

EDWARD BALL WAKULLA SPRINGS

STATE PARK

UNIT MANAGEMENT PLAN

APPROVED

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks

December 14, 2007

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INTRODUCTION

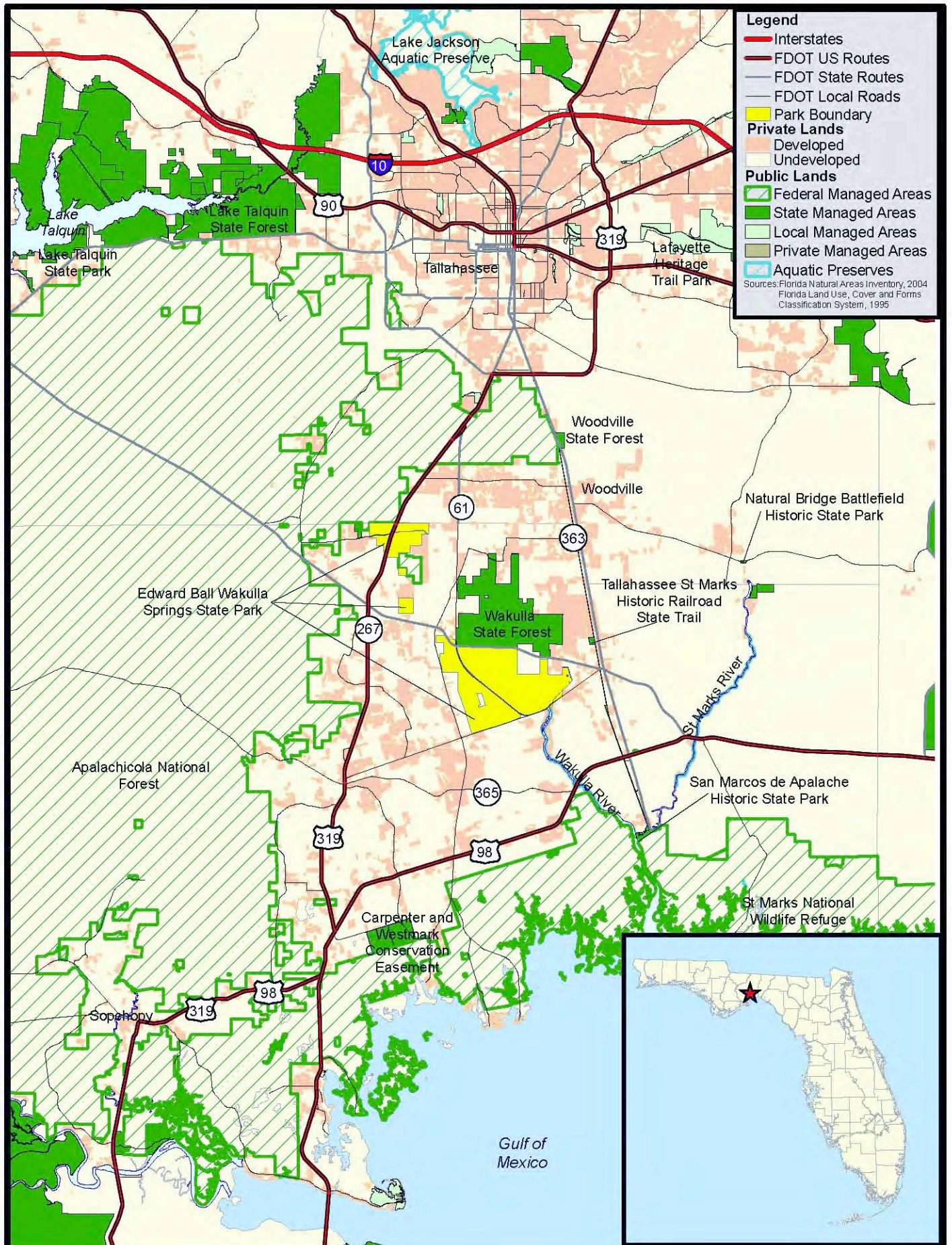
Edward Ball Wakulla Springs State Park is located in Wakulla County, approximately 10 miles south of the City of Tallahassee (see Vicinity Map). The park is comprised of multiple parcels, some of which are discontinuous, but can be organized generally into three components. The original land purchased to create the park, which includes the Wakulla Spring basin and most recreational facilities, is located between State Road 267 and State Road 61 (see Reference Map). The Cherokee Sink parcel is located to the west across State Road 61. Three additional parcels known as the River Sinks and Turner Sinks parcels are located to the northwest along the Leon and Wakulla County lines and adjacent to the Apalachicola National Forest. The largest of these three parcels is bisected by U.S. Highway 319. Access to the park is from State Road 267 (main entrance), State Road 61 (Cherokee Sink parcel) or CJ Spears and New Light Church Roads (River Sinks property).

Edward Ball Wakulla Springs State Park includes a number of significant resources and historical associations that make this property unique to the state park system. The following statements capture the essence of the park's importance to the region's natural and/or cultural heritage:

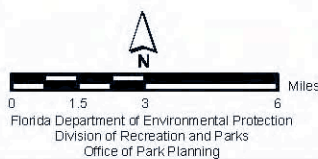
- The park contains a first magnitude freshwater spring that includes one of the world's largest basins and deepest cave systems.
- The park includes three miles of "wild" spring run that supports an abundance of wildlife that can be readily experienced by the visiting public.
- The physical and recorded history of the park provides an understanding of the long-term relationships between human cultures and natural resources on Florida's north Gulf Coast from the earliest habitation through the modern era.
- The park played a significant role in the social, economic and political life of Floridians under the ownership and development of Edward Ball.
- The Wakulla Springs Lodge complex continues to provide a unique recreational experience consistent with its origin during the Depression era.

At Edward Ball Wakulla Springs State Park, public outdoor recreation and conservation is the designated single use of the property. There are no legislative or executive directives that constrain the use of this property. The first portion of the park was acquired on September 17, 1986 using Conservation and Recreational Land (CARL) funds. The park was initially purchased to preserve and interpret one of the world's largest and deepest freshwater springs systems and the wildlife and archaeological/historical features associated with it, and to maintain and enhance unique resource-based, public recreational opportunities established by one of north Florida's influential historic figures – Edward Ball.

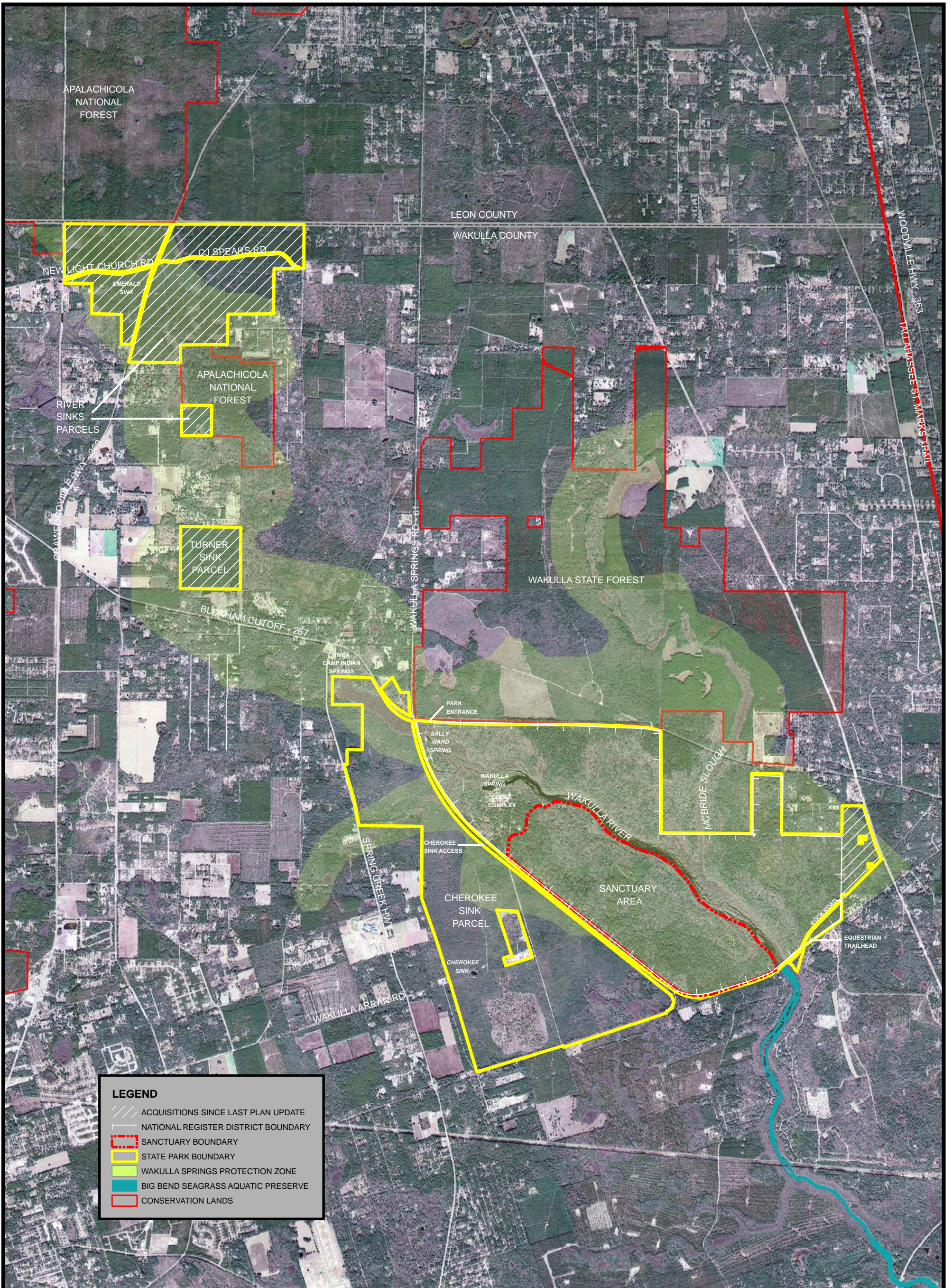
Since the initial purchase, the Trustees acquired additional properties using the funds



**EDWARD BALL WAKULLA
SPRINGS STATE PARK**



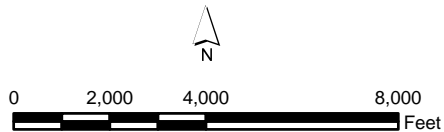
**VICINITY
MAP**



LEGEND

- ACQUISITIONS SINCE LAST PLAN UPDATE
- NATIONAL REGISTER DISTRICT BOUNDARY
- SANCTUARY BOUNDARY
- STATE PARK BOUNDARY
- WAKULLA SPRINGS PROTECTION ZONE
- BIG BEND SEAGRASS AQUATIC PRESERVE
- CONSERVATION LANDS

**EDWARD BALL WAKULLA SPRINGS
STATE PARK**



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

**REFERENCE
MAP**

from the P-2000/CARL, Florida Forever and Acquisition and Inholdings Programs (see Addendum 1). The latter acquisitions have focused on protecting the spring by acquiring land above the conduits that feed it, connecting the park with the Apalachicola National Forest and expanding resource-based recreation opportunities. Approximately, 1,314 acres have been added to the park since the 2001 plan update (see Reference Map). The park is currently comprised of 6,055.22 acres. Edward Ball Wakulla Springs State Park is classified as a state park within the Division's Unit Classification System. As a state park, a balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Emphasis of use is placed on passive recreational enjoyment through such activities as natural scenery appreciation, nature and cultural study and picnicking, and fully compatible active pursuits such as hiking, horseback riding and swimming. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, but respecting the more sensitive or fragile natural areas, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation of the park's natural, aesthetic and educational attributes.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Edward Ball Wakulla Springs State Park as a unit of Florida's state park system. It identifies the objectives, criteria and standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the December 6, 2001 approved plan. All development and resource alteration encompassed in this plan is subject to the granting of appropriate permits; easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code. The plan consists of two interrelated components. Each component corresponds to a particular aspect of the administration of the park. The resource management component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management problems and needs are identified, and specific management objectives are established for each resource type. This component provides guidance on the application of such measures as prescribed burning, exotic species removal and restoration of natural conditions.

The land use component is the recreational resource allocation plan for the unit. Based

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

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

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that timber management for restoration purposes would be appropriate at this park as an additional source of revenue for land management since it is compatible with the park’s primary purpose of resource-based outdoor recreation and conservation.

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

MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

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

It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state’s natural values; conserve these natural values for all time; administer the

development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.

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

Park Goals and Objectives

The following park goals and objectives express the Division's long-term intent in managing the state park. At the beginning of the process to update this management plan, the Division reviewed the goals and objectives of the previous plan to determine if they remain meaningful and practical and should be included in the updated plan. This process ensures that the goals and objectives for the park remain relevant over time. Estimates are developed for the funding and staff resources needed to implement the management plan based on these goals, objectives and priority management activities. Funding priorities for all state park management and development activities are reviewed each year as part of the Division's legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also aggressively pursues a wide range of other funds and staffing resources, such as grants, volunteers and partnerships with agencies, local governments and the private sector, for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Natural and Cultural Resources

1. Preserve, restore and maintain natural communities.
 - A. Expand the upland pine community restoration plan to include disturbed areas of the River Sinks property.
 - B. Maintain and continue restoration of the 150-acre upland pine site on the Cherokee Sink property.
 - C. Continue with the restoration of the Cherokee Sink area using erosion control measures such as vegetation, berms, recontouring and boardwalks.
 - D. Continue attempts to restore populations of native plants and animals found in the Wakulla River that were negatively impacted by the hydrilla infestation, i.e. the restocking of eelgrass and apple snails.
 - E. Continue attempts to restore herbaceous ground cover in upland pine sites.

2. Maintain and expand the park's prescribed fire program.
 - A. Continue prescribed fire program to maintain and restore fire type habitat.
 - B. Expand the prescribed fire program to include fire dependant areas of the River Sinks property.
 - C. Burn all "Back logged" acreage and then burn within rotation to prevent future "Back log" burn zones.
 - D. Continue to maintain and upgrade the park's burn equipment.
 - E. Conduct an annual review of the park's prescribed fire program.
 - F. Conduct yearly photo plots of selected burn zones.
 - G. Continue to train park staff to improve and expand the park's burn team.
 - H. Continue to provide support to insure District wide prescribed burn goals are met.
3. Protect, restore and maintain water quality conditions.
 - A. Continue to monitor water quality of Wakulla Spring, Wakulla River and Cherokee Sink with park staff and assistance provided by other agencies.
 - B. Record and graph visibility of Wakulla Spring and daily rainfall.
 - C. Continue with the monthly Lakewatch water-sampling program.
 - D. Continue outreach education through the Springs Ambassador to protect karst features in private ownership.
 - E. Continue exploration and mapping of the Wakulla Spring cave system and the Leon Sinks cave system.
 - F. Continue to provide support for research and monitoring projects.
4. Protect, restore and maintain native animal diversity and natural relative abundance.
 - A. Continue to Conduct the Full River Wildlife Survey of the Wakulla River twice a year.
 - B. Continue to conduct monthly wildlife surveys of the boat tour route.
 - C. Continue to conduct periodic gopher tortoise burrow surveys after prescribed burns.
 - D. Monitor and protect other designated species including the Limpkin, and Bald eagle.
 - E. Continue support for DEP Bureau of Laboratories quarterly aquatic biological sampling.
 - F. Continue efforts to restore the native apple snail population.
5. Continue due diligence of the control of invasive exotic plant and animal species.
 - A. Continue to control the growth of hydrilla in Wakulla Spring, the public swimming area, the boat area and the park portion of the Wakulla River with the assistance of DEP Bureau of Invasive Plant Management.
 - B. Identify and conduct controls on other exotic plants found within the park.
 - C. Continue to monitor and treat all areas of park property for exotic plant infestations.
 - D. Continue to monitor the spread of the exotic channeled apple snail in an effort to prevent its introduction in to park waters.

6. Designate, post with signage, patrol and manage boundaries to protect park resources.
 - A. Maintain all park boundary fencing and install new fencing where needed to reduce encroachment.
 - B. Maintain and expand patrol roads/firebreaks to include all new perimeter boundaries of the park's burn zones.
 - C. Survey and clear any new boundary line that is not clearly identified.
 - D. Monitor and control unauthorized access to sinkholes to prevent soil erosion.
7. Complete necessary surveys, plans, research projects and trainings to understand, protect, manage and interpret cultural resources.
 - A. Request a Phase I Archaeological Survey be conducted on Cherokee Sink property and other recent additions to the park.
 - B. Coordinate cultural resource research and management practices with Division of Historic Resources (DHR), Bureau of Natural and Cultural Resources (BNCR), and appropriate heritage interest organizations.
 - C. Survey or research to confirm location of suspected cemetery near Cherokee Sink.
 - D. Conduct periodic cultural resource training programs to instruct maintenance staff and park rangers on proper procedures for managing and interpreting cultural resources.
8. Eliminate or minimize impacts to cultural resources from resource management, park operations, visitor activities, vandalism, erosion and other forms of encroachment.
 - A. Regularly patrol cultural sites to assess their condition and focus monitoring efforts on those in poor condition or facing imminent threats.
 - B. Conduct all ground-disturbing activities according to Division of Historical Resources (DHR) policy and Division guidelines.
 - C. Develop and adhere to appropriate cyclical maintenance schedules for management of structures associated with the lodge complex.
9. Develop and maintain systems and procedures for collections management and cultural site record keeping.
 - A. Develop a Scope of Collections statement and collections management program to inventory, evaluate and catalog artifacts and architectural objects for their proper curation and interpretation.
 - B. Maintain a set of files for each established site. Document any activities such as maintenance, unauthorized use or other impacts and new findings that occur.
 - C. Seek safe alternative location for storing historic records such as with the Division's collections and archives managed by the Bureau of Natural and Cultural Resources.
 - D. Preserve, display and interpret farm implements, underwater bell and other items related to the history of the park.
 - E. Continue to organize, inventory, and digitize archival records related to

Wakulla Springs and provide appropriate documents to the Department of State.

10. Request appropriations and seek alternative funding support to meet pressing preservation needs of historic structures, features and cultural sites.
 - A. Assess condition and clean underground return air duct.
 - B. Update the electrical system of the administration building and replace roof.
 - C. Renovate the gift shop, specifically improvements to the electrical and plumbing.
 - D. Keep walls and roof of Laundry free of vegetation and leaf litter and trim overhanging limbs that threaten the structure.
 - E. Preserve the historic landfill/dump complex through the placement of clean fill dirt in the excavated pits.

Recreation Goals

1. Continue to provide quality resource based outdoor recreational and interpretive programs and facilities at the park.
 - A. Maintain a premier, environmentally friendly historic lodge and conference facility.
 - B. Maintain public access to the Wakulla Spring basin and river for swimming and guided glass bottom boat and riverboat tours.
 - C. Maintain public access to Cherokee Sink for swimming and picnicking.
 - D. Maintain a system of trails for hiking, biking and horseback riding.
 - E. Maintain a picnic area and playground near the waterfront entrance.
 - F. Provide a variety of programs and special events that enhance public understanding of park history, resources and management activities and promote environmental stewardship.
 - G. Provide passive interpretive opportunities through interpretive signs and kiosks at important resource locations.
2. Seek funding to expand recreational and interpretive opportunities through the development of programs, and new use areas and facilities, as outlined in this management plan.
 - A. Establish a trail system on the River Sinks property.
 - B. Enhance the existing hiking trail with a bridged crossing of Sally Ward Slough.
 - C. Provide shelters, permanent restroom and improved parking and access to Cherokee Sink.
 - D. Establish a shared use trail for hiking and horseback riding on the Cherokee Sink property.
 - E. Improve parking and traffic circulation, picnic and restroom facilities at the Lodge and picnic area.
 - F. Enhance interpretive opportunities through the adaptive reuse of the Pavilion building.
 - G. Increase meeting space capacity through the adaptive reuse of the laundry

building.

- H. Upgrade and expand informational and interpretive signage to improve trail orientation and interpretation of significant resources.
- I. Undertake improvements and establish a system for the management of SCUBA diving at Emerald Sink.
- J. Continue educational partnerships with area schools to include programming that focuses on water quality issues.

Park Administration and Operations Goals

- 1. Provide convenient, safe and well-maintained public facilities.
 - A. Provide clear, consistent park informational signage at primary public access points.
 - B. Conduct regular inspections of use areas and facilities and correct deficiencies when necessary.
 - C. Provide universal access to recreation facilities consistent with current federal guidelines.
- 2. Promote community support and bolster park staff and funding resources through education, training, research and partnership opportunities.
 - A. Secure additional park service specialist position or funding equivalent to meet increased management demands presented by an expanded resource base and new recreational facilities.
 - B. Recruit and maintain a cadre of volunteers to assist with management and interpretation of the park.
 - C. Pursue funding alternatives to the legislative budget appropriation process.
 - D. Ensure staff are properly trained and supervised in the areas of visitor services, natural and cultural resource management, park operations, interpretation and emergency procedures.
 - E. Provide a facility to house visiting researchers and volunteers contributing to an understanding of park resources and/or assisting with pressing resource management needs.
 - F. Establish and maintain partnerships with federal, state and local agencies and non-governmental organizations to enhance resource management and resource-based recreational opportunities.
- 3. Support land use planning policies, regulations and acquisition initiatives that serve to enhance management and protection of park resources.
 - A. Network with other land and water management and regulatory entities to coordinate and enhance regional resource management and protection efforts.
 - B. Monitor proposed land use changes outside the park that may impact resource integrity.
 - C. Pursue acquisition of areas deemed important to be managed as part of the park.

Management Coordination

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

The Department of Agriculture and Consumer Services, Division of Forestry (DOF), assists Division staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FFWCC), assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within park boundaries. In addition, the FFWCC aids the Division with wildlife management programs, including the development and management of the Great Florida Birding Trail program. The Department of State, Division of Historical Resources (DHR) assists staff to assure protection of archaeological and historical resources. The Department of Environmental Protection (DEP), Division of State Lands, Bureau of Invasive Plant Management aids staff in exotic plant controls including the herbicide treatment of hydrilla. The DEP, Division of Resource Assessment and Management, Florida Geological Survey assists with water sampling, water analysis, research, data and map production, and publications. DEP, Division of Water Resource Management conducts biological community sampling and analysis, and water quality monitoring. Law enforcement is provided by the DEP Division of Law Enforcement, Bureau of Park Patrol. The DEP Division of Waste Management manages the Green Lodging program and aids in recycling. The Northwest Florida Water Management District provides assistance with research, water sampling, water analysis and flow determination of the spring and river. The park is an active member of the Wakulla Spring Basin Working Group providing assistance and cooperation with the group's projects and research. The park should maintain its status as an active member of this working group.

Public Participation

The Division provided an opportunity for public input by conducting a public workshop and an advisory group meeting. A public workshop was held on Tuesday, May 22, 2007. The purpose of this meeting was to present this draft management plan to the public. An Advisory Group meeting was held on Wednesday, May 23, 2007. The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss this draft management plan.

Other Designations

Edward Ball Wakulla Springs State Park is not within an Area of Critical State Concern as defined in section 380.05, Florida Statutes and it is not under study for such designation. The park is a component of the Florida Greenways and Trails System. All waters within the unit as of 4-19-88 have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code (see Reference Map).

Surface waters in this unit are also classified as Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) waters by DEP. This unit is located adjacent to the western-most boundary of the Big Bend Sea Grasses Aquatic Preserve (see Reference Map) as designated under the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes).

The Wakulla Spring and Wakulla River are designated as National Natural Landmarks pursuant to 16 U.S. Code 461. The National Park Service maintains the Registry of Natural Landmarks that identifies and recognizes natural areas of ecological and geological significance. A portion of the park is also listed on the National Register of Historic Places as the Wakulla Springs Archaeological and Historic District (see Reference Map). This register is also maintained by the National Park Service. The Wakulla Springs Lodge was certified under the DEP Green Lodge program in December 2005.

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

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

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

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

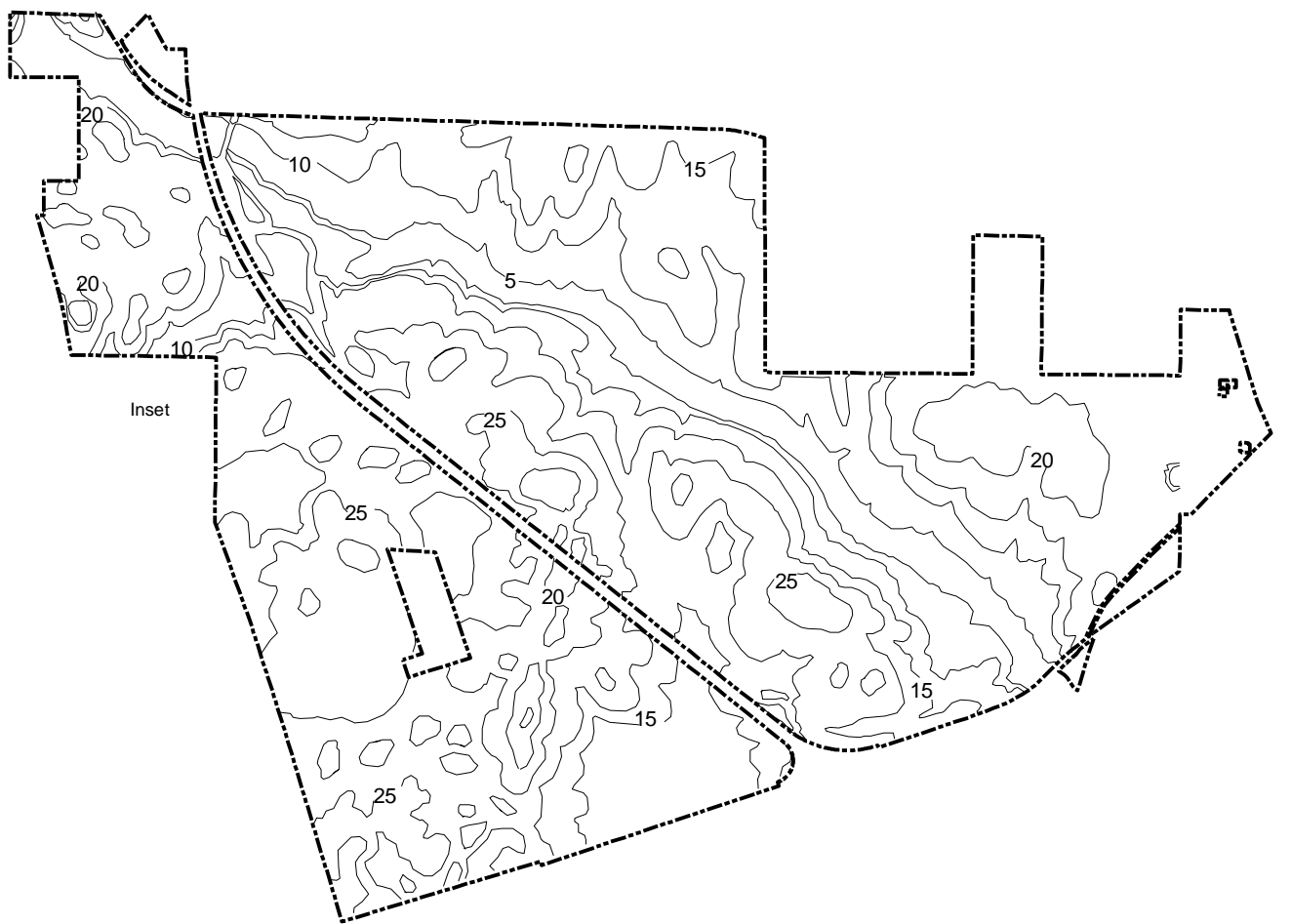
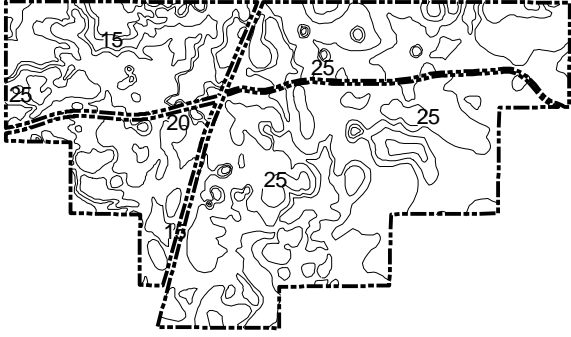
Because park units are often components of larger ecosystems, their proper management is often affected by conditions and occurrences beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program (to assess resource conditions, evaluate management activities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

RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

Topography

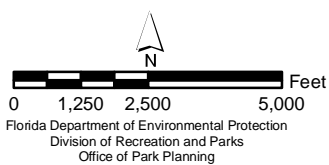
The park occurs in the physiographic province known as the Gulf Coastal Lowlands, which covers most of the southern half of the panhandle of Florida. The topography of the lowlands is generally flat with occasional ancient dune fields of higher elevation. The highest elevation at the park is about 30 feet above mean sea level. The majority, however, is below 20 feet, with the north side of the river being lower in elevation than the south side. The river, sloughs, floodplain swamps and floodplain forests make up about one-tenth of the acreage and these areas are generally below 10 feet in elevation (see Topographic Map).



LEGEND

- Park Boundary
- Contour Lines

EDWARD BALL WAKULLA
SPRINGS STATE PARK



TOPOGRAPHIC
MAP

The major topographic feature is the main spring and its wide reaching system of aquatic caves. Wakulla Spring is a first magnitude spring. With a mean flow of over 252 million gallons of water a day, the spring is classified, in average discharge, as one of the seven largest in Florida. Water clarity, when clear, enables the park visitor to see to a depth of about 125 feet where the bottom slopes under a limestone edge. The actual depth of the spring at the entrance to the cave system is about 185 feet.

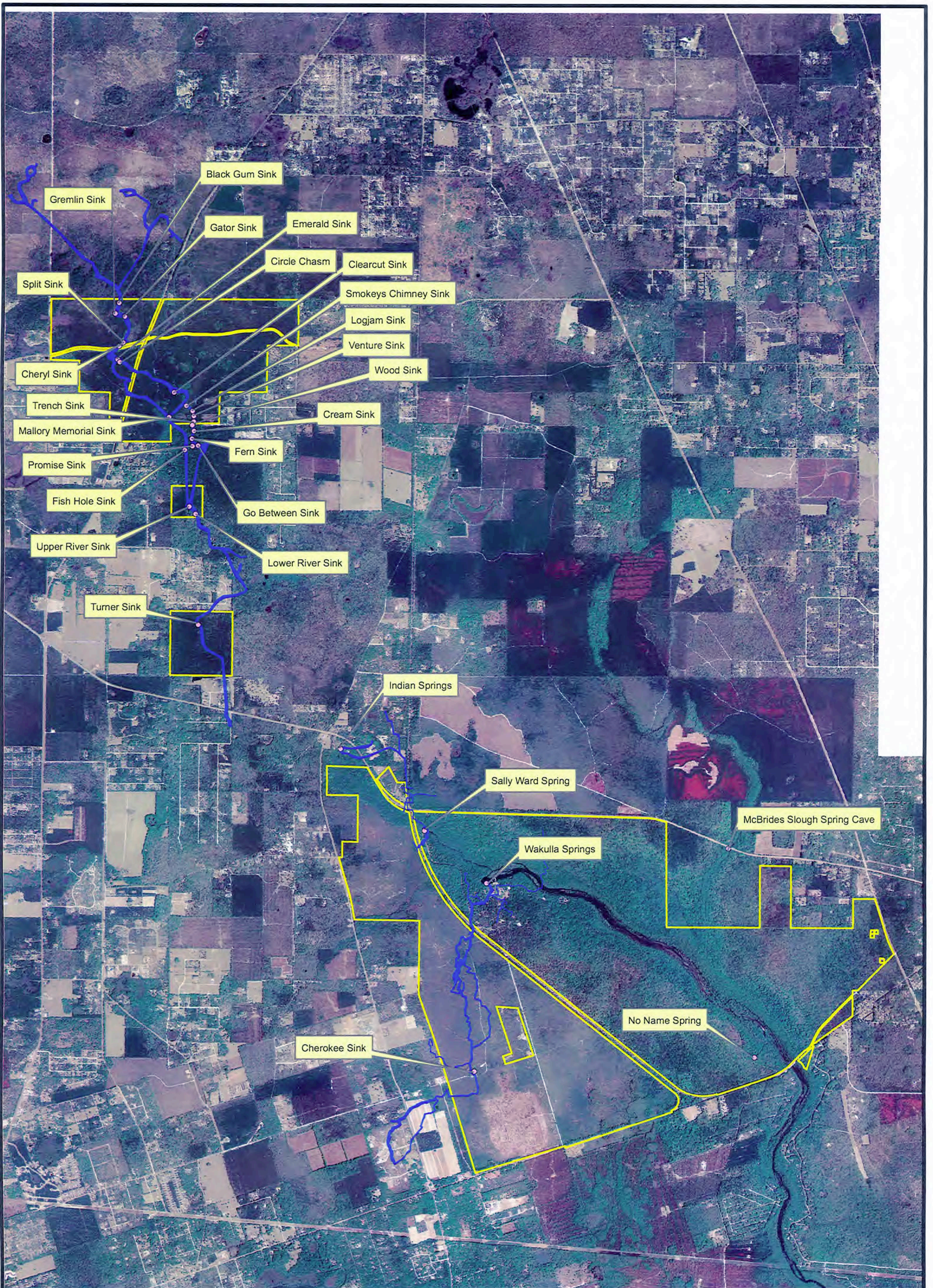
Flood prone areas include most areas below 12 feet elevation within the park. Normal vertical Wakulla River water level fluctuations within the park do not exceed three feet annually with lowest levels reported in the winter and associated with periods of reduced rainfall.

From November 15, 1955 through June 1, 1957, approximately 100 documented cave penetrations by groups of two to six SCUBA divers took place. During this time, at least 10 different divers, making 450 dives, were involved in horizontal cave penetrations ranging from 200 to 1,100 feet, which was the maximum extent of the mapping effort. Nonavailability of mixed gas and other technological limitations severely restricted bottom time on any given dive and limited maximum depths to about 250 feet.

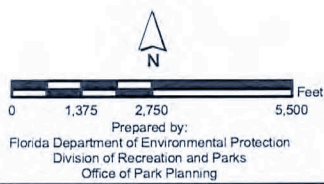
Since these initial dives, there have been three major dive efforts conducted at Wakulla Springs. The Wakulla Project occurred in October to December in 1987. The Wakulla II Project was done in November 1998 to February 1999. The Woodville Karst Plain Project (WKPP) has been conducting cave diving research since the 1980s. The WKPP has explored and mapped a large portion of the Leon Sinks, River Sinks and Wakulla Springs cave system (see Cave System Map). Some of the caves of these systems have been physically connected by divers swimming from one sinkhole to another sinkhole while additional connections have been verified through dye trace studies. Currently it remains an ongoing project. These exploration, mapping and research work projects will be further described in this plan. Additional exploration and mapping is proposed for the Wakulla Springs cave system.

At least three Pleistocene mammal bone deposits are noted in the cave system, the largest of which lies within 200-600 feet of the cave entrance. Living animals are represented by troglobitic amphipods, isopods and crayfish, as well as American eels and catfish, which were seen as far back into the cave system as 3,000 feet and at depths of 300 feet.

A smaller spring, named Sally Ward Spring, is 0.7 miles northwest of the main spring. The Sally Ward Spring Slough joins the Wakulla River downstream from the Wakulla Spring. The Sally Ward Spring cave is a meandering six to 8-foot-wide tube, with a 30-foot vertical chimney at one point. It is suspected but not verified that the Sally Ward tunnel system connects with the Wakulla Spring system. McBride Slough and its



EDWARD BALL WAKULLA
SPRINGS STATE PARK



- LEGEND**
- Spings & Sinks
 - Cave System
 - Park Boundary

CAVE SYSTEM MAP

associated floodplain swamp also joins the Wakulla River within the park. In addition to these major topographic features, several smaller springs and solution depressions occur in the park. Some of these smaller springs have been explored by cave divers from the WKPP. The explorations of these smaller springs have concluded at this time that there are no entrances into the conduit systems that can be further explored by cave divers. Only Wakulla Spring, Sally Ward, Turner Sink and the River Sinks property sinkholes are currently being explored and mapped.

Cherokee Sink is a large sinkhole lake located in the western portion of the park. This sink was formed by the collapse of the limestone bedrock. The collapse was sufficiently deep to intercept the water table forming a water-filled sinkhole. The St. Marks Formation and overlying clays are exposed around the perimeter of Cherokee Sink. The River Sinks property has several large sinkhole lakes and sinkholes located throughout the site. Many of these karst features are connected by their underground cave system. The River Sinks system of karst features has recently been proven a part of the Wakulla Spring system and contributes water flow to the spring and river. There are several other smaller sinkhole lakes and sinkholes located within the park.

Man-induced topographic alterations to the park include signs of past forestry activities, patrol or access road construction, dredging and blasting river channels, and excavation of borrow pit/dump sites. Old fire plow lines and remnant roads associated with agricultural logging and turpentine operations exist throughout the former longleaf pinelands. The upland areas of the Cherokee Sink property were clear-cut of most merchantable timber in 1987 and 1988. The upland portions of the River Sinks property are planted in loblolly pine and have been altered for this silvicultural use. Boundary road construction along State Road 267 and State Road 61, as well as road development paralleling the Wakulla River along the southern edge of the floodplain forest, occurred after 1952 and before 1972 based upon DOT aerial photos. Construction of these roads resulted in formation of low swales adjacent to the roads; irregular piling of low mounds of unused fill along the road shoulders at the forest edge, and in some places borrows of fill to level low areas while at the same time reducing elevations in some uplands area. River channel modifications to the river tour route and all of Sally Ward Slough also occurred before 1972, probably in the late 1960s. Spoil banks deposited by dredging operations have since been colonized by native pioneer vegetation normally growing on slightly higher sites than would be expected at the river's edge.

Two extensive borrow pits existing before 1937 aerial photos occur on the park. They received limited use as dumpsites, primarily of lodge construction materials and kitchen refuse. These pits, up to 30 feet in length, 4-7 feet deep and of variable width are designated 8Wa3S1 and 8Wa371 in the 1988 Archaeological Survey of Wakulla Springs conducted by the Department of the State (Bryne, 1988). Additional smaller excavated trash pits still exist near the shop complex. Other trash pits near the shop

have been filled in. At least one borrow pit near the old shop was created in 1969 when sand was removed to replace that lost from the beach during a high water episode.

Geology

Beneath a thin veneer of undifferentiated quartz, sands and clays of recent marine origin lay three limestone layers. The uppermost limestone layer lying within 25 feet of the surface and sometimes protruding through the ground at various locations in the park is the St. Marks Formation. This limestone is typically a pale orange to light gray to white and moderately hard for chalky limestone. It contains many fossils including numerous mollusk species molds and such Foraminifera as *Scrites* sp. and *Archaias* sp. The St. Marks Formation formed about 25 million years ago during the Lower Miocene Age.

At depths below 90 feet in the Wakulla Spring Cave system, St. Marks Formation limestone is replaced by the 30-35 million-year-old Lower Oligocene age Suwannee limestone. Below a depth of 400 feet the 36-39 million-year-old Ocala Group limestone occurs.

The St. Marks formation constitutes the upper unit of the Floridan aquifer and it is in this unit at depths of 25-150 feet that most Wakulla County water is drawn. The Suwannee and Ocala Group Formations comprise the lower units of the Floridan Aquifer. The Wakulla cave system explored to date runs through the Suwannee Formation.

The park includes surface features of two recent epoch sea bottom terraces associated with the advances of the sea during the earlier Pleistocene epoch. These Pamlico and Silver Bluff Terraces are found around the state's shoreline at elevations ranging from 8-25 feet and 1-10 feet respectively. The Pamlico Terrace was formed during the mid-Wisconsin interglacial stage; and it represents the largest area of the park. The more recent Silver Bluff Terrace formed perhaps 4,500 years ago when sea levels were 8-10 feet higher than they are now. At that time, a marine intrusion occurred up the valley of the Wakulla River, apparently as far as the Southern-most lowlands of the park.

Within the Gulf Coastal Lowlands, physiographic province is the region known as the Woodville Karst Plain. This area is characterized as flat to gently rolling surface of porous sands overlying Oligocene and Miocene age limestones. Surface elevation ranges from zero to 30 feet above mean sea level and slopes southward at an average of four feet per mile. Limestone is present within 25 feet of the surface in most of the area. The top of this limestone is highly karstic, having undergone extensive dissolution by groundwater percolating through the porous overlying sand. Karst topography is a term applied to land where near-surface carbonate rock has been dissolved by groundwater forming features such as sinkholes, caves, springs and depression lakes.

Soils

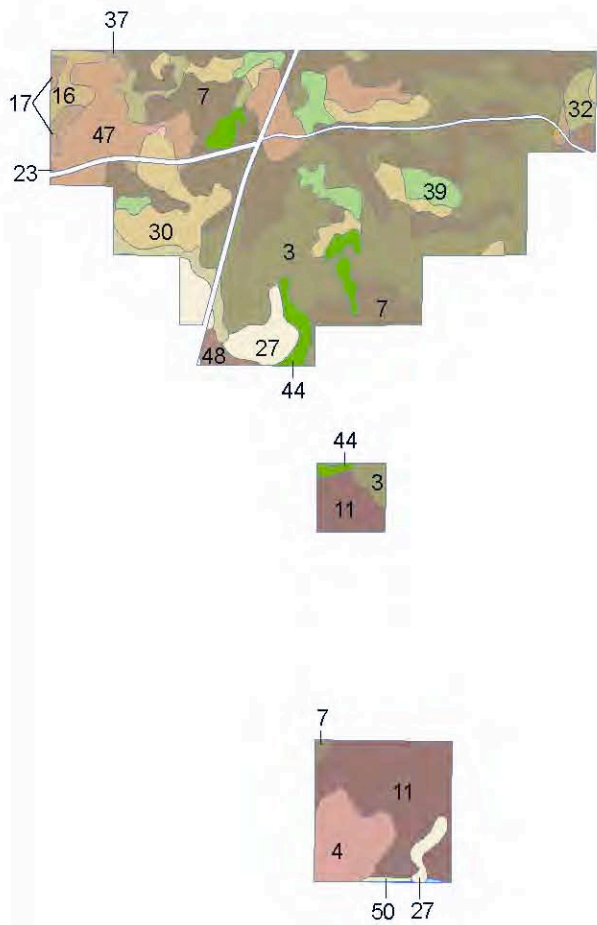
Most of the soil types at Edward Ball Wakulla Springs State Park have developed from the sandy marine terraces deposited since the mid-Pleistocene epoch (see Soils Map). These quartz sands are relatively clay free, clean, unconsolidated and acidic. Other soils in the park are alluvial sediments deposited over time in the floodplains of watercourses, sandy peats deposited in the permanent and temporary pond basins, and loose sands washed into various depressions. The thinness of the sands over the limestone substrate and the character of the sands themselves contributed to the formation of the upland pine community that dominated the area prior to human disturbance. The soil resources of the park are protected by natural ground cover in most areas. In areas used by visitors, access is controlled and limited using paths and trails. As part of these paths and trails, elevated boardwalks are used to prevent soil erosion and compaction where slopes are steep or soils are wet. There are 21 soil types at Wakulla Springs and a complete soil type description for each is contained in Addendum 3.

