TROY SPRING STATE PARK

APPROVED

UNIT MANAGEMENT PLAN

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks

MARCH 1, 2000

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

March 1, 2000

Ms. BryAnne White
Office of Park Planning
Division of Recreation and Parks
Mail Station #525

Dear Ms. White

Re: Troy Springs State Park Lease Number: 4143

On March 1, 2000, the Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, approved the subject management plan. Pursuant to Section 253.034 and 259.032, Florida Statutes, and Chapter 18-2, Florida Administrative Code the plan's five-year update will be due in March 1, 2005.

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

Sincerely,

John Barrow
Office of Environmental Services
Division of State Lands

TABLE OF CONTENTS

RESOURCE MANAGEMENT COMPONENT

LAND USE COMPONENT

TABLE

LIST OF ADDENDA

MAPS

INTRODUCTION

Troy Spring State Park is located in Lafayette County (see Location Map) about six miles northwest of Branford. Access to the park is from County Road 425 off of U.S. Highway 27 (see Vicinity Map).

The park consists of 75.54 upland acres, and 8.05 wetland/submerged acres. Total acreage for the park is 83.59 acres. The property was acquired to provide for resource-based public outdoor recreation and related purposes. Acquisition began under the CARL/P2000 program. At Troy Spring State Park, public outdoor recreation is the designated single use of the property (see Addendum 1). There are no legislative or executive directives that constrain the use of this property.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Troy Spring 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. 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.

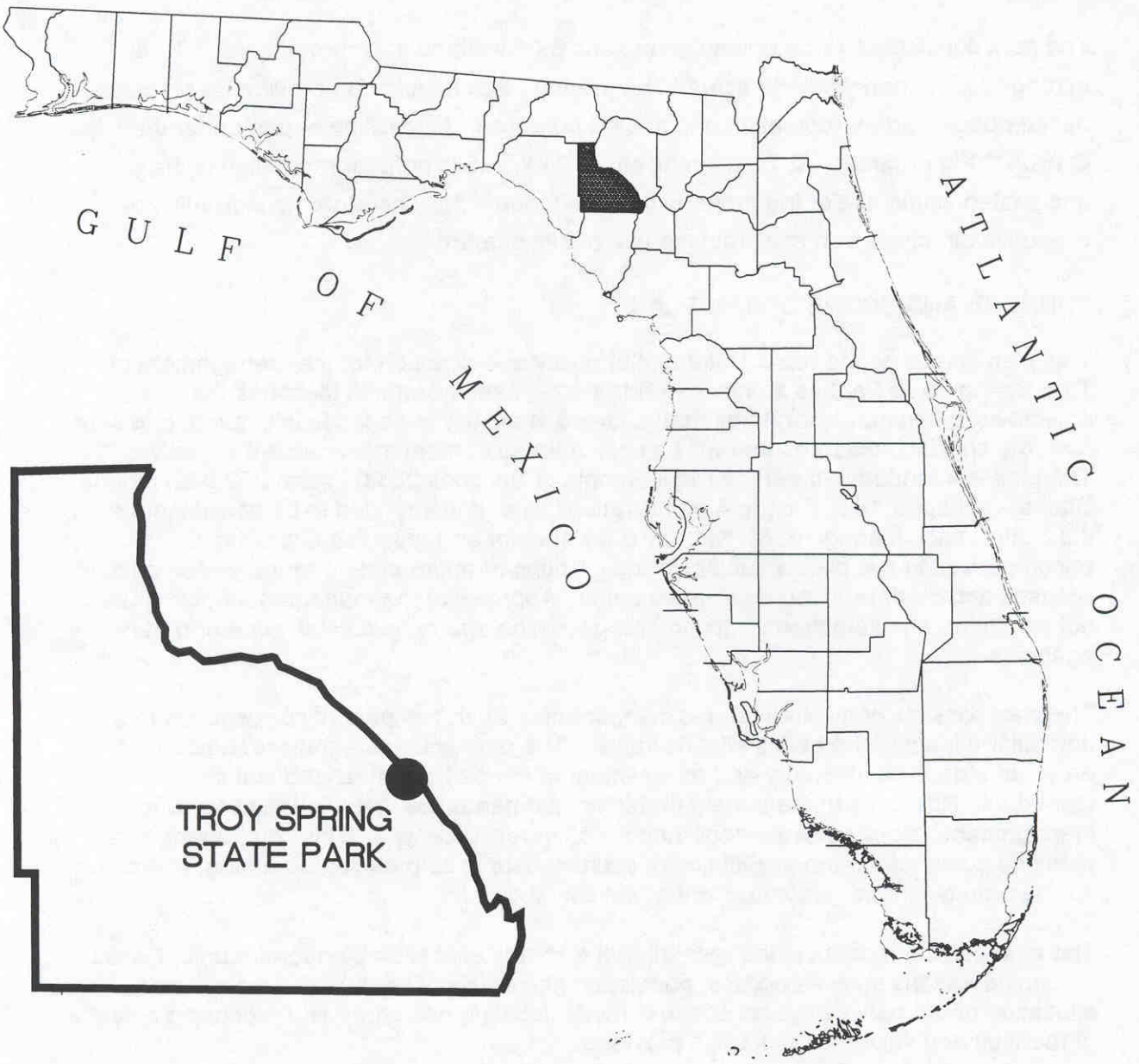
The plan consists of two interrelated components. Each component corresponds to a particular aspect of the park's administration. The resource management component provides a detailed inventory and assessment of the park's natural and cultural resources. Resource management problems and needs are identified, 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 park's physical space 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”), such as agriculture, water management and timber management was analyzed. These secondary purposes were considered within the context of the entire park and its natural and cultural resources, visitation and management. For this park, it was determined that no secondary purposes could be accommodated in a manner that would be compatible and not interfere with the primary purpose of outdoor recreation and conservation.

The potential for generating revenue to enhance management was also analyzed. It was

LOCATION MAP

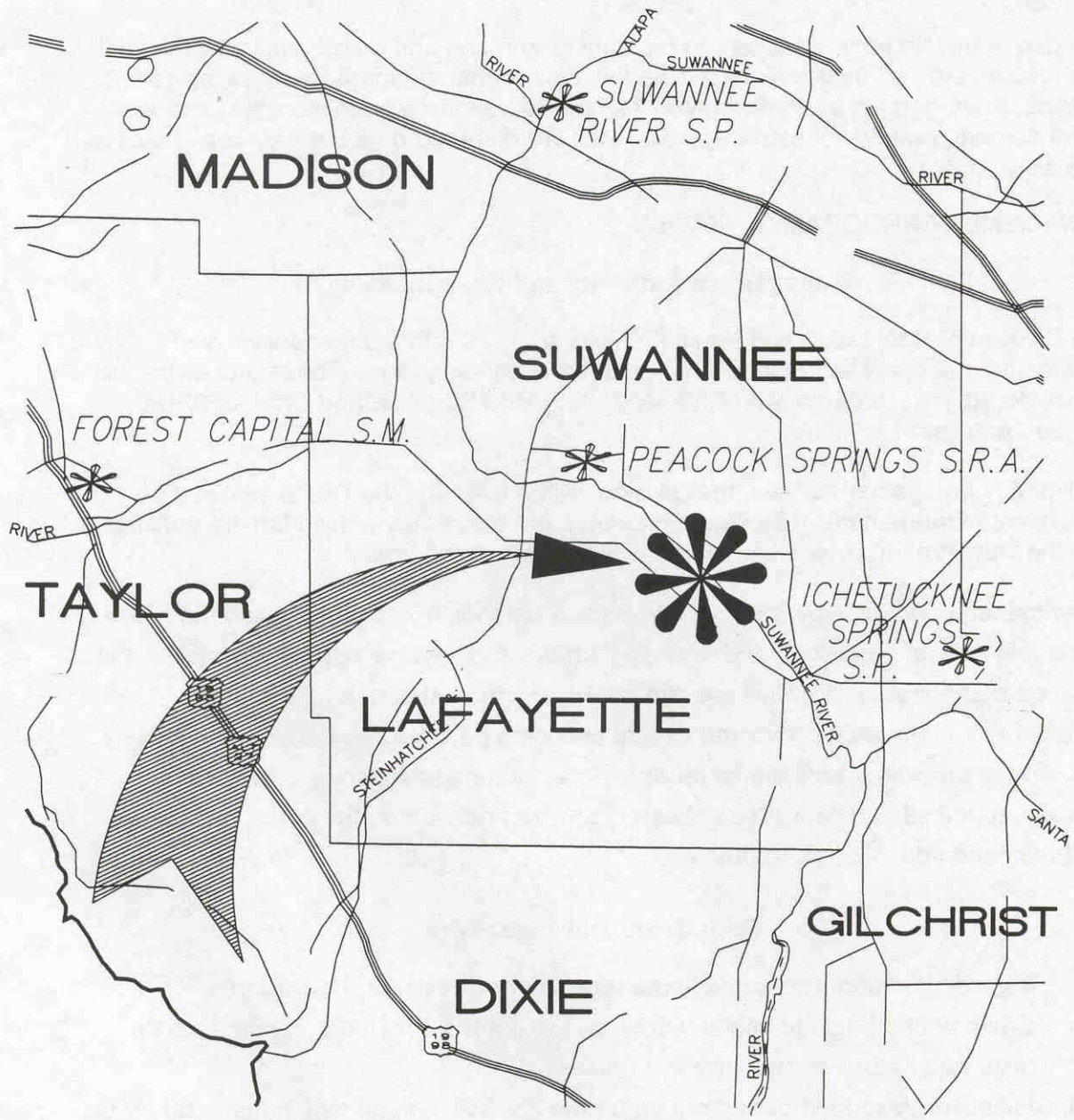


TROY SPRING STATE PARK

LAFAYETTE COUNTY

NORTH

VICINITY MAP



TROY SPRING STATE PARK

LAFAYETTE COUNTY

determined that multiple-use management activities would not be appropriate as a means of generating revenues for land management. Instead, techniques such as entrance fees, concessions and similar measures will be employed on a case-by-case basis as a means of supplementing park management funding.

The use of private land managers to facilitate restoration and management of this unit was also analyzed. Decisions regarding this type of management (such as mitigation projects, management and/or removal of timber for resource protection, restoration or enhancement, removal of exotic species, etc.) will be made on a case-by-case basis as necessity dictates.

MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

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

In all of its management efforts, the Division will be following the DEP's initiative of ecosystem management. The stated management measures in this plan are consistent with the Department's overall mission in ecosystem management.

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

Park Goals and Objectives

1. Identify, protect and actively manage the park's natural resources.

- **A.** Develop and begin to implement long-term plans for restoration of the park's disturbed natural communities.
- **B.** Initiate a prescribed burn program for the sandhill, upland pine forest, and mesic flatwoods communities.
- **C.** Determine impacts of hydrological alterations on the mesic flatwoods and depression marsh and develop appropriate plans for restoration.
- **D.** Continue to monitor periodically the quantity and quality of the spring water.
- **E.** Conduct a complete biological assessment of the spring run natural community and establish a long-term biological monitoring program.
- **F.** Control bank erosion at the spring by providing alternative facilities for public access, e.g. boardwalks.

G. Pursue acquisition of adjacent uplands to connect the park's fire-maintained areas with natural areas outside the park and to expand the protected habitat of wide-ranging designated species.

H. Survey the park and document additional plant and animal species observed.

2. Identify, preserve and protect the park's cultural resources.

A. Conduct additional cultural resource survey work (Level 1) to determine locations of prehistoric and historic sites.

B. Document and map cultural sites.

C. Document and catalog the park's known cultural resources.

D. Periodically monitor the condition of the wrecked steamship *Madison.*

E. Institute measures to protect the *Madison* from deterioration, especially that caused by humans.

F. Protect existing archaeological sites and their associated artifactual assemblage from vandalism, erosion and other forms of encroachment.

G. Interpret cultural resources in context to educate visitors about Florida's earlier inhabitants.

3. Pursue allocation of new staff positions to meet basic operational needs.

4. Provide safe, quality recreational opportunities for park visitors.

A. Improve land-based public access to the park.

B. Develop plans for providing structured swimming access to the spring via boardwalks and platforms.

C. Develop plans for providing boaters with mooring sites outside the spring run.

D. Acquire parcels identified as part of the park's Optimum Boundary.

5. Develop interpretive materials that will increase public knowledge and appreciation of the park's natural and cultural resources.

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 park staff in the development of wildfire emergency plans and furnishes permits 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 of Recreation and Parks with wildlife management programs, including the development and management of Watchable Wildlife programs. The Department of

State, Division of Historical Resources (DHR) assists staff to assure protection of archaeological and historical sites. The Department of Environmental Protection (DEP), Office of Coastal and Aquatic Managed Areas (CAMA) aids staff in aquatic preserves management programs. The DEP, Bureau of Beaches and Coastal Systems aids staff in planning and construction activities seaward of the Coastal Construction Line. In addition, the Bureau of Beaches and Coastal Systems aids the staff in the development of erosion control projects. Emphasis is placed on protection of existing resources as well as the promotion of compatible outdoor recreational uses.

Public Participation

An initial public workshop for the park was held on June 10, 1999. An additional public workshop was held on Monday, October 18, 1999, at 7:00 PM (EDT). The purpose of this meeting was to present the management plan to the public.

A DEP Advisory Group meeting was held on Tuesday, October 19, 1999, at 9:00 AM (EDT). The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss the current management plan.

Other Designations

Troy Spring State Park has not been designated as an area of critical State concern as defined in section 380.05, Florida Statutes. Currently it is not under study for such designation.

All waters within the unit have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code. Administered by the Department of Environmental Protection, this program was created by Section 403.061, Florida Statutes, and protects lakes, rivers and streams against degradation of existing ambient water quality. Surface waters in this unit are also classified as Class III waters by DEP.

This unit is not designated as an aquatic preserve under provision of the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes).

Several other significant land and water resources exist near the park. They include: Ichetucknee Springs State Park, Peacock Springs State Recreation Area, Adams Wildlife Management Area (WMA), Walker WMA, Ruth Springs WMA, O'Leno State Park, River Rise State Preserve, Steinhatchee Springs WMA, Twin Rivers WMA, Suwannee River State Park, and numerous other Water Management District parcels along the Suwannee River corridor.

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

The Division of Recreation and Parks has implemented resource management programs for the purpose of preserving for all time the natural and cultural resources of statewide significance under its administration. This component of the unit plan describes the natural and cultural resources of this park and identifies the methods that will be employed to manage them. When necessary to support statements made in this plan, published and non-published sources have been cited. These references are contained in Addendum 2.

The guiding management philosophy for natural resources is natural systems management. Primary emphasis is on restoring and maintaining the natural processes that shape the structure, function, and species composition of the State's diverse natural communities as they occurred in the state's original domain. Single species management is implemented when the recovery or persistence of a species is problematic, provided it is compatible with natural systems management or does not seriously compromise park values.

The Division also implements ecosystem management through the greenline program, which identifies the ecosystems of the unit and activities that may adversely impact the natural, cultural, recreational, aesthetic or economic values of the park. The Division maintains these greenlines and list of potential activities of concern.

RESOURCE DESCRIPTION AND ASSESSMENT

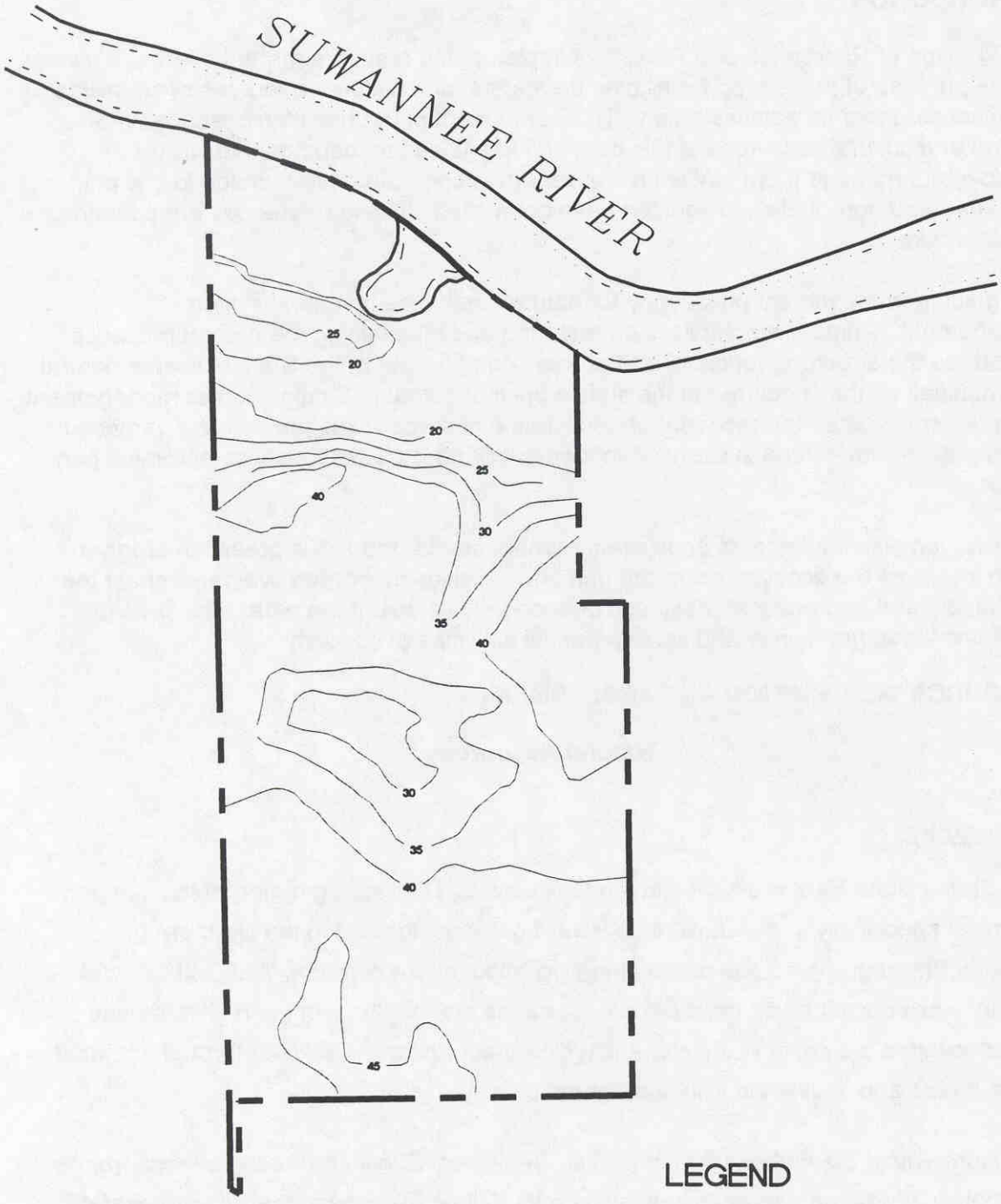
Natural Resources

Topography

Troy Spring State Park is situated in the Gulf Coastal Lowlands geomorphologic region, and more specifically in the Suwannee River Lowlands, located in the Northern or Proximal Physiographic Zone and on the Wicomico marine terrace. The Gulf Coastal Lowlands are described as gently sloping terraces that originate in the highlands and extend towards the coast. Limestone is typically at or near the surface throughout most of this region and is overlain with sand or sandy clay.

