus mexicanus</i>	37, 85

MAMMALS

Sirenias

West Indian manatee..... *Trichechus manatus* 57

* Non-native Species

**Non-native species Attraction-only occurrence

Weeki Wachee Springs State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (for all species)
Lagomorphs		
Eastern cottontail	<i>Sylvilagus floridanus</i>	8
Rodents		
Golden mouse.....	<i>Ochrotomys nuttalli</i>	15
Gray squirrel.....	<i>Sciurus carolinensis</i>	MTC
Carnivores		
Bobcat.....	<i>Felis rufus</i>	15
River otter.....	<i>Lutra canadensis</i>	57
Raccoon.....	<i>Procyon lotor</i>	MTC
Artiodactyls		
White-tailed deer.....	<i>Odocoileus virginianus</i>	15, 37

* Non-native Species

**Non-native species Attraction-only occurrence

Addendum 6 – Imperiled Species Ranking Definitions

Imperiled Species Ranking Definitions

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

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

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

FNAI GLOBAL RANK DEFINITIONS

- G1.....Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or fabricated factor.
- G2.....Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- G3.....Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- G4.....apparently secure globally (may be rare in parts of range)
- G5.....demonstrably secure globally
- GH.....of historical occurrence throughout its range may be rediscovered (e.g., ivory-billed woodpecker)
- GX.....believed to be extinct throughout range
- GXC.....extirpated from the wild but still known from captivity or cultivation
- G#?.....Tentative rank (e.g.,G2?)
- G#G#.....range of rank; insufficient data to assign specific global rank (e.g., G2G3)

Imperiled Species Ranking Definitions

- G#T#rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
- G#Qrank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
- G#T#Qsame as above, but validity as subspecies or variety is questioned.
- GUdue to lack of information, no rank or range can be assigned (e.g., GUT2).
- G?Not yet ranked (temporary)
- S1Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- S2Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- S3Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- S4apparently secure in Florida (may be rare in parts of range)
- S5demonstrably secure in Florida
- SHof historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
- SXbelieved to be extinct throughout range
- SAaccidental in Florida, i.e., not part of the established biota
- SEan exotic species established in Florida may be native elsewhere in North America
- SNregularly occurring but widely and unreliably distributed; sites for conservation hard to determine
- SUdue to lack of information, no rank or range can be assigned (e.g., SUT2).
- S?Not yet ranked (temporary)
- NNot currently listed, nor currently being considered for listing, by state or federal agencies.

Imperiled Species Ranking Definitions

LEGAL STATUS

FEDERAL

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

- LE Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.
- PE Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species. LT Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.
- PT Proposed for listing as Threatened Species.
- C Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.
- E(S/A) Endangered due to similarity of appearance.
- T(S/A) Threatened due to similarity of appearance.

STATE

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

- LE Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.
- LT Listed as Threatened Species by the FFWCC. Defined as a species, subspecies, or isolated population, which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat, is decreasing in area at a rapid rate and therefore is destined or very likely to become an endangered species within the near future.
- LS Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance or substantial human exploitation that, in the near future, may result in its becoming a threatened species?

Imperiled Species Ranking Definitions

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

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

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

Addendum 7 – Cultural Information

Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties (revised February 2007)

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 that 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 in the following:

Chapter 253, F.S. – State Lands

Chapter 267, F.S. – Historical Resources

Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties (revised February 2007)

Chapter 872, F.S. – Offenses Concerning Dead Bodies and Graves

Other helpful citations and references:

Chapter 1A-32, F.A.C. – Archaeological Research

Other helpful citations and references:

Chapter 1A-44, F.A.C. – Procedures for Reporting and Determining Jurisdiction Over Unmarked Human Burials

Chapter 1A-46, F.A.C. – Archaeological and Historical Report Standards and Guidelines

The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings

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, 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 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 prepare for locating and evaluating historic resources, both archaeological sites and historic structures.

**Management Procedures for Archaeological and Historical Sites and Properties on
State-Owned or Controlled Properties (revised February 2007)**

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, the following information, at a minimum, must be submitted for comments and recommendations.

Project Description - A detailed description of the proposed project including all related activities. For land clearing or ground disturbing activities, the depth and extent of the disturbance, use of heavy equipment, location of lay down yard, etc. For historic structures, specific details regarding rehabilitation, demolition, etc.

Project Location - The exact location of the project indicated on a USGS Quadrangle map, is preferable. A management base map may be acceptable. Aerial photos indicating the exact project area as supplemental information are helpful.

Photographs - Photographs of the project area are always useful. Photographs of structures are required.

Description of Project Area - Note the acreage of the project; describe the present condition of project area, and any past land uses or disturbances.

Description of Structures - Describe the condition and setting of each building within project area if approximately fifty years of age or older.

Recorded Archaeological Sites or Historic Structures - Provide Florida Master Site File numbers for all recorded historic resources within or adjacent to the project area. This information should be in the current management plan; however, it can be obtained by contacting the Florida Master Site File at (850) 245-6440 or Suncom 205-6440.

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

Susan M. Harp
Historic Preservation Planner
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) 245-6333
Fax: (850) 245-6438

**Management Procedures for Archaeological and Historical Sites and Properties on
State-Owned or Controlled Properties (revised February 2007)**

Eligibility Criteria for National Register of Historic Places

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; or

Eligibility Criteria for National Register of Historic Places

- e) a 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
- f) a property achieving significance within the past 50 years, if it is of exceptional importance.

Preservation Treatments as Defined by Secretary of Interior's Standards and Guidelines

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.

**Preservation Treatments as Defined by Secretary of Interior's Standards and
Guidelines**