Minerals

While several minerals occur in the park and are described below, there are no known deposits of commercial value. At the park, the exposed subsurface St. Marks Formation limestones are composed principally of the mineral calcite, a crystalline form of calcium carbonate, CaCO_3 . They contain a high percentage of impurities that contribute to their soft chalky texture. Large calcite crystals have not formed here because the subsurface limestone cavities remain water-filled. Dolomite typically is found associated with limestone in Wakulla County, but is not verified at the park.

Clay and quartz sand are also found at Wakulla Springs. Clays were originally deposited as mud in shallow marine seas or estuaries. Quartz sand, or crystalline silica, is the most abundant surface material in Florida. The sand was derived from the erosion of the ancient Appalachian Mountains and the fragmentation and transport southward of their harder quartz components.

Chert, a low-grade flint, occurs in pockets within Tampa Stage limestone. It was formed when groundwater replaced calcium carbonate with silica. Although no prehistoric quarry sites and few diagnostic artifacts are known within the park, Native Americans almost certainly obtained chert for their stone tools from the park's exposed limestone. Bryne (1988) reported ten different occurrences of primary and secondary decortication chert flakes as well as non-decortication chert flakes, all probably from the Archaic Period. In addition, chert scrapers, hammer stones, and Newnan, Wacissa, Putnam Bradford, Hernando, and Lafayette projectile points were found. In 1995, B. Calvin Jones, DHR staff archaeologist, conducted extensive archaeological investigations to mitigate ground-disturbing impacts during construction of a new sewage collection system around the Lodge and recovered Paleo-Indian tools



LEGEND

- 3- Lutterloh sand, 0 to 5 percent slopes
- 4- Alpin sand, 0 to 5 percent slopes
- 7- Otela fine sand, 0 to 5 percent slopes
- 11- Shadeville fine sand, 0 to 5 percent slopes
- 12- Shadeville-Seaboard fine sands, 0 to 3 percent slopes
- 14- Ridgewood fine sand, 0 to 5 percent slopes
- 16- Croatan-Dorovan mucks
- 17- Ortega sand, 0 to 5 percent slopes
- 21- Lakeland sand, 0 to 5 percent slopes
- 23- Leon sand
- 26- Tooles-Nutall fine sands
- 27- Moriah-Pilgrims fine sands
- 28- Tooles-Nutall fine sands, frequently flooded
- 30- Ocilla sand, 0 to 5 percent slopes
- 32- Plummer fine sand
- 33- Pottsburg sand
- 35- Rutlege sand
- 37- Sapelo sand
- 39- Surrency mucky fine sand
- 44- Tooles-Nutall fine sands, depressional
- 47- Otela-Alpin fine sands, 0 to 5 percent slopes
- 48- Otela, limestone substratum-Ortega sands, 0 to 5 percent slopes
- 50- Udorthents and Quartzipsamments, excavated
- Water

(Suwannee Simpson biface; Suwannee fluted points) that provided documented evidence of the earliest period of human inhabitation in the park.

Abundant fossils have been found in the park. Shell fossils, formed when calcite replaced the shells' calcium carbonate, are occasionally evident in the exposed limestone. Of more interest, however, are fossil animal remains that were recovered as early as 1850. In 1930, another almost complete mastodon skeleton was recovered and is now on display at the Museum of Florida History in Tallahassee. Other extinct Pleistocene species found in the spring include giant ground sloth, giant armadillo, tapir, mammoth, horse, bison and camel. The recent deep dives have reported that an abundance of fossilized bones remain in the cavern. In addition to the extensive bone beds first mentioned by Olsen (1958), a second bone deposit was discovered some 1,200 ft. into tunnel "B" at a depth of 285 ft. during the 1987 dive project.

Hydrology

The principal hydrological feature in the park is the Wakulla River, supplied by one major and several minor springs. The river is a clear, calcareous spring run. Water temperature averages 69 degrees, and the pH is 7.3 (slightly alkaline). The water is hard averaging 153 mg/l-dissolved solids. The sediment load from land runoff into the river is minimal because of the low topography and the well-vegetated riverbanks. In the first two miles of river, where the river bottom does not consist of exposed limestone, dense growths of rooted aquatic plants stabilize sandy and silty soils.

The Floridan Aquifer is the primary source of the spring water at the park. Like most large springs in Florida, the Wakulla Springs complex is of the calcium-bicarbonate type. The complete source of water contributing to the flow emerging at Wakulla Springs is uncertain, but potentiometric surfaces and research studies have shown that a portion of the recharge area is immediately south to southwest of Tallahassee. However, water flow in the cave system is towards the Grand Junction and then ultimately northwestward towards the spring vent. This flow is generally in opposition to the local potentiometric gradient.

When heavy rains leach the leaf litter's organic acids into the recharge areas, tannin-colored water flows underground and out of the springs. This condition often causes Wakulla Springs to darken from a few weeks to up to several months at a time. Before May of 1957, the spring was reportedly clear mostly year round (Wally Jenkins, personal communication). The cause of seasonally reduced clarity at Wakulla Spring for the past 35 years is presently unknown. A link between rainfall and water clarity does exist. Extreme clarity of the spring only occurs when local rainfall is minimal. This varies seasonally from year to year but increased clarity of Wakulla Spring is most common in the spring months of April and May.

While Wakulla Spring, like other major springs, is relatively stable in its discharge, it

nevertheless has the distinction of having the greatest recorded range of flow of the major Florida springs. That range, measured between 1907 and 1974, extended from a low of 25 cubic feet per second in June 1931, to a high of 1,910 cubic feet per second in April 1973. This peak flow, which is equivalent to over 14,000 gallons per second, still stands as the state record. The average flow calculated from the 67 years of records is 390 cubic feet (almost 3,000 gallons) per second.

Annual average rainfall at the park is about 56 inches, which percolates quickly into the flat sandy soils. While the surface area of Wakulla River's drainage basin is 16.2 square miles at the spring, little surface runoff enters the Wakulla River directly. However, the fact that the spring darkens much more frequently than before, suggests that locally recharged water emerging from the spring may be affected by development to the north.

Cherokee Sink is a large sinkhole lake located in the southwest portion of the park. The collapse of this sinkhole when formed was sufficiently deep to intercept the water table allowing it to become water filled. Dive exploration has shown the sink to be about 60 feet deep with a silt, sandy bottom. This silt and sand has eroded into the sinkhole at a great rate over the past years. It is believed that Cherokee Sink had a much greater depth than 60 feet and was most likely connected to the Wakulla Springs conduit system before the erosion occurred.

The River Sinks property has several large sinkhole lakes that are connected by their subterranean cave system (see Cave System Map). These River Sinks sinkholes are also connected with the Leon Sinks system to the north. A hydrological connection between the River Sinks karst system and Wakulla Spring was recently confirmed through dye trace studies.

Two offsite springs flow onto the park and discharge into the Wakulla River. Indian Spring begins off park property then flows through Indian Spring Slough onto the northwest portion of the park where it merges with Sally Ward Spring and Slough and flows into the Wakulla River. Unlike Sally Ward Slough, Indian Spring Slough does not have a permanent flow and may stop flowing during dry periods. McBride Spring flows through McBride Slough on private property north of Highway 267. The slough flows due south onto park property and into the Wakulla River. Flow appears to be continuous. Three smaller springs within the boundary of the park form spring runs that flow into the Wakulla River. Two of these springs are in the northern portion of the park and the other is in the southern end, west of the river. The two northern springs flow off park property for a short distance then flow back onto the park and into the river. Several additional small springs have also recently been discovered on park property.

Other smaller sinkholes, small basin swamps, shallow ephemeral ponds and permanent

cypress domes occur on the park. Seasonal ponds are not mapped as distinct natural communities because of their small size. Nevertheless, they serve as important water resources and breeding areas for some of the wildlife of the park.

Natural Communities

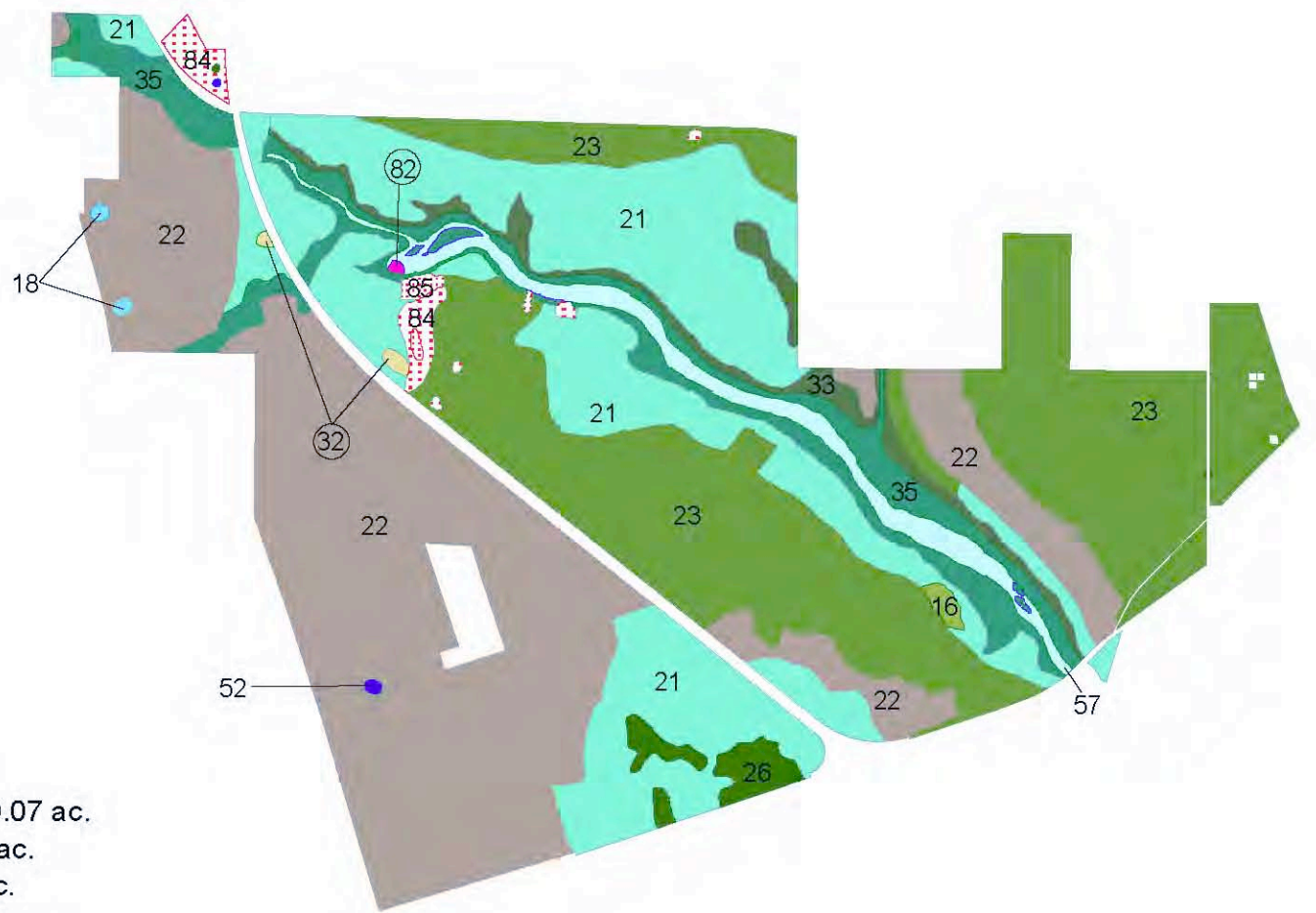
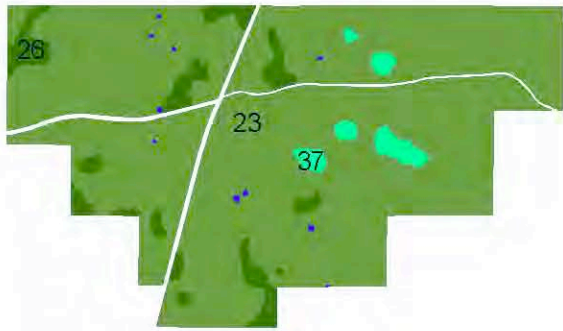
The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors, such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and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

The park contains 12 distinct natural communities (see Natural Communities Map) in addition to ruderal and developed areas. Park specific assessments of the existing natural communities are provided in the narrative below. A list of plants and animals occurring in the unit is contained in Addendum 4.

Sinkhole. The sinkholes at Edward Ball Wakulla Springs State Park are surrounded by upland areas. They provide a very moist microclimate compared to the dry uplands. Because of this, sinkholes provide habitat for many species of salamanders and invertebrates that would be unable to survive in the drier areas. The sinkhole is also an important water station for wildlife living in and using the drier upland areas that surround them.

Upland hardwood forest. The upland hardwood forest community at Wakulla Springs is of two distinct forms. The original park area contains some of the oldest and most beautiful American beech-southern magnolia climax forest to be found in the South. State champion size magnolia, beech, basswood and sassafras trees have been identified since the establishment of the park in October 1986. These large beech and magnolia trees occur in several portions of the park.

This upland hardwood forest community is not the classic rolling hill, clayey soil type, but more typical of that which would occur on the flat Gulf Coastal Plain where fire has been excluded. The sections with the oldest hardwoods may represent virgin tracts where the river, the numerous limestone outcroppings and the swampy terrain protected the community from lightning fires. Younger sections may have replaced either extensively cut hardwood forest or may be a successional stage following early removal of sections of the pine-forest.



LEGEND

- 16 - Scrubby Flatwoods-8.92 ac.
- 18 - Sinkhole-4.50 ac.
- 21 - Upland Hardwood Forest-1200.07 ac.
- 22 - Upland Mixed Forest-1585.32 ac.
- 23 - Upland Pine Forest-2446.16 ac.
- 26 - Basin Swamp-127.96 ac.
- 32 - Dome-5.73 ac.
- 33 - Floodplain Forest-122.00 ac.
- 35 - Floodplain Swamp-334.92 ac.
- 37 - Hydric Hammock-24.25 ac.
- 52 - Sinkhole Lake-5.93 ac.
- 57 - Spring-Run Stream-127.73 ac.
- 82 - Aquatic Cave-1.57 ac.
- 84 - Ruderal-49.34 ac.
- 85 - Developed-10.74 ac.

The second distinct form of upland hardwood forest is found on a portion of the property west of County Road 61. This area has an upland hardwood forest that has been mostly disturbed by a major timber-harvesting project. In 1987-88, this community was clear-cut of almost all-merchantable timber. Since the timber harvest, the area has been allowed to grow back naturally. This natural growth has resulted in a thicket of hardwood species including crabapple, laurel oak, winged elm, basswood, cherry and magnolia. The trees are mostly 2-3 inches in diameter and 15-25 feet tall. There is little to no herbaceous understory growth. Access to the area is by established roads and trails only.

Upland mixed forest. This forest is similar to the upland hardwood forest but lacks the more mesic tree species such as American beech, swamp chestnut oak and American hornbeam. This is because the upland mixed forest is located on a sandier, drier soil and at a slightly higher elevation.

The upland mixed forest at Edward Ball Wakulla Springs State Park is located entirely on the property west of County Road 61. A major timber-harvesting project similar to the harvest that occurred in the upland hardwood forest west of County Road 61 has disturbed this community. In 1987-88, this community was clear-cut of most merchantable timber. Since the timber harvest, the area has been allowed to grow back naturally. This natural growth has resulted in a thicket similar to that of the disturbed upland hardwood forest west of County Road 61 and already described.

There are some areas with small amounts of pine growth present. The pine growth is mostly young slash pine occurring in areas that are more open with less hardwood growth and more herbaceous plant growth. Some smaller areas of longleaf pine regeneration have been discovered within this community. These longleaf pine areas are adjacent to dirt roads passing through part of the community. Some small amounts of wiregrass growth have also been observed in some of these longleaf pine areas. On portions of these pine areas, several resource management practices have been conducted by park staff. These practices include, prescribed burning, hardwood controls, and planting of longleaf pine seedlings. Because of these practices and with continued resource management, these pine areas are being managed towards restoration as upland pine forest.

Upland pine forest. The upland pine forest community on the Wakulla Springs portion of the park has mostly longleaf, loblolly and slash pines remaining in the canopy. This upland pine forest is not in classic, clay soil, rolling hill habitat, but is in the flatlands of the Gulf Coastal Plain, where shallow sandy soils cap a limestone stratum. While the upland pine forest is quite extensive, hardwood succession has been occurring in varying degrees. This has occurred because fire had been excluded from the property for at least 60 years before state ownership.

The longleaf pinelands on this portion of park property have a history of a century or more of disturbance. A few living pines remain on the property which show evidence of turpentine industry "cat faces", angular gashes cut into the trees. These trees seem more common on the north side of the river but park-wide less than 1 percent of the remaining longleaf show the old catface turpentine scars. The trees large enough to be turpented 60 or more years ago were mostly eventually logged. Most of the existing longleaf pines on the property today had diameters of six inches or less and were less than 30 years old when the last round of turpentine and subsequent logging occurred. The largest longleaf and loblolly pines on the property today (those over 15 inches in diameter at breast height) are only 60-100 years old.

Logging, turpentine, agricultural practices occurring before 1935 and decades of fire suppression have resulted in the loss of pineland community keystone ground cover species throughout most of the original pine community. The resulting hardwood invasion had reduced light levels so that little pine regeneration was occurring. Soil disturbance and reduced sunlight have also eliminated keystone pine community grasses such as wiregrass on most of the park. The only naturally occurring wiregrass community of subsequent size is located on the north side of the river. Extensive, recent prescribed burning has been an important pineland restoration tool. The burning in combination with individual removal of invading hardwood tree species has improved the natural species composition within portions of this community.

Most of the upland pine forest community on the River Sinks property of the park has been altered by silvicultural practices and is now planted in loblolly pine trees. The loblolly pines are estimated to be 22 to 26 years old. The trees are planted in rows that have been "bedded." "Bedding" is a silviculture practice of gathering soil from the sides to make an elevated soil mound of one to two feet in height. The pine trees are planted on top of the mound or "bed." The pines are planted in rows on spacing of ten feet between the rows and 4 - 6 feet between the trees. Portions of these loblolly pine areas have been thinned with a past logging operation. Over scattered areas of this forest, remnant populations of wiregrass have been discovered still growing. The wiregrass is suppressed, in poor health, and in need of prescribed burning. In the northwestern most portion of the River Sinks property is a small area where timber harvesting and silvicultural practices did not occur, most likely due to its remote location. This area contains mature longleaf pines and scattered hardwood trees. There are also other areas where strips of upland pine forest along the public roads that were not planted to loblolly pine, but left in a more natural state of vegetation. This vegetation includes longleaf pine, hardwoods and wiregrass. These natural areas are very narrow and small. There is no record or evidence that the River Sinks upland pine forests were prescribed burned prior to state ownership.

Scrubby flatwoods. Scrubby flatwoods are an open canopy forest of widely scattered pine trees with a shrubby understory with barren areas of sand. The elevated, deeper

sandy soils engender a drier environment than the surrounding upland pine and upland hardwood forest.

The scrubby flatwoods of the park is small and is located just west of the River Road in the southern portion of the park. The area is mostly contained in Burn Zone D. This site is dominated by scattered, mature longleaf pines with an understory of mostly dense saw palmetto and some scattered sand live oak. Frequent prescribed fire has maintained this community.

Hydric hammock. Hydric hammock occurs on low, flat, wet sites where limestone may be near the surface. Soils are sands with considerable organic material that are generally saturated but are inundated only for short periods following heavy rains. The normal hydroperiod is seldom over 60 days per year.

The hydric hammock of the park occurs on the River Sinks property as patches of lowlands in association with karst seepage. Most of the hydric hammock is surrounded by upland pine forest that has been site prepped and planted to loblolly pine.

Basin swamp. The basin swamp soil is nearly level and very poorly drained. The soil is ponded for 200 to 300 days and has a seasonal high water table within a depth of 20 inches for most of the remainder of the year. The basin swamp is vegetated with hydrophytic trees and shrubs that can withstand the extended hydroperiod.

Some of the basin swamps at Edward Ball Wakulla Springs State Park are found in the southern portion of the property. A series of three basin swamp areas occur here. The basin swamps are not connected, being separated by the higher elevations of the surrounding disturbed upland hardwood forest. The basin swamps appear relatively undisturbed, with large mature trees present. These areas were most likely too wet to be logged when this property was timber harvested in 1987/88. Additional basin swamp areas are found on the River Sinks property surrounded by the planted loblolly pines. The swamp areas were too wet to have been site prepared and planted to pines, so they were left in their present vegetative state.

Dome. Periodic fluctuations of hydroperiods are essential for the maintenance of cypress dome community. The normal hydroperiod for domes is 200 to 300 days per year. Extended hydroperiods will limit tree growth and prevent reproduction, while shortened hydroperiods will permit the invasion of mesophytic species, which will change the character of the understory and eventually allow hardwoods to replace cypress.

In the park, two of the several solution depressions that occur within the upland pine and hardwood forest communities contain water for enough of the year and are large enough to support a cypress dome community. Fortunately, one of these areas is along

the park entrance drive and is frequently visited by lodge guests on evening walks. This cypress dome has apparently been exempt from all timbering but selective cutting has occurred at the dome periphery. Individual trees toward the center of this community are very old. Recent burning around the edges of the dome has reduced and eliminated some of the pine and hardwood tree invasion occurring near the dome. The other cypress dome is found on the Cherokee Sink property adjacent to State Road 61. Timbering and the past construction of State Road 61 have disturbed this area. Most of the cypress trees have been removed from the interior portions of the dome. Gum and maple trees now dominate with smaller cypress trees at the edges. This dome is not as wet or large as the one on the park drive. This is mostly a result of the construction of State Road 61 that now bisects the eastern portion of this community.

Floodplain forest. The floodplain forest appears relatively undisturbed with large specimens of all representative tree species. Large cypress stumps occur both in the floodplain forest and floodplain swamp throughout the park. Cypress harvesting occurred in the past, possibly beginning as early as 1895, for both lumber and shingle production. However, numerous ancient cypresses were left uncut and are located along the 3 miles of the Wakulla River within the park.

Floodplain swamp. The pristine condition of the floodplain swamp at the park is perhaps the most visible natural community to most visitors. Bald cypress grows on natural mid-channel islands of the Wakulla River, giving park visitors the feeling of being surrounded by primeval, towering cypresses.

Parts of this community were altered somewhat by channel dredging and spoil deposition activities in the late 1960s. While the spoil banks have made some wildlife such as the alligator more visible, they have also increased the densities of willows and wax myrtle along the edge of the river. The Sally Ward Spring Slough was also significantly widened by dredging at that time, and many cypress trees along the spring run and through the "back jungle" section of the tour boat route were sacrificed. While all these alterations are apparent in the upper river, conditions are pristine a short distance into the floodplain swamp and below the tour boat section. The floodplain swamps of Indian Spring Slough and McBride Spring Slough have been left relatively undisturbed.

Sinkhole lake. Cherokee Sink is considered a sinkhole lake and is located on the western portion of the park. Cherokee sink is quite large and has steep limestone walls on several sides. Its water depth is estimated to be about 60 feet. Vegetation in the sink is limited to some submerged and emergent aquatic vegetation. Fish, turtles and snakes have been observed in the water. The area immediately surrounding the sink is vegetated by mostly upland species such as longleaf pine, bracken fern, wax myrtle, laurel oak and southern red oak.

Cherokee Sink has a long history of local use as a swimming area. Due to this use and unrestricted access, Cherokee Sink has been heavily disturbed. Historically, numerous trails lead down to the sink and several dirt roads encircled the area around it. Because of these trails and roads, soil erosion in the past has been severe. Sedimentation of the sink from erosion had been occurring for several decades. This sedimentation slowly filled portions of the sink with a thick layer of sand and silt and has most likely affected its exchange of water with the associated karst environment. Over the years, trash dumping was also a problem at the sink. The bottom of the sink is covered in an array of human garbage including drink cans, glass, plastics and other objects. The land area surrounding the sink was also a collection of human refuse including mostly cans, glass and plastics. Since the property was acquired in 1999, much restoration work has been accomplished. Roads have been closed and access to sink limited to three improved and protected entry points. The walkways for these access points are elevated boardwalks that improve safety and reduce soil erosion. Much of the trash in and around the sink has been removed including a car, boat, and other objects from its waters. Some badly eroded areas have been recontoured, filled and revegetated.

There are many sinkhole lakes on the River Sinks property. These are mostly smaller and less disturbed than Cherokee Sink. Most are named and are connected to the vast system of subterranean caves and tunnels. These sinkhole lakes are surrounded by upland pine forest, most of which have been planted to loblolly pines.

Spring-run stream. The Wakulla River is approximately 250 feet wide along its 3-mile length within the park. The surface area of the river is approximately 95 acres. Significant channel features are Sally Ward Spring, No Name Spring, other unnamed springs, their respective spring runs, and McBride Slough. Other small springs contribute to the Wakulla River but not through well-defined channels.

The section of the Wakulla River within the park is as close to the primeval condition as can be found for a system of this sort. The density and variety of fish, aquatic reptiles and birds attest to the productivity of the spring and river. The abundant aquatic vegetation of the river, which includes the typical eelgrasses (*Vallisneria* and *Sagittaria*), Illinois pondweed, southern naiad, chara, pickerelweed, duck-potato and smartweed, is the base of a complex food chain. This system is currently threatened by hydrilla, an exotic aquatic plant, which can rapidly expand at the expense of the native eel-grasses. Not present in the spring or river before 1997, hydrilla came to dominate the spring at all depths, and spread down river within the park. Recent hydrilla control efforts using herbicides by DEP staff have reduced the impacts of this exotic infestation, but hydrilla is still a concern and threat to the natural balance of the Wakulla River.

Good water chemistry and some flow statistics have been recorded and maintained for Wakulla Springs over the years. In recent years, the park itself has taken on the task of collecting water samples, so a dependable, constant database is developed. This makes

the spring and river an important location for both hydrological and biological research.

Aquatic cave. The aquatic caves at Wakulla Springs have had extensive exploration conducted in spite of their extreme depths and lack of entry points. These systems are massive, in both size and distance, and extend far beyond the park's boundary. Even though well explored, little is known about the biological community of this system. Some conduits have waters that remain clear and as a result, the limestone walls are white. Other conduits walls are stained dark with tannins due to their water being dark with tannic acid. Recent increased nutrient levels in groundwater are likely having effects on the cave community. On going studies and frequent biological sampling should assist to provide information on the health of this unique community.

Ruderal and developed areas. The ruderal and developed areas make up a small portion of the park. These areas include the lodge complex and associated buildings, the formal grounds around these buildings, the ranger station and associated park entrance area, three mobile home residences, a warehouse/dry dock area, the park manager's residence, a fenced shop complex, the picnic area, parking lots, the greenhouse, the park's administrative offices, a mowed wildlife observation area, and a small vegetation disposal site.

Designated Species

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

From the plant and animal inventories, 43 designated species are recorded for the park to date. These species include 4 plants, 1 fish, 6 reptiles, 22 birds, 4 mammals and 6 arthropods. Most of the animals are associated with the Wakulla River and are safe as long as the habitat remains in good condition. It should be noted that the snail kite is only a transient in this region and is recorded from a single four-month visit in the late 1950s. The wood stork rarely visits although it is a year-round resident in the region. The gopher tortoise and Southeastern fox squirrel's range in the park have been expanding recently, mostly due to the increased application of prescribed fire now being conducted by park staff. New recruitment of gopher tortoise is evident from burrow surveys done in selected burn zones after each prescribed burn. Recorded observations of both the gopher tortoise and Southeastern fox squirrel have been more frequent and from expanded areas. Expansion of populations should continue as the prescribed burning program progresses. The Suwannee cooter also appears to be benefiting from prescribed burning. Several new turtle nesting locations have been discovered in burn zones after burning has been completed and new sunlit areas are

created. This may become crucial to the Suwannee cooter population if it ever becomes threatened due to the heavy predation by raccoons and crows on its other nesting areas.

On August 8, 1997, a group of four manatees was observed in the Wakulla Spring basin. The three adults and one calf were the first documented sighting of manatees in the spring basin. They stayed in the spring basin area for three days before returning to the lower part of the Wakulla River. In December of 2000, a single young manatee was observed in the spring basin. The manatee remained in the spring and upper portion of the river for 4 days before it left park waters. In December of 2002, three manatees were sighted in the spring and stayed for 2 days. 2003 showed a tremendous increase in manatee use of the spring and upper Wakulla River. A total of 16 different sightings were recorded starting with 2 in January, then 2 in June, August had 7, September had 3, November and December both had 1. The highlight of the sightings was when a group of eight manatees appeared at the dive tower on August 22 and stay in the area for two days. In 2004, four sightings were recorded with one each in July, August, September and October. In 2005, the increased use of the spring by manatees continued with two sightings occurring in April including a group of 9 manatees in the spring on April 12th and 13th, five sightings in July, 20 sightings in August, 13 in September with 9 manatees seen on September 2nd, 11 sightings in October, and sightings in November. The increased manatee use of the spring and river continued in 2006 as manatees were commonly seen on the boat tour route from May 16th through November 27th. The last sighting of a manatee in 2006 was December 21st. Manatee sightings are common on the lower portion of the river during the non-winter months.

In January of 1999, during a full river wildlife survey, a roosting colony of Southeastern bats (*Myotis austroriparius*) was discovered in a cypress tree in the middle of the river. This is the only documented case of this bat species roosting in a tree surrounded by water in the state of Florida.

Special Natural Features

The park contains several outstanding features, the most notable of which are the huge main spring with its aquatic cave fauna and fossil Pleistocene mammal remains, and the spring run that supports a great diversity and abundance of wildlife. Wakulla Spring is considered one of the world's largest and deepest freshwater springs. The spring is 185 feet deep where the cave system begins. The spring bowl, the area where the water flows out, is almost four acres in size. Other minor springs, and several large sinkhole lakes add to this collection of karst features. Also of major importance is the abundance of old-growth trees, including virgin bald cypress throughout the river floodplain, and champion-size southern magnolia, American beech, white oak, and other hardwood species in sections of the park. Some of the bald cypress trees on the river have had their age determined through growth ring analysis. Based on this analysis, the age for some trees range from 400 to 600 years old.

Cultural Resources

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

Humans have occupied and used Wakulla Springs for nearly 12,000 years. Archaeological evidence shows intermittent habitation from Paleo-Indian through European contact (1513), with significant Paleo-Indian, Archaic, Deptford, Swift Creek, Weeden Island and Fort Walton period sites. Later periods are also represented, particularly Spanish mission (8Wa321), Creek and Seminole (8Wa312). Late nineteenth and early twentieth century use included heavy timbering, farming and naval stores activities during the nineteenth century and the development of tourism during the twentieth century. The Florida Master Site File (FMSF) lists 70 sites within the unit (see Addendum 6).

The acquisition of the area by Edward Ball in 1934 resulted in its development as an attraction that focused on the preservation of wildlife and the conservation of natural features. The Wakulla Springs Lodge, designed by the firm of Marsh and Saxelbye of Jacksonville, is an excellent example of the use of Mediterranean Revival architecture. Edward Ball Wakulla Springs State Park was nominated to the National Register of Historic Places as an archaeological and historic district in 1992.

Wakulla Springs has been studied since the nineteenth century. The spring was well known to paleontologists since approximately 1850, when "Professor King" of Newport, Florida, recovered skeletal materials of a mastodon. Other mastodon remains were found during the late nineteenth and early twentieth century. Following the report of some 600-bone points found in general association with extinct Pleistocene elephant remains from the underwater cave area of the springs (Olsen 1958), attention turned to Paleo-Indian remains: Suwannee projectile points, bone points, and the remains of sloth and deer, in addition to megafauna. The archaeologist Wilfred Neill described what he saw as Paleo-Indian kill sites similar to Clovis sites reported in the American southwest (Neill 1964), making 8Wa24 one of the type sites cited to support the concept of Paleo-Indian big game hunters in Florida. In 1988, staff of the

Department of State, Division of Historical Resources, Bureau of Archaeological Resources, conducted a limited archaeological survey. More recently, B. Calvin Jones uncovered impressive Paleo-Indian tools (Suwannee Simpson biface; Suwannee fluted points) during testing in advance of construction for a sewage collection system in 1995.

The area of the Wakulla Springs Lodge complex features the most publicly visible cultural resources, consisting of 8Wa24, the submerged area in and around the spring; 8Wa305, the six structures and the roads and walkways of the lodge complex; and 8Wa329, the upland area surrounding the lodge building.

Briefly, the Wakulla Springs spring boil, 8Wa24, was the site where mastodon skeletal materials and worked stone and bone artifacts were recovered. The lodge complex holds evidence about twentieth century development in the area, while the upland area on which the lodge complex sits contains evidence for intermittent aboriginal habitation over several thousand years.

Most visible elements of these three resources are in fair to good condition, although each has been disturbed or modified. Because the area occupied by these sites is used heavily by the public – the spring and lodge complex are the focus of most visitation – all suffer from daily wear and tear which threatens the integrity of each.

For the purpose of cultural resources management, the park is divided into two zones: the lodge complex and the undeveloped area.

The lodge complex. Cultural resources of the lodge complex include the structures, designed historic landscape, roadways, and terrain alterations that facilitate operations of the lodge and spring; the archaeological resources beneath this landscape; and the underwater area of the spring.

The park contains 27 buildings. The lodge and support buildings were designed and constructed as uncomplicated, utilitarian structures, and they have been little altered throughout the years. Nine of these are associated with the Wakulla Springs Lodge complex that Edward Ball built between the mid 1930s and mid 1960s. The remaining 18 structures are nonhistoric buildings associated with the maintenance or use of the park. The visible elements of the resources in this zone are in fair to good condition.

The Wakulla Springs Lodge is a two-story Mediterranean Revival building, shaped like the Greek letter pi. It has textured stucco exterior, arched entries, and low pitched, side gabled roof. The roof surface of the main block and wings of the building was asbestos shingles and the attached hipped roof on the north elevation was covered with metal bright orange baked enamel flat shingles. All portions of the roof were reconstructed in 2001 and replaced with a metal barrel material similar to that found on the original roof. Fenestration includes arched, 4-light casement windows on the first story, and

rectangular, 3-light casement windows on the second story. Due to a buildup of many layers of old paint, the exterior coating over the stucco walls was no longer an effective moisture barrier. In 2004, with the approval of the Division of Historical Resources, the walls had the old layers of paint removed down to the original primer layer by wet sandblasting and were repainted with a special two-part epoxy-based finish that has an extended life expectancy. The paint color is "Warm Sun" that was matched to one of the initial layers of old paint that was removed. Three exterior stucco chimneys are located on the elevations of the courtyard located on the south side of the building. The main fireplace and chimney continues to function with the lobby fireplace, however the damper mechanism and firebrick must be repaired to ensure good draft and fire control. The chimney to the west, on the kitchen side, is no longer used and was capped in 2004. The chimney on the east side of the courtyard once served the boiler room. It now serves as the exhaust for the gas water heater.

In 1997, \$320,000 was spent renovating the lodge guest rooms. Furnishings in the rooms were re-finished or replaced with appropriate period replacement pieces. Included in the project was the restoration of all guest room windows. The windows in rooms 24 and 40 were replaced with new vinyl clad windows that should be replaced with historically appropriate window frames and sash. All other windows were removed of all paint down to the bare wood. Window hardware was refurbished and restored to full working condition.

Within the structures, the lobby is the most heavily used area of the lodge and is the only surviving significant interior space used for congregation of visitors and guests. It has marble tile floors, wainscoted and plastered walls. It is generally in fair condition. The kitchen area was gutted and completely renovated. In 1995-96, additional walk-in cooler space was added to the building. In 2002, well-known art conservator Rustin Levenson was contracted to clean and restore the elaborately painted ceiling in the lobby. Funding for the \$98,000 project was provided by the Friends of Wakulla Springs and matched with a Division of Historical Resources historic preservation grant. The nearby bathhouse has been improved and restored in recent years and is in good condition.

Significant cultural resources, both recorded and unrecorded, are located below grade in the lodge complex. Park and District staffs are mindful of threats to the integrity of the resources and follow Division policy relating to Chapter 267, F. S., and the Operations Manual, Cultural Resources Chapter, whenever ground-disturbing activities are necessary. For example, significant Paleo-Indian artifacts became known during approved archaeological testing in advance of sewer line replacement during 1995 and numerous projects have been implemented in conjunction with the Archaeological Resources Monitor training program administered by DHR and the Division.

Undeveloped area. Discussion is limited to the sites that are visible in this area.

8Wa309 is a Weeden Island mound complex consisting of Deptford and Weeden Island components. The site comprises two sand ceremonial/burial mounds (A and B) and a small related Weeden Island occupation that includes 8Wa330. Both Mound A and B appear to be in fair condition, with no recent evidence of potholing or animal rooting. One large old looter hole should be filled. The larger of the mounds has trees, some quite large, growing on it; these include southern magnolia, beech, sweetgum and dogwood. There is a crescent-shaped borrow pit located immediately northwest of the mound. Mound B is linear (c. 15 x 5 meters) and is located about 65 meters northeast of Mound A. The associated circular borrow pit is adjacent to the mound to the southwest.

The Apple Snail site (8Wa00539) also contains an aboriginal mound that appears to be in good condition. One large southern magnolia tree and numerous young ironwood trees (*Carpinus caroliniana*) are growing on it. These are the largest of the known mound sites in the park. Other sites have not been inspected since the last resource management evaluation conducted by the Division.

8Wa330 is a Weeden Island habitation site with a minor Fort Walton or Leon-Jefferson component. The site is located on a roughly circular slightly elevated area approximately 20 meters in diameter. This feature may be a natural rise, but the possibility exists that it may be a low burial mound associated with 8Wa309. It appears to be in good condition.

8Wa311 and 8Wa319 contain the remains of a historic turpentine distillery. They are located between the Wakulla River and the 10-foot contour, at the junction of two traditional sites (the park road along the contour and the road now designated as State Road 365) and the Wakulla River. The historic earthwork identified as 8Wa328 is located across the river from this area. It is approximately 2 meters high, 3-4 meters wide and 65 meters long. The site, which may represent the remains of an early logging operation, appears to be in good condition. At the time of this writing, sufficient information does not exist to ascertain whether the still and the logging operation responsible for constructing the earthworks were connected to help supplement the modest subsistence agriculture of the area.

8Wa326 contains the only physical evidence for the population of African Americans living in the vicinity during the first half of the twentieth century. The site is an early-to-mid 20th century house site that is approximately square with dimensions of 50 by 50 meters consisting of limestone fragments, bottles and metal containers. It appears to be in good condition.

RESOURCE MANAGEMENT PROGRAM

Special Management Considerations

Timber Management Analysis

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

Edward Ball Wakulla Springs State Park has four areas of planted pines where timber harvesting would aid in the restoration of these disturbed sites (see Addendum 7). The two smaller sites, parts of Burn Zone N and Burn Zone J, have planted slash pine and require a harvest to remove the slash pine and then a restocking of longleaf pine seedlings to begin restoration. The uplands of the River Sinks property and Turner Sink are mostly disturbed having been site prepared and planted to loblolly pines approximately 25 years ago. Timber harvesting will be required to restore these upland areas to a longleaf pine/wiregrass community. Burn Zone B is a large area of 50-year-old planted slash pine that will require an updated review by park staff before any restoration work.

Additional Considerations

Management of natural communities is often enhanced by physically restoring areas that have been disturbed or otherwise manipulated by people. Such is the case at Wakulla Springs where most of the upland pine areas have been manipulated by human activities such as farming, turpentine for navel stores, timbering and the exclusion of natural fires from the upland forest before state ownership. Before these human disturbances, wiregrass probably occurred on most of the upland areas of the park. These practices have removed much of the native wiregrass and other herbaceous ground cover species from the park. The best area of wiregrass growth is found on the north side of the river, in an area of about 100 acres located in Burn Zone E. There are several other areas where wiregrass is present but it is poorly stocked, suppressed, and in poor condition. A priority of the park staff's management consideration is the restoration of disturbed upland sites. This restoration process has been implemented primarily through three management practices, prescribed burning, selective hardwood tree removal, and planting native plant species.

The vast majority of the Cherokee Sink property has been disturbed. This includes

most of the upland areas and the sinkhole lake itself. The upland areas were mostly clear-cut of most timber in 1987/88 and have since grown into a natural thicket of hardwoods. One area of 150 acres has been identified for restoration and the process has begun with hardwood controls and planting to longleaf pine. The results thus far have been excellent. Three other areas of the Cherokee Sink property have been prescribed burned and are targeted for additional resource management practices in an effort to restore them to an upland pine type community. Cherokee Sink had suffered from unrestricted human use for several decades prior to becoming part of the park. Soil erosion caused by the unrestricted vehicle and foot traffic, and trash dumping degraded this natural feature, but recent efforts of restoration have improved the appearance of the sink and lessened the previous damage. All of these areas are in need of continuing review and planning for their future use and restoration.

The River Sinks and Turner Sink property uplands are mostly disturbed, having been site prepped and planted to loblolly pine trees about 25 years ago. These areas are in need of restoration that will include the process of timber harvesting, prescribed burning, and vegetative planting.