Elevations within the unit, according to U.S. Geological Survey quadrangle maps, range from below 20 feet above mean sea level (m.s.l.) along the Suwannee River to over 45 feet above m.s.l. in the southern half of the property (see Topographic Map). Most of the park lies within the 100-year flood plain as calculated by the Suwannee River Water Management District (SRWMD) for this reach of the Suwannee River.

Three or four relatively small ponds were dredged in the mesic flatwoods of the park by a previous owner. Large spoil piles and a series of ditches are associated with these ponds.



LEGEND

- WATER LINE
- PROPERTY LINE
- ROADWAY
- STABILIZED ROAD
- STRUCTURE

NORTH

GRAPHIC SCALE

200 0 200 400 800

(IN FEET)

Prepared by: Division of Recreation and Parks
Office of Park Planning

TROY SPRING STATE PARK

TOPOGRAPHIC MAP

Geology

Troy Spring State Park is underlain by a series of geologic strata. From youngest to oldest these include Pliocene to Recent surficial sands and clays, Ocala Group, Avon Park Limestone, Lake City Limestone, and Oldsmar Limestone (Crane, 1986).

The upper surficial material consists of Recent Age deposits mixed with Plio-Pleistocene Age sediments that were laid down as terraces as sea levels fluctuated during successive glacial periods. The Pleistocene deposits are mostly fine-grained sands, clayey at the surface, but coarser with increasing depth. Large pebbles of phosphate and quartz are commonly found at the base of the sand. Recent and Pleistocene deposits may reach 20 feet in thickness.

The Ocala Group, an Eocene deposit, is actually three limestone formations of similar character. From youngest to oldest, these are the Crystal River, Williston, and Inglis Formations. These limestones are so similar that they were recently lumped together as the Ocala Limestone (Florida Geological Survey 1991) The limestones of the Ocala Group vary from a loose, porous, cream to white colored coquina composed of large foraminifera and shells to a brown, solution-riddled, echinoid-rich limestone. The deposit ranges in thickness from 100 to 200 feet thick.

Avon Park Limestone consists of alternate layers of dark brown dolomite and chalky limestone, both of which may contain chert and gypsum. This formation varies from 170 to 270 feet in thickness. The Avon Park Limestone may also be combined with the Lake City Limestone and referred to as the Avon Park Formation (Florida Geological Survey 1991).

The Lake City Limestone, another Eocene formation, is composed of alternate layers of dark brown dolomite and chalky limestone, both of which may contain chert and gypsum. Gypsum and anhydrite may occur at the base of the formation. The Lake City Limestone reaches 500 feet in thickness.

The last formation of Eocene Age is the Oldsmar Limestone, also known as the Oldsmar Formation (Florida Geological Survey 1991). While the top half of the formation is a very porous, brown limestone with some gypsum and anhydrite, the bottom half is a thick zone of dolomite with chert or anhydrite. Oldsmar Limestone ranges between 250 and 350 feet in thickness.

Soils

Four soil types occur within Troy Spring State Park according to the Draft Soil Survey for

Lafayette County (see Soils Map). These include Penney sand, zero to 5 percent slope; Blanton - Ortega complex, 0 to 5 percent slope; Fluvaquents, frequently flooded; and Garcon - Albany - Meadowbrook complex, 0 to 5 percent slope, occasionally flooded. See Addendum 3 for complete descriptions of these soils.

Most of the soils within the park are relatively stable and soil erosion is minimal; however, portions of the shoreline along the spring run are suffering from significant erosion. The most severe erosion is occurring on the northern shore, where motorboats and canoes land and launch. Information obtained from long-term residents of the area indicates that about 10-15 feet of shoreline has been lost in this location over the last 10-15 years.

One of the main factors contributing to the erosion problem is a dramatic increase in motorboat, jet ski, and houseboat traffic. On weekends and holidays there are often 40-50 motor boats, canoes, and jet-skis in the spring and spring-run at one time. Motorized vessels produce significant wake, and operators of motorboats and jet-skis typically beach their craft on the shore with much more force than do canoeists. The need to stabilize the shorelines, prevent further erosion, better manage visitor use patterns, and install appropriate facilities will be addressed during development of the park. Management activities will follow generally accepted best management practices to prevent additional soil erosion and conserve soil and water resources on site.

Minerals

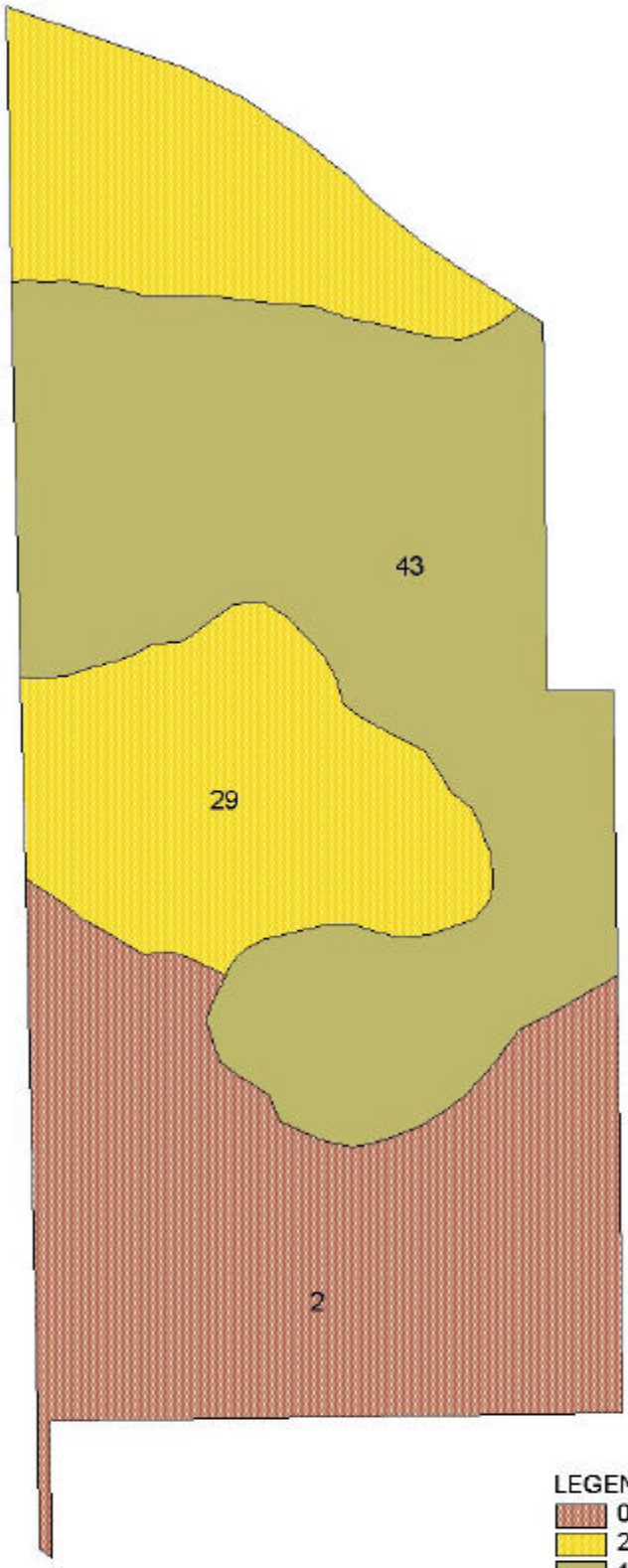
Though no mining activities are known to have occurred in the park, limestone is extracted in the surrounding region for road base material. Whether mineral deposits of commercial value exist in the park is unknown.

Hydrology

Troy Spring State Park is within the Lower Suwannee River basin. The basin drains some 10,000 square miles in Florida and Georgia. An average of 7,100 million gallons of water per day (mgd) is ultimately discharged by the river into the Gulf of Mexico.

Regionally, the Floridan aquifer is near the surface and is unconfined (Florida Geological Survey 1991). Therefore springs and seeps discharge into the river and augment its flow. During flood stage, however, the cycle may be reversed and the springs may act as insurgence points.

Currently, much of the lower basin of the Suwannee River is relegated to silvicultural or agricultural land uses, though weekend and retirement home sites are increasing in numbers within the river corridor. Since the Floridan aquifer is regionally unconfined, there is cause for concern; the aquifer can easily be polluted by runoff or by



LEGEND

- 02-Penney sand, 0 to 5 percent slope
- 29-Fluvaquents, frequently flooded
- 43-Garcon-Albany-Meadowbrook complex, 0 to 5 percent, occasionally flooded

N

300 0 300 600 Feet

Prepared By:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning
Date: September 23, 1999 - RE
Printed: March 1, 2000-RE
Approved By:

TROY SPRING
STATE PARK

SOILS MAP

malfunctioning septic or sewage systems.

The Suwannee River, however, recently received a considerable amount of public attention, which in turn resulted in legislative action to protect and preserve its character. It is now designated Outstanding Florida Water; to complement an earlier recognition of the system as Class III waters.

Troy Spring is located between river miles 82 and 83 of the Suwannee River. The SRWMD has calculated the following flood elevations for this section of the river for 2, 10, and 100-year events. All data are expressed as feet above mean sea level (m.s.l.).

	Event		
	2-year	10-year	100-year
River Mile 82	26’	35’	40’
River Mile 83	27’	36’	40’

The quality and clarity of water discharging from the spring system appears to be in decline. The SRWMD currently collects water samples from the spring and measures discharge during the summer months. Data from 1997 indicate nitrate-nitrogen levels ranging from 2.42 to 2.72 mg/L. Water quality is rated as “poor” under the SRWMD rating system (Hornsby and Mattson 1997). The FDEP 1996 Water Quality Assessment For The State Of Florida, Section 305(b), Northeast Florida District Technical Appendix (Hand et al, 1996) indicates that the water quality of the spring is “poor” and does not meet standards for Class III waters. Although general water quality analysis parameters are measured, fecal coliform counts are not included. It should be noted that the “poor” rating by FDEP was due solely to total dissolved nitrate/nitrite exceeding standards in 1992. Additional water quality testing will be necessary to track future changes and to determine the sources of the elevated nitrogen levels.

Anecdotal evidence indicates that the quality and clarity of water discharged from Troy Spring in the past was usually very high. The water was typically so clear that one could easily see from the surface of the spring to the bottom, a depth of nearly 70 feet (Ferguson et al. 1947). At present, however, park staff reports that the water usually appears to be a “pea green”color and visibility is very low. The 1996 Water Quality Assessment report indicates a Secchi disc visibility reading of only 4.3 feet in 1992 (Hand et al. 1996). Samples analyzed by the University of Florida in 1997 indicate that the majority of the total solids were non-volatile. The turbidity may be due to the

presence of clay silt particulates in emissions from the spring vents, possibly the result of subterranean collapses in conduits feeding the spring (French 1997).
Sources of the apparent decline in water quality may include dairy operations and row crop agriculture in the area, local limerock mining, and a lowered water table. Water quality appears to be declining in many springs of the lower and middle Suwannee River. The FDEP Ambient Monitoring Section of the Division of Water Facilities has a VISA (Very Intense Study Area) located upstream of Troy Spring in north central Lafayette County. This area encompasses 28 square miles and groundwater samples are taken from 19 wells and 7 springs. Data analyzed from 1990 through 1997 indicate that nitrate levels in the groundwater within the VISA are elevated above background levels elsewhere in the state (Maddox et al. 1998). If groundwater quality continues to decline, many of the values for which Troy Spring was acquired will be seriously compromised. The high clarity of the water, the size and depth of the spring boil, and the presence of the submerged wreck of a Confederate steamboat (the C.S.S. *Madison*) once made the site a very popular diving/snorkeling destination; lately this recreational activity has declined significantly due to the reduced visibility.

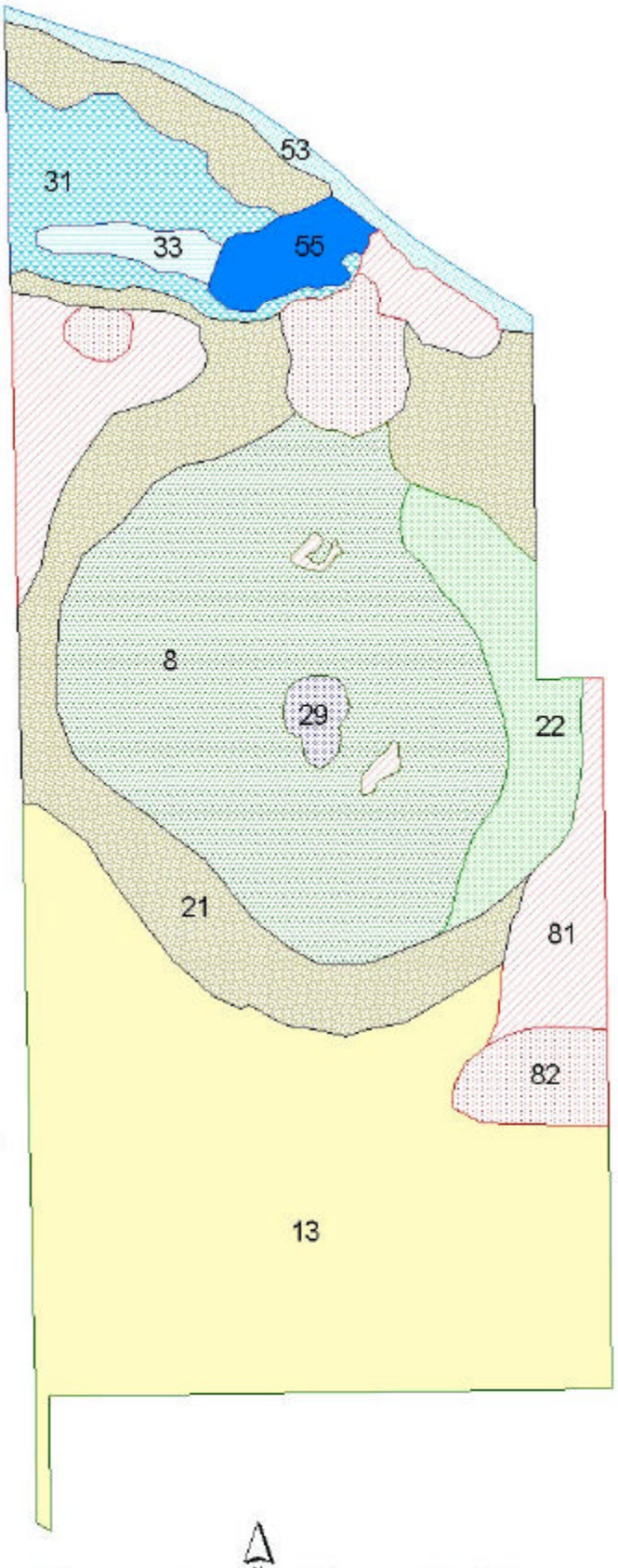
Discharge measurements for Troy Spring collected between 1942 and 1973 and listed in Rosenau et al. (1977) ranged from 148 to 205 cfs (cubic feet per second) with an average of 166 cfs. Flow measurements by the SRWMD in 1997 ranged from 93.45 cfs in June to 141.63 cfs in September (Hornsby and Mattson 1997).

The dredged ponds located near the center of the property in the mesic flatwoods may be affecting groundwater levels in the immediate vicinity. Several natural depressions occur near the ponds; these depressions were connected by ditches to the ponds, presumably when the ponds were dredged. The ditches may also be affecting the hydroperiod of the depressions.

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 ten distinct natural communities (nine mapped; one unmapped) in addition to ruderal and developed areas (see Natural Communities Map). The acreage



Natural communities shp
- 08-Mesic flatwoods, 19.51 acres
- 13-Sandhill, 27.47 acres
- 21-Upland mixed forest, 14.06 acres
- 22-Upland pine forest, 3.98 acres
- 29-Depression marsh, 0.52 acres
- 31-Floodplain forest, 4.05 acres
- 33-Floodplain swamp, 0.76 acres
- 53-Blackwater stream, 1.38 acres
- 55-Spring-run stream, 1.34 acres
- 81-Ruderal, 6.74 acres
- 82-Developed, 3.78 acres

300 0 N 300 600 Feet

Prepared By:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning
Date: September 23, 1999 - AE
Plotted: March 1, 2000-EJB
Approved By:

TROY SPRING
STATE PARK

NATURAL COMMUNITIES MAP

for each natural community is reflected on the Natural Communities Map. Park specific assessments of the existing natural communities are provided. FNAI descriptions of these natural communities are contained in Addendum 4. A list of plants and animals occurring in the park is contained in Addendum 5.

Mesic flatwoods. A low area best classified as mesic flatwoods, lies near the center of the park. The area has been logged in the past (probably several times) and has suffered from fire exclusion. At least one small depressional wetland occurs within these flatwoods. Fire-type, herbaceous ground cover components are infrequent to absent throughout this area. The mesic flatwoods are in generally poor condition, mainly due to past land use practices. The area would likely benefit greatly from prescribed burning.

Sandhill. The higher elevations within the park are largely ruderal or highly disturbed sandhill. The sandhill areas have been impacted by various disturbances including logging, ground cover conversion to bahiagrass, and long-term fire exclusion. No areas were observed having a ground cover in fair condition or better. A significant portion of the sandhill community has been converted to bahiagrass pasture. A portion of the southeast corner of this pasture has been planted in slash pine. Longleaf pines are occasional in this plantation; they may be volunteers.

The sandhills in the park are in poor condition. Although prescribed fire will be introduced, restoration of this area is a long-term goal and not immediately a high priority due to the limited extent of sandhill in the park. A significant tract of good to excellent quality sandhill occurs adjacent to the east boundary of the park; this property, the O'Brien Tract, is included in the CARL Project for the park. If portions of these sandhills were acquired, the ecological value of the Troy Spring sandhill would increase greatly since the O'Brien Tract would connect the park with several hundred acres of good to excellent quality sandhill currently owned by the SRWMD.

Upland mixed forest. Some upland portions of the park, covering 14.06 acres, are best classified as upland mixed forest. Mixed pines and hardwoods occur along the southern edge of the floodplain forest and on the slopes above the spring. These areas of upland mixed forest may not have existed under a "natural" fire-maintained landscape; rather they may be the result of upland pine forest undergoing succession due to fire exclusion. The most significant area classified as upland mixed forest occurs in a band on the natural levee along the Suwannee River. Mixed forests found on the river levees of the Suwannee and Santa Fe Rivers do not fit well into the FNAI system of natural areas classification (FNAI, 1990), and they may deserve a distinct classification, but at present they most closely fit the FNAI definition for upland mixed forest. This area within the park is considered to be in excellent condition.

Upland pine forest. Some areas, particularly along ecotones between sandhills and more mesic communities, probably once supported upland pine forest. A very few mockernut hickories and sand post oaks were noted along the eastern margin of the area classified as mesic flatwoods. In general, few upland pine remnant species occur here and native ground cover species are rare to absent. This area may improve with the introduction of prescribed fire, but it is currently in poor condition due to past disturbances and to fire suppression.

Depression marsh. A small depression marsh covering is located near the center of the property within the mesic flatwoods. This marsh has been partially ditched and drained in the past and is now only in fair condition. A ditch leads from one side of the depression marsh to a dredged pond nearby. The altered hydroperiod of the depression marsh and the long period of fire exclusion may have greatly changed the plant species composition in this community.

Floodplain forest. This community is located in the northwest part of the property and is in excellent condition. It supports a high diversity of tree species, most notably cedar elm. It has suffered little disturbance other than logging in the distant past.

Floodplain swamp. A very limited area of floodplain swamp is found within the park adjacent to the spring. This area has been described as a slough. The swamp drains into the spring from the west and lies between the floodplain forest and the uplands to the south. Some cedar elms also occur within this area.

Blackwater stream. The Suwannee River forms the north boundary of the park. Additional information about the Suwannee River can be found in the *Hydrology* section above. At the present time there is limited shoreline erosion occurring along the shoreline of the river.

Spring-run stream. Troy Spring consists of multiple spring vents and a spring-run about 200’ long. The main spring is about 70’ by 50’ and is 68’ feet deep during normal water levels.

In the recent past Troy Spring has shown high levels of turbidity and has lacked the clarity normally associated with karst springs. The high turbidity may be due to subterranean collapses or perhaps even contamination of the aquifer. The only water quality parameter of known concern at this spring is the nitrate level, but nitrate levels are elevated in many of the springs along this section of the Suwannee River. Both the FDEP and SRWMD are monitoring water quality in the area. Additional water quality information is included in the *Hydrology* section.

Troy Spring has been under DRP management for less than two years. During that period, reduced water clarity has prevented adequate documentation of the biotic composition of the spring run natural community.

Aquatic cave. The aquatic cave natural community (unmapped) at Troy Spring State Park is of unknown extent and condition since passageways cannot accommodate human intrusion. It is likely that the cave system is extensive, however. The water quality issues previously discussed for the spring-run stream also pertain to the aquatic cave system. At least one troglobite species, the pallid cave crayfish, is known to occur within the aquatic cave.

Ruderal. Several areas are currently listed as ruderal at Troy Spring State Park. Ruderal areas are located to the east and southwest of the spring in the northern part of the property, as well as along the eastern boundary. The ruderal area to the east, along the banks of the Suwannee River, may have at one time been bottomland forest, judging from elevations and remnant tree species. Much of the ground cover has been replaced with turf grass and nearly the entire understory has been removed. The other ruderal areas are associated with developed areas and roads in the uplands. These areas are currently dominated by turf and pasture grasses, although they were probably sandhill or upland pine forest at one time.

Several ponds were once dredged within the mesic flatwoods. In some cases these ponds are surrounded by spoil piles. Additional research is needed to determine the extent of impact of the dredging on the surrounding mesic flatwoods natural community.

Developed. Developed areas include a log home, frame building and a wooden barn.

Designated Species

Designated species are those which 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 6 contains a list of the designated species and their designated status for this park. Management measures will be addressed later in this plan.

The only designated plant species currently known to occur within the park is cedar elm (*Ulmus crassifolia*). The Florida occurrences of cedar elm are disjunct from the present main range of this species, namely the Mississippi River Valley (in Texas, Arkansas, Louisiana, and Mississippi).

Two designated animal species are recorded in the FNAI database, the pallid cave crayfish and the Suwannee cooter. The status of the crayfish is unknown. The declining

water quality could impact that species.

At least one active gopher tortoise burrow was noted within the park. An eastern indigo snake was also observed within the park. Judging from the extent and quality of the sandhill adjacent to the park, Sherman's fox squirrels probably also visit the unit. Given the location of the park and its associated resources, Suwannee bass and several wading birds are also probable visitors.

Special Natural Features

The primary natural features of Troy Spring State Park include the spring itself and the adjacent Suwannee River. The park was acquired as part of the Florida First Magnitude Springs, Phase II, CARL project in order to protect Troy Spring.

Cultural Resources

The three cultural sites located on the property (see Cultural Resources Map) include two prehistoric archaeological sites and one underwater historic shipwreck. Prior to the CARL Archaeological Survey investigations of 1996 (Wheeler and Newman 1996), the only site recorded at Troy Spring State Park had been the underwater site (8LF5). The upland areas had never been systematically surveyed for the presence of cultural resources.

As a result of the CARL investigations, two additional sites, 8LF55 and 8LF56, were identified. Artifacts recovered during testing included lithics, prehistoric pottery and some bone. As a whole, the ceramic assemblage represents the early Indian Pond culture that was contemporaneous with the Weeden Island period. 8LF55 is located along the southern boundary of the spring and extends to and likely beyond the western boundary of the park. The majority of the lithics and pottery recovered during the CARL survey were found within the boundaries of this site. 8LF56 is located along the entrance road in the southwest part of the park.

Site 8LF5 includes the remains of the Confederate steamship *Madison,* which was built around 1854 or 1855 for Captain James M. Tucker. The *Madison* served as a general store on the Suwannee River during the 1850s. Captain Tucker also operated a mail line between Ellaville and Cedar Key using the vessel. The steamer served as an ad hoc "warship" in the Confederate navy in 1861, when it was used to investigate and eventually take control of four vessels transporting supplies to the Union naval base in Key West. Afterwards, the ship was scuttled under the orders of James M. Tucker (the owner) when he and his troops (Company H, 8th Florida Infantry) went to fight in Virginia (Barker-Benfield 1995, cited in Wheeler and Newman 1996). Due to salvaging efforts over the years, all that remains of the *Madison* is the hull (Wheeler and Newman 1996).

The *Madison* is a highly significant resource requiring particularly sensitive management. The location of the wreck along and across much of the spring run may conflict with the recreational use of the spring. Regularly occurring impacts from recreational use include scarring by motorboat propellers during low water, use of the wreck as an anchor site for motorboats, and disturbance by divers and snorkelers.

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 and if the lead agency determines that timber management is not in conflict with the primary management objectives of the land.

A timber management analysis was not conducted for Troy Spring State Park. The total acreage for the park falls below the 1,000 acres threshold established by Florida Statutes.

Additional Management Considerations

A significant effort has been made under the P2000 program to acquire conservation lands along the Suwannee River and its tributaries. Much of the 10-year floodplain of the river is technically undevelopable, so even privately owned lands in the floodplain should continue to function somewhat as natural connectors between tracts of public conservation land along the river. On one level, much of the wildlife presently utilizing Troy Spring State Park (including river otters and bobcats) will probably continue to do so for the near future. On the other level, however, as has been noted elsewhere, if the park is not successful in acquiring an upland connection to other lands in the Troy Spring WMA, the long-term persistence of species dependent on open pineland (e.g., gopher tortoises, pocket gophers, fox squirrels) is doubtful.

The Optimum Boundary for this unit should include the remaining lands within the CARL project boundary as well as a parcel configured so as to encompass all of a floodplain forest depression (and upland buffer) that drains into the spring from the west.

Management Needs and Problems

Natural Resources

Troy Spring State Park is a relatively small property that was purchased primarily for protection and preservation of the first magnitude spring that occurs on the site. Troy

Spring State Park is but one of many properties purchased within the Suwannee River corridor under recent land buying initiatives by the State of Florida, however. The park should always be considered in the context of the surrounding state lands and should not be managed as an isolated entity.

One of the primary natural resource deficiencies at the park is the lack of quality upland natural communities. Restoration of degraded uplands in a park that is focused on aquatic resources only makes sense in the context of providing upland linkages between nearby state lands. For this reason, the restoration of the sandhills, upland pine forest, and mesic flatwoods at Troy Spring State Park will benefit a much larger area than just the few acres that lie within the park boundary.

Unfortunately the potential linkages between Troy Spring State Park and the other regional conservation lands managed by other agencies are privately owned. Some of these lands are included within the CARL project boundary but are yet to be acquired. Others were not identified during the CARL process, yet they harbor valuable natural areas. Over the long-term, the natural resources at Troy Spring State Park would greatly benefit from preservation of the lands that form these gaps in state ownership.

Troy Spring State Park will likely be developed with recreational facilities centered on the river and springs. The natural areas of the park, particularly aquatic resources, could be vulnerable to overuse or abuse unless park development proceeds carefully and sensitively.

Cultural Resources

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

The following cultural resource condition assessments for Troy Spring State Park are taken from Johnson and Warzeski (1997).

- **The *Madison* and Troy Spring 1.** The resources of 8LF5 (the *Madison*) and 8LF55 (Troy Spring 1) are generally in poor condition due to the vulnerability of the sites

to disturbance in an area of heavy recreational use. Of greatest concern is a gradual worsening in the condition of the *Madison* due to steady visitor traffic over the past two decades. The poor rating of the *Madison* reflects the various threats to its long-term stability. Commercial dive boats currently access the site from the Suwannee River and recreational swimmers access the spring both by boat and by land. It is likely that resources will degrade further if these activities are allowed to continue in the present manner.

¨ **Troy Spring 2.** The resources of 8LF56 (Troy Spring 2) are generally in good condition due to their isolation from the public use area.

¨ **Seaboard Coast Line Caboose.** There is a Seaboard Coast Line caboose on the property adjacent to the residence. It has been altered internally and utilized as a residence. Because of the loss of its original context and the amount of alteration, detailed recordation and assessment of the structure is of limited value. It is recommended, however, that park staff completes a Historic Structure form and obtains a FMSF number.

Management Objectives

The resources administered by the Division of Recreation and Parks 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 prior to the ecological disruptions caused by man. The objective for managing cultural resources is to protect these resources from human-related and natural threats. This will arrest deterioration and help preserve the cultural resources for future generations to enjoy.

Natural Resources

1. Restore disturbed natural communities within the park.

The restoration of the mesic flatwoods, sandhills and upland pine forest at Troy Spring State Park will begin with prescribed burning. Replanting of native longleaf pines from local seed sources will also be a part of future restoration plans. A longer-range objective will be the replanting of absent ground cover species.

Hydrological disturbances of the mesic flatwoods and depression marsh may be mitigated by blocking or filling ditches that are altering natural hydroperiods. The spring run will be evaluated to determine its current condition as a natural community. Unnecessary roads should be abandoned; it may be appropriate to modify some for use as trails or firebreaks.

2. Pursue acquisition of remaining CARL parcels and other Optimum Boundary parcels.

Long-term survival of the native animal and plant species at the park would be better assured through acquisition of connector properties that would link Troy Spring State Park to other state lands along the Suwannee River. Acquisition of the high quality sandhill area to the southeast of the park should be a high priority since the only sandhill of the park is currently of very poor quality.

The floodplain "slough" located west of the springs on private property should be acquired, along with an upland buffer. Although it is unlikely that development would occur in the floodplain area, private development on the adjacent uplands could degrade the quality of water in the floodplain below. Since the slough is directly connected to Troy Spring, contamination of the springs from offsite surface water runoff is a possibility. The cedar elm, a designated species, also occurs within the floodplain area west of the park boundary.

3. Protect natural values of the state park during development of facilities.

Care must be taken during the development of Troy Spring State Park to locate public and service facilities sensitively in order to reduce impacts on the spring area. Septic systems must be designed and located to prevent contamination of subterranean conduits within the Floridan aquifer. Self-contained composting toilets should be considered as an alternative to conventional septic systems.

Development within the uplands should be sited in previously developed or ruderal areas to minimize effects on natural areas.

Cultural Resources

1. Identify, document, and catalog the cultural resources of the park.

The location of the *Madison* within the spring run should be accurately mapped. Periodic monitoring of the condition of the *Madison* is recommended as a complement to a research project that has already begun studying the remains of the ship.

Additional archaeological survey (Level 1) should be considered to supplement the work already completed by the CARL Archaeological Survey team (Wheeler and Newman 1996).

2. Protect the cultural resources of the park from deterioration caused by natural or human forces.

Motorized vessels should be prohibited from passing over or anchoring on the *Madison.* Such a prohibition would help eliminate prop-scarring and other damage to the remains. Swimmers and divers should be prohibited from standing on or touching the remains of the *Madison*.

The archaeological site in the uplands adjacent to the spring should be protected from erosion and from damage due to visitor use. In areas with steep slopes, foot traffic should be restricted to stabilized walkways. Public access to the springs should be via boardwalks and platforms strategically positioned to prevent damage to cultural resources located adjacent to the spring.

Future facilities development within the park will be reviewed for possible impacts on cultural resources. A request for comment will be submitted to the Division of Historical Resources to determine if impacts on cultural resources are expected during park development.

3. Provide public interpretation of the cultural resources of the park.

Interpretive signage should be installed explaining the importance of proper management of submerged archaeological resources such as the *Madison*. Cultural resources in general should be interpreted in their context to educate visitors about Florida's earlier inhabitants.

Management Measures for Natural Resources

Hydrology

Management will comply with best management practices to maintain or improve the existing water quality on site and will take measures to prevent soil erosion and other impacts on water resources. DRP district and park staffs will work closely with the FDEP Northeast District and the SRWMD to continue the monitoring of Troy Spring and the adjacent Suwannee River. The primary hydrological concerns at Troy Spring are the quality and quantity of the spring water. In cooperation with the SRWMD, the DRP should continue to document the apparent decline in water quality at the springs. In particular, the increase in nitrogen levels should be investigated. In future sampling efforts, consideration should also be given to monitoring fecal coliform levels. Turbidity measurements and photographs should be taken on a periodic basis to track changes in water clarity. Discharge measurements should be continued by the SRWMD. DRP district staff will establish photopoints and vegetation transects to facilitate periodic evaluation of the condition of the spring run natural community.

An additional hydrological concern is bank erosion along the spring and spring run; this erosion is mainly caused by boat wakes and the beaching of boats. Foot traffic from swimmers entering and exiting the spring adds to the erosion problem. There is a concurrent degradation of water quality. Stabilized boardwalks or platforms should be constructed at appropriate locations to provide the public with swimming access to the spring. Boat traffic should be excluded from the spring run and spring for public safety reasons and to reduce water quality impacts. Appropriate mooring locations should be provided outside the spring run to allow boaters reasonable access to the park without impacting the spring system.

The dredged ponds located within the mesic flatwoods should be investigated to determine if they are affecting the water table in the vicinity. Ditches that convey surface waters in the flatwoods should be studied to determine if their effects are harmful enough that blocking or filling of the ditches would be warranted. Additional research is needed before the fate of the dredged ponds can be decided. While restoration of the natural contours of the ponds is an option, the restoration should not unacceptably impact the mesic flatwoods.

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 unit is partitioned into burn zones, and burn programs are implemented for each zone. These programs are periodically reviewed and maintained in the unit's burn plan. All prescribed burns are conducted under permit from the Department of Agriculture and Consumer Services, Division of Forestry (DOF).

The park will be divided into burn zones that use existing boundaries and roads as fire breaks wherever possible. At this time, designation of individual burn zones awaits completion of additional assessments of existing firebreaks and fuel loads. To retain the open character of the landscape, it is likely that not only sandhill but also upland pastures and ruderal areas will be burned. Burning of the mesic flatwoods will be more problematic due to the heavier fuel loads that have accumulated partly the result of past logging operations.

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 which aggravate the particular problems of a species.

Cedar elm is the only plant species known to occur in the unit that is rare statewide. Only 14 occurrences are recorded in the FNAI database. The species occurs in the

floodplain forest of the park and will likely require no active management measures. Some individuals also occur in the privately owned floodplain forest that extends beyond the western boundary of the park.

The use of prescribed fire in the management of the limited upland areas of the park should benefit sandhill-adapted species such as the gopher tortoise. Without protection and proper management of the adjacent, privately owned sandhill, however, it is doubtful that a gopher tortoise population can be sustained within the park for an appreciable length of time. Both the gopher tortoise and the Suwannee cooter will also require protection from poaching since both species have a history of being harvested for human consumption.

Exotic Species Control

Exotic species are those plants or animals that are not native to Florida, but were introduced as a result 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 impact non-resistant native species. Thus, the policy of the Division is to remove exotic species from native natural communities.

Exotic species invasions are not presently a significant problem in the park. Most infestations are small and can be easily treated using appropriate mechanical and chemical controls. Several camphor trees are established on the spoil piles of the dredged ponds within the mesic flatwoods. Other invasive exotic plants include mimosa, tung tree, Japanese climbing fern and Japanese honeysuckle. The Japanese climbing fern has already been removed manually, but periodic inspections will be required to ensure complete eradication. Feral hogs and armadillos occur on the unit and will removed by staff whenever possible.