Prescribed burning is now occurring on an estimated 2,600 acres of uplands. Burning is done every 2-5 years on most of these sites. Burns are usually done in the late winter and early spring. The burning has helped to remove small invading hardwood trees and promote the flowering and seeding of native species. Burning has opened areas up for use by wildlife and encouraged the growth of native, fire-adapted plant species. Hardwood control using fire is effective in only controlling hardwood trees that are 4 inches or less in diameter. Larger trees must be girdled and treated with an approved herbicide and left standing. The large hardwoods have limited the success of burning in many areas. After the trees are killed, burning is more effective due to the absence of the thick, moist leaf layer and shading caused by these trees. Selective hardwood removal has been conducted in Burn Zones A, D, E, I and S. Transplanting of native upland species has occurred at the park since 1990. Wiregrass clumps from nearby, non-park areas, have been transplanted successfully in to several burn zones. The wiregrass clumps also contain other native upland species that are a part of the plant community. The establishment of wiregrass at select locations has been done in hopes of establishing a native seed source that will aid in the natural recruitment of native fire-adapted species of the uplands. This natural restoration must be maintained and moved along by the prescription of frequent fires. Priority for restoration efforts is given to those sites that include the greatest biodiversity and have the best potential for the long-term health of natural communities. Expansion of such sites will provide the necessary seed source for similar, adjacent natural communities that are currently degraded.

The park's lower portion of the Wakulla River and the large land area south of the river and mostly east of the shop complex have been treated as sanctuary areas for the last 75

years. Public access to these areas is restricted. Only groups that are escorted by a park staff member are allowed to visit the protected land areas. No groups are allowed on the lower portion of the river. Permitted research is allowed in both of these restricted areas. Due to this protection, wildlife diversity in both areas is high. The lower portion of the river is home to several bird rookeries. This includes a rookery of up to 500 double-crested cormorant nests. Other nesting colonies include great egrets and cattle egrets. Individual birds also nest through out this area including a successful Bald eagle's nest that is actively inhabited. The largest alligators on the river are located mostly in this area. The land area has large populations of whitetail deer and turkey, as well as gopher tortoise, Southeastern fox squirrel, bobcat, and hawks. Several reports of black bear sightings have been made to the park. Due to the park's close proximity to large natural areas, it is likely these black bears are being seen as they traverse through park lands to reach their preferred habitat found on those lands. Access to the area north of the river had been limited in the past. In 1999, access for the public was increased by the construction of a parking lot and extensive multi-use trail system. Grant funding has been obtained by the Friends of Wakulla Springs for construction of a trail and bridge that will cross over the Sally Ward Slough. The new trail will provide additional access to the trails on the north side of the river. With this increased use of the north side area, the wildlife sanctuaries of the park to the south should remain intact and undisturbed, as they have been for the previous 75 years.

Known cultural sites are recorded on maps and provided protection. Cultural resources must continue to be protected from park activities including prescribed burning, firebreak construction, and any other management activities. Management practices that can have possible impacts on a cultural resource must be planned and conducted to eliminate or minimize impacts to the resource.

Management Needs and Problems

Natural Resources

Prescribed fire. The prescribed fire program must be maintained and expanded at Wakulla Springs. Park staff must insure that burn zones are burned within their recommended burn rotation of 2-3 years or 2-5 years. All areas that are determined to be "backlog" will be top priority for burning. When burning is conducted, expansions of the burn areas are attempted by pushing fire into surrounding hardwood/pine areas. Establishment of firebreaks/ control lines is still a need along several perimeter boundary lines. With the construction of these firebreaks, several additional burn zones will be established. Park staff will continue to work with District staff in pursuing funding for the needed firebreaks.

Uplands restoration. Continue restoration of the various upland pine forest and upland mixed forest areas of the park. Areas must be prioritized and scheduled for timber harvesting, prescribed burning, hardwood control, site preparation, and

planting or seeding of native plant species. A review of the management of the Cherokee Sink area needs to be conducted. The review will help determine the condition of this feature, the progress of restoration, and additional management needs. The management review should include development of a restoration plan for portions of the now closed Wakulla Springs Cut-off Road.

Water quality. Levels of nitrates in Wakulla Spring have increased from 0.1 mg/l in the late 1960s to 1.1 mg/l in the early 1990s and continuing up to that level today. This is a tenfold increase in nitrates over that time. A Northwest Florida Water Management District study of the ten-year average (1990 - 1999) and median annual nitrogen loads to the Wakulla Springs contributory area gave relative contribution from inventoried nitrogen sources as follows: Waste Water Treatment Facilities Effluent- 40 percent, Atmospheric Deposition - 26 percent, Waste Water Treatment Facilities Residuals - 15 percent, Commercial Fertilizer - 7 percent, Onsite Disposable Systems (Septic Tanks) - 6 percent, Sinking Streams - 4 percent, Livestock - 2 percent. A dye-trace study in 2006 confirmed that water leaving the City of Tallahassee's southeast sprayfield wastewater treatment plant was emerging at Wakulla Spring. A 2005 dye-trace study confirmed that water from Lake Munson and traveling to Ames Sink, was also emerging at Wakulla Spring. Additional studies should be encouraged and supported to determine nutrient loading and the nutrient budgets for the possible sources of nitrogen. Continue the improved gathering of water quality data collection that has recently been conducted for the spring and river. Maintain the excellent working relationships with other agencies that are aiding in the gathering of this data. Expand water quality sampling to include Cherokee Sink. Continue educational programs and community outreach relating to groundwater protection through the Springs Ambassador position. Implement scientifically based policy changes at the local government level that significantly reduce nutrient inputs into the groundwater.

Water clarity. Continue to monitor water clarity/visibility of Wakulla Spring. Estimation or use of a secchi disc measures visibility of the spring. Rainfall is recorded daily by an electronic rain gauge near the waterfront area and at the park entrance station using a manual rain gauge. Both spring visibility and daily rainfall can then be tracked and compared for any pattern or relationship that is observed.

Water flow. The pattern of flow of the Wakulla Spring cave system needs to be further examined and researched. Additional flow information will be beneficial and can be used in the comparisons of rainfall, water clarity/visibility and water quality. Great strides in mapping of the conduit system have been made in the last five years. The continued exploration, mapping and dye tracing of the system is paramount in providing protection to its resources. Locating subterranean features on the land surface is equally important for planning purposes.

Exotic plants-aquatic. The control of hydrilla in the Wakulla River must be maintained

in order to promote the health of the river, provide safe swimming and conduct boat tours. Adequate funding and staffing for hydrilla control must also be maintained.

Exotic plants-terrestrial. Because of aggressive efforts by the Park Biologist, terrestrial exotic plants have not become a major impact to the park. Treatment and retreatment of exotics on the initial park property has prevented the spread of these plants. Recent property additions to the park have come with populations of exotics. Early treatment and working with adjacent landowners has resulted in good controls. Ornamental plants within the cultural landscape of the lodge complex have not presented threats to the natural communities. Continue to monitor for any additional infestations of exotic plants on park lands and remove or treat.

Exotic and nuisance animals. The exotic channeled apple snail is currently infesting several water bodies in Leon County. It has a dramatic impact on aquatic vegetation in Lake Munson. It will likely make its way to park waters but efforts will be made to prevent its introduction. Feral cats around the main use area have an impact on the native wildlife. Because the park does not have nearby neighbors, it is suspected that most cats are released in the park. Feral and free roaming dogs are also periodic problems, especially during hunting season. Signs of feral hog activity are evident on the River Sinks property. Management and control may be difficult since use on the adjacent lands includes an active hunt camp. Coyotes have been observed on park property but no impact to native wildlife has been documented. Raccoons and crows continue to prey on Suwannee cooter nests at an extremely high rate. Trapping and removal of raccoons for testing of tick borne disease should help in controlling the raccoon population. The occasional nuisance alligator is managed following the Division's policy and assuring the safety of the park visitor is not compromised.

Wildlife populations. Wildlife density and health within the park boundary remains good. Periodic research and documentation is authorized to monitor the health of non-designated species. Research on fish, butterflies, aquatic invertebrates and other species has been authorized. Long-term wildlife surveys such as the full river survey, boat tour route survey, Christmas bird count and post burn gopher tortoise burrow survey have been conducted since state acquisition. This data is used to track wildlife populations and trends.

Designated species. Populations of designated species within the park need to be protected and monitored. Species such as the Limpkin and apple snail need to have their populations monitored on a regular basis. The cause of the rapid decline of the Apple Snail population is still undetermined. Monitoring of the Bald eagle's nest needs to continue in concert with the Florida Fish and Wildlife Conservation Commission. Because the nest is located in an area restricted from public access and not in a fire adapted community no additional measures are necessary. Populations of gopher tortoise and Southeastern fox squirrel need to be monitored to see how they are

responding to the restoration efforts of the upland pine areas. Observations of manatees in park waters need to be recorded by park staff.

Soil erosion. Great improvements have been made to the badly eroded Cherokee Sink. Through the funding of the Springs Initiative Program, designated entry points have been provided and much of the badly eroded slopes restored. A couple other areas still have deep ditches and scars from past-unrestricted use but are slowly becoming vegetated. With continued efforts to control access routes, these areas may heal on their own. The improvements have resulted in a substantial increase in visitation, which in turn could impact the resources.

Stormwater runoff and gradual erosion from the upward slope of the swimming area beach continue to be a problem. In addition, a concern is the migration of sand from the swimming area down river. The movement of sand covers native aquatic grasses and builds up at the boat dock. Periodic dredging of the sand to relocate it back to the swim area will continue. The dredging is authorized under a current Corps of Engineers permit. Stormwater runoff from the New Light Church County Road on the River Sinks property is a concern for some wetland areas. Contact with county officials will be initiated by park staff to reduce or eliminate this impact.

Park staffing. Efforts to supplement staffing devoted to resource management have been marginally successful. An OPS position, the Springs Ambassador, is funded through the Springs Initiative Program. The ambassador locates and documents karst features (see Cave System Map), works closely with other agencies, performs community outreach and variety of other tasks in an effort to protect karst resources and increase awareness related to springs protection. However, to meet the needs of the increased demands of more than doubling the park acreage, most of which is fire dependant habitat, monitoring requirements related to the continued decline in water quality, providing prescribed fire support and hurricane cleanup to other parks, and other workload issues, an additional FTE park staff position or funding equivalent is a park need.

Cultural Resources

The Lodge Complex. The lodge complex receives heavy use; consequently, its integrity is constantly threatened. Overall, the elements of the resources in this zone are in fair to good condition. Restoration or replication of original features is considered at the time of cyclical repair or replacement. The lodge and support buildings were designed and constructed as uncomplicated, utilitarian structures, and there has been little change through the years.

The lodge structure itself has remained unchanged for the most part. Protective activity is accomplished through park review of ordinary maintenance activities performed by the maintenance and custodial staff and from advice by the Bureau of Natural and

Cultural Resources (BNCR) and the DHR.

Numerous improvements and repairs have been made to the lodge since it was acquired and the structure is in good condition. In spite of a new roof and new exterior painting, moisture problems continue to create damage to the stucco walls in some areas. The plumbing infrastructure is old and may be a contributing factor to the moisture problem.

The massive lobby fireplace is structurally sound but the damper no longer functions. Park staff has been unsuccessful in locating someone that is capable of making the necessary repairs. Staff will continue to search for a qualified vendor to make repairs to the damper.

The heating and cooling ventilation system (HVAC) of the lodge is in need of an upgrade. Of significance is the underground return air duct that runs through the courtyard. The air duct needs to be cleaned and repaired to improve air quality.

The drain lines of the gift shop have been replaced with pipes that are on the surface of the floor. A renovation project needs to occur to relocate these pipes. The floor needs to be cut, new drain lines installed and repairs made to the marble floor as required, replacing the cut tile with available in-kind marble tile that the park has on site.

Other historic buildings of the lodge complex include the restroom building, the spring pump house, the winch house and the updated boat ticket office. The outside rooms of the restroom building have some wood damage and evidence of rodent damaging activity. Park staff will be diligent in quickly making minor repairs when such damage is first observed.

Administrative building. Often referred to as the staff house, the administrative building is in dire need of an electrical wiring system upgrade. This structure, which served as a dormitory for female employees, is wood, much of which is heart pine. The building now serves as the park's administrative office and houses the archival records of the park. Windows in the structure are also failing and need to be conserved as was accomplished in the Lodge.

Laundry building. Protective repairs were made to the building in 2001 in conjunction with the lodge-roofing project. The deteriorated metal roof was replaced with a new roof of the same metal. For many years, prior to state ownership, the attic space was used for storage. Ceiling rafters will likely need to be reinforced before the building can be used for a public meeting space.

Archaeological resources. An archaeological survey of the Cherokee Sink area needs to be conducted. Of special interest is a 1900s Casseaux cemetery located near Cherokee

Sink. The history of land use for this area and the River Sinks property also needs to be researched.

Significant archaeological resources, both recorded and unrecorded, are located below grade at the lodge complex. Threats to the resource integrity are taken into account by park and District 1 staff in accordance with procedures relating to Chapter 267, F. S., whenever ground disturbances are necessary

Threats in the undeveloped areas of the park are for the most part; caused by the effects of rooting animals, weather induced damage, and vegetative growth. Most firebreaks are mowed when possible to reduce ground disturbance. Light, shallow harrowing is required in some areas to reduce the potential of prescribed fires escaping. Public impact on these resources is minimized by limited access to the areas. As noted above, these resources are in good condition and no known looting of sites has occurred.

Management Objectives

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

Natural Resources

1. Prescribed fire. Continue to expand prescribed fire efforts. Expand burnable areas in burn zones through hardwood controls and burning under proper conditions. Identify additional burn zones and establish fire breaks on new properties (Cherokee Sink, Turner Sink, River Sinks and Wanetta). These new zones will be based on the biological community, the restoration needs and prioritized based on the potential for restoration. Burn all "backlog" burn zones.
2. Uplands restoration. Expand natural community restoration efforts by prescribed burning, hardwood controls, timber harvesting, and planting of native species. Determine what upland areas of the park are candidates for natural community restoration. Continue efforts of planting or seeding native herbaceous groundcover species and longleaf pines. Monitor and document progress of the 150-acre restoration site at the Cherokee Sink property.
3. Water quality and clarity. Continue efforts to monitor the water quality of Wakulla Spring and Wakulla River. Continue to work closely with other agencies to collect, analyze and share water quality data. Work towards a central location for posting data. Continue to support efforts to determine scientifically the impacts of the City of Tallahassee municipal sprayfield on the Wakulla Springs

system. Work with the City of Tallahassee and DEP to develop strategies and practices for improvements in advanced wastewater treatment at the Tallahassee municipal sprayfield. Continue to support research and efforts to determine the impacts of septic tank use within the Wakulla Springs Basin on the nutrient loading of Wakulla Spring. Wakulla County has made recent proposals to support advanced wastewater treatments for septic tanks in the Wakulla Basin and to require buffer areas around karst features in this area. These actions should be encouraged and supported. Some private landowners in the basin are already using advanced treatment systems for their septic tanks. These combined efforts, overtime, should lead to reduce nutrient loading from human caused sources.

4. Water Sampling. Expand water quality sampling efforts to include Cherokee Sink to determine if increased recreational activity is impacting the resource.
5. TMDL. Monitor the agency's intent and timeline to establish Total Maximum Daily Load (TMDL) for Wakulla Springs.
6. MFL (Minimum Flows & Levels). Monitor the intent and timeline of the Northwest Florida Water Management District to establish a MFL for Wakulla Springs
7. Water Visibility. Continue to record and graph the visibility of Wakulla Spring and the daily rainfall for the park. Support and encourage efforts to determine sources of "dark water."
8. Water flow. Continue to support efforts by other agencies, research and volunteer groups, to explore, conduct dye traces and map the cave system of Wakulla Spring. Continue efforts by Springs Ambassador to locate, map and describe karst features to aid with exploration efforts and support land use decisions.
9. Exotic Plants – Aquatic. Maintain efforts to remove hydrilla from the spring and river to lessen the impact of the plant on the river ecosystem. Research additional methods of control and if practical, implement based on funding. Continue restoration efforts such as transplanting native aquatic grasses and supporting Bureau of Invasive Plants Apple Snail captive breeding and reintroduction program.
10. Exotic Plants – Terrestrial. Continue to monitor and treat for new or resprouting exotic plants. Document on maps location of all observed exotic plants.
11. Exotic and nuisance animals. Continue trapping and removal of feral cats and dogs when observed. Monitor impacts of feral hog activity on River Sinks property and, if necessary, establish hog removal contract or other measures for removal. Monitor spread of exotic channeled apple snail and make efforts to prevent introduction. Monitor impacts by other exotic or nuisance species and manage as appropriate.
12. Wildlife populations. Continue bi-annual full river survey and produce report. Continue monthly boat tour route survey. Continue to support annual Christmas bird counts. Identify and mark with signage park boundaries. Repair, replace and install boundary fencing, particularly on boundaries where encroachment by adjacent landowners is a concern.

13. Designated species. Continue to record sightings and document whenever manatees are seen in park waters. Continue to record sightings of Limpkin. Provide support for Bureau of Invasive Plant Managements efforts to captive breed and reintroduce Apple Snails into park waters. Conduct documented surveys of snail egg clusters to determine status of reestablished population. Monitor Bald eagle nest activity and report observations to Florida Fish and Wildlife Conservation Commission as requested. Continue to monitor nesting activities of Suwannee cooter. When practical screen nests from predators, particularly those in public use areas. Expand nesting habitat of the cooter to uplands areas adjacent to the river using prescribed fire. Record reported sightings and other evidence of black bear to document their occurrence on park property. Continue to conduct post burn gopher tortoise burrow surveys in select burn zones.
14. Soil erosion. Continue restoration efforts around Cherokee Sink area including encouraging use of designated entry points. Continue revegetation and erosion control efforts on slopes of the sink. Develop a plan to restore portions of the now closed Wakulla Springs Cutoff Road. Monitor recreational use activities in and around other sinkholes as increased visitation occurs.
15. Stormwater. Improved stormwater runoff and renourishment of the beach sand will be continued in an effort to reduce the soil erosion of the swimming area beach and adjacent slope in front of lodge. Restore area heavily impacted from vehicle traffic associated with hydrilla removal. Restrict vehicle access to this area to essential use only.
16. Park staffing. Pursue one additional FTE position to assist with resource management responsibilities including providing prescribed fire support to other parks in the area. Continue to augment biological staff through other funding sources such as the Springs Initiative Program, Bureau of Invasive Plant Management and grants. Recruit volunteers with specific skills and abilities to assist with resource management duties and responsibilities.
17. National Natural Landmark (NNL) Listing. Provide information as needed to the National Park Service to ensure continued NNL designation.

Cultural Resources

18. Archaeological Resources Survey. Request a Phase I Archaeological Survey be conducted on the most recent additions to the park.
19. Coordination of Activities. Coordinate cultural resource research and management practices with DHR, Bureau of Natural and Cultural Resources (BNCR), and appropriate heritage interest organizations.
20. Causseaux Cemetery. Survey or research to confirm location of suspected Causseaux cemetery near Cherokee Sink.
21. National Register Listing. Update the National Register of Historic Places listing to reflect the findings of the archaeological investigations and monitoring that has been accomplished since the property was nominated.

22. Cultural Resource Training. As needed, conduct cultural resource training programs to instruct maintenance staff and park rangers on proper procedures for managing and interpreting cultural resources.
23. Cultural Site Monitoring. Regularly patrol cultural sites to assess their condition and focus monitoring efforts on those in poor condition or facing imminent threats.
24. Archaeological Resources Monitoring. Conduct all ground-disturbing activities according to Division of Historical Resources (DHR) policy and Division guidelines.
25. Cyclical Maintenance. Develop and adhere to appropriate cyclical maintenance schedules for management of structures associated with the lodge complex.
26. Scope of Collections. Develop a Scope of Collections statement and collections management program to inventory, evaluate and catalog artifacts and architectural objects for their proper curation and interpretation.
27. Park Site files. Maintain a set of files for each established site. Document any activities such as maintenance, unauthorized use or other impacts and new findings that occur.
28. Park Archives. Seek safe alternative location for storing historic records such as with the Division's collections and archives managed by the Bureau of Natural and Cultural Resources. Continue to organize, inventory, and digitize archival records related to Wakulla Springs.
29. Large Historic Implements. Preserve, display and interpret farm implements, underwater bell and other items related to the history of the park.
30. Lodge Stucco. Correct moisture problems that are causing deterioration to the interior stucco of the Lodge, repair fireplace damper and return air duct.
31. Historic Staff House (Administration Building) Update the electrical system of the administration building and replace roof.
32. Lodge gift Shop. Renovate the gift shop, specifically improvements to the plumbing drain lines.
33. Laundry Building Keep walls and roof of Laundry free of vegetation and leaf litter and trim overhanging limbs that threaten the structure
34. Historic Dump. Preserve the historic landfill/dump complex through the placement of clean fill dirt in the excavated pits.

Outreach and Education

35. Community Outreach. Continue educational programs and community outreach relating to groundwater protection through the Springs Ambassador position.
36. Environmental Education. Establish environmental educational program with middle school students to collect, analyze and post water quality data.

Management Measures for Natural Resources

Hydrology

The Wakulla Springs Basin Working Group was established in 1992 to encourage the

sharing of information and data between agencies, organizations, groups and individuals in order to protect the water quality of Wakulla Spring and the Wakulla River. The working group, which meets four times a year, consists of about 50 representatives of concerned groups and individuals. Reports on the history of water quality data collection and recommendations for future data collection have been produced by the group. Some of the recommendations accomplished are; 1) a current meter installed at the mouth of the Wakulla cave, 2) the installation of a hydro-lab meter at the boat dock area, 3) collection and analysis of additional water samples obtained by cave divers, 4) installation of three monitoring wells in the conduits at conduit intersections, 5) installation of sampling tubes and data collection meters in each of the three conduit wells, 6) installation and periodic replacement of the water sampling tube at the spring that is now shared by several agencies, 7) recommendations that have effected land use planning activities, and 8) continued meetings of this group. This group has been a major influence in generating cooperation and closer coordination of work efforts among the several agencies that are charged with protection of the water resources.

In 2001, the Governor's Springs Initiative focused the attention of government and the private sector on the need to protect springs on a regional level. Before that time, monitoring of flow, water quality and biology at Wakulla Springs was sporadic and inconsistent. Funding from the 2001 initiative, and from the subsequent Springs Initiatives, has supported research and work to protect springs. Water quality and quantity monitoring at Wakulla Springs is greatly improved. Discharge is monitored continuously, and water quality is monitored monthly. In addition to water quality and quantity monitoring, projects funded to date by the Springs Initiatives also include: recharge basin delineation, baseline biological surveys of spring fauna, semi-annual stream condition index (SCI) monitoring of the spring runs, establishing best management practices for land use in springs recharge areas, and providing public forums for education and outreach to improve the understanding of springs management. Preservation of Florida's springs requires protection of spring flows and water quality. Protection of these relies on the scientific data collected in the monitoring programs and studies funded by the Springs Initiatives.

There have been three major dive exploration efforts since Wakulla Springs became a state park. The first was the Wakulla Project in 1987 that mapped a portion of the cave system, collected samples of water and fauna from the cave and explored a portion of the Sally Ward Cave. A twenty man diving team from the U. S., Mexico, and Great Britain extended exploration and mapping efforts during the October-December 1987 Wakulla Dive Project. The team discovered four major conduits that converge into a main tunnel leading into the Wakulla Springs cavern entrance. None of the four tunnels was traced to their origin, despite penetrations of 4,176 feet, 3,600 feet, and 2,684 feet in tunnels B, D and C respectively. "A" Tunnel which passes southward under State Road 61 pumped tannic water at the same time "D" tunnel running northward,

“B” tunnel running northeast, and “C” tunnel running southeast then south were pumping clear water. The main tunnels are interspersed with unexplored side tunnels and rooms that ranged as large as “The Grand Canyon,” a huge chamber 100 feet high and 150 feet across. Explorers reached a maximum vertical depth of 360 feet in B tunnel.

A second Wakulla Project was conducted in late 1998 and early 1999. This project, called “Wakulla II” conducted additional mapping of the cave system using a 3-D video mapper. Also mapping of the cave system on the surface was done for the first time ever. This surface mapping gives park staff a surface location that follows the path of the below ground conduit system.

A third exploration project has been ongoing at the park since 1991. This long-term project has been conducted by the Woodville Karst Plain Project (WKPP) group. This group has performed multiple dives at Wakulla Spring and Sally Ward caves. They have also attempted to dive the smaller springs in the park as well as many of the sinks and springs of the cave system in the Woodville Karst area. The WKPP have discovered over 15 tunnels within the Wakulla system and have mapped more than 15 miles of cave system at the park (see Cave System Map). They have dived over three miles in length in one tunnel and have gone to depths of more than 300 feet. They have determined the conduits that carry the dark, tannic water, and those conduits that are always filled with clear water. In addition to their dives, the WKPP has assisted the park, and several other agencies and individuals, by collecting water samples from individual conduits, the construction and placement of sampling equipment in the cave system, planting of native aquatic plants for restoration, providing interpretation of their dive experiences and assistance in educating the public on the Woodville Karst system.

Two areas of most concern exist for water protection of Wakulla Spring and river. The first concern is the increase of “dark water” days for the spring. “Dark water” days occur when the visibility of Wakulla Spring is less than 75 feet and the glass bottom boats cannot run. The park has been able to track when glass bottom boats run since 1986. The data of this tracking shows that glass bottom boats now are running less than 60 percent of the time. The visibility of the spring has been measured consistently by park staff since 1994. This data shows an apparent relationship with rainfall and visibility. However, the number of dark water days has increased significantly in comparison to any changes in rainfall during the most recent years. Park staff will continue to collect this information. Recent dye trace studies conducted within the Woodville Karst area have provided new information as to the location, flow and travel time of the dark, tannin waters within the Wakulla system. With this information and additional study and research, the source and cause of the dark water may be determined and possible solutions implemented.

The second concern is the dramatic increase in nutrient levels of the spring water. The Wakulla River is currently listed as impaired water by the Department of Environmental Protection (DEP). Since the early 1970s, there has been a three-fold increase in the nitrate levels. Phosphorous levels have also greatly increased over time. These higher nutrient levels have led to recent growth spurts of various algae species and hydrilla in the spring and river. The causes and sources of these higher levels of nutrients are currently being researched and discussed. Evidence indicates that septic tanks north of the park and the City of Tallahassee municipal sewage sprayfield are contributing to the nutrient increase. Discussions are ongoing to reduce nutrient discharge from both of these potential sources, as well as, continuing to explore other sources of potential contribution. The Division supports the ongoing research initiatives and encourages local government actions based on the best available science to address the water quality problems of the park. DEP has identified the need to establish Total Maximum Daily Loads (TMDL) for the Wakulla River. The timeline was originally set for 2007 but was postponed pending results from some ongoing research. Division staff should continue to encourage and work with DEP to set a timeline for establishing a TMDL.

Wakulla Springs has the distinction of having the largest fluctuation of flow of any of the major springs in Florida. The maximum-recorded flow of 1,910 cfs occurred on April 11, 1973 with the minimum-recorded flow of 25. 2 cfs occurring on June 18, 1931. Because of new equipment that captures flow data, we now know that the flow, as well as temperature, changes on a frequent basis. Data collected during the 2004 hurricanes provides strong evidence of tidal influence and hydrologic connection to the Spring Creek system. Establishment of Minimum Flows and Levels (MFL) have been identified as a priority by the Northwest Florida Water Management District. Division staff should continue to encourage and work with the NFWFMD to set a timeline for establishing a MFL.

In May of 1997, the Northwest Florida Water Management District with the assistance of the Florida State University Academic Dive Program installed an automatic current meter at the mouth of the spring. The S-4 meter was installed at a depth of 190 feet at the entrance of the main tunnel.

Recent improvements to park roads have reduced surface runoff and now provide better protection of the water resources of the park. Improvements were made to the Park Drive near Sally Ward Spring, the Lodge Drive near two sinkholes, the parking lot of the lodge, and relocation of the picnic/swimming area parking lot and the parking lot of the lodge. Improvements were made from the funding of a Federal/Florida Department of Environmental grants under the 319 Non-Point Source Grant Program. This grant also provided funds for the park to develop additional public education materials on the water quality of the spring and river.

Cherokee Sink is now a resource of Edward Ball Wakulla Springs State Park. As stated earlier, Cherokee Sink had been disturbed by a history of unregulated use and access. As state park property, improvements have been implemented that address the need for restoration of this resource, its protection and regulate its use and access by the public. Actions taken by the park include; 1) Limiting vehicle access to the sink by use of a single entrance road, closing all other non-required roads, building a 20 car parking lot in a approved area. 2) Conducting periodic prescribed burning of the upland areas around the sink. 3) Conducting extensive clean up and trash removal of the area, including in the waters of the sink. 4) Construction of three over ground boardwalks for access to the sink that reduce soil compaction, soil erosion, and improve visitor safety. 5) Restoration of a heavily eroded shoreline and sloped area of the sink by the use of fill dirt and revegetation of native plants. 6) Additional erosion control measures taken at several other, less severe erosion sites. 7) Placement of several picnic tables and grills on the site. 8) Placement of a portable bathroom on site for public use. 9) Closure and security of the site at night.

Erosion of the beach and lodge grounds at the swimming area continues to occur. The park has been granted an extension to its five-year permit by the U. S. Army Corps of Engineers and the Florida Department of Environmental Protection to renourish the beach area by dredging the swimming area. A retaining wall was installed to reduce erosion and was a requirement of the permit. The Florida State University Anthropology Department has made two attempts at dredging this area. These two attempts met with minimal success and the effects of the erosion were still present. Park staff developed and implemented a more intense dredging operation relocating soils that had eroded in to the river. The previous use of this area as an access point for vehicles removing collected hydrilla has been discontinued and all vehicles access is limited. Rainfall and the continued heavy visitor use of this area will require ongoing maintenance dredging and a permanent fix is not likely to occur.

The park became a member of the Florida Lakewatch Program in April of 1996. Edward Ball Wakulla Springs State Park was the first spring/river to become a member of this program. The Lakewatch Program analyses monthly water samples collected by park staff. The monthly samples are collected from three sites in the spring and river. The samples are analyzed for, visibility, total phosphorus, total nitrogen and chlorophyll. The database of over 9 years of samples is probably the longest term, dependable, sampling data that has been collected by Wakulla Springs staff.

Prescribed Burning

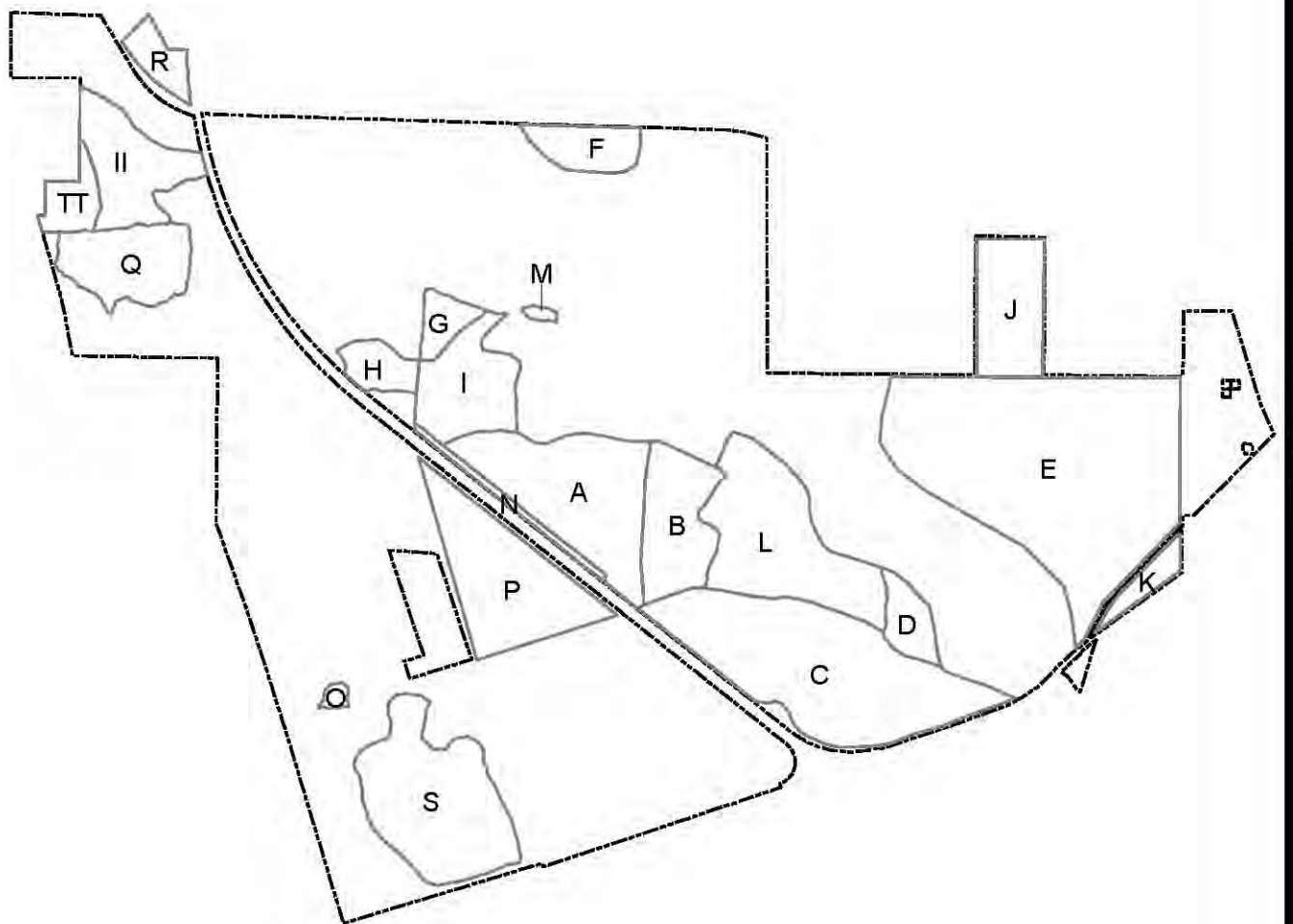
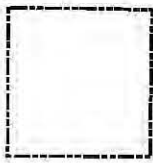
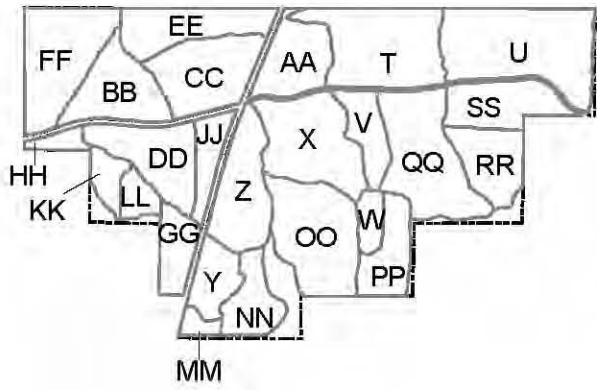
The objectives of prescribed burning are to create those conditions that are most natural for a particular community, and to maintain ecological diversity within the unit's natural communities. To meet these objectives, the park is partitioned into burn zones, and burn prescriptions are implemented for each zone. The park burn plan is updated annually to meet current conditions. All prescribed burns are conducted with

authorization from the Department of Agriculture and Consumer Services, Division of Forestry (DOF). Wildfire suppression activities will be coordinated between the Division and the DOF.

The goal of the Wakulla Springs burn program is to expand all burn zones to their maximum area of fire-type community. New interior fire lines are discouraged and fires are allowed to burn naturally into surrounding areas in an effort to increase the size of the burned areas. Much of the characteristics of these fire-type communities had been lost over a time of 60-80 years because of a lack of fire occurring in these areas. Upland hardwood trees such as laurel oak, sweet gum and dogwoods had invaded these sites due to this lack of fire. This hardwood invasion changed the make up of these fire-type communities and put them well on their way to succession from an upland pine community to an upland mixed/hardwood community. With succession, the characteristics of the open, pine-dominated community with its lush vegetative ground cover would be lost. The invading hardwoods provided more shade that reduced the growth of herbaceous ground cover. This loss of ground cover made these areas less attractive to the wildlife of the upland pine community. Deer, turkey and quail had less cover for protection, gopher tortoise and Southeastern fox squirrel had less open areas to move from site to site. The loss of ground vegetation forced the gopher tortoise to move to the edges and roadsides of these areas in order to find its food source of lush grasses and weeds.

The burn program at Edward Ball Wakulla Springs State Park has been in progress for 18 years. Since the first six test burns of a total of 12 acres in March of 1988, the burn program has expanded to 46 burn zones covering approximately 2,600 acres (see Burn Zones Map). In an 18-year period, 129 prescribed burns have been conducted. These fires have burned an estimated 7,200 acres. The results of this burning have been excellent. Constant, repetitive burning of zones on 2-3 year rotations has provided positive impacts to the upland community. Hardwood stocking has been reduced, herbaceous plant growth has increased and desired wildlife species have increased and moved into new areas. The prescribed burning in combination with other restoration efforts has halted the progression of succession in many of the upland areas.

The burn program of the park originally concentrated on late spring and summer burning after an initial winter burn to reduce the 60-year-old fuel load. Prescribed burning in the late summer has been difficult in some zones. High concentrations of hardwoods, lack of native grasses, and high moisture content of hardwood leaf litter has limited the effectiveness of burns done at those times. These conditions have forced park staff to conduct burns in the late winter and early spring for some zones and parts of other zones. The weather conditions for these late winters, early spring burns have been excellent with low humidity's, higher winds and drier fuels. The results of these burns have been excellent. Burn zones have been expanded and the goals of burning are being met. These goals include: 1) fuel load reduction which, if left to accumulate,



LEGEND

- Park Boundary
- Burn Zones



might cause a destructive wildfire, 2) exposure of bare mineral soil which has allowed for the successful germination of herbaceous vegetation and pine seeds, 3) reduction of invading hardwood trees, and 4) maintenance of planted pine areas as the first step in the restoration process of disturbed sites.

The burn program has been expanded into selected areas of the Cherokee Sink and River Sinks properties of the park. These areas are burned based on the condition of the plant community and the probability that the community can be restored successfully. These areas include sites with wiregrass growth, the presence of longleaf pines, other open upland areas with a fair stocking of herbaceous vegetation, and planted pine stands. These types of sites are more likely to carry a fire through the zone and respond to the effects of burning.

All burn zones have been reviewed for existence of cultural resources. Burn zones that have cultural resources are then evaluated for degree of threat that burning has to the integrity of the resource. If there is a threat, then methods for lessening or eliminating the threats are accounted for in the burn plan for that zone. Interpretation of prescribed burning has helped park visitors and neighbors understand the principles and use of this resource management tool.

Prescribed burning for Edward Ball Wakulla Springs State Park (by year) is as follows:

1. 1986: The state purchases the park. No recorded prescribed burning has ever been conducted on the property. No burning is done this year.
2. 1987: On December 6, test plots are selected and prepared for burning. No burning is done this year.
3. 1988: All six test plots are burned on March 1 and evaluated on March 31. The recommendation is made to expand the burning in all six plots. A total of 12 acres are burned.
4. 1989: Three burns are conducted and the first spring burn is done at Wakulla. A total of 178 acres are burned.
5. 1990: Four burns are conducted two of which are the first repeat burns done at Wakulla. The first summer burn is conducted. A total of 100 acres are burned.
6. 1991: Three burns are conducted and a new burn zone is added. A total of 77 acres are burned.
7. 1992: Six burns are conducted and three new burn zones are added. A total of 466 acres are burned.
8. 1993: Five burns are conducted. Burn evaluation of burn done April 30, observes wiregrass flowering in Burn Zone D. First time recorded for the state park. "Hot" burn on part of Burn Zone B and bark beetle attack on 7 acres. A total of 331 acres are burned.
9. 1994: Five burns are conducted. Two new burn zones are added. A total of 204 acres are burned.

10. 1995: Eight burns are conducted. One new burn zone is added. A total of 458 acres are burned.
11. 1996: Seven burns are conducted. Two new burn zones are added. A total of 173 acres are burned.
12. 1997: Eight burns are completed. A total of 489 acres are burned.
13. 1998: Seven burns are conducted. Severe spring/summer drought occurs. A total of three inches of rain in 3 months. Drought index hits 771 on June 24. Four wildfires occur on the park. Bark beetle infestation of Burn Zone K's longleaf pine covering 5 acres occurs. A total of 254 acres are burned.
14. 1999: Six burns are conducted. Two new fire engines are purchased for future prescribed burning. A new record of 639 acres is burned.
15. 2000: Five burns are conducted. US Forest Service National Interagency Prescribed Fire Training crews hosted by park and assist with burns. A total of 260 acres are burned.
16. 2001: Nine burns are conducted. Two new burn zones are added. The first burns on the Cherokee Sink property of the park are completed. A total of 512 acres are burned.
17. 2002: Eight burns are conducted. Two new burn zones are added. A new record of 712 acres is burned.
18. 2003: Twelve burns are conducted. Four new burn zones are added. The first burns on the River Sinks property are completed. The first Basic Interagency Burn Class is hosted by the park. A Polaris six wheel drive spray unit is added to the park's fire suppression equipment. A total of 593 acres are burned.
19. 2004: Nine burns are conducted. Three new burn zones are added. A total of 499 acres are burned.
20. 2005: Ten burns are conducted. Three new burn zones are added. The second Basic Interagency Burn Class is hosted by the park. A new record of 826 acres is burned.
21. 2006: Nine burns are conducted. Ten new zones are added. A total of 413 acres are burned.

Designated Species Protection

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

Three designated species appear to have benefited from the expanding prescribed fire program conducted by park staff. The populations of gopher tortoises in Burn Zones A, E, H, J, and S have increased since the first burns were conducted. Gopher tortoise burrow surveys conducted after each burn in these zones has shown an increase in burrows and the addition of small burrows. The small burrows are an indication of successful recruitment occurring in these areas. Observations of the Southeastern fox squirrel have been noted from several different areas. Prior to the initiation of the Wakulla Springs burn program, observations of the fox squirrels were noted only from a small area of the park situated in the northwest corner of Burn Zones A and I. In the last five years, the fox squirrels have been seen in all portions of Burn Zones A and I, as well as in Burn Zones B, C, and L. For the first time ever, fox squirrels were observed in the park on the north side of the Wakulla River, when they were twice seen in Burn Zone E. Another animal that appears to have benefited from burning is the Suwannee cooter. The cooter is the most common turtle seen on the Wakulla River. Dr. Dale Jackson, during his five-year research study of the Suwannee cooter, noted the turtle nested mostly in disturbed areas such as the River Road, the meadow area, and the warehouse area. Because of this nesting pattern, predation by raccoons and crows is extremely high for these areas. After Burn Zone B was burned, Suwannee cooter nesting was observed in the newly open areas of the burn zone. In addition, after Burn Zone L was burned, nesting was observed there. To nest in Burn Zones B and L, the turtles had to crossover River Road.

There is one active Bald eagle's nest located within the park. The nest is located in a large cypress tree on the north bank of the Wakulla River located about two miles down river from the spring (latitude 30° 13' 27. 9" North and longitude 84° 16' 25. 3" West). The nest has been active for the last 12 years and has been very successful producing at least one chick each year. The nest is monitored in cooperation with the Florida Fish and Wildlife Conservation Commission. The Commission flies aerial surveys of the nest yearly checking for eggs and fledglings. Park staff monitors the nest during the late fall and winter. The nest is monitored from a land observation point so that nesting activity is not disturbed. Human activity near the nest is restricted during the nesting period.

Several of the listed species are birds that are associated with the Wakulla River. These include the Limpkin, Little blue heron, Snowy egret, Tricolor heron, White ibis, Yellow crowned night heron, and Black crowned night heron. These bird species are monitored by park staff conducting monthly river tour surveys, daily boat tour observations, Christmas bird counts, and by a survey of the entire Wakulla River done twice each year. Population counts, nesting sites and activity, and locations of birds are noted with this monitoring. The Limpkin population at the park has all but disappeared over the last seven years with only an occasional bird being observed and then only for a day or two at a time. The apple snail, the main food source of the Limpkin, has also declined sharply in population over the same time. An apple snail

restoration effort has been conducted by park staff and Environmental Specialist Jess Van Dyke of the Bureau of Invasive Plant Management. Jess collected apple snail eggs from the nearby spring-fed Wacissa River. The eggs were placed in a lab, raised to a mature size determined to be safe from most predators (about the size of a quarter) and released in a small area near the turn around on the tour route. It is hoped that whatever caused the rapid decline in the apple snail population will not affect the introduced population and a new recruitment population will continue the cycle. During the period of 2004 and 2005, over 2,500 apple snails have been released into the park. During this same two-year period, surveys by park staff have observed a dramatic increase in the amount of apple snail egg production where the snails were released. Future surveys will be conducted to monitor the snail's population. It is hoped, that with a sufficient population of apple snails, the Limpkin will return to the river on a permanent basis.

Manatees were observed at Wakulla Spring for the first time ever in early August of 1997 when a group of four made their way up the river to the spring. The manatees stayed for three days before heading back down river and out of the park. Manatee use of park waters has dramatically increased since with continuous summer use being the norm for the last three years. Manatees are also regularly observed in the Wakulla River below the park boundary. When manatees are in park waters, all Federal and State regulations concerning their protection are followed and enforced. Boat tour drivers are made aware of the manatee's presence and advised to slow and stay clear of the mammals. Park staff has been encouraged to learn more about the manatees so they can be interpreted during the regular boat tours. Lifeguards at the swimming area are instructed to keep swimmers out of the water area near the manatees when they are present.

The protection of troglodytic faunas found in the park's aquatic caves is also a goal of park staff. The blind crayfish are vulnerable to over collecting. Since the 1987 dive project, no specimen collections of any troglodytic fauna have been authorized. Park staff will give careful consideration and review to any future proposals of collection.

Exotic Species Control

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

The hydrilla presence in the Wakulla River and spring is the most threatening exotic plant at the park. The impact of this plant to the park has been so dramatic and widespread, that it requires special consideration. Unfortunately, the swift-flowing

nature of the river and the extent of hydrilla invasion will make control a long term, costly process. Hydrilla has the potential for causing serious, permanent deterioration of the system.

No one knows exactly how this exotic was introduced. Hydrilla was first observed in the spring run area in April of 1997. Its spread had increased at an alarming rate, out competing and displacing large amounts of eelgrass and other submerged vegetation in the upper two miles of the river and spring.

The control of hydrilla began with initial hand removal in 1997 and 1998 both from the surface and by SCUBA divers. Some control of the exotic plant was gained in the spring bowl and swimming area, but hydrilla continued to spread rapidly down river throughout the boat tour route. Starting in 1999 mechanical harvesting of hydrilla was contracted to a private vendor and a much larger area of the river was being controlled. Large amounts of hydrilla were removed but its spread marched down river outside the collection area and the boat tour route. Also in 1999 an attempt at biological control was made in conjunction with Florida A and M University when 20,000 flies (*Hydrellia pakistane*) were released on a small portion of the river. No evidence of any negative impacts to the hydrilla from fly activity was ever observed and the control attempt was deemed a failure.

Removal efforts by hand, SCUBA diving, and mechanical harvesting continued with minimal success until 2002, when park and DEP staff determined another control option must be attempted. Previous suggestions to use herbicides had been rejected until park staff witnessed first hand the successful treatment and control of hydrilla at Merritts Mill Pond in Jackson County. Based on this review of an active project similar to the Wakulla system, the decision was made to proceed with the use of herbicide. The first step was to release rodamine dye and monitor its dispersion throughout the river. The study was funded by Bureau of Invasive Plant Management and conducted by the U. S. Corps of Engineers and a private contractor. Evidence showed that adequate mixing occurred and the use of herbicide could proceed. In order to obtain proper concentrations of herbicide reliable flow data was essential. The Northwest Florida Water Management District took surface measurements at all the discharge points, provided the flow data and continued to provide this essential data for each subsequent treatment.

All reviews had been accomplished and it was determined that an application of the herbicide Aquathol K would be applied to the river in April of 2002. Notice was given to area residents regarding the use of the herbicide. On April 16, 2002, the herbicide treatment of the Wakulla River began. The treatment lasted 52 hours and an estimated rate of 4.25 ppm of Aquathol K was applied. The results of the first treatment were amazing but also concerning. Control of hydrilla was excellent with approximately 70-80 percent of the hydrilla removed from the river. This included areas outside the park

boundary over 3 miles away. However, concerns were also raised when several native plants were also impacted by the treatment and a minor die-off of river crayfish was observed soon after the treatment. Turbidity downstream was also high and lasted for more than a month. The massive biomass of dead plant material disintegrated quickly. Additionally, sediments that had built up on the river bottom from the hydrilla infestation were discharging due to the increase in water flow that occurred after the plants died off. These two factors were the cause of the excessive turbidity. Follow up treatments resulted in much less turbidity. Excellent control of the hydrilla lasted for about 6 months.

After research had been done on the impacts to native plants and the river crayfish, a reduced herbicide treatment was proposed for November 2002. The second treatment using Aquathol K was done at a rate of almost 2.0 ppm. Control of hydrilla was again attained to a satisfactory level with less impact to native plant species and no negative impacts on the river crayfish. After the successful second herbicide application, it was determined by Division and DEP staff that herbicide treatments would be the primary tool used in the control of hydrilla for Wakulla Spring and river.

Since April of 2002, there have been eight herbicide treatments completed with excellent desired results and minimal negative impacts. During the April 2005 treatment, crayfish (*Procambarus peninsulanus*) were monitored to determine if the herbicide was toxic to them. The investigation determined there were no toxic signs from the crayfish after the treatment. Two possible causes of crayfish die off are, a decline in dissolved oxygen due to the massive plant die off or some other unknown combination of factors. Most of the dead crayfish were observed in a section of the river where the aquatic plant chara is predominant.

Park staff at this time feels that the management of hydrilla at Wakulla Springs State Park is at a controlled level and this control can be maintained by similar future management actions. Park staff continues to remove hydrilla from public use areas by hand when needed, but this removal is minimal compared to past levels of activity. As always, park staff will continue to seek assistance, research and funding from additional sources in dealing with hydrilla control.

A substantial attack of removal on a second aquatic exotic, parrot's feather has been enacted over the last ten years. This exotic has been eradicated from the west end of the swimming area and an area just below the boat dock. Parrot's feather is now only present along the shore of the meadow area and a short distance down river. Several control efforts by park staff have been conducted on this last remaining infestation site. With continued removal efforts, this exotic plant should soon be eradicated from park waters.

Brazilian elodea is present in great amounts in Sally Ward Spring and its creek run that

connects with the Wakulla River. The elodea has been removed in small amounts and its impacts to the park resources have been greatly overshadowed by the infestation of hydrilla. Elodea has been displaced by hydrilla in the upper portions of the Wakulla River, but still infests portions of the middle section of the river. Impacts from elodea have been much less severe than those presented by hydrilla.

An infestation of water lettuce was discovered at Turner Sink that completely covered this waterbody. A hand removal effort was initiated and completed. Now this area is monitored for revegetation by this exotic.

Upland exotic plants at Edward Ball Wakulla Springs State Park are present but for the most part their impacts are minor and are dealt with on a routine basis. When exotic plants are observed they are removed and treated. The site is monitored for reinfestation and additional treatment is applied if necessary. The River Sinks property of the park has two exotic species with extensive populations, the mimosa tree and Japanese climbing fern. Over 24,000 mimosa trees have been removed since state ownership, but the infestation is still present at several locations. Japanese climbing fern is commonly found at many sites and the park is mapping the locations of this plant and considering the use of an agency task force suppression effort to achieve better control of this specie.

Exotic animals at the park are not a major concern. The exotic channeled apple snail has made its way into several water bodies in Leon County to the north. It is widespread in Lake Munson and has had a significant negative impact on the aquatic plants. Efforts will be made to monitor the spread of this invasive species and prevent its introduction into park waters. The biggest problems are feral cats and dogs that are dropped off at the park, stray hunting dogs and feral hogs on the River Sinks property. The hunting dogs are usually caught and, if they can be identified, their owner is contacted to retrieve the animal. Dogs, whose owner cannot be identified, are held and then turned over to the Wakulla County Animal Control. Cats are taken to Wakulla County Animal Control or given to private individuals. Park staff ownership of free ranging cats is not allowed. The feral hog impacts are being monitored and control measures will be taken if deemed needed by park and District 1 staff.

Problem Species

Problem species are defined as native species whose habits create specific management problems or concerns. Occasionally, problem species are also a designated species, such as alligators. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species that are considered a threat or problem.

Problem species at Edward Ball Wakulla Springs State Park are limited to alligators, eastern diamondback rattlesnakes, raccoons, crows and vultures. Alligators near the

park's swimming area are a constant concern. Smaller gators, 4-7 feet long, are pushed out of their natural areas by larger gators. These smaller gators often try to move into the areas surrounding the swimming area. An alligator report is filed when park staff observes an alligator in or near the swimming area. When park staff files an alligator report, the park biologist does an alligator assessment on the offending gator. Based on the results of the assessment, actions are recommended. The recommended action ranges from continue to monitor and record the actions of the alligator to removal of the alligator. When removal is recommended, park staff contacts the Florida Fish and Wildlife Conservation Commission. The Commission gives authorization for the gator removal and contacts an approved, contracted alligator trapper. The trapper, with assistance from park staff, locates and removes the problem gator. Sometimes alligators are encountered on the nature trails of the park. These gators are chased away from the trails by park staff. Interpretive signs on alligators are posted at the swimming area and along the nature trails. The eastern diamondback rattlesnake is sometimes encountered on the nature trails and on the lodge grounds. When encountered and park staff is made aware of the snake's presence, the snake is removed and placed in a natural, non-use area of the park.

Raccoons and crows are a concern because of their highly efficient predation of turtle nests. Suwannee cooters nest in and along the 3-mile long River Road, on the beach sand of the swimming area, and on the lodge grounds. Nesting activity occurs during the late spring and early summer. Dr. Dale Jackson in his 5-year study of this turtle (Jackson 1997) determined that predation by the crows and raccoons accounted for a 99 percent loss of eggs, which is a concern to park staff. Turtle populations are measured in all wildlife surveys of the river environment. There has been no detection of a decrease in the Suwannee cooter population. When Suwannee cooters are observed nesting on the lodge grounds, the nests are sometimes screened for protection from crows and raccoons. These screened, protected nests are then interpreted to the visitors through signage that is placed at the screen.

Vultures are nuisances at both the waterfront and swimming area. Problem encounters with vultures have been documented at the park when it was in private ownership. Their destruction of park property can be costly and frustrating. Their natural wastes are smelly and unsightly. Park staff has attempted several control measures to keep the vultures away from these areas. Most have met with failure. The most recent and effective deterrent are sprinklers that cover the area around the boat dock. The sprinklers are on a timer and come on in the early morning when the vultures begin their move from their roosting trees to the boat dock area. Park staff will continue to explore ways to reduce the impacts from these annoying birds.

Infestations of pine bark beetles have been a problem. When infested trees are located in use areas such as the picnic grounds, the resulting dead snags can be a safety hazard. When beetle killed trees are deemed a safety hazard, the snags are dropped and

removed from the site. Other pine trees surrounding the infested site are examined for beetle signs and are sometimes treated with an approved insecticide to prevent further beetle infestation. When bark beetle attacks occur in natural areas, the site is monitored. If the infestation is minor, no action is taken and the infestation is allowed to run its natural course, usually taking out only a few stressed trees. If the beetle infestation is large enough that a timber harvesting operation can be justified, the site and the impacts of harvesting are reviewed. If the review determines harvesting is practical then the infested trees may be harvested.

Management Measures for Cultural Resources

The management of cultural resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. 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 of cultural resources at the park is accomplished according to cyclical schedules developed for each zone. The structures of the lodge complex zone are managed in the manner of an adaptive reuse of historic structures. The period considered appropriate for restoration or replication planning is 1938-1942, unless a specific structure is of a later construction. No false or thematic "restoration" of any structure will be attempted. Schedules should be periodically reviewed and updated in conjunction with BNCR and District 1 staff.

Architectural features and fabrics that no longer exist but whose restoration or replication would contribute to aesthetic appreciation of the lodge complex should be identified. Restoration or replication has been considered and implemented in the replacement and/or repair of several projects at the lodge. These projects include; all

windows in the lodge restored and two windows replaced with a modern substitute that is in keeping with the overall design of the lodge structure, the asbestos tile roof removed and replaced with a metal barrel tile similar to the original roof material, the exterior walls water sandblasted and painted with an elastomeric type paint called "Warm Sun" that is similar in color to one of the original layers of paint, the interior ornate painted ceiling cleaned and restored by well known art conservator Rustin Levenson, and a portion of the walkway south of the lodge reconstructed using pavers that are the same size and similar in color to the historic hand made pavers.

Appropriate materials and techniques for each element of the interior spaces of the lodge complex should be developed and implemented. Materials and techniques utilized in performing routine maintenance functions should be periodically reviewed and updated in conjunction with the BNCR and District 1 staff to ensure appropriateness of chemical compounds, materials used to apply and remove such compounds, and reversibility of processes performed.

Pressing maintenance needs of the Lodge include identifying and correcting the moisture problems impacting the stucco interior, renovation of gift shop, including improving plumbing drain lines, repair of fireplace and clean and repair of the underground return air duct below the courtyard.

Update the electrical system of the administration building by removing the old wiring. Staff will continue to pursue funding from internal and external sources to accomplish the urgent project of updating the electrical system. The building's roof will likely need replacement within the next few years.

Walls and roofs of historic structures should be kept free of vegetation, leaf litter and large overhanging limbs.

Preserve the historic landfill/dump complex. The best method of preserving the evidence and artifacts is through the placement of clean fill dirt in the excavated pits. This will prevent any further deterioration of artifacts from the elements or from resource management activities.

Because of the likelihood for prehistoric sites near the park, park and District staff should routinely visit known sites in the undeveloped area of the park to protect sites and potential sites from vandalism. Monitoring sites using photo points is encouraged. Reports of activities should be filed at both the park and District offices.

Woody vegetation in archaeological sites should be managed according to Division guidelines. Native herbaceous ground cover, such as spikegrass (*Chasmanthium* sp.) should be established and encouraged on mounds to limit possibilities for erosion.

Any new plans for prescribed burning and any other resource management activities should be reviewed for impacts to cultural resources before their implementation. Park staff should continue raking around cat-faced pines that are near fire lines.

Ground-disturbing activities will be conducted in accordance with the Department of State, Division of Historical Resources (DHR) policy and as delineated in the Operations Manual.

Vandalism should be discouraged using interpretive signage near the lodge complex that includes warnings against collecting artifacts in both terrestrial and aquatic environments.

Submerged cultural resources require special management. Any use of the spring other than recreational swimming and boat tours will be guided by the existence of cultural and paleontological resources contained therein. Questions concerning the protection of these resources and associated artifacts as well as planning for changes in activity patterns in the spring area should be directed to staff of the DHR as well as the Division Bureau of Natural and Cultural Resources.

Known cultural resources in the undeveloped area will remain unidentified to the public until and unless current limitations on public access to the area are altered. Should such changes occur, management routines should be altered to adapt to changed circumstances.

Research Needs

Natural Resources

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

Additional research on the growth, impact and control methods of the exotic plant hydrilla remains a need. Assistance from other agencies with this subject will continue to be pursued by park staff. Impacts of removal and restoration of lost native aquatic plants will also continue to be researched.

Continuation of research on water quality continues to be a high priority. The quarterly sampling by DEP, Bureau of Laboratories, Florida Geological Survey and Northwest Water Management District should continue to monitor changes in the water quality. The Wakulla River remains listed on the Impaired Waters list and the establishment of Total Maximum Daily Loads (TMDL) by the Department will soon be determined. Any

research and resulting data will help in the process. Although new evidence now links the nutrient increases to the effluent discharged from septic tanks north of the park and City of Tallahassee municipal sewage treatment system, additional research needs to be conducted to provide scientific data to confirm the amount of impact these connections are having on the Wakulla Springs system. The sampling tubes located in the three wells and main spring vent are shared by agencies and universities conducting water quality research. Sharing of this valuable research and additional research by universities should be encouraged. Establishment of a partnership with middle school students and University of Florida-IFAS program to conduct water quality monitoring is underway. Data collected by the students will be shared and, although it will not meet the Departments Q and A standards, it could provide initial trends and increased awareness of water quality problems at Wakulla Springs.

Continuation of research on water quantity and flows is a priority. Installations of several meters that measure velocity or flow have been valuable. Current devices include; 1) current meter in the main spring vent that is retrieved about twice a year and the data downloaded and shared by staff from the NFWFMS, 2) seven meters located in individual conduits and cabled through the monitoring wells. Data is currently manually downloaded and shared by staff from FGS. Plans are to make the data retrievable and accessible on the internet, 3) a staff gauge located at the boat dry-dock area that is maintained by the NFWFMD. Data from the gauge is available from the NFWFMD web site, 4) a meter located at upper bridge that is maintained by the USGS measures stream flow and level and the data is available by accessing the USGS web site. Dye tracing studies conducted by Hazlett-Kincaid have provided valuable information on the conduits located in the Wakulla Springs basin and needs to be continued.

Continuation of research on water clarity is a priority. Information provided by the Woodville Karst Plain Project divers has provided valuable evidence of the sources of dark water. However, evidence during extreme dark periods is limited due to the divers' inability to dive in these poor conditions. Continued research on the sources of dark water is needed. Methods to provide a measurement of dark water would be useful in determining degrees of darkness rather than recording general terms like, "too dark to run glass bottom boats. "

Continued exploration and mapping of the karst system of Wakulla Springs needs to be pursued. The exploration and mapping of the karst system now includes karst features found on park properties, as well as, private and other public lands. Efforts will continue to map the conduit system by the Woodville Karst Plain Project divers and documenting surface karst features by the Springs Ambassador and other contacts.

Biota inventories are a continuing need of the park as its properties expand. Specific needs are to continue to expand lists of plant and animals occurring at the park.

Mapping and monitoring of listed species are a top priority of this research need. A condition of research permits requires the researcher to provide a list of all plant and animals encountered during their research activity.

Natural and artificial germination of native upland plant species is a research need for the restoration of the upland pine areas of the park. Determination and location of successful species and sites are a primary goal for this research need.

Research into the historical land use of the upland areas of the park are a need to help assist in the possible restoration of some of the plant communities. If the impacts of prior land use can be determined, then the need for restoration can be addressed.

Cultural Resources

A phase I archaeological survey is needed for the Cherokee Sink property. Of primary concern are the historical use of Cherokee Sink and the presence of the Causseaux Cemetery. Further research and exploration of this area needs to be accomplished to insure the proper management of the Cherokee Sink property.

Local oral tradition holds that a community of African Americans living in the area earned money by rowing tourists across the spring. Travel literature places African American boatmen at the spring (Long 1883), but physical evidence concerning this population is limited to the remains of Wa326. Additional evidence is likely to exist in the area but would require a more intensive survey than Bryne's 1988 survey. Thus, a Phase II archaeological survey and/or a folk life-based historical study are recommended.

Knowledge about African Americans as well as others who worked the turpentine and naval stores industries during the late nineteenth and early twentieth centuries is limited to evidence provided by cat-faced pine trees. Additional historical research is needed to document the activities of these communities.

Research about the structures of the lodge complex is ongoing, and the efforts of outside researchers are welcomed as long as their efforts do not threaten the physical integrity of the resources.

When individuals with historical knowledge of Wakulla Springs are encountered, their name, address and telephone number are obtained. Efforts are then made by park staff to conduct an oral interview of such individuals to record their experiences.

Resource Management Schedule

A priority schedule for conducting all management activities that is based on the purposes for which these lands were acquired, and to enhance the resource values, is contained in Addendum 8. Cost estimates for conducting priority management

activities are based on the most cost effective methods and recommendations currently available.

Land Management Review

Section 259. 036, Florida Statutes, established land management review teams to determine whether conservation, preservation and recreation lands titled in the name of the Board of Trustees of the Internal Improvement Trust Fund (board) are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259. 032, the board of trustees, acting through the Department of Environmental Protection (department).

Edward Ball Wakulla Springs State Park was subject to a land management review on October 19, 1999. The review team made the following determinations:

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

LAND USE COMPONENT

INTRODUCTION

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

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

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

EXTERNAL CONDITIONS

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

Regional Population

The park is located in the Apalachee Planning District, which includes Calhoun, Franklin, Gadsden, Gulf, Jackson, Jefferson, Leon, Liberty and Wakulla Counties. The Apalachee District remains largely rural in character, and is reported by the Florida Statistical Abstract 2006 as the least populated of the state's 11 planning districts with an estimated population of 458,500. As of 2000, nearly 375,000 people resided within 50 miles of the park. Medium projections for the Apalachee District forecast additional growth of more than 24 percent by 2020. Leon is by far the most populous county, accounting for half of the total population of the region. Despite having one of the lowest population densities in the state, this region is growing

rapidly. Wakulla County recorded the third fastest growth rate of all Florida counties between 1990 and 2000. The City of Tallahassee is the largest metropolitan area of the region with an estimated 2005 population of 174,781. The park is a short drive from Woodville, Crawfordville, St. Marks and Sopchoppy. These communities continue to grow, fueled in large part by the Capitol city's expansion. Despite a relatively modest population size compared to other districts in the state, a strong projected growth rate, combined with proximity to a large, rapidly growing urban center will only serve to produce additional demand for recreation services.

Existing Use of Adjacent Lands

Wakulla County maintains a high percentage of open space and conservation lands, with roughly sixty percent of the county in public ownership. The park is located in an area with a significant concentration of resource based recreation opportunities provided by surrounding public lands that makes this region attractive to outdoor recreation enthusiasts (see Vicinity Map). The Apalachicola National Forest protects over a half million acres north and west of the park. The 68,000 acres of the St. Marks National Wildlife Refuge are located a short distance south along the coastline of Apalachee Bay. San Marcos de Apalache Historic State Park is situated a short drive south at the confluence of the Wakulla and St. Marks Rivers. The Wakulla State Forest includes over 4,000 acres adjacent to the park on the north side of Highway 267. The Tallahassee-St. Marks Historic Railroad State Trail is less than five miles from the main entrance to the park.

Privately owned lands adjacent to the park include a mix of undeveloped woodlands, open fields, pine plantations, and low-density single-family housing. Private lands surrounding the park maintain a rural, agricultural character.

Declining water quality and clarity are critical management issues at the park. Addressing these issues effectively is complicated by the fact that Wakulla Springs is vulnerable to land uses that may be far removed from the park itself. Evidence suggests that elevated nutrient levels and reduced water clarity are aggravated by a variety of factors, including septic tanks, stormwater runoff and the City of Tallahassee wastewater sprayfield. Local governments have recently begun taking a hard look at how land uses and wastewater treatment practices within their jurisdictions contribute to these problems and are beginning to implement solutions. In 2006, Wakulla County adopted regulations that increased setbacks from sinkholes and springs and requires performance-based septic systems for new developments and as replacements for older, malfunctioning systems. Also in 2006, a settlement agreement was reached between the City of Tallahassee and Wakulla County, environmental groups and concerned residents in response to objections to the renewal of the City's permit to operate the southeast sprayfield. The agreement commits the City to provide advanced wastewater treatment at its Thomas P. Smith

and Lake Bradford Road facilities resulting in significantly improved quality of wastewater available for reuse. The agreement also calls for expanding water reuse for irrigation on golf course and other landscapes, upgrading the biosolids treatment processes to provide organic, slow-release fertilizer, developing a new sprayfield management system that focuses on nitrogen removal and establishes a Wakulla Springs Watershed Protection Committee to work on regional solutions to the water quality problem and to identify funding opportunities. DEP has set a 2008 date to establish parameters for Total maximum Daily Loads (TMDL). Water quantity has also become an issue of concern. The Northwest Florida Water Management District has made it a priority to establish Minimum Flows and Levels (MFL). The Division will continue working with other state agencies and local governments to find solutions that will protect the long-term interest of the park.

Planned Use of Adjacent Lands

The park is located within the Wakulla Springs Special Planning Area designated in the Wakulla County Land Development Code, Ordinance #94-28 (see Reference Map). The planning area is governed by land use restrictions regulating the use, handling, production, storage and disposal of toxic or hazardous substances. Proper enforcement of this ordinance will help avoid the future development of incompatible land uses within the spring basin and serve to protect the water quality of Wakulla Springs.

The Wakulla County Comprehensive Plan's Future Land Use Map designates adjacent lands a mix of Agricultural and Rural Residential (R1/R2). Agricultural lands primarily support timber and/or farming activities and allow for very low residential densities. Lands designated R1/R2 provide for a range of agricultural, residential and limited commercial activities at low densities. While these land use designations are compatible with the park, they are open to amendment, which could lead to higher density development and potentially incompatible uses on adjacent lands.

As adjacent lands are converted to more intensive uses additional resource and visitor management challenges will face the park. Development adjacent to the park could exacerbate exotic species control, limit opportunities for using prescribed fire, alter existing patterns of hydrology and potentially threaten water quality in light of the abundance of karst features in the area. One recent proposal of concern involved the development of a commercial water bottling operation on adjacent lands west of Cherokee Sink. To date, this proposal has not received the necessary land use changes to proceed. The Department of Community Affairs has blocked numerous proposed land use changes in the vicinity of the park out of concerns, in part, for potential impacts to Wakulla Springs.

Increased development adjacent to the park may detract from the wilderness feel of

the park and impact the visitor experience through increased noise and light pollution. In addition, as park boundaries become more populated incidents of unauthorized access, illegal uses and encroachments onto park lands may increase. Park staff will continue to monitor land use changes adjacent to the park and provide input, when necessary, on proposed development plans to local planning officials to ensure the protection of park resources.

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

Recent acquisitions have expanded the park to 6,055 acres, nearly 87 percent of which are classified as uplands. Recreational uses and existing facilities are concentrated primarily on roughly 60 acres south of the main spring, including the swimming area, boat docks, lodge and picnic area. The park contains a mix of floodplain swamp, upland pine forests, and hardwoods of exceptional quality on both sides of the river. Under Edward Ball's ownership, +1,000 acres south of the river were designated a wilderness sanctuary (see Reference Map). The park maintains the "Sanctuary" consistent with its historic purpose, restricting most human activity from this area. Forested areas north of the river offer a high quality aesthetic experience for recreational users.

The Cherokee Sink parcel contains nearly 1,500 acres of highly disturbed uplands. This area has been degraded by land clearing and currently supports an abundance of hardwood thickets. It will take some time before the visual quality of the landscape is restored and it becomes appealing for recreation. This area presents an opportunity to divert future demand for expanded recreational access away from the lodge complex and waterfront and other sensitive resource areas.

Uplands of the River Sink parcels have been managed for pine production. Much of these areas are comprised of row-planted loblolly pines and will take some time

before they resemble natural conditions.

Water Area/Shoreline

The park contains over 130 acres of surface waters, including the first three miles of the Wakulla River. The park's springs, sinkhole lakes and river run provide ample opportunities for water-based recreation. The only developed shoreline access is at the main spring area. The swimming area is approximately 1.5 acres and includes roughly 350 feet of shoreline. The remainder of the river shoreline is largely inaccessible due to the floodplain swamp that borders it. The shoreline is accessible in a few places downriver but their geographic isolation, presence of sensitive wildlife habitat and the Sanctuary boundary limit access opportunities along the river corridor. Resource conditions at Cherokee Sink are well-suited for recreational swimming access, which is consistent with the historic use of this area. Sinkhole lakes dot the River Sink parcels providing visual interest and opportunities for water-based recreation, including SCUBA diving.

Natural Scenery

The natural scenery at the park is outstanding. The park is one of the most scenic in Florida, having received a National Natural Landmark designation in 1967. The views of the river, both above and below the water, are extraordinary. A remnant of primeval, wild Florida is evident downriver of the main spring, and views into the depths of the basin are breathtaking. The woodlands along the river are exceptional although parts of the park were altered by past farming and logging activities. The cypress swamps and hardwood forests of the park contain many large trees that provide a beautiful, shaded canopy. Variety in the natural landscape is an important element of the natural scenery of the park.

Significant Wildlife Habitat

The park provides important habitat for a variety of wildlife, including a number of designated species. What makes the park unique is that it provides ample opportunity for visitors of all abilities to see wildlife up close. The Sanctuary provides recreational value by contributing to species abundance and diversity that increases opportunities for visitors to encounter wildlife in public access areas. Likewise, the river corridor supports bird rookeries, a roosting colony of bats, an active eagle's nest and provides a warm water refuge for manatees. By limiting public access in these areas, significant portions of the park serve as a wildlife refuge.

The park provides ample opportunities for the visitor to encounter park wildlife. The trail system north of the river provides access to uplands that support populations of gopher tortoises and Southeastern fox squirrels. The boat tours introduce visitors to the aquatic wildlife, including alligators, turtles, fish and a variety of wading and diving birds. Birding is of such quality that the park is a designated stop on the Panhandle Section of the Great Florida Birding Trail.

Natural Features

The park's springs, river run and sinkholes are the primary natural features of significance. The most important of these features is Wakulla Spring--one of the world's largest and deepest fresh water springs. The spring is connected to one of the largest cave systems ever mapped in the world. In addition to the unique karst features of the park, numerous old growth trees, including centuries old bald cypress and state champion size beech, sassafras and bitternut hickory, create a lasting impression on park visitors. The quality and uniqueness of the resources of Wakulla Springs were recognized in 1967 with a National Natural Landmark designation.

Archaeological and Historical Features

Humans have found Wakulla Spring a favorable place to gather for thousands of years. Seventy-two cultural sites have been identified within the park spanning at least as far back as 8,000 BC. The park has had an important role in the social and political identity of the area, having served over the years as a staging area for the launching of political campaigns and a place where society's elite as well as common folk gathered to socialize and recreate. The park presents many unique opportunities to interpret the cultural history of the region.

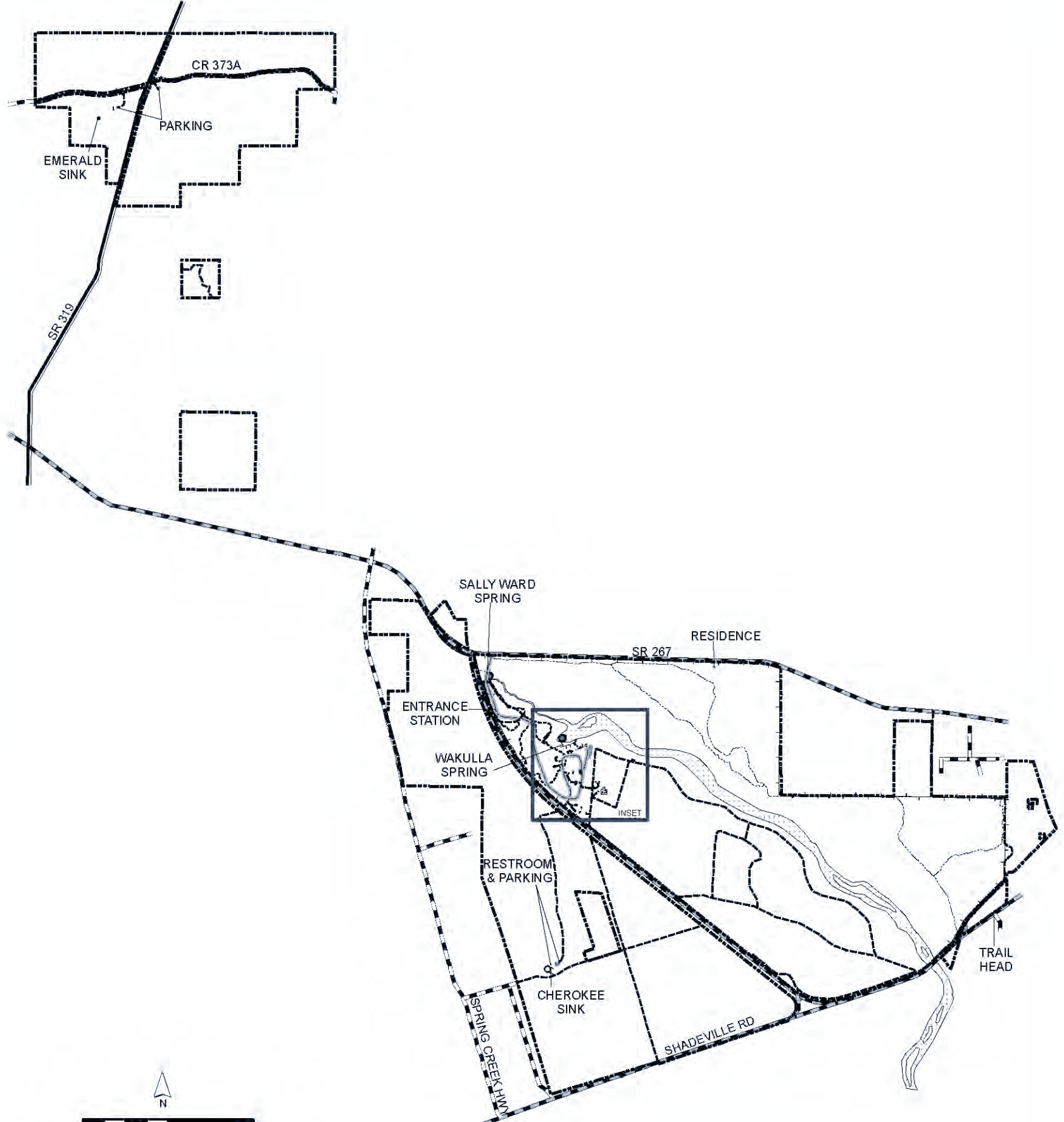
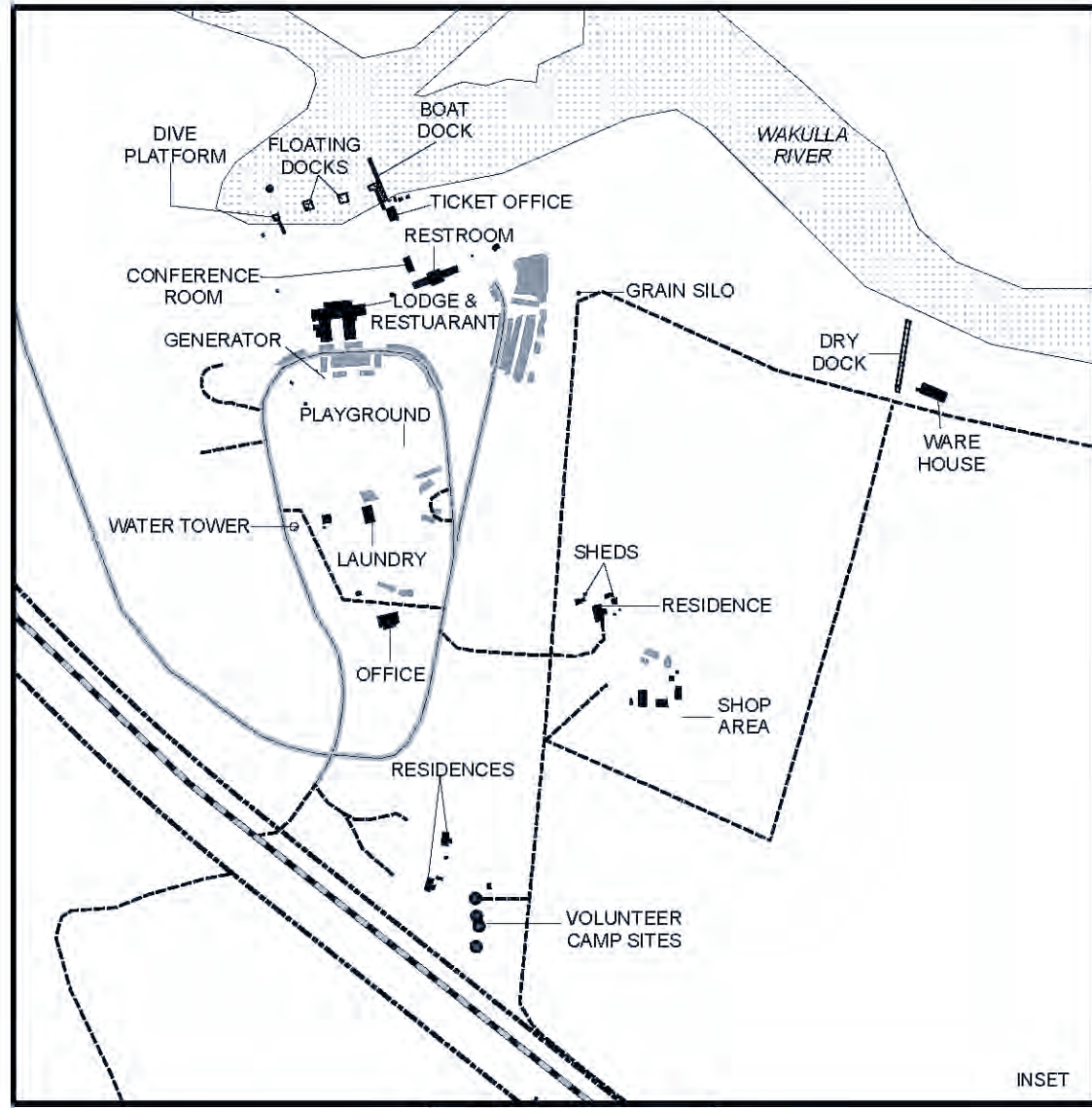
The Wakulla Springs Archaeological and Historic District was placed on the National Register of Historic Places in 1993 and includes lands within the original boundary of the park (see Reference Map). The lodge and restaurant has been in operation since 1937. These facilities have changed little over the years, offering elegant menu items in the dining room, sandwiches, ice cream and souvenirs in the old-fashioned snack bar overnight accommodations and southern hospitality. The lodge's stucco walls, arches and metal tile roof are indicative of the Mediterranean Revival style of architecture that was commonly used during this period. The natural beauty of the site is enhanced by a number of charming, historic structures, reminiscent of the quiet and serenity of a bygone era. The lodge complex and grounds provide an ideal setting to host conferences, meetings and special events.

Assessment of Use

Past uses of the park, applicable zoning and future land use designations, current recreation activities and visitor programs, established protected zones, and existing facilities are briefly described in the following sections. The Base Map reflects all legal boundaries, structures, facilities, roads, and trails existing in the park.

Past Uses

The Wakulla Springs area was used extensively by aboriginal inhabitants of the area. In latter years, the park was used as a World War II training facility, movie filming location and training site for the Florida State College for Women (now FSU) Tarpon Club. A variety of uses have altered the landscape over time,



- LEGEND**
- Park Boundary
 - US Highway
 - State Road
 - County Road
 - Park Road Paved
 - Park Road Unpaved
 - Hiking Trails
 - Shared Use Trails
 - Structures
 - Parking Lots

EDWARD BALL WAKULLA
SPRINGS STATE PARK

0 1,500 3,000 6,000 Feet
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

BASE
MAP

including farming, logging and naval stores operations.

From 1937 until acquisition by the state, the spring basin was operated as a resort while the lands south of the river were preserved as a wildlife sanctuary. Recreation activities included guided boat tours, glass bottom boat rides, and swimming while the Wakulla Restaurant and Lodge provided food and accommodations. The woodlands were protected from hunting and fishing during this period and fire suppression contributed to successional changes in the forest communities. The river channel and Sally Ward Creek were modified in the late 1960s.

The Cherokee Sink parcel was extensively logged prior to state ownership. The River Sinks and Turner Sink parcels were intensively managed for silviculture before they were added to the park.

Future Land Use and Zoning Designations

The following table provides a summary of the 2006 future land use (FLU) and zoning designations for the park according to the Wakulla County Community Development Department. The Conservation FLU is the most restrictive available and intended for areas in public ownership for preservation and limited resource management purposes. Remaining FLU designations allow for public land uses if compatible and consistent with the designation and established as a conditional use in the Wakulla Land Development Code. Public recreation facilities are identified as a conditional use in the Code for all applicable zoning designations.

Jurisdiction	Future Land Use	Zoning
Wakulla County	Conservation; Agriculture (Primary Ag.); Rural-1 (Ag./Rural Fringe); Rural-2	AG Agricultural; RR-5 Rural Residential; RR-1 Semi-Rural Residential; RR-1(a) Semi-Rural Single-Family; R-1(A) Single-Family Residential; R-2 Two-Family (duplex) Residential; C-2 General Commercial

A variety of land use designations is generally a reflection of patterns of previous ownerships and/or a lack of specific zoning and future land use options dedicated to accommodate state park uses. The Division works with local governments to establish designations that provide both consistency between comprehensive plans and zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation opportunities.