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. Management must devise measures that balance designated species protection with problem species control.

No problem species are known to occur within Troy Spring State Park.

Management Measures for Cultural Resources

The management of cultural resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. Approval from Department of State, Division of Historical Resources (DHR) must be obtained before taking any actions, such as development or site improvements, that could affect or disturb the cultural resources on state lands. A statement of DHR's policies and procedures for the management and protection of cultural resources is contained in Addendum 7.

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

Identification of existing cultural resources will help determine management measures for the tract. Additional archaeological investigation must be scheduled prior to any park development at the site. Unfortunately the headspring, which is the area of highest visitor use and greatest development, is also potentially one of the more significant archaeological areas in the park. Any additional development around the headspring should avoid soil disturbance, especially in areas that have not been previously developed or disturbed. Likewise, the planning and implementation of activities designed to enhance recreation, resource management, interpretation, or protection in the park must consider the need to preserve cultural resources as well.

In order to protect the sunken steamship *Madison* adequately, motorized vessels should be prohibited from entering the spring run. Swimmers and divers should be prohibited from standing on or handling the remains of the wreck. Interpretive signage should be installed which explains the importance of proper management of submerged archaeological resources.

Files pertaining to recorded cultural resources will be established and maintained at the park. Information pertaining to the resource such as photographs, yearly condition assessments and FMSF will be contained in these files. Such files will become a permanent resource management file and will not be scheduled for disposal. Inspection of each identified cultural resource will be conducted by management on a yearly basis to monitor changes or activities that may have impacted the resource. If a Crisis and Miscellaneous Incident report is completed for an event occurring at a recorded cultural resource site, a copy of the report should be placed in the appropriate park resource file. Updates on recorded cultural resources should be forwarded to the Florida Master Site File on a regular basis.

Management will encourage proposals for survey or other fieldwork from qualified archaeologists by referring the project to the State Archaeologist. If survey or other research is approved, management will cooperate with researchers. Managers will inform researchers that copies of reports and completed Florida Master Site File forms must be turned in to the park and district. Any research activities pertaining to archaeological resources require permission of the State Archaeologist, and any activities conducted without a permit or that clearly go outside the scope of the permit are subject to citation and legal action.

Research Needs

Natural Resources

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

1. Water quality monitoring should be conducted on a periodic basis by either the FDEP or the SRWMD. Parameters measured should include fecal-coliform levels and turbidity, as well as discharge.

2. Additional surveys are needed to document occurrences of plants and animals within the park, both to develop more complete species lists and to record additional designated species.

Cultural Resources

1. Additional research on the history and current condition of the *Madison* is needed for proper interpretation and management of the resource.

2. A proposal for a Level 1 archaeological survey needs to be drafted.

Resource Management Schedule

A priority schedule for conducting all management activities which is based on the purposes for which these lands were acquired, and to enhance the resource values, is contained in Addendum 8. The cost estimates for conducting these priority Management activities are based on the most cost-effective methods and recommendations that is currently available (see Addendum 8).

Land Management Review

Troy Spring State Park has not been the subject of a land management review, pursuant to Florida Statutes.

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 park's natural and cultural resources, 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's 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 park's resource base. 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, adjacent land uses and the park's interaction with other facilities.

Existing Use of Adjacent Lands

The land uses surrounding Troy Spring State Park include low density residential, silvicultural and agricultural uses. To the north, the park is defined by the Suwannee River, which is heavily used for recreational boating, fishing and personal watercraft. In the area surrounding Troy Spring State Park, weekend and retirement home development is increasing. The SRWMD owns several non-contiguous properties that are collectively referred to as Troy Springs Conservation Area.

Planned Use of Adjacent Lands

Development on the land uses adjacent to Troy Spring State Park is generally planned to remain at the current use level, and it is anticipated that any private upland not included in future state or local government acquisitions will be developed for residential use. At

this point, the primary effects of adjacent land uses on the park derive from the heavy, and essentially unregulated, recreational uses of the river for boating, fishing, jet skiing, canoeing and kayaking. Boats and personal watercraft enter the spring-run from the river.

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.

Troy Spring is named for the approximately 70 foot deep spring, located up a short run from the Suwannee River. This first magnitude spring is the focal point for the park's recreational activities that have traditionally included swimming and boating. The forested upland landscapes of Troy Spring State Park are typical of the Suwannee River floodplain, and show evidence of continual human intervention. The upland natural communities of this park include mesic flatwoods, sandhill, upland mixed forest, and upland pine forest. The wetland communities include floodplain swamp, floodplain forest, depression marsh, blackwater stream, spring-run stream and aquatic caves. The park includes approximately half a mile of Suwannee River shoreline, and almost 900 feet of spring-run shoreline. These features combined with the surrounding publicly owned and managed lands provide a broad array of recreational and educational opportunities for the park's visitors.

Gulf sturgeon, gopher tortoises, aquatic turtles, Eastern indigo, Suwannee bass, Suwannee cooter and cedar elms are among the most significant listed plant and animal species that can be found at Troy Spring State Park. All listed species will be protected under established Division management policies, and visitor impacts carefully monitored to identify potential impacts.

Troy Spring is the most significant natural feature in the park, and is also its primary visual resource. It is a first magnitude spring, and discharges a relatively large volume of water. Water levels and discharges fluctuate dramatically depending on precipitation,

groundwater tables and floods. The spring has a funnel shaped vent, surrounded by a steep bowl, with a 5 - 10 foot relief. Recreational activity, mainly swimming, is centered on the spring, as there is no authorized public upland access to the site. Portions of the spring-run shoreline are experiencing significant erosion due to motorboat and canoe landings and launchings. Foot traffic has also contributed to the erosion around the spring.

Troy Spring has the potential to contain many important historical and archeological sites because of the first magnitude spring, the proximity of numerous springs on adjacent parcels, its boundary with the Suwannee River, and the presumed nearby location of two historic settlements, Old Troy and New Troy. As noted in the *Cultural Resource* section, relatively little is known about the cultural resources of this park, and it has not been the subject of a comprehensive cultural resources survey. According to the Florida Master Site File there are two upland pre-historic sites, that represent the early Indian Pond culture, and one underwater historic site, the submerged remains of the steamship *The Madison.*

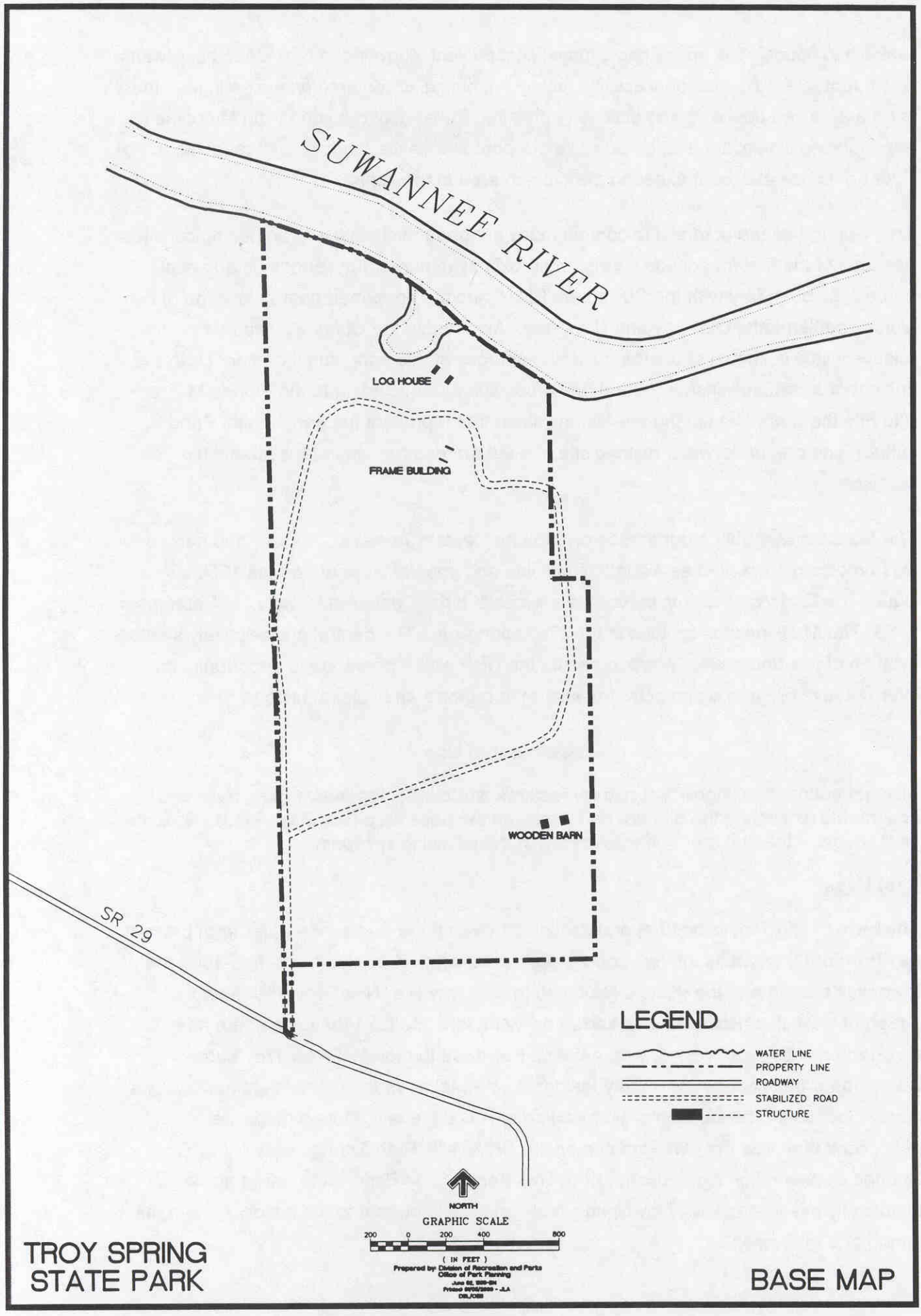
The Madison was built around 1854 or 1855 for Captain James M. Tucker, and named for his hometown. It served as a floating mail line and general store during the 1850's. During the Civil War the ship served as a warship in the Confederate navy. In September 1863, *The Madison* was scuttled in the Troy spring-run. The central and relatively shallow location of this underwater wreck presents the DRP with a tremendous opportunity for interpretative programs and activities about the region's and cultural history.

Assessment of Use

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

Past Uses

The town of Old Troy located approximately 8 miles up the Suwannee River from present day Branford, served as the first county seat for Lafayette County. In the mid-1800 the town was burned and the settlers relocated to a nearby site, New Troy. For a short period of time, this new town was known as McIntosh. By 1871 the town name had reverted back to New Troy. On New Year's Eve 1892 the town of New Troy burned. Shortly after this occurrence county residents voted to move the county seat to Mayo, its current location. The location of both settlements is uncertain, though there are indications that New Troy was located on the SRWMD's Ruth Springs tract in the Troy Springs Conservation Area, upstream of Troy Spring State Park. Both towns are historically associated with Troy Spring itself, and are important to the history of both the



TROY SPRING STATE PARK

BASE MAP

spring and the region.

In 1995, the DEP purchased the property from the Sheriffs Boys Ranch, to be managed by the Office of Greenways and Trails. Management was transferred to the DRP in 1997.

Recreational Uses

Traditional recreational uses focused on the spring and included swimming, boating, snorkeling and scuba diving. In recent years, the decline in water clarity and visibility have restricted both snorkeling and scuba diving activities.

Other Uses

Hazel B. Kirby has a 20-foot wide legal access easement to her property through this park.

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 Troy Spring State Park, the sandhill, floodplain forest, floodplain swamp, depression marsh, spring-run stream, blackwater stream, and aquatic cave natural communities have been designated as protected zones (see the Natural Communities Map).

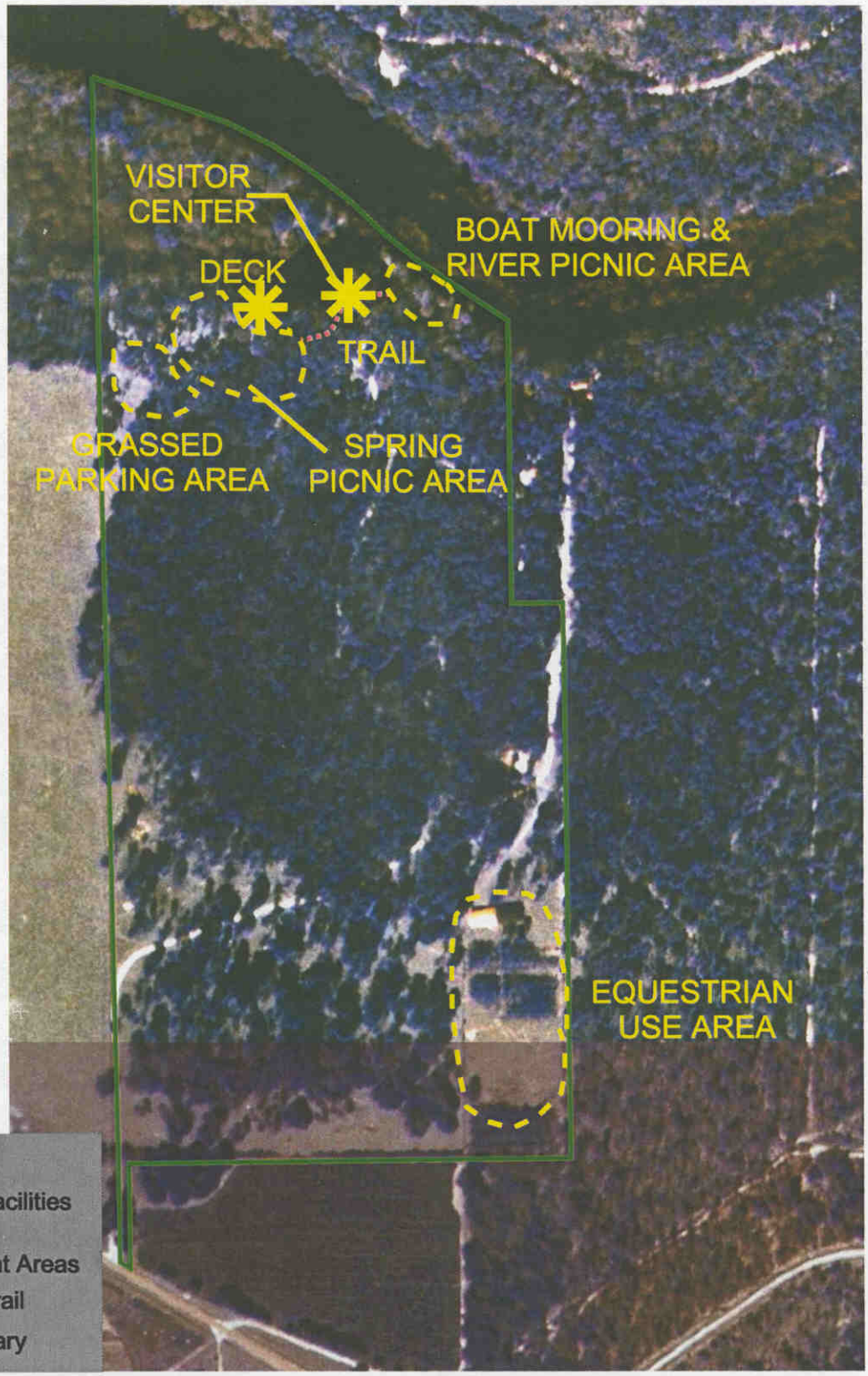
Existing Facilities

The following is a list of the existing facilities at Troy Spring State Park:

Log building / residence /office
Woodframe building / storage shed
Train caboose
Woodshed
Outhouse
Bathhouse
Horse barn
Service roads (1.5 mi.)

CONCEPTUAL LAND USE PLAN

The following narrative represents the current conceptual land use proposal for this park. As new information is provided regarding the park's environment, 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



TROY SPRING STATE PARK

Prepared By:
Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning
Date: September 23, 1999 - AE
Printed: January 05, 2000 - JLA
DSL/OES

CONCEPTUAL LAND USE PLAN

based on this conceptual land use plan, as funding becomes available.During the development of the unit management plan, the Division assesses potential impacts of proposed uses on the resources of the property. Uses that could result in unacceptable impacts are not included in the conceptual land use plan. Potential impacts are more thoroughly identified and assessed through the site planning process once funding is available for the development project. At that stage, design elements, such as sewage disposal and stormwater management, and design constraints, such as designated species or cultural site locations, are move thoroughly investigated. Facilities are designed and constructed using best management practices to avoid impacts and to mitigate those that cannot be avoided. 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. After new facilities are constructed, the park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses and Proposed Facilities

DRP staff has approached planning for Troy Spring State Park within the context of a regional, public land framework, as provided by the DRP's Troy Spring State Park unit, and the SRWMD's Owens, Adams, Walker and Ruth Springs tracts. These public properties represent a linear section of the Suwannee River corridor, one that has the potential for numerous recreational and educational activities. In this context, the SRWMD and the DRP are proposing single- and shared-use trails, nature trails, picnicking, swimming, camping, canoeing, natural and cultural resource interpretation, and environmental education activities and facilities.

At Troy Spring State Park, the DRP is proposing picnicking, swimming, equestrian facilities, and interpretative activities and facilities.

Spring swimming and picnic area. The traditional use of the Troy Spring area is swimming and picnicking. This plan proposes providing picnicking and parking areas to the spring's southwest. This will allow the DRP to create a suitable picnicking facility, and reduce some of the erosion and run-off problems currently plaguing the spring. Several medium picnic shelters, scattered picnic tables and grills will be located in this area. Access to the swimming area, from the spring slope, should be from a deck located at the spring bowl's southern edge, adjacent to the slough.

A stabilized, grassed parking area, for up to 20 vehicles, should be established to the picnic area's west. The amount of land currently available limits the size of this parking area. When the adjacent land parcel is acquired, the parking area should be relocated to that parcel and paved. When this occurs, the Spring Picnic Area can be expanded to accommodate additional use. The existing bathhouse structure should be replaced with a

new one, and an overlook/small deck re-established below the log building / administrative office.