Current Recreational Use

Visitation at the park has fluctuated between years over the last decade, with a high of nearly 213,000 visitors in fiscal year 1999/00. Visitation has shown a downward trend since this peak year although the 175,210 people that visited the park in fiscal year 2005/06 reflected an increase over the previous year. Conclusions regarding trends in visitation are difficult to make, but declines at Wakulla Springs may be linked to water clarity problems at the park and the limited number of days available to run the glass bottom boats. Visitation peaks during the summer months and coincides with the best times of the year to enjoy the cool spring water.

Wakulla Spring is the focal point of recreational use at the park. Controlled access to the spring basin and river is provided by a designated swim area and guided boat tours. River and glass bottom tour boats give visitors an opportunity to experience the river, spring and associated wildlife. In recent years, the number of days with sufficient visibility to run the glass bottom boats has been reduced to the point that visitors can no longer depend on being able to participate in this popular activity. Swimming, snorkeling and diving are prohibited directly over or within the spring vent, and personal watercraft, including canoes and kayaks, are prohibited on the river within the park boundary. The main body of the park contains hiking trails between the lodge and Sally Ward Spring and a shared use trail north of the river. Swimming is also a popular recreational activity at Cherokee Sink.

The lodge complex provides overnight accommodations, dining and meeting space. Lodge facilities are popular with individuals and groups and are utilized for special events (weddings, receptions, etc.), professional meetings and conferences.

Current Visitor Programs

Primary interpretive themes are those ideas about park resources that are so important that every park visitor should understand them. Just as park significance statements help set resource protection priorities, primary interpretive themes help set visitor experience priorities. The following theme statements have been identified for the park and should be used as a foundation for the park's interpretive programming.

- The Wakulla Springs system is one of the world's largest and most researched karst systems. From surface water to caves to springs, the Wakulla Springs system provides a working model for understanding the cycling of water through karst topography and its sensitivity to human impacts.
- From Florida's first inhabitants to our most recent arrivals, Wakulla Springs has always supported human activity through subsistence, economic exploitation, education, entertainment and recreation.
- The river run at Wakulla Springs, offers a rare modern-day glimpse into how abundant wildlife once was all across Florida.

The surrounding grounds of the lodge are used for special event programming. This includes outdoor viewing of films that were shot on location at the park and the popular Wakulla Wildlife Festival that is held every April. The latter event takes place over several days, with regional field trips, talks and displays devoted to Florida's native wildlife and their habitats and supported by a variety of participating organizations.

Wakulla Springs State Park participates in the DEP's Learning in Florida's Environment (LIFE) initiative. The LIFE initiative seeks to establish a series of field-based, environmental-science education programs around the state. The goal of the program is increased student achievement and teacher professional development in science. The Wakulla Springs LIFE Initiative is a partnership between the DEP, Wakulla County School District and the Leon and Wakulla County Extension Offices of UF/IFAS. The DEP provides equipment and professional development opportunities for teachers, the extension offices provide trained volunteers to help facilitate the field labs, the school district supports teacher participation and transportation costs and the park staff provide logistical support, facilities and program support.

Other Uses

Scientific research occurs on park grounds, much of which has been devoted to mapping the aquatic cave system. Wakulla Springs is considered one of the most studied karst systems in the world. The resource management component provides additional details of these research activities. Data gathered as a result of this research will be used to gain a better understanding of the hydrogeology of the springshed, make better land use decisions and improve environmental education activities.

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 Edward Ball Wakulla Springs State Park, the Sanctuary and all critically imperiled (S1), imperiled (S2) and wetland communities, have been designated as protected zones (see Conceptual Land Use Plan). The Sanctuary was in place before state ownership and should be maintained to buffer the river and protect the abundant wildlife for which the park is famous. Most human activity outside that necessary for park operations will continue to be restricted from those areas lying within the boundary of the Sanctuary. Requests for access into these areas, for research or related purposes and other guided activities, will be evaluated by park staff on a case by case basis.

Existing Facilities

Waterfront and Lodge complex. The waterfront is a center of activity at the park. A marked swim area with a narrow sand beach, grass covered sunbathing area and floating docks, support water access adjacent to the main spring. A dive platform provides additional enjoyment of the spring waters. Two small surface level concrete retaining walls run parallel to the shoreline. One was installed prior to state ownership. A second was installed in December 1998 to address beach erosion and was a requirement by the U.S. Army corps of Engineers as a condition for a dredging permit. A fence separates this area from the lodge grounds and provides a means for park staff to control access during off-hours. A tour boat dock and ticket office comprises the remaining facilities at the waterfront. Facilities in this area were upgraded in 2002 to improve aesthetics, architectural consistency and provide interpretive exhibits. The renovation project was funded through a Partnership In Parks (PIP) with the Friends of Wakulla Springs.

Consistent with the historic presence of watercraft in the spring basin, the park offers riverboat and glass-bottom boat tours. The former provides superb wildlife viewing opportunities along the Wakulla River while the latter affords a glimpse of the underwater world of the spring basin. These boats are a vital component of the recreation opportunities of the park and provide important natural and cultural history interpretation. The boats currently used were acquired by Edward Ball in the 1960s. They remain structurally sound and have been maintained through the years. In 2004 the Alligator river boat was converted to electric propulsion. Once the system has been refined the goal is to convert the remaining three river boats.

The lodge contains 27 guestrooms, three conference rooms, restaurant, snack bar and gift shop. Capacities for the Magnolia Room, Edward Ball Conference Room and Pavilion Conference Room are 14, 20 and 50 persons, respectively. The Cypress Room is a large room located adjacent to the dining room and is also available for private dinner parties or meetings. The lodge is generally in good repair, having undergone renovations in the late 1990s and early 2000s (see Resource Description and Assessment, Cultural Resources). East of the lodge is a small gazebo and a bathhouse. The bathhouse is in good condition having been renovated in 1995 but is inadequate in size for the park visitation. Rooms on each end of the bathhouse are used for storage, a small water quality lab room and a dive equipment room for park staff. The grounds between the lodge and the water are kept free from visual obstructions to maintain the view toward the spring. The Pavilion is located adjacent to the bathhouse and is used as additional meeting space.

Traffic circulation and parking areas at the lodge and waterfront entrance were reconfigured during the previous planning cycle to provide more efficient and safer access. The lodge parking area was replaced with pervious concrete and now provides parking for 51 vehicles. Parking for visitors picnicking and swimming used to be

accommodated in a dirt lot between the picnic area and the waterfront entrance, and at times within the picnic area itself. Although this unregulated style of parking was popular with picnickers, it was unsafe for pedestrians, caused severe soil compaction around the existing large trees, and undermined staff's ability to regulate the carrying capacity of the park. Now there is greater separation between parking areas and traffic signs direct lodge guests and day use visitors to the appropriate locations. The dirt parking area between the picnic area and waterfront entrance was closed and vegetation is recovering. A new parking area for day visitors was built on an abandoned drain field east of the picnic area that accommodates up to 100 vehicles. A loading zone for buses and a separate drop-off area for picnickers are provided on road shoulders. Bus parking is provided in an adjacent location. An additional pervious parking area for up to 23 vehicles was constructed near the playground. Geoweb technology was utilized in constructing these parking areas to provide a pervious surface to facilitate stormwater management. This redesign has increased public safety, generated additional open green space for recreational activities and reduced soil compaction around the large trees located in the picnic area. The provision of marked, designated parking areas also facilitates management of visitation on peak days. While parking and circulation have improved, visitors coming to the park for picnicking and swimming continue to park in the lodge parking area utilizing space that should be restricted for lodge and dining room guests and swimming/picnicking parking capacity is inadequate on peak days.

Picnic area. A designated picnic area southeast of the lodge contains scattered tables beneath a canopy of tall pines. This area is extremely popular with groups visiting the park.

Trails. The Sally Ward Spring Nature Trail loops 2.5-mile westward from the lodge grounds and is limited to hiking only. In 2006 an interpretive area and short boardwalk were added to provide access to two small sinkholes near the lodge parking area. This provides a unique opportunity to educate people about the karst topography and ongoing research in close proximity to the park facilities. One of three wells placed in the cave system is located next to the boardwalk and provides an excellent opportunity to interpret ongoing research. A seven-mile double-loop, shared-use trail provides hiking, off-road bicycling and equestrian opportunities north of the river. The trailhead is located off Rock Road near the eastern boundary of the park and has a stabilized parking for up to ten vehicles with horse trailers. The construction of the Sally Ward Bridge (see Potential Uses and Proposed Facilities) will provide better access to this trail and an opportunity to use the trail systems for guided walks.

Cherokee Sink Parcel. The road to Cherokee Sink is approximately 4,000 feet south of the Highway 61 and 267 intersections. Facilities are limited to a stabilized parking area, portable restroom, picnic tables and grills, boardwalks for access and an elevated observation/dive platform. Primary use of this area is swimming, although SCUBA

diving is allowed. Continued restoration efforts to stabilize the slopes and provide recreation access have been made possible through Springs Initiative funding.

River Sink Parcel. A small gravel parking area has been established to facilitate trail access to the River Sinks parcel off C.J. Spears Road. A small parking area, steps and diver platform provide access to Emerald Sink for SCUBA diving.

Support facilities. A modern ranger station is located along the park drive with a small paved parking area. The park has four residences that include three mobile homes, one of which is employee-owned. A boat maintenance/storage building is located a short distance downriver from the main spring area. The park also contains various standard support structures for storage of equipment and workspace and four volunteer host sites.

Two structures that were original components of the lodge complex serve as the headquarters for park administration and a laundry facility. These structures are stable but will eventually require some restoration work.

A state owned water tower is located near the laundry building that serves the park. This structure is anticipated to be a significant maintenance and safety problem in the future. The tower is tied into the existing Talquin Cooperative water supply company. A new tower has been installed in the River Sink community and may eliminate the need for the park's tower. Discussions continue with Talquin Cooperative to determine the need for this structure. If it is determined the tower is no longer necessary to insure the park has adequate water pressure it is recommended to be removed from the park.

The following is a listing of existing recreation and support facilities:

Waterfront and Lodge Complex

Swim area and beach (1.5 acres)	Snack bar
Dive platform	Restaurant
Boat dock	Gift shop
Tour boats (9)	Gazebo
Concrete pier	Bathhouse
Ticket office	Concession
Guestrooms (27 person capacity)	Paved lodge parking (51 paved spaces)
Conference rooms (3)	

Picnic Area

Scattered picnic tables (100)	Stabilized parking (100 vehicles)
Grills	Stabilized parking (23 vehicles)
Playground equipment	

Trails

Sally Ward Spring Nature Trail (2.5 mi.) Rock Road Trailhead:
Shared-use trail (7.0 mi.) and
Parking (10 trailer capacity)

Cherokee Sink

Parking (30 vehicle capacity)
Boardwalk access
Portable restroom

Observation/Dive platform
Picnic Tables and Grills

River Sinks

River Sinks parking (20-vehicle capacity)
Diver Parking (10 vehicles)
Steps and diver platform access

Portable restroom
Picnic Table
Trailhead parking (15 spaces)

Support Facilities

Laundry
Administration building
Ranger Station
Ranger residences (3)
Boat maintenance/storage building
Pump sheds (1)
Greenhouse
Utility buildings (3)
Shop building

Silo building used for storage
Equipment storage building
Flammable storage building
Water tower
Volunteer Host Sites with storage/laundry bldg (4)
Employee Owned Mobile Home site
Winch Building

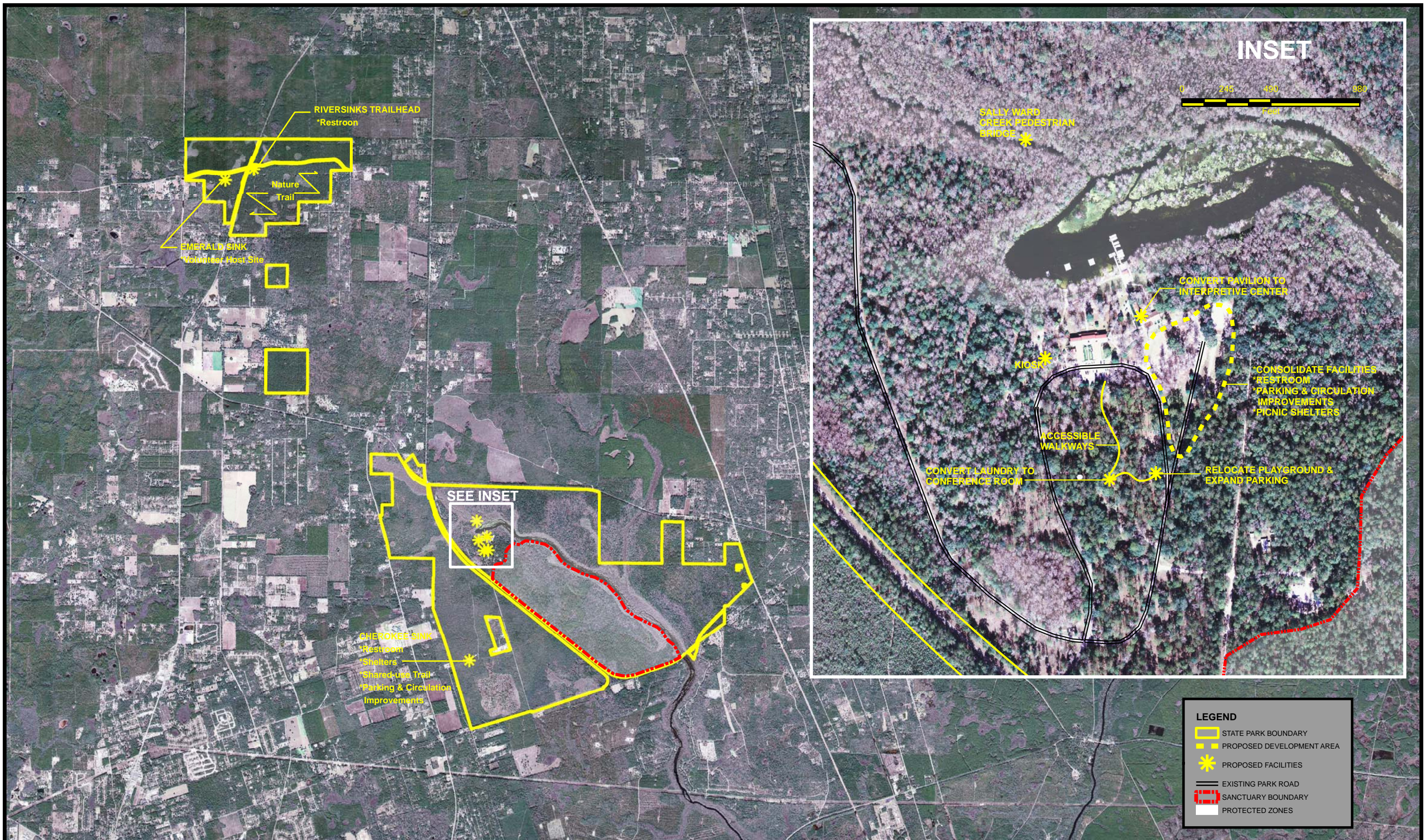
CONCEPTUAL LAND USE PLAN

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

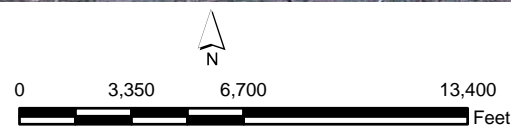
Site Planning and Design Process

During the development of the unit management plan, the Division assesses potential impacts of proposed uses on the resources of the property. Uses that could result in unacceptable impacts are not included in the conceptual land use plan.

Potential impacts are more thoroughly identified and assessed through the site planning process once funding is available for the development project. At that stage,



**EDWARD BALL WAKULLA SPRINGS
STATE PARK**



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

**CONCEPTUAL LAND
USE PLAN**

design elements, such as sewage disposal and stormwater management, and design constraints, such as designated species or cultural site locations, are more thoroughly investigated. Advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Stormwater management systems are designed to minimize impervious surfaces to the greatest extent feasible, and all facilities are designed and constructed using best management practices to avoid impacts and to mitigate those that cannot be avoided. Federal, state and local permit and regulatory requirements are met by the final design of the projects. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, the park staff monitors conditions to ensure that impacts remain within acceptable levels.

Natural community impacts have been minimized by siting most proposed improvements within existing ruderal or developed areas. Remaining locations of proposed improvements are located in areas that have received high levels of past disturbance associated with silviculture operations (Cherokee Sink and River Sinks parcels). Proposed improvements in the vicinity of karst features will maintain appropriate buffers and be designed to avoid stormwater impacts. Efforts will be made to avoid disturbance to known cultural site locations. Ground disturbing activity associated with proposed development will include appropriate monitoring protocols and the review of the Division of Historical Resources.

Potential Uses and Proposed Facilities

The current recreational uses at the park are appropriate and should continue. Acquisition of additional land in recent years presents opportunities to expand recreational opportunities, including additional trails and SCUBA diving. Existing picnicking and trail facilities are targeted for improvements and new conference space proposed. Interpretive facility improvements are proposed that facilitate learning opportunities and creates a system of interpretive points of interest through the use of static displays at key resource areas of the park. Refer to the Conceptual Land Use Plan for locations of proposed facilities.

Waterfront and Lodge Complex. The internal configuration of the Pavilion is not well-suited for its current use as meeting space. It is recommended that the use of this building be shifted to interpretive purposes. There is a strong need for additional exhibit space at the park and a location to occupy visitors awaiting a ride on the tour boat. While the ticket office provides a sheltered venue for viewing exhibits about the park, it is small and can only support a very limited number of people. Visitors tend to gravitate to the lobby of the lodge while they are waiting, which is a problem when it involves groups of children in their wet bathing suits. A small interpretive center will provide an opportunity to expand programming at the park and a location more suitable for groups to congregate. The building is conveniently located

near the waterfront and in proximity to restrooms. Modifications to the building will be necessary to serve this purpose and may include expanding the interior space by reestablishing a portion of the roofline over the existing deck.

To compensate for a loss of meeting space, it is proposed that the laundry facility be adaptively reused as a meeting facility. The size and internal configuration of this building lends itself to renovation for this purpose. Its location, removed from the high traffic areas near the waterfront, provides an environment more conducive to holding meetings. It is recommended that the building be modified to provide a capacity of up to 100 persons. The adjacent playground equipment is proposed to be relocated closer to existing picnic facilities and the pervious parking lot in this area expanded to an appropriate size to accommodate users of the meeting facility. Universally accessible pathways will be needed to connect the meeting facility with the parking area and the lodge.

It is recommended that traffic circulation improvements be implemented to more effectively separate user traffic and ensure lodge guests have adequate parking. Consideration should be given to adding an electronic gate just north of the playground parking area to allow delivery vehicles to exit the lodge parking area and prevent picnickers from using spaces designated for lodge guests. Existing signage should also be evaluated for opportunities to improve the flow of traffic. A variety of options should be considered that will be effective at addressing this problem.

Picnic Area. The picnic area currently lacks sheltered facilities. Funding for construction of two large picnic shelters has been allocated to provide much needed covered space to eat and gather for the many large groups that frequent the area. Consideration will be given to relocating the existing playground equipment in the future if it is determined to present a conflict with the proposed conference facility in the laundry building or necessary to improve visitor circulation.

Support facility improvements within the picnic area include the addition of a restroom and reconfigured and expanded parking. Improved restroom facilities for day users will help decrease traffic within the lodge and reduce wear and tear on historic facilities. Parking improvements are needed to discourage use of the lodge parking area by visitors to the picnic area and waterfront and to accommodate existing recreational capacity. It is recommended that buses be provided space to load and unload passengers near the waterfront but that they are parked away from this area, at least during periods of peak visitation. This will allow the use of existing bus parking for private vehicles (approximately 20-vehicle capacity). Finally, it is proposed that the capacity of the remaining parking areas be increased to accommodate an additional 40 vehicles. Limiting expansion to roadsides and the vicinity of existing parking areas will minimize the need to clear vegetation. New

parking will continue to utilize pervious materials to facilitate stormwater management.

Trails and Interpretive Signage. To enhance an understanding of the primary interpretive themes of the park, it is recommended that a series of connected interpretive stations be developed at key locations. Each station would be strategically located at a site appropriate to tell an important piece of the Wakulla Springs story. Interpretive signs, kiosks, print or audio guides would be utilized at each station. Low profile signage is recommended in areas where protecting the scenic landscape is a priority, such as the grounds of the lodge. Logical points of interest are the spring basin, waterfront visitor center, lodge and other historic structures, Sally Ward Slough, archaeological features, Cherokee Sink, other karst features and Champion trees. For example, there is a particular need for a multi-paneled kiosk at the waterfront devoted to educating the public on the hydrological issues facing the park. Also, a trailhead kiosk just southwest of the lodge is needed to orient users to existing boardwalk overlooks at adjacent karst features and the Sally Ward Spring Nature Trail. The design and development of the stations should be approached in a comprehensive manner, assuring consistency with identified interpretive themes, and making appropriate connections between sites to create a holistic picture of the rich history and environment of the park that is relevant to visitors.

A footbridge on Sally Ward Creek is recommended to link existing trail systems and to provide enhanced views of this natural feature. The section of trail between the lodge and proposed footbridge is proposed to be evaluated for improvements designed to provide universal access. Improvements may include stabilizing surfaces and clearing obstructions where practical.

The potential exists to connect existing and proposed trails with the Wakulla State Forest, Apalachicola National Forest and the YMCA Camp Indian Springs. The Division is receptive to exploring opportunities for trail connectivity with adjacent land managers and implementing improvements consistent with operational and resource management needs of the park. Acquisition of the Ferrell property, identified in the Optimum Boundary, would provide the linkage to these other properties.

Responsible trail use will be actively promoted to avoid user conflicts from developing on existing and proposed trails. Park staff will monitor trail use and implement management measures, if necessary, to address problems adversely affecting park resources or the user experience. Actions may include increased education, trail re-routing, hardening or closure. It is also recommended that all existing trails be evaluated for ease in navigation and directional signs and trail maps provided where necessary.

Cherokee Sink Parcel. The access route to Cherokee Sink is along a narrow, dirt road with patches of soft sands, wallowed-out areas and stretches that allow for the passing of only one vehicle at a time. Vegetation has been removed to eliminate the worst blind spots and potential traffic hazards. While the narrow, heavily vegetated road is visually attractive, additional improvements are needed to address long-term safety and maintenance needs. Other options to be considered include a modest widening to ensure safe, two-way vehicular flow or creating one-way circulation on a portion of the route following existing road corridors. In addition, the existing parking area is recommended to be organized with parking stops and expanded to accommodate a maximum of 35 vehicles.

The Cherokee Sink parcel has the potential to develop over 6 miles of additional shared-use trails. The existing network of dirt roads should be utilized to the greatest extent possible. The existing stabilized parking area would serve as the trailhead. Given current resource conditions developing a trail system on this property is considered a lower priority to other trail improvements identified in this plan. The appeal of this area to equestrian use will be evaluated, and if considered appropriate, a number of horse trailer spaces developed in the vicinity of the existing parking area.

Additional amenities are recommended to accommodate visitors to the sink. Two small picnic shelters, scattered picnic tables and grills and a restroom are proposed on the north side of the sink within disturbed areas. Due to groundwater quality concerns, the provision of permanent restroom facilities is recommended. The sewer line that connects the park to the Wakulla County sewer systems runs down the old Wakulla Arran road in close proximity to Cherokee Sink. Water supply is also in close proximity. A restroom facility that is connected to central water and sewage is recommended. Future levels of use may necessitate additional boardwalk access points and platform seating areas for visitor convenience and to minimize erosion from foot traffic.

A fee collection station is recommended to collect fees from visitors to Cherokee Sink.

River Sink Parcels. This recent acquisition has numerous sinkholes that provide recreation interest within uplands dominated by planted pines. It is recommended that existing unimproved roads be developed into an interpretive trail system that highlights the karst features of the property east of U.S. Highway 319 and south of CJ Spears Road. The roads are of sufficient width to accommodate hikers and bikers. It is recommended that up to 3.5 miles of trails be developed in this area and that the sinkholes of the property be evaluated to determine if swimming access could be provided to one karst feature along the trail. A gravel parking area has been established off CJ Spears Road to facilitate access. A small restroom, trail directional

signage and an honor box fee collection station are proposed to support use of the trail.

Emerald Sink, located west of U.S. Highway 319 and south of New Light Church Road has been a popular destination for SCUBA divers prior to state ownership. For several years prior to state ownership the property was leased and was closed to diving activity. The Division is receptive to allowing diving activities on a permit basis. Through the efforts of members of the dive community all material and labor was donated to construct steps and a diver access platform in 2007. A pervious parking area was provided using Springs Initiative funds. Due to the extreme depths and dark water conditions, a review panel consisting of representatives from several dive organizations will determine diver eligibility. Eligible divers will be required to make reservations to dive Emerald Sink. The restrictive procedure will help to prevent damage to the resource, reduce the potential for diver injury and enhance the divers' recreational experience by limiting the number of divers at any given time. Emergency contact information will be clearly posted. A designated landing site for a Life Flight helicopter is located at the Wakulla Springs Baptist Church in case of an emergency. To facilitate visitor management in this area, a volunteer host RV site is also recommended.

Support Facilities. A petroleum storage building is recommended for storage of fuel for equipment, prescribed burning and other park operational needs. New codes stipulate that paint and fuel be stored in separate buildings. Because of the concern with ground water protection a building with impervious floor material and one that meets new codes requirements is recommended.

The Woodville Karst Plain is one of the most studied systems in the world with a large number of research projects being conducted by a variety of agencies and organizations. The need to provide onsite support to visiting researchers, in the form of work space and accommodations, has been identified. The park administration building currently provides limited space to house researchers while conducting work at the park. The Division will consider expanded use of the administration building for these purposes, as space allows. Future park plans may consider relocating park administrative functions to allow for the full adaptive reuse of this building.

Facilities Development

Preliminary cost estimates for the following list of proposed facilities are provided in Addendum 8. 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.

Waterfront and Lodge Complex

Interpretive Center

Meeting facility

Picnic Area

Large picnic shelters (2)

Parking expansion (additional 40 spaces)

Restroom

Trails and Interpretive Signage

Kiosks and signs

Cherokee Sink Parcel

Small picnic shelters (2)

Improved access road

Restroom

Organize/expand parking (up to 35 vehicles)

Shared-use trail (6+ miles)

Fee collection station

River Sinks Parcels

Restroom

Fee collection station

Trail directional signage

Volunteer host site

Interpretive trail (up to 3.5 miles)

Shop Area

Fuel Storage building

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. 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 recreational carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 1).

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

Table 1--Existing Use And Recreational Carrying Capacity

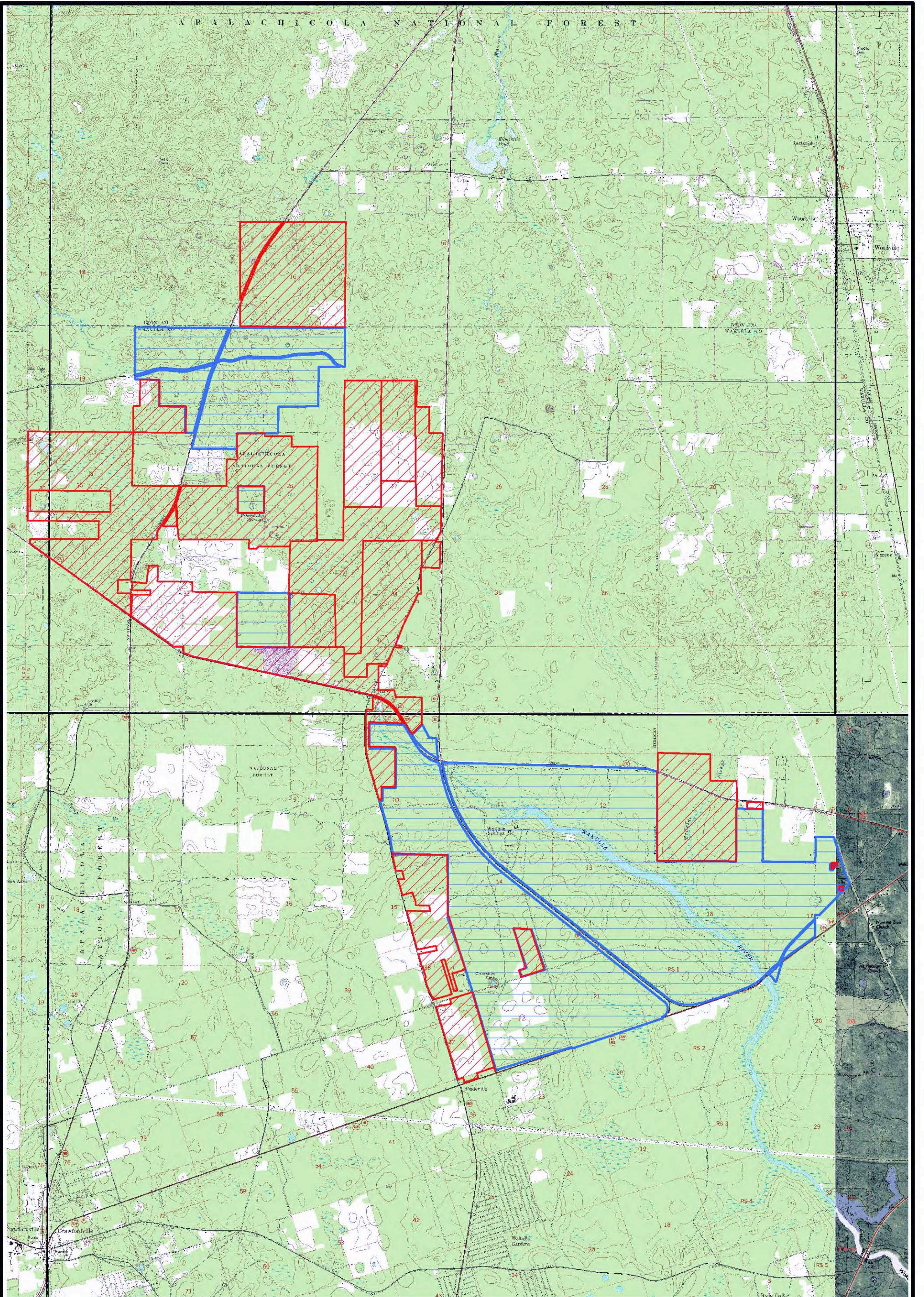
Activity/Facility	Existing Capacity		Proposed Additional Capacity		Estimated Recreational Capacity	
	One Time	Daily	One Time	Daily	One Time	Daily
Lodging / Meeting Space	152	152	50	50	202	202
Picnic Area / Waterfront	545	1,090			545	1,090
Trails	95	190	100	200	195	390
Cherokee Sink	106	212			106	212
Emerald Sink (diving)			8	16	8	16
TOTAL	898	1,644	158	266	1,056	1,910

Optimum Boundary

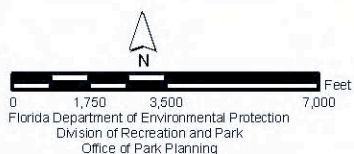
As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency.

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

The optimum boundary map reflects lands identified for direct management by the Division as part of the park. These parcels comprise nearly 6,000 acres and may include public as well as privately owned lands that improve the continuity of existing park lands, provide additional natural and cultural resource protection, and/or allow for future expansion of recreational activities. At this time, no lands are considered surplus to the needs of the park.





EDWARD BALL WAKULLA
SPRINGS STATE PARK



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

LEGEND

-  Optimum Boundary
-  Park Boundary

OPTIMUM BOUNDARY MAP

Addendum 1 – Acquisition History and Advisory Group List with Staff Report

Edward Ball Wakulla Springs State Park Acquisition History

Purpose and Sequence of Acquisition

The State of Florida has acquired Edward Ball Wakulla Springs State Park to develop and manage the property for public outdoor recreation and related purposes.

On September 17, 1986, the Board of Trustees of the Internal Improvement Trust Fund (Trustees) obtained title to a 2,860.53-acre property that constituted the initial area of Edward Ball Wakulla Springs State Park. The Trustees purchased the property under CARL Program. Since this initial purchase, the Trustees have acquired several parcels under P-2000/CARL and P-2000/A and I programs and added them to Edward Ball Wakulla Springs State Park.

On October 20, 1986, the Trustees conveyed its management authority of Edward Ball Wakulla Springs State Park to the state agency presently known as the Department Of Environmental Protection, Division of Recreation and Parks (Division) under Lease No. 3463. The lease is for a period of fifty (50) years, and it will expire on October 19, 2036.

According to the lease agreement between the Division and the Trustees, the Division will manage Edward Ball Wakulla Springs State Park for the conservation and protection of natural and cultural resources and for resource-based public outdoor recreation that is compatible with the conservation and protection of the property.

Title Interest

The Trustees hold fee title to Edward Ball Wakulla Spring State Park.

Special Conditions on Use

Edward Ball Wakulla State Park is designated single-use to provide resource-based public outdoor recreation and other related uses. There are no legislative or executive directives that constraint the use of the park. Uses such as, water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this .

Outstanding Reservations

Following is a listing of outstanding rights, reservations and encumbrances that apply to Edward Ball Wakulla Springs State Park.

Edward Ball Wakulla Springs State Park Acquisition History

Instrument: Purchase and Sale Agreement
Instrument Holder: The Nemours Foundation
Beginning Date: July 9, 1986
Ending Date: There is no specific ending date.
Outstanding Rights, Uses, Etc.: The agreement states that the property shall be named "Edward Ball Wakulla Springs State Park."

Instrument: Special Warrant Deed
Instrument Holder: The Nemours Foundation
Beginning Date: September 17, 1986
Ending Date: There is no specific ending date.
Outstanding Rights, Uses, Etc.: The warranty deed is subject to certain access and access easements.

Edward Ball Wakulla Springs State Park Advisory Group List

Brian Langston, Chair
Wakulla County Board of County
Commissioners
P.O. Box 1263
Crawfordville Florida 32326

Joseph Duggar Jr., Chair
Wakulla Soil and Water
Conservation District
963 Crawfordville Highway
Crawfordville, Florida 32327

Sandy Cook, Park Manager
Wakulla Springs State Park
550 Wakulla Park Drive
Wakulla Springs, Florida 32305

John Himes, Regional Non-Game
Biologist
Florida Fish and Wildlife
Conservation Commission
3911 Highway 2321
Panama City, Florida 32409-1658

Kawika Bailey, Senior Forester
Florida Division of Forestry
Wakulla State Forest
3674 Bloxham Cut-off Road
Crawfordville, Florida 32327

Marcus Beard, District Ranger
Apalachicola National Forest
Wakulla Ranger District
P.O. Box 579
Bristol, Florida 32321

Melissa Charbonneau, Preserve
Manager
Big Bend Seagrass Aquatic Preserve
3266 North Sailboat Avenue
Crystal River, Florida 34428

Mike Wisenbaker, Historic
Preservationist
Florida Division of Historical Resources
500 South Bronough Street
Mail Station 8
Tallahassee, Florida 32399-0250

Linda Jamison
Sierra Club
Big Bend Group
8469 Lake Atkinson Drive
Tallahassee, Florida 32310

Elizabeth Platt, President
Apalachee Audubon Society
1904 Skyland Drive
Tallahassee, Florida 32303

Gil Nelson
Native Plant Society
157 Leonard's Drive
Thomasville, Georgia 31792

Richard Graham, Chair
Florida Trail Association
Apalachee Chapter
2228 Shirley Ann Court
Tallahassee, Florida 32308

Edward Ball Wakulla Springs State Park Advisory Group List

Suzanne Lane
Southern Trailriders Association
630 Kittrell Road
Quincy, Florida 32351

Jason Ottinger, Conservation Chair
National Association of Cave Diving
4907 Planters Ridge Drive
Tallahassee, Florida 32311

Jim Stevenson, Chair
Wakulla Spring Basin Working Group
4797 Lakely Drive
Tallahassee, Florida 32303

Casey McKinley
Woodville Karst Plain Project
615 SW 80 Drive
Gainesville, Florida 32607

Della Parker-Hanson, President
Friends of Wakulla Springs State Park,
Inc.
14 Egret Street
Crawfordville, FL 32327

Nancy Durrett
811 New Light Church Road
Crawfordville, Florida 32327

Al Ferriera, Camp Director
YMCA Camp Indian Springs
2387 Bloxham Cut-off Road
Crawfordville, Florida 32327

The Advisory Group meeting to review the proposed land management plan for Edward Ball Wakulla Springs State Park was held at the Lodge on May 23, 2007.

Chairman Brian Langston (Wakulla County Board of County Commissioners), John Himes (Florida Fish and Wildlife Conservation Commission), Kawika Bailey (Florida Division of Forestry), Marcus Beard (Apalachicola National Forest), Melissa Charbonneau (Big Bend Seagrass Aquatic Preserve), Suzanne Lane (Southern Trailriders Association), Della Parker-Hanson (Friends of Wakulla Springs State Park, Inc.) and Al Ferriera (YMCA Camp Indian Springs) were not in attendance. All other appointed Advisory Group members were present. Attending staff included Danny Jones, Eric Keifer, Sandy Cook, Scott Savery, Bonnie Allen, Phil Werndli and Michael Kinnison.

Division of Recreation and Parks staff delivered a presentation on the management plan that provided an overview of current resource conditions, recreational use and progress made on implementing identified management objectives of the current approved management plan. Each member of the advisory group was then asked to express his or her comments on the plan.

Summary of Advisory Group Comments

Joseph Duggar, Jr.

- Recent improvements at Butler Sink were successful in addressing erosion from cattle. Soil and Water Conservation District is available to help with designing shoreline restoration projects.
- Conservation easements should be considered as an alternative to fee simple acquisition to protect lands for the park. Northwest Florida Water Management District has established easements on the St. Marks River. Costs less and addresses landowner interest in continuing to utilize the property.
- Plan is headed in right direction. Be cautious in expanded parking around sinks. Need to limit numbers of visitors at some point to protect the resource. Consider one-way ingress/egress at Cherokee Sink.
- Is it possible to treat hydrilla at another time of year? Current schedule conflicts with time fish are bedding.
- Restrict recreational use of River Sinks property with no hunting, fishing or swimming.
- Park needs to lead by example in methods used to handle solid waste. Recommend type of septic system that uses heat to cook solids down, evaporates off water and produces waste product that is bagged and suitable for fertilizer.
- Consider interlocking barrier to keep sand from migrating from beach.

Jim Stevenson

- Park is unique and fortunate to have a park manager and biologist that have received the Division's Resource Manager of the Year award.
Revise the optimum boundary map to include the undeveloped lands overlying the new cave south of Turner Sink.
- Continue to replace standard septic tanks with state-of-the-art nitrogen removing septic systems. Install a composting septic system at the future host site near Emerald Sink to avoid the discharge of effluent to the groundwater.
- Add a sentence stating that future park managers shall be actively involved in the Wakulla Spring Basin Working Group and other interagency efforts to protect the waters flowing to Wakulla Spring.
- It is a stretch to consider the present meeting facilities a conference center. A larger meeting room facility is needed to accommodate larger groups. Renovation of the old laundry building could be part of such a facility. The facility should be a combination visitor center (with exhibits) and meeting room. The facility should be within easy walking distance of the Lodge.
- A research center would provide support for researchers studying the spring system. While the facility should be near the spring and river, it could be located on nearby state park lands so as not to clutter the main use area with additional buildings.
- Swimming area is located at the most significant natural feature of the state park and is on the verge of being incompatible with the scenic and natural values of the park. This area should be stabilized to stop erosion of the natural shoreline perhaps with a deck installed flush with the natural grade. Consider establishing a carrying capacity specifically for this use area to reduce damage from trampling.
- Significant progress has been made in restoring Cherokee Sink and in making the site safe for recreation. I would not expand the parking area since the current level of use is probably the maximum that the site can accommodate. A point of access to the water on the east side of the sink receives heavy foot traffic and is a source of turbidity. A small deck with steps would solve this problem.

Gil Nelson

- No state park is managed better than Wakulla Springs. Appreciate what staff does to manage and protect it.
- Park has a good burn program. Need to keep burning, particularly south of Rock Road area.
- Need to use plant material as close to the park as possible for restoration work.
- Park does a commendable job managing exotic species. Need to stay aggressive in removing cogon grass.
- Best land management strategy is to buy property in fee simple. Recommend acquiring as much property as possible to protect the park.
- Concerned about recommendation for larger conference, interpretive and research facilities. Primary purpose of park is conservation. Larger facility may divide

attention of already strained staff. Supportive of modest expansion of Laundry building.

Mike Wisenbaker

- Need to update the dates on diving exploration by the Woodville Karst Plain Project.
- Add DHR as entity to include for input regarding maintenance activity for the Lodge.

Sandy Cook

- Appreciate support and funding provided through the Governor's Springs Initiative and Friends of Wakulla Springs, Inc.

Elizabeth Platt

- Will birding be encouraged on the proposed River Sinks trail?
- When was last birding inventory done?
- Where does existing equestrian use occur?

Richard Graham

- Suggest developing a brochure with lists of plants and animals to make available at proposed trailhead kiosk at Lodge. An interpretive guide with numbered sites eliminates the need for extensive signage.
- Florida Trail Association recently assisted with the successful installation of a prefabricated, 80-foot single span bridge on Division of Forestry land. May be able to assist park with Sally Ward bridge.

Nancy Durrett

- Park is provided access across my land to River Sinks property.
- My family has been there since turpentine times. Family used to fence sinkholes to keep cows out and would use prescribed fire to foster growth of wiregrass for forage.
- Land is extremely abundant with wildlife, particularly hawks and owls.

Casey McKinley

- Agree that park is extremely well managed and appreciates commitment to supporting dive research.
- Encourage pursuit of additional properties to protect Wakulla Springs, particularly the Ferrell parcel, Indian Springs, Salem Church and St. Joe parcel at northwest corner of 267 and 319. The latter piece is above a significant conduit that is suspected to connect to the spring. Adjust optimum boundary to reflect current knowledge of the cave systems.
- Consider swap with the national forest to consolidate ownership of River Sinks properties.
- Supports improve meeting and interpretative facilities but need to think bigger.

Recommend a stand-alone facility that will help communicate the constant threats to the resource.

Jason Ottinger

- Applauds current administration and success of park. Great job at providing recreational opportunities. Park has good relationships outside park boundaries.
- Appreciates diving access to Emerald Sink. Support establishing volunteer host site on property. Will be assisting with monitoring impacts in cave system.
- Understands that park does have limits on use and needs to balance public access with resource protection.