Boating. Traditionally, boaters have accessed the spring by mooring their boats to the spring slope. To avoid increased impacts to the slopes, spring-run and *The Madison*, this plan recommends barring boating access from the spring, while providing mooring facilities, for up to 15 boats, along the Suwannee River. Where the spring empties into the Suwannee River, the DEP's Division of Law Enforcement has established an idle speed zone. This plan also proposes the establishment of an idle-speed no-wake zone along the park's boundaries on the Suwannee River. The DRP will continue to work with the boating community on the development of use guidelines, and public notification and education at boating access points along the Suwannee River. On-site notification and enforcement efforts will be important components in managing this recreational activity.

Canoeing and kayaking. For the purpose of viewing *The Madison*, canoers and kayakers will be able to continue to use the area between the roped-off swimming area and the spring mouth. In order to access the spring swimming area, canoers and kayakers will be able to disembark at the proposed mooring facility, and walk to the swimming area.

River picnic area. With the establishment of the mooring facilities noted above, there would be a demand for nearby picnicking facilities. This plan, therefore, proposes providing picnicking facilities along the riverbank. Scattered picnic tables and grills will be located in this shaded area, and a boardwalk or other universally accessible trail will provide access to the spring swimming area.

The development of mooring and picnicking facilities in this periodically flooded location takes into account the fact that during these events, the proposed facilities will not be available for public use.

Equestrian trailhead and camping area. The central location of Troy Spring State Park in the regional, public land context makes locating the equestrian facilities in this vicinity appropriate. The existence of a horse barn in the park also provides an excellent opportunity for the development of an equestrian overnight facility. The amount of land currently available, however, limits the possibility of a full-scale camping area or trailhead. To encourage recreational use, temporary facilities will be developed on the 3 acres to the east of the existing service road. When the adjacent land parcel is acquired, the equestrian camping area will be expanded, and a separate equestrian day-use trailhead will be developed.

Visitor center. The potential for environmental education about this region's natural and

cultural history, as well as park specific environmental stewardship issues is tremendous. For this purpose, it is recommended that the existing log structure be adapted into a visitor center. This facility will provide the park with a central resource for interpretive and environmental education programs, and serve as an administrative office. The park's interpretive programs should also utilize the train caboose.

In addition to the visitor center, interpretive exhibits are recommended at locations throughout the park to inform the public regarding the park's natural and cultural resource management activities. Unsupervised public access to the known cultural sites in the park is not recommended, however, educational and interpretive tours by qualified staff and volunteers should be important components of the park's programs.

Trails. The development of Troy Spring State Park within the context of a public lands framework presents an opportunity for expanding the trail potential available to park visitors. Within the park boundaries, there are no trails, though visitors may use the existing service roads and SRWMD trail easements to access the other public lands. When the adjacent contiguous land parcels are acquired, non-vehicular trail connections will be developed between Troy Spring State Park and the adjacent SRWMD lands.

Support Facilities. Currently, public access to Troy Spring State Park is from County Road 246. Barring other possible entrance options at this time, the plan recommends the installation of a tollbooth, and continued use of the boundary service road as the park road. This service road will require stabilization in several locations. When additional lands are acquired, a paved entrance road linking both Troy Spring and the Ruth Springs tract should be established.

The existing woodframe building, currently in use as a shop / storage shed, requires some renovation to continue this function.

The following is a summary of facilities needed to implement the conceptual land use plan for Troy Spring State Park:

Recreational Facilities

Spring Swimming and Picnic Area
Medium picnic shelters (4)
Swimming area deck
Small deck (admin. bldg.)
Interpretive signs

River Picnic Area and Mooring Facility
Scattered picnic tables & grilles
Boardwalk (325 ft.)
Interpretive signs

Equestrian Trailhead / Camping Area
Primitive camping area (10 sites)

Visitor Center
Adapt log structure into visitor center /administrative office
Interpretive signs

Support Facilities

Spring Swimming and Picnic Area
Bathhouse
Grassed parking (20 vehicles)

River Picnic Area and Mooring Facility
Mooring facility (up to 15 boats)

Equestrian Trailhead / Camping Area
Stabilized parking area (10 trailers / rigs)

Tollbooth
Renovate woodframe shop structure
Stabilize service roads

Facilities Development

A list of proposed facilities to provide for enhanced recreational opportunities is provided in Addendum 8. The cost estimates for the proposed facilities are based on the most cost effective construction standards available.

Existing Use and Optimum Carrying Capacity

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

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

Optimum Boundary

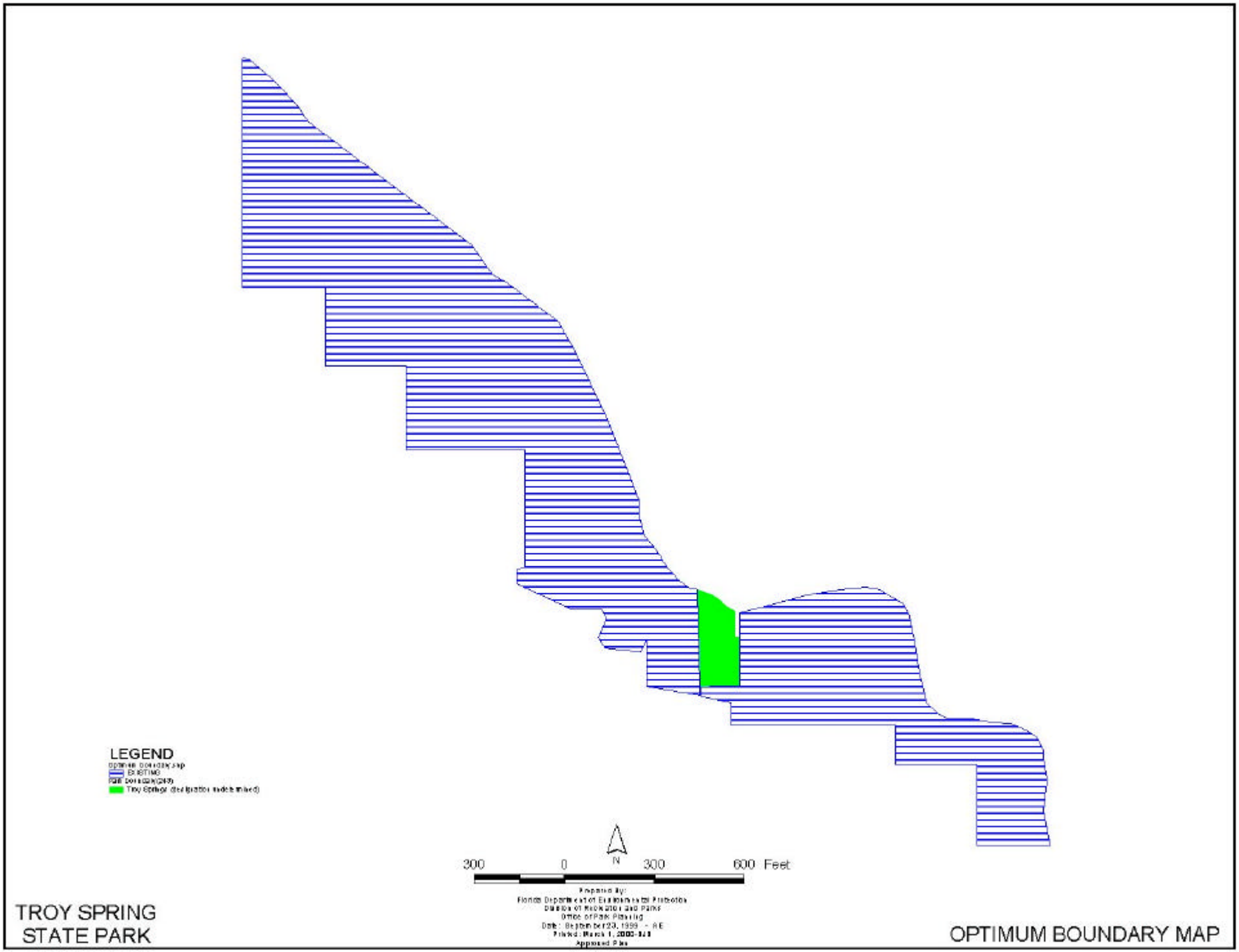
As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency. At this time,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

The optimum boundary for this park includes ten separate parcels, four of which are currently managed by the SRWMD. Acquisition of these lands will enhance the park's boundaries for resource management purposes, and will allow for increased public recreational use (see Optimum Boundary Map).

TABLE 1

Existing Use and Optimum Carrying Capacity

Activity/Facility	Existing Capacity One Time	Existing Capacity Daily	Proposed Additional Capacity One Time	Proposed Additional Capacity Daily	Estimated Optimum Capacity One Time	Estimated Optimum Capacity Daily
Spring Swimming and Picnic Area	70	140			70	140
Mooring Facility/ River Picnic Area	60	120			60	120
Canoers in Spring	8	32			8	32
Overnight Equestrian	15	15			15	15
TOTALS	**153**	**307**			**153**	**307**


LEGEND
300
0
N
300
600 Feet
TROY SPRING
STATE PARK
OPTIMUM BOUNDARY MAP

ADDENDUM 1

ACQUISITION HISTORY

AND

LEASE AGREEMENT NUMBER 4143

TROY SPRING STATE PARK

ACQUISITION HISTORY

Sequence of Acquisition

On June 12, 1995, the Board of Trustees of the Internal Improvement Trust Fund (Trustees) obtained title to an 83.59-acre property which later became Troy Spring State Park. The property was purchased under P2000/CARL program. Since this initial acquisition, the Trustees have not acquired any land to add to Troy Spring State Park. Hence, the present area of Troy Spring State Park is 83.59 acres.

Initially the Trustees leased Troy Spring State Park to the Department of Environmental Protection, Office of Greenways and Trails (OGT) under Lease No. 4094. However, OGT surrendered and released this leasehold interest to the property on February 27, 1997. Subsequently, on March 10, 1997, the Trustees conveyed management authority of Troy Spring State Park to the Department of Environmental Protection, Division of Recreation and Parks (DRP), under lease No. 4143.

Title Interest

The Trustees hold fee simple title to Troy Spring State Park, and DRP manages the property under lease No. 4143 for a period of fifty (50) years. The lease will expire on March 9, 2047.

Special Conditions on Use

In accordance the lease from the Trustees, the DRP shall manage the leased premises only for the conservation and protection of natural and historical resources and resource based public outdoor recreation which is compatible with the conservation and protection of these public lands, along with other related uses necessary for the accomplishment of this purpose as designated in the Management Plan as required by paragraph 7 of the lease.

A copy of the Trustees Lease Agreement # 4143 is available upon request.

Outstanding Reservations

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

INSTRUMENT:	Easement
INSTRUMENT HOLDER:	NA.
BEGINNING DATE:	NA
ENDING DATE:	NA.
OUTSTANDING RIGHTS, USES, ETC.:	This is a 20-foot wide- ingress-egress easement to parcel 1829-c, recorded in O.R. Book 82, PAGE 698 of Lafayette County, a political subdivision of the State of Florida.

ADDENDUM 2

REFERENCES CITED

Barker-Benfield, Simon. 1995. A wellspring of Civil War nautical history. *The Florida Times-Union*, Jacksonville, FL, Sept. 17, 1995.

Crane, J.J. 1986. An Investigation of the Geology, Hydrogeology, and Hydrochemistry of the Lower Suwannee River Basin, Report of Investigation No. 96, Bureau of Geology, Division of Resource Management, Florida Department of Natural Resources, Tallahassee. 205 pp.

Ferguson, G.E., C.W. Lingham, S.K. Love and R.O. Vernon. 1947. Springs of Florida. Florida Geological Survey, Geological Bulletin No. 31. 198pp.

Florida Geological Survey. 1991. Florida's Ground Water Quality Monitoring Program, Hydrogeological Framework, edited by T.M. Scott, J.M. Lloyd, and G.L. Maddox. 97 pp.

Florida Natural Areas Inventory and the Florida Department of Natural Resources, 1990. Guide to the Natural Communities of Florida. Tallahassee, FL. 111 pp.

French, B.T. 1997. University of Florida, Dept. of Agric. and Biol. Eng. Letter to Ron Preston, Ichetucknee Springs State Park.

Hand, J., J. Col and L. Lord. 1996. 1996 Water Quality Assessment for the State of Florida Technical Appendix Northeast Florida. Bureau of Surface Water Management, Florida Department of Environmental Protection, 95 pp.

Hornsby, D. and R. Mattson. 1997. Surfacewater Quality and Biological Monitoring Annual Report 1997. Suwannee River Water Management District. 122 pp. + appendix.

Johnson, E., and J.M. Warzeski. 1997. Draft Resource Management Audit, Troy Springs. FDEP, Division of Recreation and Parks. 13pp.

Maddox, G.L., C. Cosper, and P. Craig. 1998. Agricultural land use and groundwater quality in the Lafayette County, Florida Very Intense Study Area (VISA). Ambient Newsletter. 2(1) 1-5.

NRCS. *No date.* Draft Soil Survey of Lafayette County. U.S.D.A., Natural Resource Conservation Service.

Rosenau, J.C., G.L. Faulkner, C.W. Hendry, Jr., and R.W. Hull. 1977. Springs of Florida. Florida Bureau of Geology, Bulletin No. 31 (Revised). 461 pp.

Wheeler, R.J., and C.L. Newman. 1996. An assessment of cultural resources at the Troy Springs Conservation and Recreation Area. Bureau of Archaeological Research, C.A.R.L. Archaeological Survey.

ADDENDUM 3

SOIL DESCRIPTIONS

2.) Penney sand, 0 to 5 percent slope - This nearly level and gently sloping, excessively drained soil is on broad ridges and on isolated knolls. The mapped areas range from about 3 to 120 acres. Slopes are smooth or convex. Typically, the surface layer is dark gray fine sand about 5 inches thick. The subsurface layer extends to a depth of about 80 inches. The upper part is light yellowish brown and very pale brown fine sand. The lower part, which has been mixed with the subsoil, is very pale brown fine sand that has thin lamellae of strong brown loamy fine sand. Permeability of this soil is rapid.

The available water capacity is very low and low. The seasonal high water table is below a depth of 72 inches. The soil is low in natural fertility.

The natural vegetation consists of longleaf pine, live oak, and turkey oak. The most common grasses are chalky bluestem, lopsided indiangrass, hairy panicum, creeping bluestem, slender bluestem, and pineland threeawn.

4.) Blanton - Ortega complex, 0 to 5 percent slope - This unit consists of nearly level to gently sloping, moderately well-drained soils underlain by limestone bedrock and excessively drained soils on upland ridges. These soils have a well aerated root zone that is limited by a seasonal high water table in wet season and droughtiness during periods of low rainfall. The available water capacity averages low to moderate in the root zone. Natural fertility is moderate.

In normal years, these soils have a seasonal high water table at a depth of 48 to 72 inches for 1 to 4 months. In other months, the water table is below these depths.

29.) Fluvaquents, frequently flooded - This map unit consists of nearly level, very poorly drained soils that occur on flood plains. They have thick black or very dark gray surface layers. The subsoil is sandy to loamy and extends to depths of more than 60 inches. Permeability is moderately slow in the loamy layer, and moderately rapid in the sandy layer. These soils are subject to frequent flooding.

In normal years, these soils have a seasonal high water table within 6 inches of the surface for 2 to 6 months. During other months, the water table is deeper.

43.) Garcon - Albany - Meadowbrook complex, 0 to 5 percent, occasionally flooded - This map unit consists of nearly level and gently sloping, somewhat poorly drained soils on terraces and poorly drained soils in depressions along the river. They have rapidly permeable sandy layers to depths of 20 to 60 inches over moderately to moderately rapid permeable subsoil. These soils are occasionally flooded.

In normal years, these soils have a seasonal high water table at a depth of 18 to 40 inches for 1 to 4 months. In other months, the water table is below these depths. The available water capacity is low in the root zone. Natural fertility is low.

ADDENDUM 4

NATURAL COMMUNITY DESCRIPTIONS

(8) MESIC FLATWOODS - (synonyms: pine flatwoods, pine savannahs pine barrens). Mesic Flatwoods are characterized as an open canopy forest of widely spaced pine trees with little or no understory but a dense ground cover of herbs and shrubs. Several variations of Mesic Flatwoods are recognized, the most common associations being longleaf pine - wiregrass - runner oak and slash pine - gallberry - saw palmetto. Other typical plants include: St. Johns-wort, dwarf huckleberry, fetterbush, dwarf wax myrtle, stagger bush, blueberry, gopher apple, tar flower, bog buttons, blackroot, false foxglove, white-topped aster, yellow-eyed grass, and cutthroat grass. Typical animals of Mesic Flatwoods include: oak toad, little grass frog, narrowmouth toad, black racer, red rat snake, southeastern kestrel, brown-headed nuthatch, pine warbler, Bachman's sparrow, cotton rat, cotton mouse, black bear, raccoon, gray fox, bobcat, and white-tailed deer.

Mesic Flatwoods occur on relatively flat, moderately to poorly drained terrain. The soils typically consist of 1-3 feet of acidic sands generally overlying an organic hardpan or clayey subsoil. The hardpan substantially reduces the percolation of water below and above its surface. During the rainy seasons, water frequently stands on the hardpan's surface and briefly inundates much of the flatwoods; while during the drier seasons, ground water is unobtainable for many plants whose roots fail to penetrate the hardpan. Thus, many plants are under the stress of water saturation during the wet seasons and under the stress of dehydration during the dry seasons.

Another important physical factor in Mesic Flatwoods is fire, which probably occurred every 1 to 8 years during pre-Columbian times. Nearly all plants and animals inhabiting this community are adapted to periodic fires; several species depend on fire for their continued existence. Without relatively frequent fires, Mesic Flatwoods succeed into hardwood-dominated forests whose closed canopy can essentially eliminate the ground cover herbs and shrubs. Additionally, the dense layer of litter that accumulates on unburned sites can eliminate the reproduction of pine which require a mineral soil substrate for proper germination. Thus, the integrity of the Mesic Flatwoods community is dependent on periodic fires. However, fires that are too frequent or too hot would eliminate pine recruitment and eventually transform Mesic Flatwoods into Dry Prairie.