Linda Jamison

- Consider building a demonstration facility (green building) for education and conferences.
- Supports opening Emerald to public but understands need to restrict to diving only.
- Retired community is untapped resource for volunteers. Congregate facilities provide potential groups of volunteers. Could help with education programming.
- Wakulla benefits from an amazing coordination of interests to further the interests of the park. Research initiatives, particularly dive exploration, are making a significant contribution to protecting the springs. Potential exists for increased research with FSU.
- Consider capping number of users in swim area. Crowding at dive tower can be a problem. FSU may be able to help in meeting need for lifeguards.
- Is there baseline data on river to monitor herbicide impacts?
- Roundup has potential to adversely impact amphibians. Why are there not more tadpoles in spring?

Staff Response and Recommendations

Optimum Boundary

- Current boundary will be reviewed in light of new knowledge of conduits connected to Wakulla Springs.

Solid Waste Treatment

- The majority of all facilities in the original park property are now connected to central sewer. Where feasible, future restroom facilities will be connected to central sewer. More remote facilities will utilize best available technologies to protect water quality such as performance-based septic systems or composting units.

Management Coordination

- Objective 2.E and 3.A are considered sufficient to address park involvement in interagency initiatives, such as the Wakulla Spring Basin Working Group. However,

text will be added that clarifies the park's coordination with the Working Group under the Management Coordination section on the Introduction.

Conference and Visitor Center

- It is true that current meeting space capacity does not meet standards of a full-fledged conference facility. The plan's concept of renovating the laundry would provide a modest increase in capacity to host group meetings, offer a space more conducive than the Pavilion to conduct a meeting and remain in scale with the operational resources of the park. While staff does not recommend creating a major conference facility at the park, the plan will consider modifying the Laundry building to provide space for meetings with a capacity of up to 100 persons.

The Pavilion's location is ideal to provide expanded interpretive opportunities, particularly for the many groups of students that are backed up waiting for a ride on the tour boats. This change is considered appropriate in scale, consistent with the historic focus of the park and important to meet a pressing operational need.

Interpretation of park resources could be enhanced with additional static interpretive displays and/or field guides and other informational materials that treat the park as an outdoor classroom without constructing additional costly, resource intensive facilities. In addition to existing proposals to expand park interpretation, the plan will be revised to identify the need for a multi-paneled kiosk outside the waterfront visitor center with a focus on the hydrological issues facing the park.

Research Facility

- The Woodville Karst Plain is one of the most studied systems in the world with a large number of research projects being conducted by a variety of agencies and organizations. The need to provide onsite support to visiting researchers, in the form of workspace and accommodations, has been identified. The park administration building currently provides limited space to house researchers while conducting work at the park. The Division will consider expanded use of the administration building for these purposes, as space allows. Future park plans may consider relocating park administrative functions to allow for the full adaptive reuse of this building.

Swimming Area

- Staff does not agree that the level of impacts in the swimming area warrant construction of deck or similar facility or further restrictions on access at this time. Retaining walls and elimination of vehicular access in this area have improved soil erosion. Damage from trampling is concentrated within the peak summer months and then the area is allowed to recover during the rest of the year. While impacts do occur, they are considered within acceptable limits. A picnicking and swimming

capacity has been developed using Division recreational carrying capacity standards. Proposed parking and circulation improvements designed to help manage use in these areas are planned consistent with these standards.

Cherokee Sink

- Staff agrees that the existing use of Cherokee Sink is nearing capacity on peak days. Concept will be revised to clarify that proposed parking improvements in this area should limit eventual capacity to 35 vehicles at one time. The need for additional steps and boardwalks will be evaluated and implemented where appropriate.
- Plan will identify creating one-way circulation as a potential means of improving safe, vehicular access and preserving the aesthetics of road.
- Staff agrees that future abandonment of County Road 61 would greatly improve park control of access to this property.

Uplands Restoration

- Wiregrass has been transplanted from the Apalachicola National Forest and from private lands. With the newly acquired property, the park now has a source for wiregrass seed. We try to stay within 50 miles of park when collecting plant material and collect from like communities--flatwoods to flatwoods or sandhill to sandhill.

Use of Herbicides

- Aquathol treatment has actually improved conditions for bass bedding and federal restrictions on consuming fish after application have been lifted. Timing of herbicide application considers a variety of issues including need to keep swim area open during peak season, presence of wildfowl, manatees and other wildlife. The park is refining the herbicide application process and working towards using the lowest effective concentration.
- Park works with DEP Bureau of Laboratories to monitor impacts. Sampling is conducted quarterly. Recent tests have shown no toxic reaction in crayfish to herbicide application, however, there has been some crawfish mortality after at least two treatments. There is a need for more research in this area. Roundup is applied in spot applications and not broadcast haphazardly.

River Sinks Property

- Birding is certainly an appropriate activity on the River Sinks property although the current conditions of the natural communities are not well suited for viewing birds. The proposed Sally Ward bridge will provide a nice location for birding and link to existing trails north of the river that provide additional opportunities.
- Hunting is not allowed anywhere at the park. Fishing is currently permitted on River Sinks property and consideration being given to allowing swimming access to one of the sinks that would require hiking some distance from the parking area. The anticipated levels of these recreational uses are not anticipated to significantly

impact the resources of the property.

- Equestrian trails are located north of the river. The YMCA has developed an equestrian facility near the park but its location across County Road 267 is not conducive for linking to the park. Potential exists to connect existing trails north to the Wakulla State Forest. Trail opportunities would be greatly enhanced with additional acquisitions connecting north toward the Apalachicola National Forest.

Bird Surveys

- Wildlife surveys are ongoing at the park and used to update species lists. These include full river surveys, boat tour route survey, Christmas bird count and post burn gopher tortoise burrow surveys.

Addendum 2 – References Cited

Edward Ball Wakulla Springs State Park References Cited

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- 1990a Monitoring of Facility Improvements in the Vicinity of the Lodge at Wakulla Springs State Park. Survey Report #2503, on file in the Florida Master Site File, R.A. Gray Bldg., Tallahassee, FL
- 1990b Post Hole Testing within Area of Proposed Greenhouse at Wakulla Springs State Park. Survey Report #2483, on file in the Florida Master Site File, R.A. Gray Bldg.
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Addendum 3 – Soils Descriptions

Edward Ball Wakulla Springs State Park Soils Descriptions

Lutterloh sand, 0-5 percent slope (03). Lutterloh sands consist of somewhat poorly drained, moderately permeable, nearly level soils in lower positions on uplands. They formed in unconsolidated deposits of marine sandy and loamy sediments. Slopes range from 0 to 5 percent. A water table is 12 to 30 inches below the surface for one to two months in most years. Soil reaction ranges from extremely acid to strongly acid. Texture ranges from loamy sand to sandy clay loam and is frequently stratified.

Alpin sand, 0-5 percent slope (04). Alpin sands consist of excessively drained, very rapidly permeable, and nearly level to gently sloping soils on high uplands. They formed in thick beds of wind or marine sand deposits. Slopes range from 0 to 5 percent. The water table is below a depth of 80 inches throughout the year. Soil reaction is very strongly acid to medium acid. Texture ranges include sand, loamy sand, and sandy loam.

Otela fine sand, 0-5 percent slope (07). Otela fine sands consist of moderately well-drained soils on nearly level to sloping low knolls, broad uplands, and side slopes adjacent to stream channels on the Coastal Plain. They formed in sandy and loamy marine or eolian sediment. Slopes range from 0 to 5 percent. A perched water table is above the subsoil during wet periods and at a depth of more than 72 inches for the remainder of the year. Soil reaction ranges from very strongly acid to moderately alkaline. Texture ranges include loamy fine sand, fine sand, sand, sandy clay loam, sandy loam, and fine sandy loam.

Shadeville fine sand, 0-5 percent slope (11). Shadeville fine sands consist of moderately deep, well-drained soils on smooth to undulating uplands. Slopes range from 0 to 5 percent. The water table is greater than 6 ft. deep year-round. Soil reaction ranges from strongly acid to moderately alkaline with increasing depth. Textures include fine sand, fine sandy loam, sand, sandy loam, and sandy clay loam.

Shadeville-Seaboard fine sand, 0-3 percent slope (12). Shadeville-Seaboard fine sands are a complex of Shadeville fine sands (described above) and Seaboard fine sands, the latter consist of moderately well drained, nearly level to gently undulating soils, occurring on lower uplands and on higher positions in flatwoods. Slopes range from 0 to 3 percent. The seasonal high water table is deeper than 48 in. for the majority of the year. Soil reaction ranges from strongly to slightly acid. Textures are sand and fine sand.

Ridgewood fine sand, 0-5 percent slope (14). Ridgewood fine sands consist of somewhat poorly drained rapidly permeable soils on uplands. They formed in thick beds of sandy marine deposits. Slopes range from 0 to 5 percent. The water table is 24 to 40 inches for 2 to 4 months or more during most years, rising for brief periods with rain and dropping below 40 inches when extremely dry. Soil reaction ranges from very strongly acid to medium acid. Texture is sand or fine sand.

Edward Ball Wakulla Springs State Park Soils Descriptions

Croatan-Dorovan mucks (16). Croatan-Dorovan mucks are nearly level and are poorly drained. The upper part of the surface layer is black muck which can be 15 to 65 inches thick. The water table is within 10 inches of the surface for 2 to 4 months of the year and is above the surface for 5 to 8 months. The available water capacity is very high, permeability is moderate and organic matter content is very high in the surface layer. Natural fertility is low.

Ortega sand, 0-5 percent slope (17). Ortega sands consist of moderately well drained, rapidly permeable, and nearly level to gently sloping soils on ridges on the uplands. They formed in thick sandy marine or wind deposits. Slopes range from 0 to 5 percent. The water table is generally from 60 to 72 inches below the surface, but is occasionally from 40 to 60 inches during heavy rainfall. Soil reaction is very strongly acid to slightly acid. Texture includes sand and fine sand.

Lakeland sand, 0-5 percent slope (21). Lakeland sands consist of excessively drained, very rapidly permeable, and nearly level to gently sloping soils on high upland areas. They formed in thick deposits of marine, wind or fluvial sand deposits. Slopes range from 0 to 5 percent. The water table is below a depth of 80 inches. Soil reaction ranges from very strongly acid to medium acid throughout. Texture is loose sand.

Leon sand (23). Leon sands consist of poorly drained, moderately to rapidly permeable, nearly level soils on broad flatwood areas and in some places along drainageways. They formed in thick beds of sandy marine sediments. Slopes are less than 2 percent. The water table is at a depth of 10 to 40 inches for more than 9 months and a depth of less than 10 inches for 1 to 4 months during periods of high rainfall. Soil reaction ranges from extremely acid to strongly acid at all depths. Texture is sand or loamy sand.

Tooles-Nuttall fine sands (26, 28, and 44). Tooles-Nuttall fine sand is a complex that consists of very poorly to poorly drained, nearly level soils in flatwoods. The water table is high, within 0-20 inches year round and in some case floods up to 6 months of the year. Soil reaction is very strongly acid to moderately alkaline. Textures include fine sand, sand, sandy, sandy clay loam and sandy clay.

Moriah-Pilgrims fine sands (27). Moriah-Pilgrims fine sands are a complex consisting of somewhat poorly drained, slowly to moderately permeable, nearly level soils of low uplands and flatwoods. They formed in sandy and loamy marine sediments. Slopes range from 0 to 2 percent. The water table is within a depth of 18 to 36 inches for 2 to 5 months in most years. Soil reaction ranges from extremely acid to moderately alkaline with increasing depth. Textures include sand, fine sand, sandy clay loam, sandy clay, and sandy loam.

Ocilla sand, 0-5 percent slope (30). Ocilla sands are poorly drained soils in low areas on

Edward Ball Wakulla Springs State Park Soils Descriptions

uplands. The available water capacity is low and permeability is rapid. The organic matter content and natural fertility are low. Slopes range from 0 to 5 percent. The water table is high and is at a depth of 12 to 30 inches for 2 to 4 months of the year and at a depth of 30 to 72 inches for the remainder of the year. Textures are sand, sandy clay loam, and sandy loam.

Plummer fine sand (32). Plummer fine sands consist of poorly drained, moderately permeable, nearly level soils on broad low areas, in poorly defined drainageways, and in depressional areas. They formed in marine or fluvial sediments. Slopes range from 0 to 2 percent. The water table is at the surface or within a depth of 15 inches for 3 to 6 months in most years. Soil reaction is very strongly acid to medium acid. Textures range through fine sand, muddy fine sand, sandy loam, fine sandy loam, or sandy clay loam.

Pottsburg sand (33). Posttsburgh sands consist of poorly drained, moderately permeable, nearly level soils in flatwoods. They formed in a thick sandy deposit on marine terraces. Slopes range from 0 to 2 percent. The water table is at depths of less than 12 inches for 1 to 4 months or longer during most years. Soil reaction ranges from extremely acid to medium acid. The texture is fine sand.

Rutledge sand (35). Rutledge sands consist of very poorly drained, rapidly permeable, nearly level soils in shallow depressional areas and narrow natural drainageways. They formed in deposits of sandy marine sediments. Slopes range from 0 to 2 percent. The water table is at or near the surface most of the year. Many areas are flooded frequently for brief periods. Soil reaction ranges from extremely acid to medium acid. Textures include sand, fine sand, loamy sand and loamy fine sand.

Sapelo sand (37). Sapelo sands consist of poorly drained, rapid to moderate permeability, nearly level soils in flatwoods. The seasonal high water table is at a depth of 15 to 30 inches for 2 to 4 months most years. The available water capacity is very low to moderate. The organic matter content is moderately low, and natural fertility is low. Textures are sand, sandy loam and sandy clay loam.

Surrency mucky fine sand (39). Surrency mucky fine sands consist of very poorly drained, rapidly permeable, nearly level soils in depressions and drainageways. They formed in loamy marine or fluvial deposits. The mapped areas are circular or irregular in shape. Slopes are less than 1 percent. The soil is ponded for 6 to 9 months of the year. The high water table is at or near the surface for the remainder of the year. Soil reaction is extremely acid to strongly acid. Textures include mucky fine sand, fine sand, sand, fine sandy loam, sandy loam, and sandy clay loam.

Otela-Alpin fine sands, 0-5 percent slopes (47). Otela-Alpine fine sands are a complex consisting of Alpine fine sands (described above) and Otela fine sands. The latter

Edward Ball Wakulla Springs State Park Soils Descriptions

consist of deep, moderately well drained, moderately to moderately rapidly permeable soils on broad uplands. They formed in sandy and loamy marine sediments over limestone on a karst topography. Slopes range from 0 to 5 percent. The water table is perched above about 50 in. for about 1 to 4 months or for short durations during periodic high rainfall. Soil reaction is very strongly to strongly acid. Textures include fine sand, fine sandy loam and sandy clay loam.

Otela Limestone substratum Ortega sands, 0-5 percent slope (48). Otela limestone substratum Ortega sands is a complex consisting of Otela fine sands, (described in Otela-Alpine fine sands) and Ortega fine sands (also described above).

Udorthents and Quartzipsamments, excavated (50). Udorthents and Quartzipsamments, excavated is a somewhat poorly drained soil, nearly level, and are in areas that have been excavated for fill material on the Coastal Plain. Generally the mapped areas contain about 55% Udorthents and similar soils and 40% Quartzipsamments and similar soils. Slopes range from 0 to 5 percent. Permeability is rapid to moderate and available water capacity is low to moderate. In most years the seasonal high water table is at a depth of 24 to 42 inches. The organic matter content and natural fertility are low. Textures include sand, sandy loam and sandy clay loam.

Addendum 4 – Plants And Animals List

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Chives	<i>Aallium schoenoparsum</i>	
Three-seeded mercury.....	<i>Acalypha gracilens</i>	
Southern red maple	<i>Acer rubrum</i>	
Sugar maple	<i>Acer saccharum</i>	
Red buckeye.....	<i>Aesculus pavia</i>	
Fungi	<i>Agaricus abruptibulbus</i>	
Fungi	<i>Agaricus auricolor</i>	
Fungi	<i>Agaricus pocillator</i>	
Fungi	<i>Agaricus sp.</i>	
Century plant*	<i>Agave Americana</i>	
Wild hoarhound.....	<i>Ageratina aromatica</i>	
Harvest lice	<i>Agrimonia microcarpa</i>	
Ajuga, bugle.....	<i>Ajuga reptans</i>	
Mimosa*	<i>Albizia julibrissin</i>	
Fungi	<i>Amanita arkandana</i>	
Fungi	<i>Amanita bisporigera</i>	
Fungi	<i>Amanita brunnescens</i>	
Mushroom sp.....	<i>Amanita citrina</i>	
Fungi	<i>Amanita crenulata</i>	
Fungi	<i>Amanita magnivelaris</i>	
Fungi	<i>Amanita roanokensis</i>	
Fungi	<i>Amanita spreta</i>	
Fungi	<i>Amanita vaginata</i>	
Prince feather	<i>Amaranthus hypocondriacus</i>	
Common ragweed	<i>Ambrosia artemisiifolia</i>	
Service.....	<i>Amelanchier arborea</i>	
Pepper vine	<i>Ampelopsis arborea</i>	
Hog peanut	<i>Amphicarpaea bracteata</i>	
Fungi	<i>Amthracophyllum lateritium</i>	
Bluestem, broomsedge	<i>Andropogon virginicus var. glaucus</i>	
Dwart snapdragon.....	<i>Antirrhinum majus</i>	
Marsh parsley	<i>Apium leptophyllum</i>	
Columbine.....	<i>Aquilegia canadensis</i>	
Devil's-walkingstick	<i>Aralia spinosa</i>	
Green dragon.....	<i>Arisaema dracontium</i>	
Wiregrass.....	<i>Aristida stricta</i>	
Snakeroot.....	<i>Aristolochia serpentaria</i>	
Cane	<i>Arundinaria gigantea</i>	
Milkweed.....	<i>Asclepias perennis</i>	
Butterfly-weed.....	<i>Asclepias tuberosa</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Redring milkweed	<i>Asclepias variegata</i>	
Pawpaw	<i>Asimina longifolia var. spatulata</i>	
Small-fruited pawpaw	<i>Asimina parviflora</i>	
Cast iron plant	<i>Aspidistra elatior</i>	
Ebony spleenwort	<i>Asplenium platyneuron</i>	
Climbing aster	<i>Aster carolinianus</i>	
Aster	<i>Aster sagittifolius</i>	
White-topped aster	<i>Aster tortifolius</i>	
Yellow foxglove.....	<i>Aureolaria flava</i>	
Fungi	<i>Austroboletus subflavidus</i>	
Mosquito fern	<i>Azolla caroliniana</i>	
Groundsel tree	<i>Baccharis glomesuliflora</i>	
Angel wing begonia.....	<i>Begonia hybrid 'Lucerna'</i>	
Mixed colors begonia	<i>Begonia semperflorens</i>	
Shrimp plant	<i>Beloperone guttata</i>	
Rattan vine	<i>Berchemia scandens</i>	
Beggar tick.....	<i>Bidens alba</i>	
Cross vine.....	<i>Bignonia capreolata</i>	
False nettle.....	<i>Boehmeria cylindrica</i>	
Fungi	<i>Boletellus russellii</i>	
Fungi	<i>Boletus auripes</i>	
Fungi	<i>Boletus auriporus</i>	
Fungi	<i>Boletus frostii</i>	
Fungi	<i>Boletus griseus</i>	
Fungi	<i>Boletus hortonii</i>	
Fungi	<i>Boletus patriotius</i>	
Fungi	<i>Boletus spadiceus</i>	
Fungi	<i>Boletus speciosus</i>	
Southern grape fern	<i>Botrychium biternatum</i>	
Rattlesnake fern.....	<i>Botrychium virginianum</i>	
Sekito ornamental cabbage.....	<i>Brassica oleracea</i>	
Dwarf curled kale.....	<i>Brassica oleracea 'Acephala</i>	
Black-haw, gum bumelia	<i>Bumelia lanuginosa</i>	
Pindo palm.....	<i>Butia capitata</i>	
American boxwood.....	<i>Buxus sempervirens</i>	
Fancy-leafed caladium	<i>Caladium bicolor</i>	
Pot marigold	<i>Calendula officinalis</i>	
Beautyberry.....	<i>Callicarpa americana</i>	
Sweet shrub.....	<i>Calycanthus floridus</i>	
-----	<i>Calypocarpus vialis</i>	

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Camellia.....	<i>Camellia japonica</i>	
Camellia sasanqua	<i>Camellia sasanqua</i>	
Trumpet vine	<i>Campsis radicans</i>	
Canna - 4 color varieties.....	<i>Canna indica</i>	
Fungi	<i>Cantharellus amethysteus</i>	
Fungi	<i>Cantharellus cibarius</i>	
Fungi	<i>Cantharellus minor</i>	
Sedge.....	<i>Carex albolutescens</i>	
Sedge.....	<i>Carex amphibola</i>	
Sedge.....	<i>Carex cherokeensis</i>	
Sedge.....	<i>Carex comosa</i>	
Sedge.....	<i>Carex crus-corvi</i>	
Sedge.....	<i>Carex digitalis</i>	
Sedge.....	<i>Carex floridana</i>	
Sedge.....	<i>Carex gigantea</i>	
Sedge.....	<i>Carex jooi</i>	
Sedge.....	<i>Carex leptalea</i>	
Sedge.....	<i>Carex louisianica</i>	
Sedge.....	<i>Carex lupulina</i>	
Sedge.....	<i>Carex striatula</i>	
Sedge.....	<i>Carex texax</i>	
Sedge.....	<i>Carex tribuloides</i>	
Sedge.....	<i>Carex willdenowii</i>	
Deer tongue.....	<i>Carphephorus sp.</i>	
Ironwood.....	<i>Carpinus caroliniana</i>	
Bitternut hickory	<i>Carya cordiformis</i>	
Pignut hickory	<i>Carya glabra</i>	
Mockernut hickory.....	<i>Carya tomentosa</i>	
Wild sensitive plant.....	<i>Cassia nictitans</i>	
Chinkapin.....	<i>Castanea pumila</i>	
Madagascar.....	<i>Catharanthus</i>	
New Jersey tea.....	<i>Ceanothus americanus</i>	
Cockcomb.....	<i>Celosia argentea cristata</i>	
Plumosa, prince feather.....	<i>Celosia argentea pyramidalis</i>	
Hackberry.....	<i>Celtis laevigata</i>	
Butterfly-pea	<i>Centrosema virginianum</i>	
Buttonbush.....	<i>Cephalanthus occidentalis</i>	
Hornwort.....	<i>Ceratophyllum demersum</i>	
Redbud	<i>Cercis canadensis</i>	
Wild chervil.....	<i>Chaerophyllum tainturieri</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Musk-grass.....	<i>Chara spp.</i>	
Spikegrass.....	<i>Chasmanthium nitidum</i>	
Spikegrass.....	<i>Chasmanthium sessiliflorum</i>	
Fungi.....	<i>Chlorophyllum molybdites</i>	
Florist chrysanthemum.....	<i>Chrysanthemum indicum</i>	
Ox-eye daisy.....	<i>Chrysanthemum leucanthemum</i>	
Water hemlock.....	<i>Cicuta mexicana</i>	
Camphor tree*.....	<i>Cinnamomum camphora</i>	
Thistle.....	<i>Cirsium horridulum</i>	
Sawgrass.....	<i>Cladium jamaicense</i>	
Lichen.....	<i>Cladonia sp.</i>	
Macroalgae.....	<i>Cladophora</i>	
Fungi.....	<i>Clavulina cincerea</i>	
Leatherleaf.....	<i>Clematis crispa linnaeas</i>	
Fungi.....	<i>Clitocybe gibba</i>	
Butterfly pea.....	<i>Clitoria mariana</i>	
Tread softly.....	<i>Cnidocolus stimulosus</i>	
Coralbeads.....	<i>Cocculus carolinus</i>	
Coleus.....	<i>Coleus blumei</i>	
Fungi.....	<i>Collybia iocephala</i>	
Fungi.....	<i>Collybia spongiosa</i>	
Fungi.....	<i>Coltricia cinnamomea</i>	
Dayflower.....	<i>Commelina erecta</i>	
Macroalgae.....	<i>Compsopogon</i>	
Mist flower.....	<i>Conoclinium coelestinum</i>	
Tickseed.....	<i>Coreopsis gladiata</i>	
Lance-leaved coreopsis.....	<i>Coreopsis lanceolata</i>	
Dogwood.....	<i>Cornus asperilolia</i>	
Flowering dogwood.....	<i>Cornus florida</i>	
'Cherokee Princess'.....	<i>Cornus florida hybrid</i>	
'Cloud 9'.....	<i>Cornus florida hybrid</i>	
'Plena'.....	<i>Cornus florida hybrid</i>	
Stiff cornel dogwood.....	<i>Cornus foemina microcarpa</i>	
Stiff cornel dogwood.....	<i>Cornus foemina foemina</i>	
Pampas grass.....	<i>Cortaderia selloana</i>	
Parsley haw.....	<i>Crataegus marshallii</i>	
Hawthorn.....	<i>Crataegus pulcherrima</i>	
Littlehip hawthorn.....	<i>Crataegus spathulata</i>	
Dwarf thorn.....	<i>Crataegus uniflora</i>	
Green haw.....	<i>Crataegus viridis</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Fungi	<i>Crinipellis</i> sp.	
Swamp lily	<i>Crinum americanum</i>	
Milk and wine crinum lily	<i>Crinum powelli</i>	
Star of east	<i>Crocoshmia crocosmiiiflora</i>	
Crocus	<i>Crocus candidus</i>	
Rabbit-bells	<i>Crotalaria rotundifolia</i>	
Silver croton	<i>Croton argyranthemus</i>	
Rush	<i>Crotonopsis linearis</i>	
Fungi	<i>Cymatoderma caperatum</i>	
Baldwin florsedge	<i>Cyperus globulosus</i>	
Leatherwood.....	<i>Cyrilla racemiflora</i>	
Fungi	<i>Daedalea</i> sp.	
Wood vamp climbing hydrangea.....	<i>Decumaria barbara</i>	
Beggar's ticks	<i>Desmodium rotundifolium</i>	
-----	<i>Dichanthelium commutatum</i>	
-----	<i>Dichanthelium dichotomum</i>	
Panic grass.....	<i>Dichanthelium laxiflorum</i>	
Pony-foot.....	<i>Dichondra carolinensis</i>	
Fungi	<i>Dictyopanus</i> sp.	
Poor-Joe	<i>Diodia teres</i>	
Buttonweed.....	<i>Diodia virginiana</i>	
Yam	<i>Dioscorea villosa</i>	
Persimmon	<i>Diospyros virginiana</i>	
Dwarf sundew	<i>Drosera brevifolia</i>	
Leatherwood fern.....	<i>Dryopteris ludoviciana</i>	
Indian strawberry	<i>Duchesnia indica</i>	
Dyschoriste.....	<i>Dyschoriste oblongifolia</i>	
Eastern purple coneflower.....	<i>Echinacea purpurea</i>	
	20,31	
Brazilian elodea*	<i>Egeria densa</i>	
Silverthorn elaeagnus	<i>Elaeagnus pungens</i>	
Florida Elephant's-foot.....	<i>Elephantopus elatus</i>	
Elephant's-foot.....	<i>Elephantopus carolinianus</i>	
Virginia wild rye	<i>Elymus virginicus</i>	
Green-fly orchid	<i>Epidendrum conopseum</i>	
Beech drops.....	<i>Epifagus virginiana</i>	
Lovegrass	<i>Eragrostis</i> sp.	
Sugarcane plumegrass.....	<i>Erianthus giganteus</i>	
White-tops.....	<i>Erigeron strigosus</i>	
Dog-tongue	<i>Eriogonum tomentosum</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	<i>Scientific Name</i>	Primary Habitat (For Designated Species)
Coralbean	<i>Erythrina herbacea</i>	
Tasmanian blue gum	<i>Eucalyptus globulus</i>	
Cider gum	<i>Eucalyptus gunni</i>	
Strawberry bush	<i>Euonymus americanus</i>	
Aureo-picta euonymus.....	<i>Euonymus japonica</i>	
White thoroughwort.....	<i>Eupatorium album</i>	
Dog fennel.....	<i>Eupatorium capillifolium</i>	
Dog fennel.....	<i>Eupatorium compositifolium</i>	
Ageratum	<i>Eupatorium incarnatum</i>	
Boneset.....	<i>Eupatorium perfoliatum</i>	
Spurge.....	<i>Euphorbia discoidalis</i>	
Spurge.....	<i>Euphorbia excerta</i>	
American beech.....	<i>Fagus grandifolia</i>	
Fungi	<i>Favolus sp.</i>	
Fescue.....	<i>Festuca optiflora</i>	
White ash.....	<i>Fraxinus americana</i>	
Popash, Carolina ash	<i>Fraxinus caroliniana</i>	
Green ash.....	<i>Fraxinus pennsylvanica</i>	
Pumpkin ash.....	<i>Fraxinus profunda</i>	
Goblin gaillardia.....	<i>Gaillardia arstata hybrid</i>	
Milk pea.....	<i>Galactia elliottii</i>	
Wild licorice	<i>Galium circaezans</i>	
Goosegrass	<i>Galium pilosum</i>	
Sweet-scented bedstraw	<i>Galium uniflorum</i>	
Southern gaura	<i>Gaura angustifolia.</i>	
Dangleberry	<i>Gaylussacia frondosa</i>	
Fungi	<i>Geastrum saccatum</i>	
Fungi	<i>Geastrum sp.</i>	
Fungi	<i>Geastrum triplex</i>	
Yellow jessamine.....	<i>Gelsemium sempervirens</i>	
Cranesbill	<i>Geranium carolinianum</i>	
Gerbera daisy.....	<i>Gerbera jamesonii</i>	
Large-flowered sword lily	<i>Gladiolus sp.</i>	
Water locust	<i>Gleditsia aquatica</i>	
Fungi	<i>Gloerporus dichrous</i>	
Sweet everlasting	<i>Gnaphalium obtusifolium</i>	
Fungi	<i>Gyroporus castaneus</i>	
Fungi	<i>Gyroporus purpurinus</i>	
Fungi	<i>Gyroporus subalbellus</i>	
Witch hazel.....	<i>Hamamelis virginiana</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	<i>Scientific Name</i>	Primary Habitat (For Designated Species)
Mushroom sp.....	<i>Hapalopilus croceus</i>	
English ivy*	<i>Hedera helix</i>	
Innocence.....	<i>Hedyotis procumbens</i>	
Bitter weed	<i>Helenium amarum</i>	
Rockrose	<i>Helianthemum arenicola</i>	
Annual sunflower	<i>Helianthus annuus</i>	
Rough sunflower.....	<i>Helianthus hirsutus</i>	
Day lily 'Astec gold'	<i>Hemerocallis fulva var.</i>	
Day lily 'Yellow'	<i>Hemerocallis fulva var.</i>	
Day lily 'Garnet and gold'	<i>Hemerocallis fulva var.</i>	
Spike crested coral root	<i>Hexalectris spicata</i>	
Halberd-leaved marhmallow	<i>Hibiscus militaris</i>	
Rose-of-Sharon	<i>Hibiscus syriacus</i>	
Hawkweed	<i>Hieracium gronovii</i>	
Amaryllis.....	<i>Hippeastrum equestre</i>	
Fungi	<i>Hohenbuhelia sp.</i>	
Dutch hyacinth*.....	<i>Hyacinthus orientalis</i>	
Hortensia hydrangea	<i>Hydrangea macrophylla</i>	
Oakleaf hydrangea.....	<i>Hydrangea quercifolia</i>	
Hydrilla*	<i>Hydrilla verticillata</i>	
Swamp pennywort.....	<i>Hydrocotyle verticillata</i>	
Macroalgae.....	<i>Hydrodictyon</i>	
Mushroom sp.....	<i>Hygrophores subsordius</i>	
Fungi	<i>Hygrophorus autoconicus</i>	
Fungi	<i>Hygrophorus miniatus</i>	
Fungi	<i>Hygrophorus miniatus var crenulata</i>	
Spider lily	<i>Hymenocallis rotata</i>	
St.Andrew's-cross.....	<i>Hypericum hypericoides</i>	
Swamp stargrass	<i>Hypoxis leptocarpa</i>	
Mint.....	<i>Hyptis mutabilis</i>	
Carolina holly	<i>Ilex ambigua</i>	
Dwarf Clarissa holly	<i>Ilex aquifolium hybrid</i>	
Ferox holly	<i>Ilex aquifolium hybrid</i>	
Dahoon holly	<i>Ilex cassine</i>	
Large or sweet gallberry	<i>Ilex coriacea</i>	
Deciduous holly	<i>Ilex decidua</i>	
Inkberry, Gallberry	<i>Ilex glabra</i>	
American holly	<i>Ilex opaca</i>	
Savannah holly	<i>Ilex opaca hybrid</i>	
East Palatka holly	<i>Ilex opaca hybrid</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Yaupon holly	<i>Ilex vomitoria</i>	
Yellow anise	<i>Illicium parviflorum</i>	
Balsam impatiens	<i>Impatiens balsamina</i>	
Busy Lizzy impatiens	<i>Impatiens Wallerana</i>	
Wild potato vine.....	<i>Ipomoea pandurata</i>	
Cypress vine	<i>Ipomoea quamoclit</i>	
Blue morning glory	<i>Ipomoea trichocarpa</i>	
Virginia willow.....	<i>Itea virginica</i>	
Rush	<i>Juncus coriaceus</i>	
Shore rush	<i>Juncus marginatus</i>	
Rush	<i>Juncus polycephalus</i>	
Dwarf juniper	<i>Juniperous 'Andora compacta'</i>	
Southern red cedar.....	<i>Juniperus silicicola</i>	
Spiral juniper	<i>Juniperus 'Torulosa'</i>	
Water willow	<i>Justicia ovata</i>	
Dwarf dandelion	<i>Krigia virginicum</i>	
Fungi	<i>Lactarius allardii</i>	
Fungi	<i>Lactarius argillaceifolius</i>	
Fungi	<i>Lactarius atroviridis</i>	
Fungi	<i>Lactarius corrugis</i>	
Fungi	<i>Lactarius deceptivus</i>	
Fungi	<i>Lactarius glaucescens</i>	
Fungi	<i>Lactarius hygrophoroides</i>	
Fungi	<i>Lactarius indigo</i>	
Fungi	<i>Lactarius luteolus</i>	
Fungi	<i>Lactarius subserviifluus</i>	
Fungi	<i>Lactarius subvellerus</i>	
Fungi	<i>Lactarius subvernalis</i>	
Fungi	<i>Lactarius tomentosomarginatus</i>	
Fungi	<i>Lactarius volemus</i>	
Fungi	<i>Lactarius volemus var flavuus</i>	
Fungi	<i>Lactarius yazooensis</i>	
Blue lettuce.....	<i>Lactuca floridana</i>	
Crape myrtle	<i>Lagerstroemia indica</i>	
Fungi	<i>Leccinum rugosiceps</i>	
Pinweed	<i>Lechea mucronata</i>	
Duckweed	<i>Lemna obscura</i>	
Fungi	<i>Lentinellus ursinus</i>	
Fungi	<i>Lentinus crinitis</i>	
Fungi	<i>Lentinus detonsus</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Poor man's pepper	<i>Lepidium virginicum</i>	
Fungi	<i>Lepiota procera</i>	
Fungi	<i>Lepiota subrachodes</i>	
Bush clover	<i>Lespedeza sp.</i>	
Fungi	<i>Leucoagaricus brunnescens</i>	
Fungi	<i>Leucoagaricus cepaestipes</i>	
Fungi	<i>Leucoagaricus rubrotincta</i>	
Blazing star	<i>Liatris chapmanii</i>	
Blazing star	<i>Liatris elegans</i>	
Glossy privet*	<i>Ligustrum lucidum</i>	
Golden privet*	<i>Ligustrum ovalifoium</i>	
Fungi	<i>Limacella glioderma</i>	
Spice bush	<i>Lindera benzoin</i>	
Blue toad-flax	<i>Linaria canadensis</i>	
Sweetgum	<i>Liquidambar styraciflua</i>	
Lily turf	<i>Liriope muscari</i>	
Lily turf	<i>Liriope spicata</i>	
Twayblade	<i>Listera australis</i>	
Cardinal flower	<i>Lobelia cardinalis</i>	
Bellflower	<i>Lobelia floridana</i>	
Japanese honeysuckle*	<i>Lonicera japonica</i>	
Coral honeysuckle	<i>Lonicera sempervirens</i>	
Water primrose	<i>Ludwigia repens</i>	
Hurricane lily	<i>Lycoris radiata</i>	
Japanese climbing fern*	<i>Lygodium japonicum</i>	
Macroalgae	<i>Lyngbya wollei</i>	
Staggerbush	<i>Lyonia fruticosa</i>	
Fringed loosestrife	<i>Lysimachia lanceolata</i>	
Southern magnolia	<i>Magnolia grandiflora</i>	
Saucer magnolia	<i>Magnolia soulangiana</i>	
Sweet bay	<i>Magnolia virginiana</i>	
Green adder's-mouth orchid	<i>Malaxis unifolia</i>	31,33
Crab apple	<i>Malus angustifolia</i>	
Angle pod	<i>Matelea gonocarpa</i>	
Mecardonia	<i>Mecardonia acuminata</i>	
Chinaberry*	<i>Melia azedarach</i>	
Melonette	<i>Melothria pendula</i>	
Fungi	<i>Micromphale foetidus</i>	
Climbing hempweed	<i>Mikania scandens</i>	
Garden four-o'clock	<i>Mirabilis jalapa</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Partridge berry, twin berry	<i>Mitchella repens</i>	
Miterwort	<i>Mitreola petiolata</i>	
Horse mint	<i>Monarda punctata</i>	
Indian pipe	<i>Monotropa uniflora</i>	
Red mulberry	<i>Morus rubra</i>	
Banana tree.....	<i>Musa acuminata</i>	
Fungi	<i>Mutinus elegans</i>	
Wax myrtle.....	<i>Myrica cerifera</i>	
Parrot's-feather*	<i>Myriophyllum brasiliense</i>	
Southern naiad	<i>Najas guadalupensis</i>	
Nandina*	<i>Nandina domestica</i>	
Various cultivars	<i>Narcissus sp.</i>	
Water-cress.....	<i>Nasturtium microphyllum</i>	
Hurricane lily	<i>Nerine sp.</i>	
Yellow water lily	<i>Nymphaea mexicana</i>	
Swamp tupelo.....	<i>Nyssa sylvatica var. biflora</i>	
Cut-leaved evening primrose.....	<i>Oenothera laciniata</i>	
Star of Bethlehem	<i>Ornithogalum thyrsoides</i>	
Sensitive fern	<i>Onoclea sensibilis</i>	
Mondo grass*	<i>Ophiopogon japonicus</i>	
Woodsgrass; Basketgrass	<i>Oplismenus setarius</i>	
Prickly-pear cactus.....	<i>Opuntia humifusa</i>	
Macroalgae	<i>Oscillatoria</i>	
Wild olive	<i>Osmanthus americana</i>	
Tea olive	<i>Osmanthus fragrans</i>	
Cinnamon fern.....	<i>Osmunda cinnamomea</i>	
Royal fern	<i>Osmunda regalis</i>	
Hop hornbeam	<i>Ostrya virginiana</i>	
Lady's sorrel.....	<i>Oxalis corniculata</i>	
Lady's sorrel.....	<i>Oxalis dillenii</i>	
Fungi	<i>Panellus pusillus</i>	
Maidencane.....	<i>Panicum hemitomon</i>	
Fungi	<i>Panus crinitus</i>	
Blackberry lily hybrid.....	<i>Paradancana norrissii hybrid</i>	
Whitlow-wort	<i>Paronychia baldwinii</i>	
Virginia creeper	<i>Parthenocissus quinquefolia</i>	
Thin paspalum.....	<i>Paspalum setaceum</i>	
Passionflower.....	<i>Passiflora incarnata</i>	
Yellow passion flower	<i>Passiflora lutea</i>	
Geranium.....	<i>Pelargonium hortorum hybrid</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Redbay	<i>Persea borbonia</i>	
Swampbay.....	<i>Persea palustris</i>	
Parsley.....	<i>Petroselinum crispum</i>	
Garden petunia.....	<i>Petunia hybrida</i>	
Fungi	<i>Phallus rubicundus</i>	
Bean vine, wild bean.....	<i>Phaseolus polystachyus</i>	
Florida phlox.....	<i>Phlox floridana</i>	
Fungi	<i>Pholiota polychroa</i>	
Mistletoe	<i>Phoradendron serotinum</i>	
Red-leaf photinia.....	<i>Photinia glabra</i>	
-----	<i>Phyllanthus urinaria</i>	
Fungi	<i>Phylloporus boletinoides</i>	
Fungi	<i>Phylloporus rhodoxanthus</i>	
Ground cherry	<i>Physalis pubescens</i>	
Obedient plant.....	<i>Physostegia leptophylla</i>	
Pokeberry; Pokeweed.....	<i>Phytolacca americana</i>	
Shortleaf pine.....	<i>Pinus echinata</i>	
Slash pine	<i>Pinus elliottii</i>	
Spruce pine.....	<i>Pinus glabra</i>	
Longleaf pine	<i>Pinus palustris</i>	
Loblolly pine.....	<i>Pinus taeda</i>	
Piriqueta	<i>Piriqueta carolinana</i>	
Japanese pittosporum*	<i>Pittosporum tobira</i>	
Variegated pittosporum.....	<i>Pittosporum tobira var.</i>	
Golden aster	<i>Pityopsis sp.</i>	
Hoary plantain.....	<i>Plantago virginica</i>	
Little club-spur orchid.....	<i>Platanthera clavellata</i>	31,33
Southern rein-orchid.....	<i>Platanthera flava</i>	
Fungi	<i>Pleurotus ostreatus</i>	
Marsh fleabane, camphor weed....	<i>Pluchea camphorata</i>	
Annual bluegrass	<i>Poa annua</i>	
Yew podocarpus.....	<i>Podocarpus macrophylla</i>	
Polygala	<i>Polygala grandiflora</i>	
Bachelor button	<i>Polygala nana</i>	
Wild water-pepper.....	<i>Polygonum hydropiperoides</i>	
Pinkweed.....	<i>Polygonum pennsylvanicum</i>	
Smartweed	<i>Polygonum sp.</i>	
Resurrection fern.....	<i>Polypodium polypodioides</i>	
Rustweed.....	<i>Polypremum procumbens</i>	
Christmas fern	<i>Polystichum acrostichoides</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Pickeralweed.....	<i>Pontederia cordata</i>	
Shadow witch orchid.....	<i>Pontheiva racemosa</i>	
Cottowood.....	<i>Populus deltoides</i>	
Purslane rose.....	<i>Portulaca sp.</i>	
Illinois pondweed	<i>Potamogeton illinoensis</i>	
Gall-of-the-earth.....	<i>Prenanthes serpentaria</i>	
Mermaid-weed	<i>Proserpinaca palustris</i>	
Wildplum	<i>Prunus americana</i>	
Carolina laurel cherry.....	<i>Prunus caroliniana</i>	
Wild cherry	<i>Prunus serotina</i>	
Ornamental cherry.....	<i>Prunus sp.</i>	
Hog plum	<i>Prunus umbellata</i>	
Fungi	<i>Pseudofavolus cucullatus</i>	
Bracken fern.....	<i>Pteridium aquilinum</i>	
Mock bishop's weed	<i>Ptilimnium capillaceum</i>	
Fungi	<i>Pulveroboletus cfr. Lignicola</i>	
Firethorn.....	<i>Pyracantha coccinea</i>	
False dandelion.....	<i>Pyrrhopappus carolinianus</i>	
White oak	<i>Quercus alba</i>	
Bluff oak	<i>Quercus austrina</i>	
Southern red oak	<i>Quercus falcata</i>	
Laurel oak.....	<i>Quercus hemisphaerica</i>	
Bluejack oak	<i>Quercus incana</i>	
Turkey oak	<i>Quercus laevis</i>	
Diamond oak	<i>Quercus margaretta</i>	
Swamp chestnut oak.....	<i>Quercus michauxii</i>	
Dwarf live oak	<i>Quercus minima</i>	
Water oak	<i>Quercus nigra</i>	
Runner oak.....	<i>Quercus pumila</i>	
Shumard oak.....	<i>Quercus shumardii</i>	
Post oak.....	<i>Quercus stellata</i>	
Live oak	<i>Quercus virginiana</i>	
Fungi	<i>Ramariopsis kunzei</i>	
Pale meadow beauty.....	<i>Rhexia mariana</i>	
Meadow beauty.....	<i>Rhexia petiolata</i>	
Macroalgae.....	<i>Rhizoclonium hieroglyphicum</i>	
Azalea - Southern Indian hybrids.....	<i>Rhododendron indicum</i>	
Azalea - Kurume hybrids.....	<i>Rhododendron obtusum</i>	
Swamp honeysuckle	<i>Rhododendron serrulatum</i>	
Winged sumac	<i>Rhus copallina</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Rhynchosia.....	<i>Rhynchosia difformis</i>	
Dollarleaf.....	<i>Rhynchosia reniformis</i>	
Beakrush.....	<i>Rhynchospora caduca</i>	
Beakrush.....	<i>Rhynchospora microcarpa</i>	
Beakrush.....	<i>Rhynchospora mixta</i>	
Fungi.....	<i>Ripartitella braziliensis</i>	
Ornamental rose.....	<i>Rosa hybrids</i>	
Swamp rose.....	<i>Rosa palustris</i>	
Rosemary.....	<i>Rosmarinus officinalis</i>	
Highbush blackberry.....	<i>Rubus argutus</i>	
Sand blackberry.....	<i>Rubus cuneifolius</i>	
Dewberry.....	<i>Rubus trivialis</i>	
Black-eyed susan.....	<i>Rudbeckia hirta</i>	
Wild petunia.....	<i>Ruellia caroliniensis</i>	
Sourdock.....	<i>Rumex hastatulus</i>	
Fungi.....	<i>Russula cfr. Albonigra</i>	
Fungi.....	<i>Russula amoenolens</i>	
Fungi.....	<i>Russula copacta</i>	
Fungi.....	<i>Russula foetentula</i>	
Fungi.....	<i>Russula cfr. Laurocerasi</i>	
Fungi.....	<i>Russula mariae</i>	
Fungi.....	<i>Russula mutabilis</i>	
Fungi.....	<i>Russula cfr. Pectinatoides</i>	
Fungi.....	<i>Russula rubescens</i>	
Fungi.....	<i>Russula cfr. Subgraminicolor</i>	
Fungi.....	<i>Russula subsection griseinae</i>	
Fungi.....	<i>Russula variata</i>	
Dwarf palmetto.....	<i>Sabal minor</i>	
Cabbage palm.....	<i>Sabal palmetto</i>	
White sabatia.....	<i>Sabatia brevifolia</i>	
Swamp pink.....	<i>Sabatia calycina</i>	
Pearlwort.....	<i>Sagina decumbens</i>	
Eel grass.....	<i>Sagittaria kurziana</i>	
Arrowhead.....	<i>Sagittaria lancifolia</i>	
Carolina willow.....	<i>Salix caroliniana</i>	
Lyre-leaved sage.....	<i>Salvia lyrata</i>	
Perennial blue sage.....	<i>Salvia sp.</i>	
Pineland pimperel.....	<i>Samolus parviflorus</i>	
Black snakeroot.....	<i>Sanicula canadensis</i>	
Fungi.....	<i>Sarcodon fennicum</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Sassafras	<i>Sassafras albidum</i>	
Lizard's tail.....	<i>Saururus cernuus</i>	
Sensitive brier	<i>Schrankia microphylla</i>	
Bulrush	<i>Scirpus lineatus</i>	
Nutrush	<i>Scleria oligantha</i>	
Nutrush	<i>Scleria triglomerata</i>	
Skullcap	<i>Scutellaria integrifolia</i>	
Sebastian bush	<i>Sebastiania fruticosa</i>	
Dusty miller	<i>Senecio cineraria</i>	
Butter weed.....	<i>Senecio glabellus</i>	
Saw palmetto	<i>Serenoa repens</i>	
Knotroot.....	<i>Setaria geniculata</i>	
Purple heart	<i>Setcreasea purpurea</i>	
Indian hemp.....	<i>Sida rhombifolia</i>	
Rosinweed.....	<i>Silphium simpsonii</i>	
Water parsnip	<i>Sium suave</i>	
Greenbrier	<i>Smilax auriculata</i>	
Catbrier.....	<i>Smilax bona-nox</i>	
Greenbrier	<i>Smilax ecirrhata</i>	
Wild sarsaparilla	<i>Smilax glauca</i>	
Sarsaparilla vine.....	<i>Smilax pumila</i>	
Jackson-brier	<i>Smilax smallii</i>	
Greenbrier	<i>Smilax tamnoides</i>	
Coral greenbrier	<i>Smilax walteri</i>	
Horse nettle.....	<i>Solanum carolinense var. floridanum</i>	
Goldenrod	<i>Solidago candensis var. scabra</i>	
Sweet goldenrod	<i>Solidago odora</i>	
Prairie wedgescale	<i>Sphenopholis obtusata</i>	
Indian pink.....	<i>Spigelia marilandica</i>	
-----	<i>Spilanthes americana</i>	
Nodding ladies' -tresses.....	<i>Spiranthes odorata</i>	
Little ladies'-tresses.....	<i>Spiranthes tuberosa</i>	
Bridalwreath	<i>Spireae arguta</i>	
Macroalgae.....	<i>Spirogyra</i>	
Fungi	<i>Steccherinum sp.</i>	
Fungi	<i>Stereum ostrea</i>	
Mushroom sp.....	<i>Stereum ostrim</i>	
Fungi	<i>Stereum striatum</i>	
Queen's delight.....	<i>Stillingia sylvatica</i>	
Black cat grass.....	<i>Stipa avenacea</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Stoke's aster.....	<i>Stokesia laevis</i>	
Fungi.....	<i>Strobilomvces confuses</i>	
Fungi.....	<i>Strobilurus sp.</i>	
Stylisma.....	<i>Stylisma humistrata</i>	
Stylodon.....	<i>Stylodon careus</i>	
Horse sugar, sweetleaf.....	<i>Symplocos tinctoria</i>	
Bald cypress.....	<i>Taxodium distichum</i>	
Hoary pea.....	<i>Tephrosia spicata</i>	
Rice-paper plant.....	<i>Tetrapanax papyriferus</i>	
Wood fern, southern shield fern...	<i>Thelypteris kunthii</i>	
Basswood.....	<i>Tilia americana</i>	
Spanish moss.....	<i>Tillandsia usneoides</i>	
Crane-fly orchid.....	<i>Tipularia discolor</i>	
Poison ivy.....	<i>Toxicodendron radicans</i>	
Climbing dogbane.....	<i>Trachelospermum difforme</i>	
Windmill palm.....	<i>Trachycarpus fortunei</i>	
Tragia.....	<i>Tragia urens</i>	
Fungi.....	<i>Trametes cubensis</i>	
Fungi.....	<i>Trametes sector</i>	
Fungi.....	<i>Tremella concrescens</i>	
Fungi.....	<i>Tremellodendron pallidum</i>	
Mushroom sp.....	<i>Tricholoma sp.</i>	
Blue curls	<i>Trichostema sp.</i>	
Tall redtop.....	<i>Tridens flavus</i>	
Carolina clover.....	<i>Trifolium carolinianum</i>	
Red trillium.....	<i>Trillium sessile</i>	
Venus' looking-glass.....	<i>Triodanis biflora</i>	
Venus' looking-glass.....	<i>Triodanis perfoliata</i>	
Fungi.....	<i>Tylopilus indecisus</i>	
Fungi.....	<i>Tylopilus rhoadsiae</i>	
Fungi.....	<i>Tyopilus rubrobrunneus</i>	
Cattail.....	<i>Typha sp.</i>	
Winged elm.....	<i>Ulmus alata</i>	
American elm.....	<i>Ulmus americana var. floridana</i>	
Sparkleberry.....	<i>Vaccinium arboreum</i>	
Highbush blueberry.....	<i>Vaccinium corymbosum</i>	
Blueberry.....	<i>Vaccinium darrowii</i>	
Elliott blueberry.....	<i>Vaccinium elliotti</i>	
Shiny blueberry.....	<i>Vaccinium myrsinites</i>	
Deerberry.....	<i>Vaccinium stamineum</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Plants