Mesic Flatwoods are closely associated with and often grade into Wet Flatwoods, Dry Prairie, or Scrubby Flatwoods. The differences between these communities are generally related to minor topographic changes. Wet Flatwoods occupy the lower wetter areas, while Scrubby Flatwoods occupy the higher drier areas.

Mesic Flatwoods are the most widespread biological community in Florida, occupying an estimated 30 to 50% of the state's uplands. However, very few undisturbed areas of Mesic Flatwoods exist because of habitat mismanagement and silvicultural, agricultural, or residential development. Mesic Flatwoods are often fairly resilient, and with proper management they can generally be restored.

(13) SANDHILL - (synonyms: longleaf pine - turkey oak, longleaf pine - xerophytic oak, longleaf pine - deciduous oak, high pine). Sandhills are characterized as a forest of widely spaced pine trees with a sparse understory of deciduous oaks and a fairly dense ground cover of grasses and herbs on rolling hills of sand. The most typical associations are dominated by longleaf pine, turkey oak, and wiregrass. Other typical plants include

bluejack oak, sand post oak, sparkleberry, persimmon, winged sumac, pinewoods dropseed, Indian grass, wild buckwheat, queen's delight, yellow foxglove, bracken fern, runner oak, goats rue, partridge pea, milk pea, dollarweeds, wild indigo, gopher apple, and golden-aster. Typical animals include tiger salamander, barking treefrog, spadefoot toad, gopher frog, gopher tortoise, worm lizard, fence lizard, mole skink, indigo snake, coachwhip snake, pine snake, short-tailed snake, crowned snake, eastern diamondback rattlesnake, bobwhite, ground dove, red-headed woodpecker, rufous-sided towhee, fox squirrel and pocket gopher.

Sandhills occur on hilltops and slopes of gently rolling hills. Their soils are composed of deep, marine-deposited, yellowish sands that are well-drained and relatively sterile. The easily leached soil nutrients are brought back to the surface by the burrowing habits of some sandhill animals. Sandhills are important aquifer recharge areas because the porous sands allow water to move rapidly through with little runoff and minimal evaporation. The deep sandy soils help create a xeric environment that is accentuated by the scattered overstory, which allows more sunlight to penetrate and warm the ground. The absence of a closed canopy also allows Sandhills to cool more rapidly at night and to retain less air moisture. Thus, temperature and humidity fluctuations are generally greater in Sandhills than in nearby closed canopy forests.

Fire is a dominant factor in the ecology of this community. Sandhills are a fire climax community, being dependent on frequent ground fires to reduce hardwood competition and to perpetuate pines and grasses. The natural fire frequency appears to be every 2 to 5 years. Without frequent fires, Sandhills may eventually succeed to Xeric Hammock. Unburned or cutover Sandhills may be dominated by turkey oak.

Sandhills are often associated with and grade into Scrub, Scrubby Flatwoods, Mesic Flatwoods, Upland Pine Forest, or Xeric Hammock. Sandhills were widespread throughout the Coastal Plain, but most have been degraded by timbering, overgrazing, plowing, fire exclusion, and other disturbances. Much of Florida's Sandhill communities have been converted to citrus groves, pastures, pine plantations, or residential and commercial developments. Thus, the importance of properly managing the remaining tracts is accentuated.

(20/21) UPLAND HARDWOOD FOREST AND UPLAND MIXED FOREST - (synonyms: mesic hammock, climax hardwoods, upland hardwoods, beech-magnolia climax, oakmagnolia climax, pine-oak-hickory association, southern mixed hardwoods, clay hills hammocks, Piedmont forest). Upland Hardwoood Forests and Upland Mixed Forests are characterized as well-developed, closed-canopy forests of upland hardwoods on rolling hills. These communities have quite similar physical environments and share many species, including southern magnolia, pignut hickory, sweetgum, Florida maple, devil's walking stick, American hornbeam, redbud, flowering dogwood, Carolina holly, American holly, eastern hophornbeam, spruce pine, loblolly pine, live oak, and swamp chestnut oak, among others. The primary difference between these communities is that Upland Mixed Forests generally lack shortleaf pine, American beech and other more northern species that typically occur in Upland Hardwood Forests. This is predominantly a result of minor climatic differences, Upland Hardwood Forests being most common in Northern panhandle Florida, and Upland Mixed Forests being most common in northern and

central peninsula Florida. Other typical plants include gum bumelia, hackberry, persimmon, red cedar, red mulberry, wild olive, redbay, laurel cherry, black cherry, bluff oak, water oak, cabbage palm, basswood, winged elm, Florida elm, sparkleberry, Hercules' club, slippery elm, beautyberry, partridgeberry, sarsaparilla vine, greenbrier, trilliums, beech drops, passion flower, bedstraw, strawberry bush, silverbell, caric sedges, fringe tree, horse sugar, white oak, and blackgum. Typical animals include slimy salamander, Cope's gray treefrog, bronze frog, box turtle, eastern glass lizard, green anole, broadhead skink, ground skink, red-bellied snake, gray rat snake, rough green snake, coral snake, woodcock, barred owl, pileated woodpecker, shrews, eastern mole, gray squirrel, wood rat, cotton mouse, gray fox, and white-tailed deer.

Upland Hardwood and Mixed Forests occur on rolling hills that often have limestone or phosphatic rock near the surface and occasionally as outcrops. Soils are generally sandy-clays or clayey sands with substantial organic and often calcareous components. The topography and clayey soils increase surface water runoff, although this is counterbalanced by the moisture retention properties of clays and by the often thick layer of leaf mulch which helps conserve soil moisture and create decidedly mesic conditions. Furthermore, the canopy is densely closed, except during winter in areas where deciduous trees predominate. Thus, air movement and light penetration are generally low, making the humidity high and relatively constant. Because of these conditions Upland Hardwood and Mixed Forests rarely burn.

Upland Hardwood Forests and Upland Mixed Forests are climax communities for their respective geographic locations. They are often associated with and grade into Upland Pine Forest, Slope Forest or Xeric Hammock. Occasionally, Upland Mixed Forests may also grade into Maritime Hammock or Prairie Hammock. During early stages of succession, Upland Hardwood and Mixed Forest may be difficult to distinguish from Upland Pine Forests that have not been burned for several years. Disturbed sites may require hundreds of years to reach full development with species compositions representative of climax conditions.

Silvicultural, agricultural, industrial, and residential developments have already eliminated the vast bulk of these communities. These activities are continuing at an accelerated pace in many areas, such that the few remnant mature examples are in urgent need of protection and proper management.

(22) UPLAND PINE FOREST - (synonyms: longleaf pine upland forest, loblolly-shortleaf upland forest, clay hills, high pineland). Upland Pine Forest is characterized as a rolling forest of widely spaced pines with few understory shrubs and a dense ground cover of grasses and herbs. Pristine areas are dominated by longleaf pine and wiregrass, while areas that suffered agricultural disturbances are dominated generally by shortleaf and loblolly pines and old field grasses and herbs. Other typical plants include southern red oak, runner oak, bluejack oak, black jack oak, post oak, sassafras, black cherry, gallberry, persimmon, mockernut hickory, twinflower, huckleberry, dangleberry, goldenrod, Indian grass, partridge pea, goats rue, winged sumac, blueberry, dog fennel, snakeroot, golden-aster, yellow jessamine, broomsedge, asters, pencil flower, bracken fern, greenbrier, fox grape, flowering dogwood, sweetgum, and blackgum. Typical animals include gopher tortoise, eastern fence lizard, eastern diamondback rattlesnake,

bobwhite, red-bellied woodpecker, fox squirrel, cotton rat, cotton mouse, gray fox, bobcat, and white-tailed deer.

Upland Pine Forest occurs on the rolling hills of extreme northern Florida. The soils are composed of sand with variable, sometimes substantial, amounts of Miocene clays. The resultant prevalence of clays helps retain soil moisture, creating more mesic conditions than originally would have occurred. Thus, many plants which previously were restricted to valleys and other low areas may now inhabit the Upland Pine Forests.

Fire is a dominant factor in the ecology of this community because it reduces hardwood encroachment and facilitates pine and wiregrass reproduction. Without relatively frequent fires, Upland Pine Forest succeeds to Upland Mixed Forest and eventually to Upland Hardwood Forest. The natural fire frequency appears to be every 3 to 5 years. More frequent fires would likely eliminate pine recruitment, especially when loblolly and shortleaf pines are dominant species.

Upland Pine Forest is a fire climax community that is associated with and often grades into Upland Mixed Forest or Upland Hardwood Forest. Gradations between these communities are frequently so subtle that distinctions are usually arbitrary. Upland Pine Forest is often confused with Sandhill. The primary differences between them reside in their soil characteristics and some species of plants and animals.

Upland Pine Forests have been substantially degraded throughout their range. The sandy clay soils were prime agricultural lands for plantations as well as for American Indians. Thus, the longleaf pines were logged, the soil was turned, and the wiregrass disappeared. Only isolated tracts of the original longleaf pine-wiregrass association remain, the bulk being replaced by loblolly-shortleaf pine associations. Much of the latter has further succeeded to Upland Mixed or Hardwood Forest because of fire exclusion. The restoration of Upland Pine Forest to its original condition is impeded by the current inability to propagate wiregrass where it has been extirpated.

(29) DEPRESSION MARSH - (synonyms: isolated wetland, flatwoods pond, St. John's wort pond, pineland depression, ephemeral pond, seasonal marsh). Depression Marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. Depression Marshes are similar in vegetation and physical features to, but are generally smaller than, Basin Marshes. Typical plants include St. John's wort, spikerush, yellow-eyed grass, chain fern, willows, maidencane, wax myrtle, swamp primrose, bloodroot, buttonbush, fire flag, pickerelweed, arrowheads, and bladderwort.

Larger and more permanent Depression Marshes may have many of the same plants and animals listed as typical of Basin Marshes. However, because of their isolation and small size, many Depression Marshes support a very different assemblage of species than that found in larger, more permanent wetlands. Depression Marshes are considered extremely important in providing breeding or foraging habitat for such species as the flatwoods salamander, mole salamander, tiger salamander, dwarf salamander, striped newt, oak toad, cricket frog, pinewoods treefrog, barking treefrog, squirrel treefrog, little grass frog, southern chorus frog, ornate chorus frog, narrowmouth toad,

eastern spadefoot toad, gopher frog, white ibis, wood stork and sandhill crane. Depression Marshes occurring as isolated wetlands within larger upland ecosystems are of critical importance to many additional wetland and upland animals.

Depression Marshes are typical of karst regions where sand has slumped around or over a sinkhole and thereby created a conical depression subsequently filled by direct rain fall, runoff, or seepage from surrounding uplands. The substrate is usually acid sand with deepening peat toward the center. Some depressions may have developed or be maintained by a subsurface hardpan. Hydrological conditions vary, with most Depression Marshes drying in most years. Hydroperiods range widely from as few as 50 days or less to more than 200 days per year.

Fire is important to maintaining this community type by restricting invasion of shrubs and trees and the formation of peat. Fire frequency is often greatest around the periphery of the marsh and least toward the center. A severe peat fire can lower the ground surface and create a pond at the center of the marsh.

Depression Marshes are often associated with and grade into Wet Prairie, Seepage Slope, Wet Flatwoods, Mesic Flatwoods, Dome Swamp or Bog. They also may occur in association with various types of lakes, such as Sandhill Lake or Flatwoods Lake.

Depression Marshes are threatened by drainage, agriculture, pollution, fire suppression, and invasion of exotic species. Depression Marshes may be filled and converted to other uses. A regional lowering of the water table as a result of overuse may eliminate many Depression Marshes. Depression Marshes on some public lands have been deepened by explosives to allow for stocking with game fish. By preying upon the eggs and larvae of frogs and salamanders, these fish may eliminate the amphibians that depend on such seasonal wetlands for successful reproduction. Likewise, many species of invertebrates not adapted to predation by fishes may be eliminated.

(31) FLOODPLAIN FOREST - (synonyms: bottomland hardwoods, seasonally flooded basins or flats, oak-gum-cypress, elm-ash-cottonwood, second bottom, levee forest, river terrace, river ridge). Floodplain Forests are hardwood forests that occur on drier soils at slight elevations within floodplains, such as on levees, ridges and terraces, and are usually flooded for a portion of the growing season. Floodplain Forests are largely restricted to the alluvial rivers of the panhandle. The dominant trees are generally mixed mesophytic hardwoods, such as overcup oak, water hickory, diamond-leaf oak and swamp chestnut oak. The understory may be open and parklike or dense and nearly impenetrable. Other typical plants include bluestem palmetto, willow oak, green ash, Florida elm, sweetgum, hackberry, water oak, American hornbeam, tulip poplar, coastal plain willow, black willow, eastern cottonwood, swamp cottonwood, river birch, red ample, silver maple, box elder, American sycamore, catalpa, sweetbay magnolia, hawthorn, swamp azalea, pink azalea, gulf sebastiana, lanceleaf greenbrier, poison ivy, peppervine, rattanvine, indigo bush, white grass, plume grass, redtop panicum, caric sedges, silverbells, crossvine, American wisteria and wood grass.

Floodplain Forests harbor a diverse array of animals including both temporary residents and permanent residents. Typical animals include marbled salamander, mole

salamander, two-toed amphiuma, Alabama waterdog, Southern dusky salamander, two-lined salamander, three-lined salamander, dwarf salamander, slimy salamander, rusty mud salamander, sirens, southern toad, cricket frog, bird-voiced treefrog, gray treefrog, bullfrog, river frog, Southern leopard frog, alligator, river cooter, stinkpot, Southeastern five-lined skink, broadhead skink, mud snake, rainbow snake, redbelly watersnake, brown water snake, glossy crayfish snake, black swamp snake, cottonmouth, yellow-crowned night-heron, wood duck, Mississippi kite, swallowtail kite, red-shouldered hawk, woodcock, barred owl, chimney swift, hairy woodpecker, pileated woodpecker, Acadian flycatcher, Carolina wren, veery, white-eyed vireo, red-eyed vireo, parula warbler, prothonotary warbler, Swainson's warbler, hooded warbler, cardinal, towhee, opossum, southeastern shrew, short-tailed shrew, beaver, wood rats, rice rats, cotton mouse, golden mouse, bear, and raccoon.

Soils of Floodplain Forests are variable mixtures of sand, organics, and alluvials, which are often distinctly layered. Hydroperiod is the primary physical feature of Floodplain Forests, which are inundated by flood waters nearly every year for 2 to 50% of the growing season. The organic material accumulating on the floodplain forest floor is picked up during floods and redistributed in the flood plain or is washed downriver to provide a critical source of minerals and nutrients for downstream ecosystems, in particular estuarine systems. These floods also replenish soil minerals through deposition on the floodplain. Floodplain Forests usually do not have standing water in the dry season.

Floodplain Forests are often associated with and grade into Floodplain Swamp, Bottomland Forest, Baygall, or Slope Forest. The species composition is frequently similar to that of Hydric Hammock and Bottomland Forest communities.

The maintenance of natural hydrologic regimes is critical to the health of Floodplain Forests and to the downstream systems with which they are connected. Species composition and the functional relationships throughout a river system are negatively impacted by hydrological alterations such as artificial impoundments, river diversion projects, pesticide use, forest clearcutting, or intensive agriculture.

(33) FLOODPLAIN SWAMP - (synonyms: river swamp, bottomland hardwoods, seasonally flooded basins of flats, oak-gum-cypress, cypress-tupelo, slough, oxbow, back swamp). Floodplain Swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains. Dominant trees are usually buttressed hydrophytic trees such as cypress and tupelo; the understory and ground cover are generally very sparse. Other typical plants include ogeechee tupelo, water tupelo, swamp titi, wax myrtle, dahoon holly, myrtle-leaved holly, large galberry, possumhaw, hurrah-bush, white alder, lizard's tail, leather fern, royal fern, marsh fern, soft rush, laurel greenbrier, hazel alder, hawthorn, and swamp privet.

Floodplain Swamps harbor a diverse array of animals including both temporary and permanent residents. Typical animals include marbled salamander, mole salamander, amphiuma, Alabama waterdog, Southern dusky salamander, two-lined salamander, three-lined salamander, dwarf salamander, slimy salamander, rusty mud salamander, southern toad, cricket frog, bird-voiced treefrog, gray treefrog, bullfrog, river frog,

Southern leopard frog, alligator, river cooter, stinkpot, Southeastern five-lined skink, broadhead skink, mud snake, rainbow snake, redbelly water snake, brown water snake, glossy crayfish snake, black swamp snake, cottonmouth, yellow-crowned night-heron, wood duck, swallowtail kite, Mississippi kite, redshouldered hawk, woodcock, barred owl, chimney swift, hairy woodpecker, pileated woodpecker, Acadian flycatcher, Carolina wren, veery, white-eyed vireo, red-eyed vireo, parula warbler, prothonotary warbler, hooded warbler, Swainson's warbler, cardinal, towhee, opossum, southeastern shrew, short-tailed shrew, beaver, wood rat, rice rat, cotton mouse, golden mouse, bear, raccoon, and bobcat.

Soils of Floodplain Swamps are highly variable mixtures of sand, organic, and alluvial materials, although some sites, especially within sloughs or on smaller streams, may have considerable peat accumulation. Floodplain Swamps are flooded for most of the year, with sites along channels inundated by aerobic flowing water while those of sloughs and backswamps are flooded with anerobic water for extensive periods of time. Soils and hydroperiods determine species composition and community structure. Seasonal and often prolonged inundations restrict the growth of most shrubs and herbs, leaving most of the ground surface open or thinly mantled with leaf litter. Floods redistribute detrital accumulations to other portions of the floodplain or into the main river channel. This rich organic debris is essential to the functional integrity of downriver ecosystems such as estuaries. These swamps are usually too wet to support fire.

Floodplain Swamps are often associated with and grade into Floodplain Forest or Hydric hammock, and occasionally Baygall. The species composition of Floodplain Swamps is frequently similar to the Slough, Strand Swamp, Dome Swamp, and Basin Swamp communities.