Common Name	Scientific Name	Primary Habitat (For Designated Species)
Eelgrass.....	<i>Vallisneria americana</i>	
Macroalgae.....	<i>Vaucheria</i>	
Verbena.....	<i>Verbena brasilienses</i>	
Ironweed	<i>Vernonia angustifolia var. mohrii</i>	
Southern arrow-wood	<i>Viburnum dentatum</i>	
Possum haw	<i>Viburnum nudum</i>	
Walter viburnum.....	<i>Viburnum obovatum</i>	
Rusty haw, southern black haw	<i>Viburnum rufidulum</i>	
Violet.....	<i>Viola affinis</i>	
Violet.....	<i>Viola esculenta</i>	
Florida violet.....	<i>Viola floridana</i>	
Violet.....	<i>Viola septemloba</i>	
Violet.....	<i>Viola walteri</i>	
Garden pansy.....	<i>Viola wittrockiana</i>	
Summer grape	<i>Vitis aestivalis</i>	
Downy grape	<i>Vitis cinerea var. floridana</i>	
Muscadine grape.....	<i>Vitis rotundifolia</i>	
Frost grape	<i>Vitis vulpina</i>	
Voehmena	<i>Voehmena cylindrica</i>	
American wisteria	<i>Wisteria frutescens</i>	
Chinese wisteria*.....	<i>Wisteria sinensis</i>	
Virginia chain fern	<i>Woodwardia virginica</i>	
Fungi	<i>Xanthoconium affinis</i>	
Elephant ear*.....	<i>Xanthosoma sagittifolium</i>	
Fungi	<i>Xylaria magnoliae</i>	
Bear grass, weak-leaf yucca	<i>Yucca flaccidailamentosa</i>	
Atamasco lily	<i>Zephyranthes atamasco</i>	
Dreamland coral zinnia.....	<i>Zinnia elegans hybrid</i>	
Indian rice	<i>Zizania aquatica</i>	

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	Scientific Name	Primary Habitat (For All Species)
MOLLUSKS		
Florida Floater Clam	<i>Anodonta peggyae</i>	
Clam	<i>Elliptio jayensis</i>	55
Snail	<i>Helisoma duryi</i>	55
Ram's-horn Snail	<i>Goniobasis floridense</i>	55
Apple Snail	<i>Pomacea paludosa</i>	55
ANNELIDA		
Earthworm	<i>Lumbricus terrestris</i>	20,30,31,33
ARTHROPODS		
Black Widow Spider	<i>Latrodectus mactans</i>	20,30,31,33
Crab-like Spiny Orb Weaver	<i>Gasteracantha cancriformis</i>	20,30,31,33
Golden-silk Spider	<i>Nephila clavipes</i>	20,30,31,33
Blue Purse-web Spider	<i>Sphodros abboti</i>	20,30,31,33
Carolina Wolf Spider	<i>Lycosa carolinensis</i>	20,22,30,31,33
Daddy-long-legs	<i>Leiobunum sp.</i>	Throughout
Deer Tick	<i>Ixodes scapularis</i>	Throughout
Cave Isopod	<i>Adellus sp. (undescribed)</i>	79
Woodville Karst Cave Crayfish	<i>Procambarus orcinus</i>	79
Big Blue Spring Cave Crayfish	<i>Procambarus horsti</i>	79
Florida Crayfish	<i>Procambarus paeninsulanus</i>	55
Blue Crab	<i>Callinectes sapidus</i>	55
Eastern Grass Shrimp	<i>Palaemonetes paludosus</i>	55
Hobbs' Cave Amphipod	<i>Crangonyx hobbsi</i>	79
Florida Cave Amphipod	<i>Crangonyx grandimanus</i>	79
Cave Amphipod	<i>Crangonyx floridanus</i>	79
Amphipod	<i>Crangonyx hobbsi</i>	79
Swimming Little Florida Cave Isopod	<i>Remasellus parvus</i>	79
Ebony Jewelwing Damselfly	<i>Calopteryx maculata</i>	55
Orange Bluet Damselfly	<i>Enallagma signatum</i>	55
Other Damselflies Sp.	<i>Calopteryx dimidiata</i>	55
	<i>Hetaerina titia</i>	55
	<i>Lestes disjunctus australis</i>	55
	<i>Lestes vigilax</i>	55
	<i>Argia fumipennis atra</i>	55
	<i>Argia moesta</i>	55

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	Scientific Name	Primary Habitat (For All Species)
	<i>Argia sedula</i>	55
	<i>Argia tibialis</i>	55
	<i>Enallagma cardenium</i>	55
	<i>Enallagma civile</i>	55
	<i>Enallagma concisum</i>	55
	<i>Enallagma daeckei</i>	55
	<i>Enallagma dubium</i>	55
	<i>Enallagma durum</i>	55
	<i>Enallagma geminatum</i>	55
	<i>Enallagma pallidum</i>	55
	<i>Enallagma pollutum</i>	55
	<i>Enallagma vesperum</i>	55
	<i>Enallagma weewa</i>	55
	<i>Ischnura hastata</i>	55
	<i>Ischnura kellicotti</i>	55
	<i>Ischnura posita</i>	55
	<i>Ischnura prognata</i>	55
	<i>Ischnura ramburii</i>	55
	<i>Nehalennia integricollis</i>	55
	<i>Telebasis byersi</i>	55
Common Green-darter		
Dragonfly	<i>Anax junius</i>	Throughout
Regal Darner Dragonfly	<i>Coryphaeschna ingens</i>	Throughout
Palmetto Walkingstick	<i>Anismorpha buprestoides</i>	Throughout
Southeastern Lubber		
Grasshopper	<i>Romalea microptera</i>	Throughout
Broad-winged Katydid	<i>Microcentrum rhombifolium</i>	Throughout
House Cricket	<i>Acheta domestica</i>	Throughout
Field Cricket	<i>Gyrillus pennsylvanicus</i>	Throughout
Northern Mole Cricket	<i>Gryllotalpa hexadactyla</i>	Throughout
Carolina Mantid Praying Mantis	<i>Stagmomantis carolina</i>	Throughout
American Cockroach	<i>Periplaneta americana</i>	Throughout
German Cockroach	<i>Blattella germanica</i>	Throughout
Eastern Subterranean termite	<i>Reticulitermis flavipes</i>	Throughout
Common Water Strider	<i>Gerris remigis</i>	55
Leaf-footed Bug	<i>Acanthocephala femorata</i>	55
Black Turpentine Beetle	<i>Dendroctonus terebrans</i>	20,22
Ips Engraver Beetle	<i>Ips sp.</i>	20,22
Green June Beetle	<i>Cotinus nitida</i>	30,31,33
Two-spotted Lady Beetle	<i>Adalia bipunctata</i>	Throughout

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Pyralis Firefly	<i>Photinus pyralis</i>	Throughout
Pipevine Swallowtail Butterfly	<i>Battus philenor</i>	Throughout
Zebra Swallowtail Butterfly	<i>Eurytides marcellus</i>	Throughout
Black Swallowtail Butterfly	<i>Papilio polyxenes</i>	Throughout
Giant Swallowtail Butterfly	<i>Papilio cresphontes</i>	Throughout
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	Throughout
Spicebush Swallowtail Butterfly	<i>Papilio troilus</i>	Throughout
Palamedes Swallowtail Butterfly	<i>Papilio palamedes</i>	Throughout
Southern Dogface	<i>Colias cesonia</i>	Throughout
Orange Sulphur Butterfly	<i>Colias eurytheme</i>	Throughout
Cloudless Sulphur Butterfly	<i>Phoebis sennae</i>	Throughout
Barred Yellow Butterfly	<i>Eurema daira</i>	Throughout
Little Yellow Butterfly	<i>Eurema lisa</i>	Throughout
Sleepy Orange Butterfly	<i>Eurema nicippe</i>	Throughout
Ceranus Blue Butterfly	<i>Hemiargus ceranus</i>	Throughout
Dainty Sulphur Butterfly	<i>Nathalis iole</i>	Throughout
Harvester Butterfly	<i>Feniseca tarquinius</i>	Throughout
Great Purple Hairstreak Butterfly	<i>Atlides halesus</i>	Throughout
Banded Hairstreak Butterfly	<i>Satyrium calanus</i>	22
Oak Hairstreak Butterfly	<i>Satyrium favonius</i>	22
Coral Hairstreak Butterfly	<i>Satyrium titus</i>	22
King Hairstreak Butterfly	<i>Satyrium kingi</i>	22
Gray Hairstreak Butterfly	<i>Strymon melinus</i>	Throughout
Red-banded Hairstreak Butterfly	<i>Calycopis cecrops</i>	Throughout
Henry's Elfin Butterfly	<i>Callophrys henrici</i>	Throughout
Spring Azure Butterfly	<i>Celastrina ladon</i>	Throughout
Little Metalmark Butterfly	<i>Calephelis virginicensis</i>	Throughout
American Snout Butterfly	<i>Libytheana carinenta</i>	Throughout
Gulf Fritillary Butterfly	<i>Agraulis vanillae</i>	Throughout
Variiegated Fritillary Butterfly	<i>Euptoieta claudia</i>	Throughout
Zebra Butterfly	<i>Heliconius charithonius</i>	Throughout
Phaon Crescent Butterfly	<i>Phycoides phaon</i>	Throughout
Texan Crescent Butterfly	<i>Phycoides texana</i>	Throughout
Pearl Crescent Butterfly	<i>Phycoides tharos</i>	Throughout
Question Mark Butterfly	<i>Polygonia interrogationis</i>	Throughout
American Lady Butterfly	<i>Vanessa virginicensis</i>	Throughout
Red Admiral Butterfly	<i>Vanessa atalanta</i>	Throughout
Common Buckeye Butterfly	<i>Junonia coenia</i>	Throughout
Red-spotted Purple Butterfly	<i>Limenitis arthemis</i>	Throughout
Viceroy Butterfly	<i>Limenitis archippus</i>	Throughout

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Hackberry Emperor Butterfly	<i>Asterocampa celtis</i>	Throughout
Tawny Emperor Butterfly	<i>Asterocampa clyton</i>	Throughout
Southern Pearly-eye Butterfly	<i>Enodia portlandia</i>	Throughout
Appalachian Satyre Butterfly	<i>Satyrodes appalachia</i>	Throughout
Carolina Satyre Butterfly	<i>Hermeuptychia sosybius</i>	Throughout
Gemmed Satyre Butterfly	<i>Cyllopsis gemma</i>	Throughout
Little Wood Satyre Butterfly	<i>Megisto cymela</i>	Throughout
Monarch Butterfly	<i>Danaus plexippus</i>	Throughout
Queen Butterfly	<i>Danaus gilippus</i>	Throughout
Silver-spotted Skipper	<i>Epargyreus clarus</i>	Throughout
Dion Skipper	<i>Euohyes dion</i>	Throughout
Long-tailed Skipper	<i>Urbanus proteus</i>	Throughout
Dorantes Longtail Skipper	<i>Urbanus dorantes</i>	Throughout
Southern Cloudywing Skipper	<i>Thorybes bathyllus</i>	Throughout
Northern Cloudywing Skipper	<i>Thorybes pylades</i>	Throughout
Juvenal's Duskywing Skipper	<i>Erynnis juvenalis</i>	Throughout
Horace's Duskywing Skipper	<i>Erynnis horatius</i>	Throughout
Zarucco Duskywing Skipper	<i>Erynnis zarucco</i>	Throughout
Whirlabout Skipper	<i>Polites vibex</i>	Throughout
Lace-winged Roadside Skipper	<i>Amblyscirtes aesculapius</i>	Throughout
Fiery Skipper	<i>Hylephila phyleus</i>	Throughout
Common Checkered Skipper	<i>Pyrgus communis</i>	Throughout
Tropical Checkered Skipper	<i>Pyrgus oileus</i>	Throughout
Clouded Skipper	<i>Lerema accius</i>	Throughout
Least Skipper	<i>Ancyloxypha numitor</i>	Throughout
Southern Broken-Dash Skipper	<i>Wallengrenia otho</i>	Throughout
Northern Broken-Dash Skipper	<i>Wallengrenia egeremet</i>	Throughout
Little Glassywing Skipper	<i>Pompeius verna</i>	Throughout
Byssus Skipper	<i>Problema byssus</i>	Throughout
Yehi Skipper	<i>Poanes yehi</i>	Throughout
Zabulon Skipper	<i>Poanes Zabulon</i>	Throughout
Dun Skipper	<i>Euphyes vestris</i>	Throughout
Eufala Skipper	<i>Lerodea eufala</i>	Throughout
Twin-spot Skipper	<i>Oligoria maculata</i>	Throughout
Ocala Skipper	<i>Panoquina ocala</i>	Throughout
Yucca Giant Skipper	<i>Megathymus yuccae</i>	20,22
Luna Moth	<i>Actias luna</i>	Throughout
IO Moth	<i>Automeris io</i>	Throughout
Regal Moth	<i>Citheronia regalis</i>	Throughout
Rosy Maple Moth	<i>Dryocampa</i>	Throughout

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Deer Fly	<i>Chrysops sp.</i>	Throughout
Black Horse Fly	<i>Tabanus atratus</i>	Throughout
Horse Fly	<i>Tabanus molestus mixus</i>	Throughout
Feather-legged Fly	<i>Trichopoda plumipes</i>	Throughout
House Fly	<i>Musca domestica</i>	Throughout
Love Bug	<i>Plecia nearctica</i>	Throughout
Summer Mosquitoes	<i>Aedes sp.</i>	Throughout
House Mosquitoes	<i>Culex pipiens</i>	Throughout
Cow Killer "Velvet Ant"	<i>Dasymutilla occidentalis</i>	20,22
Red Fire Ant	<i>Solenopsis invicta</i>	20,22
Eastern Yellow Jacket	<i>Vespula maculifrons</i>	20,22
Honey Bee	<i>Apis mellifera</i>	Throughout
American Bumble Bee	<i>Bombus pennsylvanicus</i>	Throughout
Oak Gallmaking Cynipids	<i>Amphibolips quercusracemaria</i>	20,22
	<i>Andricus quercusfoliatus</i>	20,22
	<i>Andricus quercuspetiolicola</i>	20,22
	<i>Belonocnema quercussvirens</i>	20,22
	<i>Callirhytis cornigera</i>	20,22
	<i>Callirhytis quercusbatatoides</i>	20,22
	<i>Callirhytis quercusrugosa</i>	20,22
	<i>Callirhytis quercusventricosa</i>	20,22
	<i>Callirhytis seminator</i>	20,22
	<i>Dryocosmus nova</i>	20,22
	<i>Dryocosmus quercuslaurifoliae</i>	20,22
	<i>Dryocosmus quercusnotha</i>	20,22
	<i>Disholcaspis quercusglobulus</i>	20,22
	<i>Disholcaspis quercussuccinipes</i>	20,22
	<i>Disholcaspis quercusvirens</i>	20,22
<i>Neuroterus nova</i>	20,22	
<i>Neuroterus quercusbatatus</i>	20,22	
<i>Xystoteras sp.</i>	20,22	
FISH		
Shad	<i>Alosa alabamae</i>	55
Bowfin	<i>Amia calva</i>	55
American Eel	<i>Anguilla rostrata</i>	55
Pirate Perch	<i>Aphredoderus sayanus</i>	55
Sheepshead	<i>Archosargus probatocephalus</i>	55
Flier	<i>Centrarchus macropterus</i>	55
Snook	<i>Centropomus undecimalis</i>	55

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Sheepshead Minnow	<i>Cyprinodon variegatus</i>	55
Gizzard Shad	<i>Dorosoma cepedianum</i>	55
Everglades Pygmy Sunfish	<i>Elassoma evergladei</i>	55
Okefenokee Pygmy Sunfish	<i>Elassoma okefenokee</i>	55
Banded Pygmy Sunfish	<i>Elassoma zonatum</i>	55
Bluespotted Sunfish	<i>Enneacanthus gloriosus</i>	55
Lake Chubsucker	<i>Erimyzon sucetta</i>	55
Redfin Pickerel	<i>Esox americanus</i>	55
Swamp Darter	<i>Etheostoma fusiforme</i>	55
Golden Topminnow	<i>Fundulus chrysotus</i>	55
Eastern Starhead Topminnow	<i>Fundulus escambia</i>	55
Seminole Killifish	<i>Fundulus seminolis</i>	55
Mosquitofish	<i>Gambusia holbrooki</i>	55
Least Killifish	<i>Heterandria formosa</i>	55
White Catfish	<i>Ictalurus catus</i>	55
Yellow Bullhead	<i>Ictalurus natalis</i>	55
Brown Bullhead	<i>Ictalurus nebulosus</i>	55
Channel Catfish	<i>Ictalurus punctatus</i>	55
Flagfish	<i>Jordanella floridae</i>	55
Brook Silverside	<i>Labidesthes sicculus</i>	55
Longnose Gar	<i>Lepisosteus osseus</i>	55
Florida Gar	<i>Lepisosteus platyrhincus</i>	55
Redbreast Sunfish	<i>Lepomis auritus</i>	55
Warmouth	<i>Lepomis gulosus</i>	55
Bluegill	<i>Lepomis macrochirus</i>	55
Dollar Sunfish	<i>Lepomis marginatus</i>	55
Redear Sunfish	<i>Lepomis microlophus</i>	55
Spotted Sunfish	<i>Lepomis punctatus</i>	55
Pygmy Killifish	<i>Leptolucania ommata</i>	55
Bluefin Killifish	<i>Lucania goodei</i>	55
Suwannee Bass	<i>Micropterus notius</i>	55
Largemouth Bass	<i>Micropterus salmoides</i>	55
Spotted Sucker	<i>Minytrema melanops</i>	55
Striped Mullet	<i>Mugil cephalus</i>	55
Golden Shiner	<i>Notomigonus crysoleucose</i>	55
Ironcolor Shiner	<i>Notropis chalybaeus</i>	55
Dusky Shiner	<i>Notropis cummingsae</i>	55
Pugnose Minnow	<i>Notropis emiliae</i>	55
Redeye Chub	<i>Notropis harperi</i>	55
Sailfin Shiner	<i>Notropis hypselopterus</i>	55

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Coastal Shiner	<i>Notropis petersoni</i>	55
Tadpole Madtom	<i>Noturus gyrinus</i>	55
Speckled Madtom	<i>Noturus leptacanthus</i>	55
Blackbanded Darter	<i>Percina nigrofasciata</i>	55
Sailfin Molly	<i>Poecilia latipinna</i>	55
Black Crappie	<i>Pomoxis nigromaculatus</i>	55
Sailfin Shiner	<i>Pteronotropis hypselopterus</i>	55
Hogchoker	<i>Trinectes maculatus</i>	55
AMPHIBIANS		
Slimy Salamander	<i>Plethodon glutinosus</i>	30,31,33
Central Newt	<i>Notophthalmus viridescens</i>	30,31,33
Eastern Narrow-mouthed Toad	<i>Gastrophryne carolinensis</i>	20,22
Eastern Spadefoot Toad	<i>Scaphiopus holbrookii</i>	20,22
Fowlers Toad	<i>Bufo woodhousei fowleri</i>	20,22
Gray Teefrog	<i>Hyla chrysoscelis</i>	30,31,33
Green Treefrog	<i>Hyla cinerea</i>	30,31,33
Spring Peeper	<i>Hyla crucifer</i>	30,31,33
Pinewoods Treefrog	<i>Hyla femoralis</i>	20,22
Squirrel Treefrog	<i>Hyla squirella</i>	20,22
Bull Frog	<i>Rana catesbeiana</i>	30,31,33
Pig Frog	<i>Rana grylio</i>	30,31,33
Southern Leopard Frog	<i>Rana utricularia</i>	30,31,33
Southern Toad	<i>Bufo terrestris</i>	20,22
Siren	<i>Siren sp.</i>	30,31,33
REPTILES		
Florida Snapping Turtle	<i>Chelydra serpentina</i>	33,55
Suwannee Cooter	<i>Chrysemys concinna suwanniensis</i>	33,55
Gopher Tortoise	<i>Gopherus polyphemus</i>	22
Eastern Mud Turtle	<i>Kinosternon subrubrum</i>	33,55
Alligator Snapping Turtle	<i>Macrolemys temminckii</i>	33,55
River Cooter	<i>Pseudemys concinna</i>	33,55
Florida Cooter	<i>Pseudemys floridana</i>	33,55
Stinkpot	<i>Sternotherus odoratus</i>	33,55
Gulf Coast Box Turtle	<i>Terrapene carolina major</i>	20,22,31
Yellow-bellied Slider	<i>Trachemys scripta</i>	33,55
Florida Softshell Turtle	<i>Trionyx ferox</i>	33,55

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
American Alligator	<i>Alligator mississippiensis</i>	33,55
Green Anole	<i>Anolis carolinensis</i>	Throughout
Fence Lizard	<i>Sceloporus undulatus hyacinthinus</i>	20,22
Six-lined Racerunner	<i>Cnemidophorus sexlineatus</i>	20,22
Eastern Glass Lizard	<i>Ophisaurus ventralis</i>	20,22
Broad-headed Skink	<i>Eumeces laticeps</i>	20,31
Southeastern Five-lined Skink	<i>Eumeces inexpectatus</i>	20,22,31
Ground Skink	<i>Scincella laterale</i>	20,22
Eastern Cottonmouth	<i>Agkistrodon piscivorus</i>	30,31,33
Black Racer	<i>Coluber constrictor</i>	20,22
Eastern Diamondback Rattlesnake	<i>Crotalus adamanteus</i>	20,22
Dusky Pigmy Rattlesnake	<i>Sistrurus miliarius barbouri</i>	20,22
Ring-necked Snake	<i>Diadophis punctatus</i>	20,22,31
Scarlet Snake	<i>Cemophora coccinea</i>	20,22,31
Scarlet King Snake	<i>Lampropeltis triangulum</i>	20,22,31
Red Rat Snake	<i>Elaphe guttata</i>	20,31,33
Gray Rat Snake	<i>Elaphe obsoleta spiloides</i>	20,31,33
Eastern Hognose	<i>Heterodon platyrhinus</i>	20,22
Eastern Kingsnake	<i>Lampropeltis getulus</i>	20,22,31,33
Coachwhip	<i>Masticophis flagellum</i>	20,22
Coral Snake	<i>Micrurus fulvius</i>	20,22,31
Southern Watersnake	<i>Nerodia fasciata</i>	30,33,55
Brown Watersnake	<i>Nerodia taxispilota</i>	30,33,55
Red-bellied Watersnake	<i>Natrix erythrogaster</i>	30,33,55
Banded Watersnake	<i>Natrix fasciata</i>	30,33,55
Rough Green Snake	<i>Opheodrys aestivus</i>	31,33
Pine Snake	<i>Pituophis melanoleucus</i>	20,22
Eastern Garter Snake	<i>Thamnophis sirtalis</i>	20,30,31,33

BIRDS

Common Loon	<i>Gavia immer</i>	55
Pied-billed Grebe	<i>Podilymbus podiceps</i>	55
Horned Grebe	<i>Podiceps auritus</i>	55
Great Cormorant	<i>Phalacrocorax carbo</i>	55
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	55
Anhinga	<i>Anhinga anhinga</i>	55
Great Blue Heron	<i>Ardea herodias</i>	55
Great Egret	<i>Ardea alba</i>	55
Snowy Egret	<i>Egretta thula</i>	55

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Little Blue Heron	<i>Egretta caerulea</i>	55
Tricolored Heron	<i>Egretta tricolor</i>	55
Green Heron	<i>Butorides virescens</i>	55
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	55
Yellow-crowned Night-Heron	<i>Nycticorax violaceus</i>	55
American Bittern	<i>Botaurus Lentiginosus</i>	55
Least Bittern	<i>Ixobrychus exilis</i>	55
White Ibis	<i>Eudocimus albus</i>	55
Roseate Spoonbill	<i>Ajaia ajaja</i>	55
Wood Stork	<i>Mycteria americana</i>	55
Canada Goose	<i>Branta canadensis</i>	55
Snow Goose	<i>Chen caerulescens</i>	55
Black Vulture	<i>Coragyps atratus</i>	Throughout
Turkey Vulture	<i>Cathartes aura</i>	Throughout
Wood Duck	<i>Aix sponsa</i>	33,55
Green-winged Teal	<i>Anas crecca</i>	55
American Black Duck	<i>Anas rubripes</i>	55
Mallard	<i>Anas platyrhynchos</i>	55
Blue-winged Teal	<i>Anas discors</i>	55
Northern Shoveler	<i>Anas clypeata</i>	55
Gadwall	<i>Anas strepera</i>	55
Eurasian Wigeon	<i>Anas penelope</i>	55
American Wigeon	<i>Anas americana</i>	55
Canvasback	<i>Aythya valisineria</i>	55
Redhead	<i>Aythya americana</i>	55
Ring-necked Duck	<i>Aythya collaris</i>	55
Greater Scaup	<i>Aythya marila</i>	55
Lesser Scaup	<i>Aythya affinis</i>	55
Bufflehead	<i>Bucephala albeola</i>	55
Common Goldeneye	<i>Bucephala clangula</i>	55
Hooded Merganser	<i>Lophodytes cucullatus</i>	55
Red-breasted Merganser	<i>Mergus serrator</i>	55
Osprey	<i>Pandion haliaetus</i>	33,55
Swallow-tailed Kite	<i>Elanoides forficatus</i>	Throughout
Snail Kite	<i>Rostrhamus sociabilis</i>	55
Mississippi Kite	<i>Ictinia mississippiensis</i>	Throughout
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Throughout
Northern Harrier	<i>Circus cyaneus</i>	55
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Throughout
Copper's Hawk	<i>Accipiter cooperii</i>	20,22,31,33

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Red-shouldered Hawk	<i>Buteo lineatus</i>	20,22,31,33
Broad-winged Hawk	<i>Buteo platypterus</i>	20,22,31,33
Red-tailed Hawk	<i>Buteo jamaicensis</i>	20,22,31,33
Golden Eagle	<i>Aquila chrysaetos</i>	OF
American Kestrel	<i>Falco sparverius</i>	20,22
Merlin	<i>Falco columbarius</i>	22
Peregrine Falcon	<i>Falco peregrinus</i>	20,22
Wild Turkey	<i>Meleagris gallopavo</i>	20,22,31,33
Northern Bobwhite	<i>Colinus virginianus</i>	20,22
Sora	<i>Porzana carolina</i>	31,33,55
Purple Gallinule	<i>Porphyryula martinica</i>	55
Common Moorhen	<i>Gallinula chloropus</i>	55
American Coot	<i>Fulica americana</i>	55
American Oystercatcher	<i>Haematopus palliatus</i>	55
Limpkin	<i>Aramus guarauana</i>	33,55
Sandhill Crane	<i>Grus canadensis</i>	20,22
Killdeer	<i>Charadrius vociferus</i>	33,55
Solitary Sandpiper	<i>Tringa solitaria</i>	33,55
Spotted Sandpiper	<i>Actitis macularia</i>	33,55
Common Snipe	<i>Gallinago gallinago</i>	33,55
American Woodcock	<i>Scolopax minor</i>	20,31,33
Magnificent Frigatebird	<i>Fregata magnificens</i>	55
Laughing Gull	<i>Larus atricilla</i>	55
Bonaparte's Gull	<i>Larus philadelphia</i>	55
Ring-billed Gull	<i>Larus delawarensis</i>	55
Black Tern	<i>Chlidonias niger</i>	55
Forester's Tern	<i>Sterna forsteri</i>	55
Sooty Tern	<i>Sterna fuscata</i>	55
Ground Dove	<i>Columbina passerine</i>	20,22,31
Mourning Dove	<i>Zenaida macroura</i>	20,22,31
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	20,31,33
Common Barn Owl	<i>Tyto alba</i>	20,31,33
Eastern Screech Owl	<i>Otus asio</i>	20,31,33
Great Horned Owl	<i>Bubo virginianus</i>	20,31,33
Barred Owl	<i>Strix varia</i>	20,22,31,33
Common Nighthawk	<i>Chordeiles minor</i>	20,22
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	20,31,33
Whip-poor-will	<i>Caprimulgus vociferus</i>	20,31,33
Chimney Swift	<i>Chaetura pelagica</i>	20,22,31,33
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	20,31,33

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Belted Kingfisher	<i>Ceryle alcyon</i>	55
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	20,22
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	20,22
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	20,22,31,33
Downy Woodpecker	<i>Picoides pubescens</i>	20,22
Hairy Woodpecker	<i>Picoides villosus</i>	20,22
Northern Flicker	<i>Colaptes auratus</i>	20,22
Pileated Woodpecker	<i>Dryocopus pileatus</i>	20,22,31,33
Eastern Wood-Pewee	<i>Contopus virens</i>	20,22
Eastern Phoebe	<i>Sayornis phoebe</i>	20,22
Acadian Flycatcher	<i>Empidonax virescens</i>	20,22
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	20,22
Eastern Kingbird	<i>Tyrannus tyrannus</i>	20,22
Purple Martin	<i>Progne subis</i>	20,22,31,33
Tree Swallow	<i>Tachycineta bicolor</i>	31,33
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	31,33
Bank Swallow	<i>Riparia riparia</i>	31,33
Barn Swallow	<i>Hirundo rustica</i>	31,33
Blue Jay	<i>Cyanocitta cristata</i>	20,22,31
American Crow	<i>Corvus brachyrhynchos</i>	Throughout
Fish Crow	<i>Corvus ossifragus</i>	20,22,33,55
Carolina Chickadee	<i>Parus carolinensis</i>	20,22,31,33
Tufted Titmouse	<i>Parus bicolor</i>	20,22
Red-breasted Nuthatch	<i>Sitta canadensis</i>	20,22,31
White-breasted Nuthatch	<i>Sitta carolinensis</i>	20,22,31
Brown-headed Nuthatch	<i>Sitta pusilla</i>	20,22
Brown Creeper	<i>Certhia americana</i>	20,22,31
Carolina Wren	<i>Thryothorus ludovicianus</i>	20,22,31,33
House Wren	<i>Troglodytes aedon</i>	20,22
Winter Wren	<i>Troglodytes troglodytes</i>	20,22
Marsh Wren	<i>Cistothorus palustris</i>	31,33,55
Sedge Wren	<i>Cistothorus platensis</i>	33,55
Golden-crowned Kinglet	<i>Regulus satrapa</i>	20,31,33
Ruby-crowned Kinglet	<i>Regulus calendula</i>	20,22
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	20,22
Eastern Bluebird	<i>Sialia sialis</i>	20,22
Veery	<i>Catharus fuscescens</i>	20,22
Gray-cheeked Thrush	<i>Catharus minimus</i>	20,22
Swainson's Thrush	<i>Catharus ustulatus</i>	20,22

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Hermit Thrush	<i>Catharus guttatus</i>	20,22
Wood Thrush	<i>Hylocichla mustelina</i>	20,22
American Robin	<i>Turdus migratorius</i>	20,22,31,33
Gray Catbird	<i>Dumetella carolinensis</i>	20,22,33
Northern Mockingbird	<i>Mimus polyglottos</i>	20,22,31,33
Brown Thrasher	<i>Toxostoma rufum</i>	20,22
Cedar Waxwing	<i>Bombycilla cedrorum</i>	20,22,31,33
Loggerhead Shrike	<i>Lanius ludovicianus</i>	22
White-eyed Vireo	<i>Vireo griseus</i>	20,22
Solitary Vireo	<i>Vireo solitarius</i>	20,22,31,33
Yellow-throated Vireo	<i>Vireo flavifrons</i>	20,22
Red-eyed Vireo	<i>Vireo olivaceus</i>	20,22
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	20,22
Tennessee Warbler	<i>Vermivora peregrina</i>	20,22
Orange-crowned Warbler	<i>Vermivora celata</i>	20,22,31
Northern Parula	<i>Parula americana</i>	20,22,31
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	20,22
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	20,22
Magnolia Warbler	<i>Dendroica magnolia</i>	20,22
Yellow-rumped Warbler	<i>Dendroica coronata</i>	20,22
Yellow-throated Warbler	<i>Dendroica dominica</i>	20,22
Pine Warbler	<i>Dendroica pinus</i>	20,22
Palm Warbler	<i>Dendroica palmarum</i>	20,22,31,33
Cerulean Warbler	<i>Dendroica cerulea</i> ¹	20,22,31
Blackpoll Warbler	<i>Dendroica striata</i>	20,22
Black-and-white Warbler	<i>Mniotilta varia</i>	20,22,33
American Redstart	<i>Setophaga ruticilla</i>	20,22,33
Prothonotary Warbler	<i>Protonotaria citrea</i>	20,22,31,33
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	20,31,33
Ovenbird	<i>Seiurus aurocapillus</i>	20,31,33
Northern Waterthrush	<i>Seiurus noveboracensis</i>	31,33,55
Louisiana Waterthrush	<i>Seiurus motacilla</i>	31,33,55
Kentucky Warbler	<i>Oporornis formosus</i>	20,22,31
Common Yellowthroat	<i>Geothlypis trichas</i>	20,55
Hooded Warbler	<i>Wilsonia citrina</i>	20,22
Wilson's Warbler	<i>Wilsonia pusilla</i>	20,22
Blue-winged Warbler	<i>Vermivora pinus</i>	20,22
Summer Tanager	<i>Piranga rubra</i>	20,22
Scarlet Tanager	<i>Piranga olivacea</i>	20,22,31
Northern Cardinal	<i>Cardinalis cardinalis</i>	20,21,31,33

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Blue Grosbeak	<i>Guiraca caerulea</i>	20,31,33
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	20,22
Indigo Bunting	<i>Passerina cyanea</i>	20,22
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>	20,22
Chipping Sparrow	<i>Spizella passerina</i>	20,22
Field Sparrow	<i>Spizella pusilla</i>	20,22
Fox Sparrow	<i>Passerella iliaca</i>	22
Song Sparrow	<i>Melospiza melodia</i>	20,22
Swamp Sparrow	<i>Melospiza georgiana</i>	20,31,33
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	20,22
White-throated Sparrow	<i>Zonotrichia albicollis</i>	20,22
Dark-eyed junco	<i>Junco hyemalis</i>	20,31,33
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	31,33
Rusty Blackbird	<i>Euphagus carolinus</i>	31,33
Boat-tailed Grackle	<i>Quiscalus major</i>	20,31,33
Common Grackle	<i>Quiscalus quiscula</i>	20,31,33
Brown-headed Cowbird	<i>Molothrus ater</i>	20,22
Orchard Oriole	<i>Icterus spurius</i>	20
Purple Finch	<i>Carpodacus purpureus</i>	20,31
Pine Siskin	<i>Carduelis pinus</i>	20,22
American Goldfinch	<i>Carduelis tristis</i>	20,31,33

MAMMALS

Nine-banded armadillo *	<i>Dasyus novemcinctus</i>	20,22,31,33
Opossum	<i>Didelphis marsupialis</i>	20,22,31
Eastern mole	<i>Scalopus aquaticus</i>	20,22,31
Marsh rabbit	<i>Sylvilagus palustris</i>	31,33
Eastern cottontail	<i>Sylvilagus floridanus</i>	20,22
Gray squirrel	<i>Sciurus carolinensis</i>	20,22,31
Fox squirrel	<i>Sciurus niger</i>	22
Southern flying squirrel	<i>Glaucomys volans</i>	20,22,31
Cotton mouse	<i>Peromyscus gossypinus</i>	20,22
Golden mouse	<i>Ochrotomys nuttalli</i>	20,22
Gray fox	<i>Urocyon cinereoargenteus</i>	20,22,31
Florida black bear	<i>Ursus americanus floridanus</i>	20,22,31,33
Raccoon	<i>Procyon lotor</i>	20,31,33
River otter	<i>Lutra canadensis</i>	33,55
Bobcat	<i>Felis rufus</i>	20,22,31
West Indian manatee	<i>Trichechus manatus latirostris</i>	55
White-tailed deer	<i>Odocoileus virginianus</i>	20,22,31,33

* Non-native Species

Edward Ball Wakulla Springs State Park – Animals

Common Name	<i>Scientific Name</i>	Primary Habitat (For All Species)
Southeastern bat	<i>Myotis austroriparius</i>	20,31,33,
Eastern pipistrel	<i>Pipistrellus subflavus</i>	20,31,33
Seminole bat	<i>Lasiurus seminolus</i>	20,31,33,55
Red bat	<i>Lasiurus borealis</i>	20,31,33
Eastern yellow bat	<i>Lasiurus intermedius</i>	20,31,33

Habitat Codes

Terrestrial

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

Palustrine

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

Lacustrine

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

Riverine

53. Alluvial Stream
54. Blackwater Stream
55. Seepage Stream
56. Spring-Run Stream

Estuarine

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

Marine

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

Subterranean

81. Aquatic Cave
82. Terrestrial Cave

Miscellaneous

83. Ruderal
84. Developed

Habitat Codes

Addendum 5—Designated Species List

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

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

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

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

FNAI GLOBAL RANK DEFINITIONS

- G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- G4 = apparently secure globally (may be rare in parts of range)
- G5 = demonstrably secure globally
- GH = of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
- GX = believed to be extinct throughout range
- GXC = extirpated from the wild but still known from captivity or cultivation
- G#? = tentative rank (e.g., G2?)
- G#G# = range of rank; insufficient data to assign specific global rank (e.g., G2G3)
- G#T# = rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
- G#Q = rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
- G#T#Q = same as above, but validity as subspecies or variety is questioned.
- GU = due to lack of information, no rank or range can be assigned (e.g., GUT2).
- G? = not yet ranked (temporary)
- S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- S3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- S4 = apparently secure in Florida (may be rare in parts of range)
- S5 = demonstrably secure in Florida
- SH = of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
- SX = believed to be extinct throughout range
- SA = accidental in Florida, i.e., not part of the established biota
- SE = an exotic species established in Florida may be native elsewhere in North America
- SN = regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine
- SU = due to lack of information, no rank or range can be assigned (e.g., SUT2).
- S? = not yet ranked (temporary)
- N = Not currently listed, nor currently being considered for listing, by state or federal agencies.