Alteration of the hydroperiod by impoundments or river diversions and the disruption of floodplain communities by forestry or agriculture have devastating consequences to entire river and bay systems. Many plant and animal species, both onsite and down river, depend upon the presence and natural fluctuations of these swamps for survival and reproduction.

(53) BLACKWATER STREAM - (synonyms: blackwater river, blackwater creek). Blackwater Streams are characterized as perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The tea-colored waters of Blackwater Streams are laden with tannins, particulates, and dissolved organic matter and iron derived from drainage through swamps and marshes. They generally are acidic (pH = 4.0 - 6.0), but may become circumneutral or slightly alkaline during low-flow stages when influenced by alkaline groundwater. Water temperatures may fluctuate substantially and are generally correlated with seasonal flutuations in air temperature. The dark-colored water reduces light penetration and, thus, inhibits photosynthesis and the growth of submerged aquatic plants. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but their presence is often reduced because of typically steep banks and considerable seasonal flunctuations in water level. Typical plants include golden club, smartweed, sedges, and grasses. Typical animals include river longnose gar, gizzard shad, threadfin

shad, redfin pickerel, chain pickerel, ironcolor shiner, Ohooppee shiner, weed shiner, blacktail shiner, chubsucker, channel catfish, banded topminnow, pygmy killifish mosquitofish, mud sunfish, flier, everglades pygmy sunfish, banded sunfish, redbreast sunfish, dollar sunfish, stumpknocker, spoted bass, black crappie, darters, Alabama waterdog, river frog, alligator, snapping turtle, alligator snapping turtle, river cooter, Florida cooter, peninsula cooter, stinkpot, spiny softshell, red-belly watersnake, brown watersnake, beaver, and river otter.

Blackwater Streams have sandy bottoms overlain by organics and frequently underlain by limestone. Limestone outcrops may also occur. Blackwater Streams generally lack the continuous extensive floodplains and natural levees of Alluvial Streams. Instead, they typically have high, steep banks alternating with Floodplain Swamps. High banks confine water movement except during major floods. The absence of significant quantities of suspended sediments reduces their ability to construct natural levees.

Blackwater Streams are the most widely distributed and numerous Riverine systems in the southeast Coastal Plain. Very few, however, have escaped major disturbances and alteration. Clearcutting adjacent forested lands is one of the more devastating alterations for this community. Additionally, the limited buffering capacity of Blackwater Streams intensifies the detrimental impacts of agricultural and industrial effluents.

(55) SPRING-RUN STREAM - (synonyms: calcareous stream, spring, or creek). Spring-run Streams are characterized as perennial water courses which derive most, if not all, of their water from artesian openings in the underground aquifer. Waters issuing from the aquifer are generally clear, circumneutral to slightly alkaline (pH = 7.0 - 8.2), and perennially cool (66 - 75F). These conditions saturate the water with important minerals, allow light to penetrate deeply, and reduce the limiting effects of environmental fluctuations, all of which are conducive for plant growth. Thus, Spring-run Streams are among the most productive aquatic habitats. Typical plants include tape grass, wild rice, giant cutgrass, arrowheads, southern naiads, pondweeds, and chara. Typical animals include mollusks, stoneflies, mayflies, caddisflies, simuliids, chironomids, American alligator, alligator snapping turtle, Suwannee cooter, loggerhead musk turtle, rainbow snake, red-belly watersnake, brown watersnake, and many fishes.

Spring-run Streams generally have sand bottoms or exposed limestone along their central channel. Calcareous silts may form thick deposits in quiet shallow zones, while leaf drift and other debris collect around fallen trees and quiet basins. The latter, along with limestone outcrops and rock debris, form important aquatic habitats for many small aquatic organisms. When undisturbed, submerged aquatic vegetation clothes most of the spring-run stream bottom and provides shelter and an abundant food source for the extensive web of life.

The water emanating from the aquifer is generally clear because of the filtering and absorbing actions of the soils and aquifer limestones through which the water percolates and flows. When the water is deep, it may appear bluish because of light-refraction characteristics that are similar to those which cause the sky to be blue on clear days. If the water sources for the aquifer are substantially influenced by nearby swamps or flatwoods, the spring-run may temporarily become stained with tannins and other

dissolved organics during or following periods of heavy rains. When extensive underground cavities connect the spring caverns with nearby sinks and swallow holes, the spring-run may become turbid with suspended particulates during and following heavy rains and floods. Conversely during periods of low rainfall, the aquifer can become supersaturated with calcium, carbonates, and other ions. These chemicals readily precipitate when water reaches the surface, causing the spring head or boil to appear milky.

Human activities affect flow rates by withdrawing water from the aquifer through deep wells. When withdrawal is substantial within the recharge area, spring flow is reduced or, in some cases, ceases entirely. Normal flow rates may return when excessive withdrawals are eliminated.

People can also substantially affect the quality of spring waters. Agricultural, residential, and industrial pollutants may readily leach through soils, especially when they are improperly applied or disposed. If polluted groundwater infiltrates the deep aquifer feeding a Spring-run Stream, recovery may not be possible. Applications of herbicides to control aquatic plant growth are also detrimental, because their use often induces eutrophication of the stream.

Other human-related impacts to Spring-run Streams include the destruction of aquatic vegetation by overuse or misuse, and the introduction and proliferation of exotic plants and animals. Both of these impacts may be very difficult to control. Overuse is likely to increase because of the limited number of publicly-owned springs and the desires of an increasing population to enjoy their clean, cool, aesthetic qualities and unique recreational opportunities. Exotic species are often severely detrimental to native species, and they may also disrupt recreational activities. A delicate balance between recreation and preservation must be sought.

(79/80) AQUATIC AND TERRESTRIAL CAVE - (synonyms: cave, cavern grotto, chamber, chimney, sink, swallow hole, spring rise). Aquatic and Terrestrial Caves are characterized as cavities below the surface of the ground in karst areas of the state. A cave system may contain portions classified as Terrestrial Caves and portions classified as Aquatic Caves. The latter vary from shallow pools highly susceptible to disturbance, to more stable, totally submerged systems. Because all caves initially develop under aquatic conditions, Terrestrial Caves can be considered essentially dry Aquatic Caves. The limestone aquifers that underlie the entire state of Florida could be considered vast Aquatic Cave communities. Troglobites (also called phreatobites) are organisms specially evolved to survive in deep cave habitats. The occasional observation of various species of troglobites in deep water wells from several regions in the state suggests that this community could be widespread. However, the dependence of troglobites on detrital inputs and other nutrients imported from the surface generally limits the distribution of well developed Aquatic Cave communities to karst areas with surface connections.

The area around cave entrances may be densely vegetated with species from the surrounding Natural Community. Within the cave, however, illumination levels and, thereby, vegetation densities drop rapidly with increased distance from the entrance.

Within the limits of light penetration, called the twilight zone, species of algae, mosses, liverworts, and an occasional fern or herbaceous plant may grow. Beyond the twilight zone, plants are generally absent or limited to a few inconspicuous species of fungi that grow on guano or other organic debris. Thus, Subterranean Natural Communities differ from most other Natural Communities in that living plants are not dominant elements.

Animals inhabiting Subterranean Natural Communities are generally divided into three groups according to their cave adaptations: trogloxenes, troglophiles, and troglobites. Trogloxenes spend much of their time in caves, but they must periodically return to the surface to feed or breed. Woodrats, harvestmen, cave crickets, some salamanders, and many species of bats are typical examples of trogloxenes. Troglophiles may regularly live in caves, but their conspecifies also inhabit surface communities with moist microhabitats. Cave orb spiders, and some crickets, fish and salamanders are typical examples of troglophiles. Troglobites are obligatory cave dwellers with special adaptations for living in complete darkness. Blind cave crayfish, blind cave salamander, cave amphipods, cave shrimp, cave snail, and cave isopods are typical troglobites in Florida's Aquatic Caves; cave mites, some cave spiders and springtails, and a cave earwig are typical troglobites in some Terrestrial Caves in north Florida. Even though they never leave their cave environments, troglobites and troglophiles depend on outside energy sources, such as detritus that washes in through sinkholes and other cave entrances. Fecal materials derived from trogloxenes which feed outside the cave are also important nutrients for troglobites. Without these energy subsidies, the troglobitic elements could not exist.

Two geologic processes are predominantly responsible for the development of caves: phreatic and vadose. Phreatic processes occur below the aquifer's surface where ground water is confined and subjected to hydrostatic pressure. Vadose processes occur at the top or above the aquifer, where air enters the passageways and water flows freely under the influence of gravity. In both processes, the dissolution and corrosion of limestone play active roles in enlarging cave passageways. These forces differ primarily in the slopes of the passageways which result. Phreatic passageways are generally circular or elliptic, while vadose passageways are more triangular with the broad base of the triangle at the bottom. All limestone caves begin development under phreatic conditions in the aquifer. As water tables drop, vadose conditions eventually replace phreatic conditions. If the water table then rises, another reversal of processes occurs. Because water tables have fluctuated substantially with fluctuating sea levels during the Pleistocene and other geologic epochs, most caves in Florida exhibit both phreatic and vadose characteristics.

Since limestone caves initially develop in the aquifer, they are frequently associated with aquifer-related surface features. Thus, a Spring Run Stream issues from an Aquatic Cave, while Sinkhole Lakes and occasionally Blackwater Streams lead into Aquatic Caves. Similarly, Terrestrial Caves may occur at the bottoms of dry sinkholes or be associated with ancient springs, swallow holes or Aquatic Caves that have since been exposed by lower water tables. Typically, Terrestrial Caves may also exhibit aquatic conditions during periods of heavy rainfall, or vice versa during droughts. Additionally, Terrestrial Caves may harbor relatively permanent pools or lakes that are formed in natural depressions in the floor of the cave from the buildup of rimstone, or where the

aquifer inundates the lower cavities. Thus, Terrestrial and Aquatic Caves often occur together.

Cave waters are generally clear, with deep water appearing bluish. The water may become stained brown from tannins leached from decaying plant matter nearby and carried in with rainwater. The water may also become milky white if fine limestone mud from the bottom of the Aquatic Cave is suspended in the water column following disturbance. A bottom substrate of organic silts can also muddy the water with suspended particles. Waters are generally circumneutral to alkaline with a high mineral content (particularly calcium bicarbonate and magnesium) and with constant temperature. Flowing water within Aquatic Caves generally has a lower pH, is often undersaturated with respect to carbonates, and has a relatively richer fauna. Contrastingly, pools that are fed by seepage or dripping water are generally characterized by a high pH, high concentration of dissolved carbonates, low content of organic matter suitable for food, and a sparse fauna. Cave water characteristics may also vary seasonally because of fluvial inputs from interconnected surface streams, or because of detrital pulses and other surface inputs during periods of substantial aquifer recharge. In general, however, Aquifer Caves are very stable environments with relatively constant physical and chemical characteristics.

Terrestrial Caves also are very stable environments, having relatively constant temperatures and humidities. Within the cave, however, these factors may vary with location. For example, the twilight zone (nearest to the light source) is generally warmer and experiences more temperature and humidity fluctuations than does the middle zone, a dark zone that is subject to air circulation due to "cave breathing" phenomena. The deep zone, when it occurs, is the most stable zone of a Terrestrial Cave, because the air in it is essentially static. Terrestrial Cave faunas often partition their distributions according to these zones, with trogloxenes being more common in the twilight and middle zones and troglobites being more common in the deep zone.

Subterranean Natural Communities are extremely fragile. Their faunas are adapted to very stable environments and have a limited ability to survive even minor environmental perturbations. Terrestrial Caves are threatened by disturbances of spelunkers. The mere entry into a bat roosting, maternity, or hibernation cave is often sufficient to cause abandonment by bats, thereby causing a major reduction in an important energy source for the remainder of the cave ecosystem.

Alterations in or around cave entrances will often upset detrital input levels and may also induce significant changes in air circulation patterns and the cave microclimate. Aquatic Caves are threatened by pollution of ground and surface waters from agricultural, industrial, and residential sources, as well as by disturbances from divers. The unique troglobitic species generally have very low population levels and can be severely impacted by overcollection or by changes in nutrient input levels that result from surface manipulations or hydrological alterations. Thus, special precautions and management procedures must be invoked to protect these unique, fragile communities from deleterious activities.

(81/82) RUDERAL AND DEVELOPED. - Ruderal areas are characterized by having the

natural substrate or the natural community overwhelmingly altered as a result of human activity. Native vegetation is sparse and is often replaced by weedy or exotic species. These areas require a long-term restoration effort.

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

ADDENDUM 5

PLANT AND ANIMAL LIST

TROY SPRING STATE PARK

PLANTS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for designated species)
	PTERIDOPHYTES	
Japanese climbing fern	*Lygodium japonicum* *	
Resurrection fern	*Polypodium polypodioides*	
Bracken fern	*Pteridium aquilinum*	
	GYMNOSPERMS	
Southern red cedar	*Juniperus silicicola*	
Slash pine	*Pinus elliottii*	
Longleaf pine	*Pinus palustris*	
Loblolly pine	*Pinus taeda*	
Bald cypress	*Taxodium distichum*	
	ANGIOSPERMS	
MONOCOTS		
Andropogon	*Andropogon* spp.	
Bottlebrush threeawn	*Aristida spiciformis*	
Longleaf chasmanthium	*Chasmanthium sessiflorum*	
Cyperus	*Cyperus* sp.	
Sugarcane plumegrass	*Erianthus* sp.	
Bahia grass	*Paspalum notatum* *	
Dwarf palmetto	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
Saw palmetto	*Serenoa repens*	
Greenbrier	*Smilax bona-nox*	
Wild sarsaparilla	*Smilax glauca*	
Wild sarsaparilla	*Smilax pumila*	
St. Augustine grass	*Stenotaphrum secundatum* *	
DICOTS		
Red maple	*Acer rubrum*	
Mimosa	*Albizia julibrissin* *	
Tung-oil tree	*Aleurites fordii* *	
Bastard indigo	*Amorpha fruticosa*	
Pepper vine	*Ampelopsis arborea*	
Long-leafed pawpaw	*Asimina longifolia*	
Flag pawpaw	*Asimina obovata*	
Small-fruited pawpaw	*Asimina parviflora*	

*** Non-native Species**

TROY SPRING STATE PARK

PLANTS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for designated species)
White wild indigo	*Baptisia lactea*	
Groundsel bush	*Baccharis halimifolia*	
River birch	*Betula nigra*	
Cross-vine	*Bignonia capreolata*	
Bog-hemp	*Boehmeria cylindrica*	
Beautyberry	*Callicarpa americana*	
Trumpet creeper	*Campsis radicans*	
Blue-beech	*Carpinus caroliniana*	
Water hickory	*Carya aquatica*	
Pignut hickory	*Carya glabra*	
Mockernut hickory	*Carya tomentosa*	
Partridge-pea	*Cassia chamaecrista*	
Hackberry	*Celtis laevigata*	
Button bush	*Cephalanthus occidentalis*	
Mexican tea	*Chenopodium ambrosioides* *	
Fringe tree	*Chionanthus virginicus*	
Camphor-tree	*Cinnamomum camphora* *	
Leather flower	*Clematis reticulata*	
Dogwood	*Cornus florida*	
Parsley haw	*Crataegus marshallii*	
Rabbit-bells	*Crotalaria rotundifolia*	
Dicerandra	*Dicerandra densiflora*	
Persimmon	*Diospyros virginiana*	
Florida elephant's-foot	*Elephantopus elatus*	
Dog fennel	*Eupatorium compositifolium*	
Florida privet	*Forestiera acuminata*	
Pop ash	*Fraxinus caroliniana*	
Yellow jessamine	*Gelsemium sempervirens*	
Water locust	*Gleditsia aquatica*	
Rabbit's tobacco	*Gnaphalium obtusifolium*	
Scratch daisy	*Haplopappus divaricatus*	
Rock rose	*Helianthemum corymbosum*	
St. John's wort	*Hypericum hypericoides*	
Big leaf	*Hypericum tetrapetalum*	
American holly	*Ilex opaca*	
Yaupon holly	*Ilex vomitoria*	
Hairy indigo	*Indigofera hirsuta*	
Lechea	*Lechea* sp.	
Sweetgum	*Liquidambar styraciflua*	
Ludwigia	*Ludwigia maritima*	
Lady lupine	*Lupinus villosus*	
Coral honeysuckle	*Lonicera sempervirens*	
Japanese magnolia	*Magnolia X* Soulangiana *	
Southern magnolia	*Magnolia grandiflora*	

*** Non-native Species**

TROY SPRING STATE PARK

PLANTS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for designated species)
Creeping cucumber	*Melothria pendula*	
Partridge berry	*Mitchella repens*	
Wax myrtle	*Myrica cerifera*	
Prickly pear	*Opuntia humifusa*	
Wild olive	*Osmanthus americana*	
Virginia creeper	*Parthenocissus quinquefolia*	
Redbay	*Persea borbonia*	
Mistletoe	*Phoradendron serotinum*	
Bear's foot	*Polymnia uvedalia*	
Wild cherry	*Prunus serotina*	
Hog plum	*Prunus umbellata*	
Laurel oak	*Quercus hemisphaerica*	
Turkey oak	*Quercus laevis*	
Overcup oak	*Quercus lyrata*	
Water oak	*Quercus nigra*	
Small post oak	*Quercus stellata*	
Live oak	*Quercus virginiana*	
Swamp honeysuckle	*Rhododendron* sp.	
Winged sumac	*Rhus copallina*	
Sand blackberry	*Rubus cuneifolius*	
Rudbeckia	*Rudbeckia* sp.	
Wild-petunia	*Ruellia caroliniensis*	
Coastal plain willow	*Salix caroliniana*	
Sebastian bush	*Sebastiania fruticosa*	
Queen's delight	*Stillingia sylvatica*	
Carolina basswood	*Tilia caroliniana*	
Poison Ivy	*Toxicodendron radicans*	
Forked blue-curls	*Trichostema dichotomum*	
American elm	*Ulmus americana*	
Cedar elm	*Ulmus crassifolia*	31
Sparkleberry	*Vaccinium arboreum*	
Highbush blueberry	*Vaccinium corymbosum*	
Shiny blueberry	*Vaccinium myrsinites*	
Ironweed	*Vernonia gigantea*	
Violet	*Viola* sp.	
Muscadine grape	*Vitus rotundifolia*	
American wisteria	*Wisteria frutescens*	