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

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

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

- LE = Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.
- LT = Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

Edward Ball Wakulla Springs State Park Designated Species—Plants

Common Name/ Scientific Name	FDACS	<u>Designated Species Status</u>	
		USFWS	FNAI
Sweet-shrub <i>Calycanthus floridus</i>	LE		G5,S2
Eastern purple coneflower <i>Echinacea purpurea</i>	LE		G4,S1
Green adder's-mouth orchid <i>Malaxis unifolia</i>	LE		G5,S3
Little club-spur orchid <i>Platanthera clavellata</i>	LE		G5,S1

Edward Ball Wakulla Springs State Park Designated Species—Plants

Common Name/ <i>Scientific Name</i>	FDACS	<u>Designated Species Status</u> USFWS	FNAI
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Edward Ball Wakulla Springs State Park Designated Species—Animals

Common Name/ Scientific Name	Designated Species Status		
	FFWCC	USFWS	FNAI
FISH			
Suwannee bass <i>Micropterus notius</i>	LS		G3,S3
REPTILES			
American alligator <i>Alligator mississippiensis</i>	LS	T(S/A)	G5,S4
Eastern diamondback rattlesnake <i>Crotalus adamanteus</i>			G4,S3
Gopher tortoise <i>Gopherus polyphemus</i>	LS		G3,S3
Alligator snapping turtle <i>Macrochelys temminckii</i>	LS		G3,G4,S3
Florida pine snake <i>Pituophis melanoleucus</i>	LS		G4,T3?,S3
Suwannee cooter <i>Pseudemys concinna suwanniensis</i>	LS		G5,T3,S3
BIRDS			
Roseate spoonbill <i>Ajaia ajaja</i>	LS		G5,S2
Limpkin <i>Aramus guarauna</i>	LS		G5,S3
Great egret <i>Ardea alba</i>			G5, S4
Least bittern <i>Ixobrychus exilis</i>			G5,S4
Little blue heron <i>Egretta caerulea</i>	LS		G5,S4
Snowy egret <i>Egretta thula</i>	LS		G5,S3
Tricolored heron <i>Egretta tricolor</i>	LS		G5,S4
Swallow-tailed kite <i>Elanoides forficatus</i>			G4,S2
White ibis <i>Eudocimus albus</i>	LS		G5,S4
Merlin <i>Falco columbarius</i>			G4,S2
Peregrine falcon <i>Falco peregrinus</i>	LE		G4,S2
Southeastern American kestrel <i>Falco sparverius</i>	LT		G5,T4,S3

Edward Ball Wakulla Springs State Park Designated Species—Animals

Common Name/ Scientific Name	Designated Species Status		
	FFWCC	USFWS	FNAI
American oystercatcher <i>Haematopus palliatus</i>	LS		G5,S2
Southern bald eagle <i>Haliaeetus leucocephalus</i>	LT	LT	G4,S3
Worm-eating warbler <i>Helmitheros vermivorus</i>			G5,S1
Wood stork <i>Mycteria americana</i>	LE	LE	G4,S2
Yellow-crowned night heron <i>Nyctanassa violacea</i>			G5,S3
Black-crowned night-heron <i>Nycticorax nycticorax</i>			G5,S3
Osprey <i>Pandion haliaetus</i>			G5,S3,S4
Southern hairy woodpecker <i>Picoides villosus</i>			G5,S3
Snail kite <i>Rostrhamus sociabilis plumbeus</i>	LE	LE	G4,G5,T1,S1
Louisiana waterthrush <i>Seiurus motacilla</i>			G5,S2
MAMMALS			
Southeastern bat <i>Myotis austroriparius</i>			G4,S3
Manatee <i>Trichechus manatus</i>	LE	LE	G2,S2
Sherman's fox squirrel <i>Sciurus niger shermani</i>	LS		G5,T3,S3
Florida black bear <i>Ursus americanus floridanus</i>	LT		G5,T2,S2
ARTHROPODS			
Blue purse-web spider <i>Sphodros abboti</i>			G?,S4
Florida cave amphipod <i>Crangonyx grandimanus</i>			G2,G3,S2
Hobbs' cave amphipod <i>Crangonyx hobbsi</i>			G2,G3,S2,S3
Swimming little Florida cave isopod <i>Remasellus parvus</i>			G1,G2,S1
Big Blue Spring cave crayfish <i>Procambarus horsti</i>			G1,G2,S1
Woodville Karst cave crayfish <i>Procambarus orcinus</i>			G1,S1

Addendum 6 – Florida Master Site File List Of Cultural Sites

Edward Ball Wakulla Springs State Park
Cultural Sites Listed In The Florida Master Site File

FMSF#	Site Name	Culture	Description
WA00017	Wakulla Bridge	Weeden Island; Fort Walton; 19 th c. American	Artifact scatter; historic refuse
WA00024	Wakulla Springs	PaleoIndian	Kill site
WA00024A	Wakulla Springs	PaleoIndian	Pleistocene Megafauna
WA00180	USFS 80-10	Early Archaic through Fort Walton	Lithic Scatter Habitation Site
WA00304	Wakulla Boat	Late 19 th c. - e. 20 th c. US	Turn of the century mullet fishing boat
WA00305	Wakulla Springs Lodge	1937	Mediterranean Revival structure
WA00305A	Bath House	1935	Masonry structure
WA00305B	Conference Room	1935	Frame Structure
WA00305C	Engine House	1937	Mediterranean Revival structure
WA00305D	Staff Residence	1942	Frame Structure
WA00305E	Pump House	1935?	Mediterranean Revival structure
WA00305F	Water Tower	1936	Structure
WA00309	NN	Weeden Island	Mounds
WA00310	NN	Early Archaic	Habitation Site
WA00311	NN	Historic	Turpentine Camp
WA00312	Ways Site	Late Archaic; Weeden Island; Seminole	Habitation Site; Francis' Town?
WA00313	NN	Late Archaic	Habitation Site
WA00314	NN	Prehistoric	Lithic Scatter
WA00315	NN	Prehistoric	Lithic Scatter
WA00316	NN	Fort Walton	Habitation Site
WA00317	NN	Historic	Earthwork/ trash dump
WA00318	NN	Prehistoric	Lithic Scatter
WA00319	NN	Historic	Turpentine Distillery/Tar Processing; Watkin's Still?

Edward Ball Wakulla Springs State Park
Cultural Sites Listed In The Florida Master Site File

WA00320	NN	Prehistoric	Lithic Scatter
WA00321	Bear	Deptford; Fort Walton	Village – Aute?
WA00322	NN	Middle Archaic; Late Archaic; Leon-Jefferson	Artifact Scatter
WA00323	NN	Prehistoric; Weeden Island	Lithic Scatter
WA00324	NN	Prehistoric	Lithic Scatter
WA00325	NN	Prehistoric	Lithic Scatter
WA00326	NN	Historic	House Site
WA00327	NN	Prehistoric	Lithic Scatter
WA00328	NN	Historic	Earthwork/Bridge ?
WA00329	Wakulla Springs Lodge	PaleoIndian; Early Archaic; Weeden Island; Fort Walton/Leon-Jefferson	Village (Site of Wakulla Lodge)
WA00330	NN	Weeden Island; Fort Walton/Leon-Jefferson	Habitation Site; Mound? Village
WA00331	NN	Prehistoric	Lithic Scatter
WA00332	NN	Prehistoric	Lithic Scatter
WA00333	NN	Fort Walton/Leon-Jefferson	Habitation Site
WA00334	NN	Prehistoric	Lithic Scatter
WA00335	NN	Middle Archaic	Habitation Site
WA00336	NN	Weeden Island	Habitation Site
WA00337	NN	Weeden Island	Habitation Site
WA00338	NN	Prehistoric	Lithic Scatter
WA00339	NN	Weeden Island	Habitation Site
WA00340	NN	Prehistoric	Lithic Scatter
WA00341	NN	Prehistoric	Lithic Scatter
WA00342	NN	Weeden Island	Habitation Site
WA00343	NN	Middle Archaic	Habitation Site
WA00344	NN	Weeden Island	Habitation Site
WA00345	NN	Prehistoric	Lithic Scatter
WA00346	NN	Prehistoric	Lithic Scatter
WA00347	NN	Prehistoric	Lithic Scatter
WA00348	NN	Prehistoric	Lithic Scatter
WA00349	NN	Weeden Island	Habitation Site
WA00350	NN	Prehistoric	Lithic Scatter
WA00351	NN	Historic	Earthwork; trash dump
WA00352	NN	Fort Walton	Habitation Site

Edward Ball Wakulla Springs State Park
Cultural Sites Listed In The Florida Master Site File

WA00353	NN	Late Archaic/Norwood; Weeden Island	Habitation Site
WA00354	NN	Prehistoric	Lithic Scatter
WA00355	NN	Prehistoric	Lithic Scatter
WA00356	NN	Prehistoric	Lithic Scatter
WA00357	NN	Weeden Island; Fort Walton/Leon-Jefferson	Habitation Site
WA00358	NN	Late Archaic/Norwood; Deptford; Fort Walton	Habitation Site
WA00359	NN	Deptford or Swift Creek	Habitation Site
WA00360	NN	Prehistoric	Lithic Scatter
WA00361	NN	Late Archaic/Norwood	Habitation Site
WA00362	NN	Early Archaic; Middle Archaic; Weeden Island; Fort Walton	Habitation Site
WA00481	Wakulla Lodge West	Weeden Island; Seminole	Artifact Scatter
WA00513	Wakulla Springs Archaeological and Historic District	Paleolithic; Early Archaic; Middle Archaic; Deptford; Weeden Island; Fort Walton	Freshwater submerged (unspec.); Paleontological; Ceramic deposit
WA00539	Apple Snail	Weeden Island	Shell midden
WA00635	Cherokee Sink	Prehistoric	Artifact Scatter

Edward Ball Wakulla Springs State Park
Cultural Sites Listed In The Florida Master Site File

Addendum 7 – Timber Management Analysis

Timber Stand 1

Stand 1 is the majority of the upland pine community located on the River Sinks property. This area totals approximately 1,200 acres. The trees to be harvested are the planted loblolly pines that are about 25 years old. The pines are planted in rows on raised "beds" that are piled soil which are ½ foot to two feet in height. The planted pine areas can be split into 4 quadrants based on their location with respect to the paved road intersections. The northwest quadrant is the area north of New Light Church Road and west of U.S. Highway 319 (Crawfordville Highway) intersection. The southwest quadrant is south of New Light Church Road and west of U.S. Highway 319 intersection. The northeast quadrant is north of C.J. Spears Road and east of U.S. Highway 319 intersection. The southeast quadrant is south of C.J. Spears Road and east of U.S. Highway 319 intersection. The pines in all quadrants except the northwest quadrant have been thinned once before removing every 5th row of trees as well as removing additional trees from the remaining rows.

The stocking of the unthinned northwest quadrant is the highest with an estimated 600 – 700 trees per acre. The pines in this quadrant average 5-8 inches in dbh with an average tree height of 40 – 60 feet. The class size of the pine is mostly pulpwood with some chip-n-saw present. Understory growth is minimal due to shading from the thick cover of pine growth but there are many areas with remnant wiregrass growth present. The stocking of wiregrass is higher and the pine growth poorer on the sandy soils of the northern portion of this tract that borders up to the Apalachicola National Forest.

The other three quadrants are similar in having been thinned once and having a stocking of 400 – 500 trees per acre. The trees are also larger with an average of 8 – 11 inches in dbh and a tree height of 50 – 70 feet. There is wiregrass present but its stocking is much lower than that found in the northwest quadrant. More hardwood trees are present in both the understory and overstory of these three quadrants and the density of herbaceous plant growth is higher. The class size is mostly chip-n-saw with some pulpwood and sawtimber present.

The soils of all quadrants are sandy and topography is mostly level but can become significantly sloped around the karst features of sinkholes and sinkhole lakes located throughout the planted pine stands. Wet areas in addition to the sinkhole lakes include hydric hammocks and basin swamps. Portions of each quadrant have been prescribed burned within the last three years. Access to each quadrant can be made from U.S. Highway 319 and from New Light Church Road for the northwest and southwest quadrants, and from C.J. Spears Road for the northeast and southeast quadrants.

Timber Stand 2

Stand 2 is located in Burn Zone N. The tract is about 10 acres in size and contains some

planted slash pine on its eastern boundary. The slash pines were probably planted as a vista barrier to Highway 61 that borders the entire western side of this tract. The stand is very narrow and about a mile long. The slash pine are 25 - 35 years old and average about 150 - 200 stems per acre. The average diameter of the pines is 6 - 8 inches in dbh. The average tree height is 50 -60 feet. . The class size of the slash pine is almost all pulpwood.

Understory growth is minor due to several recent burns. Small oaks, sweetgum, and pines are present. Ground cover is sparse in most areas, but there is some weed and grass growth on portions of the zone. Longleaf pine and larger hardwoods make up the overstory of the western portion of the tract.

The soil is sandy and topography level except sloping some towards the state road right-of-way to west. There are no wet areas. There are active gopher tortoise borrows on the adjacent burn zone to the east. Access is from Highway 61 on the west or a park patrol road to the east.

Timber Stand 3

Stand number 3 is northern portion of Burn Zone J and is about 10 acres in size. The tract is planted slash pine estimated to 35 years in age. Stocking of the pines is 350 - 450 trees per acre. The trees have an average diameter of 9 - 12 in. dbh. The average tree height is 60 - 75 ft. The class sizes of the slash pine are mostly chip-n-saw, pulpwood, with some sawtimber.

The tract has been burned 5 times since 1992 so understory growth is moderate. The understory species are upland types such as southern red oak, hickory, sweetgum, and latural oak. Ground cover is sparse and includes broomsedge and other grasses and herbaceous species. The soil is sandy and topography is level. Historically, this stand was probably sandhill community. Longleaf pine and wiregrass are found on the adjacent property to the west. Sparse wiregrass is present in the western part of this stand.

The western portion of the tract was used as a borrow pit to supply fill material for the construction of some park roads prior to state ownership. Here the pines are smaller but wiregrass is present. Active gopher tortoise borrows are located within this portion of the tract.

Access to the site can be from a park patrol road. There is also a gated private drive adjacent to the tract that may be used for access if permission is granted from the landowners. There are five private homes along the boundary of this site.

Timber Stand 4

Stand 4 is Burn Zone B, a 100 acre tract of 50 year old planted slash pine. The average density is between 300-400 stems per acre and the average diameter is 9 - 14 inches dbh. The average tree height is 70 to 90 feet tall. The class sizes of the slash pines are mostly sawtimber with some chip-n-saw and pulpwood.

Understory growth is moderate with red bay, sweetgum, laurel oaks predominating. The ground cover is dominated by panicum, dog fennel, with various grasses and herbs.

The tract has been burned several times in the last 15 years. Most of these burns were done in the winter. One burn in the spring of 1993 apparently stressed part of the stand and a bark beetle infestation occurred. The infestation killed the slash pines on a 7-acre portion of the northern part of the tract. This 7-acre portion is now grown up with small slash pines, hardwoods and dog fennel.

The topography is mostly level with the exception of a 6-acre depression area in the middle of the tract. The soil is well drained except for the depression area which is higher in moisture. Access to the stand will be from a park road that completely circles the tract.

Wildlife seen on this tract includes whitetail deer, turkey, Sherman's fox squirrel, and Suwannee cooter turtles. The Suwannee cooter has been observed nesting in the northeast portion of the tract.

Timber Harvesting

Harvesting of Stand 1 would most likely be done by quadrants with the northwest quadrant being harvested first. The harvesting of the northwest quadrant would be a thin of the loblolly pines removing every fifth row of trees and selective removal of additional trees from the rows that are left. Trees selected for removal would be those that are diseased, poor formed, and suppressed. This first thin of this quadrant would remove approximately 50% of the volume of the pine stand. There may be some small, scattered ¼ acre plots where all loblolly pines would be removed and longleaf pines established by prescribed burning and then planting of longleaf seedlings.

It has been determined that loblolly pine growth in the northern portion of the northwest quadrant, adjacent to the Apalachicola National Forest, is extremely poor and proper restoration requires the complete removal of these pines. This area is about 30 acres in size. Wiregrass stocking in this area is good and the growth of the grass will benefit from the removal of the pines and the prescribed burning that will follow. After completion of the first burn, the planting of longleaf pine seedlings will begin. During

Edward Ball Wakulla Springs State Park Timber Management Analysis

the restoration process, some hardwood control measures maybe required as well as seeding of other native plant species. There also may be some contouring of the raised beds found in this portion of the stand.

The other three quadrants of Stand 1 would selectively be thinned to remove a portion of the loblolly pines. The loblolly pine in these three quadrants would be thinned so that enough trees are left on site to allow prescribed burning to continue. After thinning, longleaf pine seedlings will be planted in any open areas. Once the longleaf pines are established and can survive and carry prescribed burning, the rest of the loblolly pine can be harvested. Planting of native grasses and other herbaceous plants will also be a part of the restoration of these three quadrants.

Harvesting of Stand 2 will remove all slash pines within the designated zone. Some native ground cover can be planted after harvesting, but most of the stand will be left to regenerate naturally. No longleaf pines will be cut in any of the timber stands.

Harvesting of Stands 3 and 4 would be similar and involves a partial thinning of the slash pines. The slash pine in the two stands would be thinned so that enough trees are left on site to allow prescribed burning to continue. After thinning, longleaf pines will be planted in the open areas. Once the longleaf pines are established the rest of the slash pine can be harvested. Planting of native grasses and other herbaceous plants will also be a part of the restoration of these two sites. Stand 4 with its natural appearance and mature forest, is ranked the lowest in priority for timber harvesting of all the timber stands. Harvesting of Timber Stand 4 will only be done after all other timber stands have been harvested and an updated review of the need for restoration of this stand has been completed by park staff.

Addendum 8 – Priority Schedule And Cost Estimates

Edward Ball Wakulla Springs State Park – Priority Schedule And Cost Estimates

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

Natural Resource Management	
Management Activity	Estimated Cost
Exotic plant controls. 95 percent for hydrilla control (recurring).....	\$90,000.00
Prescribed burn program. Equipment, fuel, personal protection equipment (recurring)	\$5,000.00
Gyro-tract new firebreaks and perimeter boundary lines.....	\$25,000.00
Cherokee Sink additional restoration and erosion controls.....	\$25,000.00
Expansion and maintenance of upland pine community restoration project..	\$25,000.00
Monitor water quality of springs and river. Equipment, lab fees (recurring)...	\$ 1,000.00
Protection of designated species. Survey, fencing of perimeter boundaries...	\$125,000.00
Assist in the continued exploration and mapping of cave system (recurring)..	\$ 2,000.00
Compile written report of the Full River Survey.....	\$ 2,000.00
(1) Park Service Specialist position or funding equivalent (recurring).....	\$33,689.00
Total Cost:	\$1,548,860.00

Cultural Resource Management	
Management Activity	Estimated Cost
Cultural resource surveys.....	\$25,000.00
Cultural resource management plans.....	TBD
Inventory and digitize archival records.....	TBD
Develop collections management program.....	TBD
Correct maintenance problems at Lodge.....	TBD
Update electrical system at administration building.....	TBD
Renovate gift shop.....	TBD
Placement of fill in excavated pits of dump complex.....	TBD
Total Cost:	TBD

Edward Ball Wakulla Springs State Park – Priority Schedule And Cost Estimates

Capital Improvements	
Development Area or Facilities	Estimated Cost
Waterfront and Lodge Complex.....	\$530,250.00
Picnic Area	\$290,000.00
Trails	\$109,000.00
Cherokee Sink Parcel.....	\$722,100.00
River Sink Parcel	\$25,000.00
Support Facilities.....	\$17,000.00
Total Cost with Contingency	\$2,032,020.00

Additional Information

ENAI Descriptions

DHR Cultural Management Statement

1999 Final Land Management Review Report

Descriptions Of Natural Communities Developed By FNAI

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

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

The levels of the hierarchy are:

Natural Community Category - defined by hydrology and vegetation.

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

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

TERRESTRIAL COMMUNITIES

XERIC UPLANDS
COASTAL UPLANDS
MESIC UPLANDS
ROCKLANDS
MESIC FLATLANDS

PALUSTRINE COMMUNITIES

WET FLATLANDS
SEEPAGE WETLANDS
FLOODPLAIN WETLANDS
BASIN WETLANDS

LACUSTRINE COMMUNITIES

RIVERINE COMMUNITIES

SUBTERRANEAN COMMUNITIES

MARINE/ESTUARINE COMMUNITIES

Definitions of Terms Used in Natural Community Descriptions

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

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

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

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

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

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

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

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

Descriptions Of Natural Communities Developed By FNAI

Coastal Grassland - coastal flatland with sand substrate; xeric-mesic; subtropical or temperate; occasional fire; grasses, herbs, and shrubs with or without slash pine and/or cabbage palm.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Descriptions Of Natural Communities Developed By FNAI

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Floodplain Swamp - floodplain with organic/alluvial substrate; usually inundated; subtropical or

Descriptions Of Natural Communities Developed By FNAI

temperate; rare or no fire; vegetation characterized by cypress, tupelo, black gum, and/or pop ash.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Descriptions Of Natural Communities Developed By FNAI

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MARINE/ESTUARINE (The distinction between the Marine and Estuarine Natural Communities is often subtle, and the natural communities types found under these two community categories have the same descriptions. For these reasons they have been grouped together.) - Subtidal, intertidal and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land.

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

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

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

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

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

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

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

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

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

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

Descriptions Of Natural Communities Developed By FNAI

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

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

DEFINITIONS OF TERMS Terrestrial and Palustrine Natural Communities

Physiography

Upland - high area in region with significant topographic relief; generally undulating

Lowland - low area in region with or without significant topographic relief; generally flat to gently sloping

Flatland - generally level area in region without significant topographic relief; flat to gently sloping

Basin - large, relatively level lowland with slopes confined to the perimeter or isolated interior locations

Depression - small depression with sloping sides, deepest in center and progressively shallower towards the perimeter

Floodplain - lowland adjacent to a stream; topography influenced by recent fluvial processes

Bottomland - lowland not on active floodplain; sand/clay/organic substrate

Hydrology

occasionally inundated - surface water present only after heavy rains and/or during flood stages

seasonally inundated - surface water present during wet season and flood periods

usually inundated - surface water present except during droughts

Climatic Affinity of the Flora

tropical - community generally occurs in practically frost-free areas

subtropical - community generally occurs in areas that experience occasional frost, but where freezing temperatures are not frequent enough to cause true winter dormancy

temperate - community generally occurs in areas that freeze often enough that vegetation goes into winter dormancy

Fire

annual fire - burns about every 1-2 years

frequent fire - burns about every 3-7 years

occasional fire - burns about every 8-25 years

rare fire - burns about every 26-100 years

no fire - community develops only when site goes more than 100 years without burning

Descriptions Of Natural Communities Developed By FNAI

LATIN NAMES OF PLANTS MENTIONED IN NATURAL COMMUNITY DESCRIPTIONS

anise - *Illicium floridanum*
bays:
 swamp bay - *Persea palustris*
 gordonia - *Gordonia lasianthus*
 sweetbay - *Magnolia virginiana*
beakrush - *Rhynchospora* spp.
beech - *Fagus grandifolia*
blackgum - *Nyssa biflora*
blue palmetto - *Sabal minor*
bluestem - *Andropogon* spp.
buttonbush - *Cephalanthus occidentalis*
cabbage palm - *Sabal palmetto*
cacti - *Opuntia* and *Harrisia* spp.,
 predominantly *stricta* and *pentagonus*
cane - *Arundinaria gigantea* or *A. tecta*
cattail - *Typha* spp.
cedars:
 red cedar - *Juniperus silicicola*
 white cedar - *Chamaecyparis thyoides* or
 C. henryi
cladonia - *Cladonia* spp.
cypress - *Taxodium distichum*
dahoon holly - *Ilex cassine*
diamondleaf oak - *Quercus laurifolia*
fire flag - *Thalia geniculata*
Florida maple - *Acer barbatum*
gallberry - *Ilex glabra*
gums:
 tupelo - *Nyssa aquatica*
 blackgum - *Nyssa biflora*
 Ogeechee gum - *Nyssa ogeche*
hackberry - *Celtis laevigata*
hornbeam - *Carpinus caroliniana*
laurel oak - *Quercus hemisphaerica*
live oak - *Quercus virginiana*
loblolly pine - *Pinus taeda*
longleaf pine - *Pinus palustris*
magnolia - *Magnolia grandiflora*
maidencane - *Panicum hemitomon*
needle palm - *Rhapidophyllum hystrix*
overcup oak - *Quercus lyrata*
pickerel weed - *Pontederia cordata* or *P. lanceolata*
pignut hickory - *Carya glabra*
pop ash - *Fraxinus caroliniana*
pond apple - *Annona glabra*
pond pine - *Pinus serotina*
pyramid magnolia - *Magnolia pyramidata*
railroad vine - *Ipomoea pes-caprae*
red cedar - *Juniperus silicicola*
red maple - *Acer rubrum*
red oak - *Quercus falcata*
rosemary - *Ceratiola ericoides*
sagittaria - *Sagittaria lancifolia*
sand pine - *Pinus clausa*
saw palmetto - *Serenoa repens*
sawgrass - *Cladium jamaicensis*
scrub oaks - *Quercus geminata*, *Q. chapmanii*, *Q. myrtifolia*, *Q. inopina*
sea oats - *Uniola paniculata*
seagrape - *Coccoloba uvifera*
shortleaf pine - *Pinus echinata*
Shumard oak - *Quercus shumardii*
slash pine - *Pinus elliotii*
sphagnum moss - *Sphagnum* spp.
spikerush - *Eleocharis* spp.
spruce pine - *Pinus glabra*
St. John's wort - *Hypericum* spp.
swamp chestnut oak - *Quercus prinus*
sweetgum - *Liquidambar styraciflua*
titi - *Cyrilla racemiflora*, and *Cliftonia monophylla*
tuliptree - *Liriodendron tulipifera*
tupelo - *Nyssa aquatica*
turkey oak - *Quercus laevis*
water oak - *Quercus nigra*
waterlily - *Nymphaea odorata*
white cedar - *Chamaecyparis thyoides*
white oak - *Quercus alba*
willow - *Salix caroliniana*
yucca - *Yucca aloifolia*

**Management Procedures For Archaeological And Historical Sites And Properties
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A. GENERAL DISCUSSION

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

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

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

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

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

B. STATUTORY AUTHORITY

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

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

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quality of life, economy, and cultural environment. It is therefore declared to be state policy to:

1. Provide leadership in the preservation of the state's historic resources; [and]
2. Administer state-owned or state-controlled historic resources in a spirit of stewardship and trusteeship;...

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

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

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

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.
2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way that adversely affects the character, form, integrity, or other qualities that contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.
3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's

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ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.

4. Each state agency of the executive branch shall assume responsibility for the preservation of historic resources that are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.
5. Each state agency of the executive branch, in seeking to acquire additional space through new construction or lease, shall give preference to the acquisition or use of historic properties when such acquisition or use is determined to be feasible and prudent compared with available alternatives. The acquisition or use of historic properties is considered feasible and prudent if the cost of purchase or lease, the cost of rehabilitation, remodeling, or altering the building to meet compliance standards and the agency's needs, and the projected costs of maintaining the building and providing utilities and other services is less than or equal to the same costs for available alternatives. The agency shall request the division to assist in determining if the acquisition or use of a historic property is feasible and prudent. Within 60 days after making a determination that additional space is needed, the agency shall request the division to assist in identifying buildings within the appropriate geographic area that are historic properties suitable for acquisition or lease by the agency, whether or not such properties are in need of repair, alteration, or addition.
6. Consistent with the agency's mission and authority, all state agencies of the executive branch shall carry out agency programs and projects, including those under which any state assistance is provided, in a manner which is generally sensitive to the preservation of historic properties and shall give consideration to programs and projects which will further the purposes of this section.

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

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

C. MANAGEMENT POLICY

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

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

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management is to provide for land uses that are minimally destructive of resource values.

It should be noted that while many archaeological and historical sites are already recorded within state--owned or controlled--lands, the majority of the uplands areas and nearly all of the inundated areas have not been surveyed to locate and assess the significance of such resources. The known sites are, thus, only an incomplete sample of the actual resources - i.e., the number, density, distribution, age, character and condition of archaeological and historic sites - on these tracts. Unfortunately, the lack of specific knowledge of the actual resources prevents formulation of any sort of detailed management or use plan involving decisions about the relative historic value of individual sites. For this reason, a generalized policy of conservation is recommended until the resources have been better addressed.

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

- 1.** State land managers shall coordinate all planned activities involving known archaeological or historic sites or potential site areas closely with the Division of Historical Resources in order to prevent any kind of disturbance to significant archaeological or historic sites that may exist on the tract. Under 267.061(1)(b), F.S., the Division of Historical Resources is vested with title to archaeological and historic resources abandoned on state lands and is responsible for administration and protection of such resources. The Division will cooperate with the land manager in the management of these resources. Furthermore, provisions of 267.061(2) and 267.13, F.S., combined with those in 267.061(3) and 253.034(4), F.S., require that other managing (or permitting) agencies coordinate their plans with the Division of Historical Resources at a sufficiently early stage to preclude inadvertent damage or destruction to known or potentially occurring, presently unknown archaeological and historic sites. The provisions pertaining to human burial sites must also be followed by state land managers when such remains are known or suspected to be present (see 872.02 and 872.05, F.S., and 1A-44, F.A.C.)
- 2.** Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.
- 3.** In the case of known significant sites, which may be affected by proposed project activities, the managing agency will generally be expected to alter proposed management or development plans, as necessary, or else make special provisions to minimize or mitigate damage to such sites.
- 4.** If in the course of management activities, or as a result of development or the permitting of dredge activities (see 403.918(2)(6)a, F.S.), it is determined that valuable historic or archaeological sites will be damaged or destroyed, the Division reserves the right, pursuant to 267.061(1)(b), F.S., to require salvage measures to mitigate the destructive impact of such activities to such sites. Such salvage measures would be accomplished before the Division would grant permission for destruction of the affected site areas. The funding needed to implement salvage measures would be the responsibility of the managing agency planning the site destructive activity. Mitigation of historic structures at a minimum involves the preparation of measured drawings and documentary photographs. Mitigation of archaeological resources involves the excavation, analysis and reporting of the project findings and must be planned to occur sufficiently in advance to avoid project construction delays. If these

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services are to be contracted by the state agency, the selected consultant will need to obtain an Archaeological Research Permit from the Division of Historical Resources, Bureau of Archaeological Research (see 267.12, F.S. and Rules 1A-32 and 1A-46 F.A.C.).

5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological site is discouraged. There are many endangered sites in Florida (on both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.
6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).
7. Any discovery of instances of looting or unauthorized destruction of sites must be reported to the agent for the Board of Trustees of the Internal Improvement Trust Fund and the Division so that appropriate action may be initiated. When human burial sites are involved, the provisions of 872.02 and 872.05, F. S. and Rule 1A-44, F.A.C., as applicable, must also be followed. Any state agent with law enforcement authority observing individuals or groups clearly and incontrovertibly vandalizing, looting or destroying archaeological or historic sites within state-owned or controlled lands without demonstrable permission from the Division will make arrests and detain those individuals or groups under the provisions of 267.13, 901.15, and 901.21, F.S., and related statutory authority pertaining to such illegal activities on state-owned or controlled lands. County Sheriffs' officers are urged to assist in efforts to stop and/or prevent site looting and destruction.

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

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

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall

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not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. (see Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings [Revised 1990]).

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

D. MANAGEMENT IMPLEMENTATION

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

1. All land managing agencies should contact the Division and send U.S.G.S. 7.5 minute quadrangle maps outlining the boundaries of their various properties.
2. The Division will in turn identify site locations on those maps and provide descriptions for known archaeological and historical sites to the managing agency.
3. Further, the Division may also identify on the maps areas of high archaeological and historic site location probability within the subject tract. These are only probability zones, and sites may be found outside of these areas. Therefore, actual ground inspections of project areas may still be necessary.
4. The Division will send archaeological field recording forms and historic structure field recording forms to representatives of the agency to facilitate the recording of information on such resources.
5. Land managers will update information on recorded sites and properties.
6. Land managers will supply the Division with new information as it becomes available on previously unrecorded sites that their staff locate. The following details the kind of information the Division wishes to obtain for any new sites or structures that the land managers may report:

A. Historic Sites

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

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(e) Notation of known alterations to building.

B. Archaeological Sites

- (1) Site location (written narrative and mapped location).
 - (2) Cultural affiliation and period.
 - (3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).
 - (4) Threats to site (deterioration, vandalism, etc.).
 - (5) Site size (acreage, square meters, etc.).
 - (6) Artifacts observed on ground surface (pottery, bone, glass, etc.).
 - (7) Description of surrounding environment.
7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review by the Division early in the project planning.
 8. Ground disturbing activities may proceed elsewhere but land managers should stop disturbance in the immediate vicinity of artifact finds and notifies the Division if previously unknown archaeological or historic remains are uncovered. The provisions of Chapter 872, F.S., must be followed when human remains are encountered.
 9. Excavation and collection of archaeological and historic sites on state lands without a permit from the Division are a violation of state law and shall be reported to a law enforcement officer. The use of metal detectors to search for historic artifacts shall be prohibited on state lands except when authorized in a 1A-32, F.A.C., research permit from the Division.
 10. Interpretation and visitation which will increase public understanding and enjoyment of archaeological and historic sites without site destruction or vandalism is strongly encouraged.
 11. Development of interpretive programs including trails, signage, kiosks, and exhibits is encouraged and should be coordinated with the Division.
 12. Artifacts found or collected on state lands are by law the property of the Division. Land managers shall contact the Division whenever such material is found so that arrangements may be made for recording and conservation. This material, if taken to Tallahassee, can be returned for public display on a long term loan.

E. ADMINISTERING AGENCY

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

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

Contact Person

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

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**Land Management Review of Edward Ball Wakulla Springs State Park
Wakulla County (Lease No. 3463):**

October 19, 1999

Prepared by Division of State Lands Staff
Delmas T. Barber, OMC Manager
Penny Rolleston, Planner II
David Petti, Environmental Specialist II
Alphonso Craig, Staff

for
Edward Ball Wakulla Springs State Park Management Review Team

Final Report May 12, 2000

Land Manager:	Division of Recreation and Parks
Area:	2902 acres
County:	Wakulla County
Mngt. Plan Approved:	5/29/1997
Mngt. Plan Update Due:	5/29/2002

**Edward Ball Wakulla Springs State Park
1999 Final Land Management Review Report**

Management Review Team Members

Agency Represented	Team member Appointed	Team member in attendance
DEP	Mr. Adam Munson	Mr. Adam Munson
DEP /DRP	Mr. John Bente	Mr. John Bente
DACS/DOF	Mr. Bill Korn	Mr. Bill Korn
Florida Wildlife Federation	Mr. Manley Fuller	Mr. Manley Fuller
Wakulla Soil and Water Conservation District	Mr. Henry Creek	Mr. Henry Creek
FFWCC	Mr. J. Daniel Sullivan	Mr. J. Daniel Sullivan

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

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

Review Site

The management review of Edward Ball Wakulla Spring State Park Area considered approximately 2902 acres in Wakulla County that are managed by the Division of Recreation and Parks (DRP). The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management plan. The Division of State Lands approved the management plan on November 17, 1994, and the management plan update is due now.

Review Team Determination

1. Is the land being managed for the purpose for which it was acquired? **All team members agreed that Edward Ball Wakulla Springs State Park is being managed for the purpose for which it was acquired.**

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

Commendations To The Managing Agency

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

- The team commends the park staff for use of prescribed fire and land wood control measures to restore the upland pine community given their limited resources.
- The team commends the park staff for recognizing and attempting to address serious aquatic and vegetation problems.

Exceptional Management Actions

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

- Protection and maintenance of upland pine forest, upland hardwood forest, and aquatic cave.
- Survey (identify and locate) and protection and preservation of cultural resources.
- Resources management of prescribed fire of area being burned, frequency, and quality.
- Hydrological and geologic function of ground water and surface water monitoring in quality and quantity.
- Adjacent property concerns in land use of encroaching development and inholdings.
- Recreational opportunities and environmental education/outreach.
- Management resources of waste disposal and staffing.

Recommendations And Checklist Findings

Recommendations—No recommendations

Checklist Findings

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

1. Resource management of frequency of area being burned (p)

Manager's Response: Agree. Frequency of burning has been addressed in the draft Unit Management Plan revision.

2. Resource Management of plants, land use and poaching. (p)

Manager's Response: Plants and land use: Agree. Management of plants and land use will be addressed in the next updated UMP.

Poaching (p): Disagree. Poaching has never been identified as a major problem at Wakulla Springs State Park. Both trespassing and poaching are adequately being handled by boundary fencing, park patrols, and park law enforcement. Addressing poaching in the unit plan revision would infer that this is a management problem. Currently, poaching is not considered to be a problem at the park.