*** Non-native Species**

TROY SPRING STATE PARK

ANIMALS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for all species)
	FISH	
Gulf Sturgeon	*Acipenser oxyrhynchus desotoi*	53
Longnose Gar	*Lepisosteus osseus*	53
Florida Gar	*Lepisosteus platyrhincus*	53
Bowfin	*Amia calva*	53
Blacktail Shiner	*Cyprinella venusta*	53
Golden Shiner	*Notemigonus crysoleucas*	53
Sailfin Shiner	*Notropis hypselopterus*	53
Weed Shiner	*Notropis texanus*	53
Lake Chubsucker	*Erimyzon sucetta*	53
Spotted Sucker	*Minytrema melanops*	53
Channel Catfish	*Ictalurus punctatus*	53
Yellow bullhead	*Ameiurus natalis*	53
Tadpole Madtom	*Noturus gyrinus*	53
Speckled Madtom	*Noturus leptacanthus*	53
American Eel	*Anguilla rostrata*	53
Pirate Perch	*Aphredoderus sayanus*	53
Florida Brook Silverside	*Labidesthes sicculus*	53
Lined Topminnow	*Fundulus lineolatus*	53
Eastern Mosquitofish	*Gambusia holbrooki*	53
Flier	*Centrarchus macropterus*	53
Redbreast Sunfish	*Lepomis auritus*	53
Warmouth	*Lepomis gulosus*	53
Bluegill	*Lepomis macrochirus*	53
Shellcracker	*Lepomis microlophus*	53
Stumpknocker	*Lepomis punctatus*	53
Suwannee Bass	*Micropterus notius*	53
Largemouth Bass	*Micropterus salmoides*	53
Brown Darter	*Etheostoma edwini*	53
Blackbanded Darter	*Percina nigrofasciata*	53
	REPTILES	
TURTLES		
Suwannee cooter	*Chrysemys concinna suwanniensis*	55
Gopher tortoise	*Gopherus polyphemus*	22
Florida softshell turtle	*Trionyx ferox*	55
LIZARDS		
Green anole	*Anolis carolinensis*	8
Broad-head skink	*Eumeces laticeps*	21

*** Non-native Species**

TROY SPRING STATE PARK

ANIMALS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for all species)
Southern fence lizard	*Sceloporus undulatus undulatus*	22
Ground skink	*Scincella lateralis*	21
SNAKES		
Southern black racer	*Coluber constrictor priapus*	13
Eastern indigo snake	*Drymarchon corais couperi*	21
Gray rat snake	*Elaphe obsoleta spiloides*	8
BIRDS		
VULTURES		
Turkey vulture	*Cathartes aura*	Throughout
Black vulture	*Coragyps atratus*	Throughout
HAWKS, EAGLES & KITES		
Red-tailed hawk	*Buteo jamaicensis*	13
Red-shouldered hawk	*Buteo lineatus*	8
DOVES		
Mourning dove	*Zenaida macroura*	81
WOODPECKERS		
Common flicker	*Colaptes auratus*	8
Pileated woodpecker	*Dryocopus pileatus*	8
Red-bellied woodpecker	*Melanerpes carolinus*	22
Downy woodpecker	*Picoides pubescens*	21
Yellow-bellied sapsucker	*Sphyrapicus varius*	21
FLYCATCHERS		
Great crested flycatcher	*Myiarchus crinitus*	21
Eastern phoebe	*Sayornis phoebe*	13
SWALLOWS		
Barn swallow	*Hirundo rustica*	Throughout
Tree swallow	*Iridoprocne bicolor*	Throughout

*** Non-native Species**

TROY SPRING STATE PARK

ANIMALS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for all species)
JAYS & CROWS		
American crow	*Corvus brachyrhynchos*	Throughout
Fish crow	*Corvus ossifragus*	Throughout
Blue jay	*Cyanocitta cristata*	21
TITMICE		
Tufted titmouse	*Parus bicolor*	21
Carolina chickadee	*Parus carolinensis*	21
WRENS		
Carolina wren	*Thryothorus ludovicianus*	21
THRASHERS		
Gray catbird	*Dumetella carolinensis*	21
Brown thrasher	*Toxostoma rufum*	21
THRUSHES		
Hermit thrush	*Catharus guttatus*	21
American robin	*Turdus migratorius*	21
KINGLETS & GNATCATCHERS		
Blue-gray gnatcatcher	*Polioptila caerulea*	21
Ruby-crowned kinglet	*Regulus calendula*	21
VIREOS		
White-eyed vireo	*Vireo griseus*	21
Yellow-throated vireo	*Vireo flavifrons*	21
Red-eyed vireo	*Vireo olivaceus*	21
Solitary vireo	*Vireo solitarius*	21
WARBLERS		
Yellow-rumped warbler	*Dendroica coronata*	8
Yellow-throated warbler	*Dendroica dominica*	21
Palm warbler	*Dendroica palmarum*	13
Pine warbler	*Dendroica pinus*	8
Common yellowthroat	*Geothlypis trichas*	31

*** Non-native Species**

TROY SPRING STATE PARK

ANIMALS

COMMON NAME	*SCIENTIFIC NAME*	PRIMARY HABITAT (for all species)
Black-and-white warbler	*Mniotilta varia*	21
Northern parula warbler	*Parula americana*	21
Prothonotary warbler	*Protonotaria citrea*	31
Ovenbird	*Seiurus aurocapillus*	21
GROSBEAKS, SPARROWS & BUNTINGS		
Northern cardinal	*Cardinalis cardinalis*	21
American goldfinch	*Carduelis tristis*	21
Rufous-sided towhee	*Pipilo erythrophthalmus*	8
Chipping sparrow	*Spizella passerina*	13

MAMMALS

MARSUPIALS		
Opossum	*Didelphis marsupialis*	Throughout
EDENTATES		
Nine-banded armadillo	*Dasypus novemcinctus* *	Throughout
RODENTS		
Southern flying squirrel	*Glaucomys volans*	21
Southeastern pocket gopher	*Geomys pinetis*	13
Grey squirrel	*Sciurus carolinensis*	Throughout
LAGOMORPHS		
Raccoon	*Procyon lotor*	Throughout
ARTIODACTYLS		
White-tailed deer	*Odocoileus virginianus*	Throughout
Feral hog	*Sus scrofa* *	31

*** Non-native Species**

TERRESTRIAL

1 BEACH DUNE
2 BLUFF
3 COASTAL BERM
4 COASTAL ROCK BARREN
5 COASTAL STRAND
6 DRY PRAIRIE
7 MARITIME HAMMOCK
8 MESIC FLATWOODS
9 COASTAL GRASSLANDS
10 PINE ROCKLAND
11 PRAIRIE HAMMOCK
12 ROCKLAND HAMMOCK
13 SANDHILL
14 SCRUB
15 SCRUBBY FLATWOODS
16 SHELL MOUND
17 SINKHOLE
18 SLOPE FOREST
19 UPLAND GLADE
20 UPLAND HARDWOOD FOREST
21 UPLAND MIXED FOREST
22 UPLAND PINE FOREST
23 XERIC HAMMOCK

PALUSTRINE

24 BASIN MARSH
25 BASIN SWAMP
26 BAYGALL
27 BOG
28 BOTTOMLAND FOREST
29 DEPRESSION MARSH
30 DOME
31 FLOODPLAIN FOREST
32 FLOODPLAIN MARSH
33 FLOODPLAIN SWAMP
34 FRESHWATER TIDAL SWAMP
35 HYDRIC HAMMOCK
36 MARL PRAIRIE
37 SEEPAGE SLOPE
38 SLOUGH
39 STRAND SWAMP
40 SWALE
41 WET FLATWOODS
42 WET PRAIRIE

LACUSTRINE

43 CLASTIC UPLAND LAKE
44 COASTAL DUNE LAKE
45 COASTAL ROCKLAND LAKE
46 FLATWOOD/PRAIRIE LAKE
47 MARSH LAKE
48 RIVER FLOODPLAIN LAKE
49 SANDHILL UPLAND LAKE
50 SINKHOLE LAKE
51 SWAMP LAKE

RIVERINE

52 ALLUVIAL STREAM
53 BLACKWATER STREAM
54 SEEPAGE STREAM
55 SPRING-RUN STREAM

ESTUARINE

56 ESTUARINE COMPOSITE SUBSTRATE
57 ESTUARINE CONSOLIDATED SUBSTRATE
58 ESTUARINE CORAL REEF
59 ESTUARINE GRASS BED
60 ESTUARINE MOLLUSK REEF
61 ESTUARINE OCTOCORAL BED
62 ESTUARINE SPONGE BED
63 ESTUARINE TIDAL MARSH
64 ESTUARINE TIDAL SWAMP
65 ESTUARINE UNCONSOLIDATED SUBSTRATE
66 ESTUARINE WORM REEF

MARINE

67 MARINE ALGAL BED
68 MARINE COMPOSITE SUBSTRATE
69 MARINE CONSOLIDATED SUBSTRATE
70 MARINE CORAL REEF
71 MARINE GRASS BED
72 MARINE MOLLUSK REEF
73 MARINE OCTOCORAL BED

MARINE (Continued)

74 MARINE SPONGE BED
75 MARINE TIDAL MARSH
76 MARINE TIDAL SWAMP
77 MARINE UNCONSOLIDATED SUBSTRATE
78 MARINE WORM REEF

SUBTERRANEAN

79 AQUATIC CAVE
80 TERRESTRAL CAVE

MISCELLANEOUS

81 RUDERAL
82 DEVELOPED

MTC MANY TYPES OF COMMUNITIES

OF OVERFLYING

ADDENDUM 6

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)

FNAI STATE RANK DEFINITIONS

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

FNAI STATE RANK DEFINITIONS (cont.)

SH	=	of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
SX	=	believed to be extinct throughout range
SA	=	accidental in Florida, i.e., not part of the established biota
SE	=	an exotic species established in Florida may be native elsewhere in North America
SN	=	regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine
SU	=	due to lack of information, no rank or range can be assigned (e.g., SUT2).
S?	=	not yet ranked (temporary)

LEGAL STATUS

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

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

LE	=	Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which 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 which is likely to become an endangered species within the foreseeable 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.

TROY SPRING STATE PARK

DESIGNATED SPECIES

PLANTS

COMMON NAME/ *SCIENTIFIC NAME*	**DESIGNATED SPECIES STATUS** FDA	USFWS	FNAI
Cedar elm *Ulmus crassifolia*			G5, S1

TROY SPRING STATE PARK

DESIGNATED SPECIES

ANIMALS

COMMON NAME/ *SCIENTIFIC NAME*	**DESIGNATED SPECIES STATUS** FFWCC	USFWS	FNAI
Fish			
Gulf Sturgeon *Acipenser oxyrhynchus desotoi*		T	G3T2,S2
Suwannee Bass *Micropterus notius*	SSC		G2G3,S2S3
Reptiles			
Suwannee Cooter *Chrysemys concinna suwanniensis*	SSC		G5T3,S3
Eastern Indigo Snake *Drymarchon corais couperi*	T	T	G4T3,S3
Gopher Tortoise *Gopherus polyphemus*	SSC		G3,S3
Invertebrates			
Pallid Cave Crayfish *Procambarus pallidus*			G2G3,S2S3

ADDENDUM 7

CULTURAL MANAGEMENT STATEMENT

DEPARTMENT OF STATE

DIVISION OF HISTORICAL RESOURCES

MANAGEMENT PROCEDURES FOR ARCHAEOLOGICAL AND HISTORICAL SITES AND PROPERTIES ON STATE -- OWNED OR CONTROLLED LANDS (Revised August, 1995)

A. GENERAL DISCUSSION

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

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

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

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

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

B. STATUTORY AUTHORITY

Chapter 253, Florida Statutes ("State Lands") directs the preparation of "single-use" or "multiple-use" land management plans for all state-owned lands and state-owned sovereignty submerged lands. In this document, 253.034(4), F.S., specifically requires

that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites, as well as other fragile resources..."

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

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

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

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

1. Cooperate with federal and state agencies, local Governments, and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such responses.

2. Develop a comprehensive statewide historic preservation plan.

3. Identify and nominate eligible properties to the National Register of Historic Places and otherwise administer applications for listing properties in the National Register of Historic Places.

4. Cooperate with federal and state agencies, local governments, and organizations and individuals to ensure that historic resources are taken into consideration at all levels of planning and development.

5. Advise and assist, as appropriate, federal and state agencies and local governments in carrying out their historic preservation responsibilities and programs.

6. Carry out on behalf of the state the programs of the National Historic Preservation Act of 1966, as amended, and to establish, maintain, and administer a state historic preservation program meeting the requirements of an approved program and fulfilling the responsibilities of state historic preservation programs as provided in subsection 101(b) of that act.

7. Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an

appreciation of Florida history and culture. Prior to the acquisition, preservation, interpretation, or operation of a historic property by a state agency, the Division shall be provided a reasonable opportunity to review and comment on the proposed undertaking and shall determine that there exists historic authenticity and a feasible means of providing for the preservation, interpretation and operation of such property.

8. Establish professional standards for the preservation, exclusive of acquisition, of historic resources in state ownership or control.

9. Establish guidelines for state agency responsibilities under subsection (2).

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

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.

2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way that adversely affects the character, form, integrity, or other qualities that contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.

3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.

4. Each state agency of the executive branch shall assume responsibility for the preservation of historic resources that are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the

professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.

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

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

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

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

C. MANAGEMENT POLICY

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

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

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

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

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

2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted,

however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.

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

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

5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological site is discouraged. There are many endangered sites in Florida (on both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.

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

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

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

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

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

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

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

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

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

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

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

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

9. New additions, exterior alterations, or related new construction shall not destroy materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

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

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

D. MANAGEMENT IMPLEMENTATION

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

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

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

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

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

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

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

A. Historic Sites

(1) Type of structure (dwelling, church, factory, etc.).

(2) Known or estimated age or construction date for each structure and addition.

(3) Location of building (identify location on a map of the property, and building placement, i.e., detached, row, etc.).

(4) General Characteristics: (include photographs if possible) overall shape of plan (rectangle, "L" "T" "H" "U", etc.); number of stories; number of vertical divisions of bays; construction materials (brick, frame, stone, etc.); wall finish (kind of bond, coursing, shingle, etc.); roof shape.

(5) Specific features including location, number and appearance of:

(a) Important decorative elements;
(b) Interior features contributing to the character of the building;
(c) Number, type, and location of outbuildings, as well as date(s) of construction;
(d) Notation if property has been moved;
(e) Notation of known alterations to building.

B. Archaeological Sites

(1) Site location (written narrative and mapped location).

(2) Cultural affiliation and period.

(3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).

(4) Threats to site (deterioration, vandalism, etc.).

(5) Site size (acreage, square meters, etc.).

(6) Artifacts observed on ground surface (pottery, bone, glass, etc.).

(7) Description of surrounding environment.

7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review

by the Division early in the project planning.

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

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

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

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

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

C. 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 (904) 487-2333
Suncom 277-2333
FAX (904) 922-0496

ADDENDUM 8

PRIORITY SCHEDULE AND COST ESTIMATES

- Initiate restoration of disturbed natural communities within Troy Springs State Park. 0-5 years. Estimated Cost: $5,000.

- Initiate an active prescribed burn program. 0-5 years.
  Estimated Cost: $1000. ($20/acre) and equipment costs of $2,000,
  Total Estimated Cost: $3,000.

- Survey the hydrological impact of the drainage ditches and dredged ponds to determine what restorative measures are needed in mesic flatwoods and depression marshes. 0-5 years. Estimated Cost: $2,000.

- Continue monitoring spring water quality and quantity and conduct a biological assessment of the spring in cooperation with FDEP and SRWMD. 0-5 years. Estimated Cost: $2,000.

- Pursue grant funding for a Level 1 survey of cultural resources. Develop and implement programs to document and stabilize historic and archaeological sites and provide cyclic monitoring and maintenance. Provide protective measures for the submerged steamship Madison. 0-5 years. Estimated Cost: $15,000.

- Manage public access, through education, interpretive programs, and enforcement of rules and regulations to protect natural and cultural resources.
  0-5 years. Estimated Cost: $ 25,000.

- Integrate Troy Springs State Park resource management, interpretive, and recreational programs with other state lands along the Suwannee River.
  0-5 years. Estimated Cost: $2,000.

TOTAL ESTIMATED RESOURCE MANAGEMENT AND PROGRAMS COST: $62,000

Preliminary Development Cost Estimates
Division of Recreation and Parks
Office of Park Planning

District 2

TROY SPRING STATE PARK

Item No.	Item Description	Quantity	Unit	Unit Price	Estimated Cost
23	Medium Picnic Shelter	4	ea.	$ 36,000.00	$ 144,000.00
109	Picnic Tables & Grilles	15	pair	$ 500.00	$ 7,500.00
90	Swimming Area Deck	1	ea.	$ 18,000.00	$ 18,000.00
27	6' Elevated Boardwalk	325	LF	$ 165.00	$ 53,625.00
	Renovate Log Cabin into Small Vistor Center and Administration Office				$ 100,000.00
19	Entrance Booth	1	ea.	$ 8,712.00	$ 8,712.00
91	Stabilize Service Roads	1.5	mile	$ 140,000.00	$ 210,000.00
	Low-water Crossings	2	ea.	$ 6,000.00	$ 12,000.00
	Renovate or Replace Woodframe Structure				$ 70,000.00
	Renovate or Replace Small Deck Below Log Cabin				$ 15,000.00
77	Interpretive Display / Kiosk	6	ea.	$ 20,000.00	$ 120,000.00
75	Stabilized Tent Sites	10	ea.	$ 500.00	$ 5,000.00
	Stabilized Parking (10 rigs)	1	0	$ 4,760.00	$ 4,760.00
	Mooring Facilities				$ 100,000.00
	Grassed Parking Area (20 cars)				$ 2,000.00
	Mechanism to hold swimming area rope				$ 5,000.00
	Utilities				$ 55,000.00
			Sub-total		$ 930,597.00
			20% contingency fees		$ 186,119.40
			Total		**$ 1,116,716.40**