

**CRYSTAL RIVER ARCHAEOLOGICAL
STATE PARK
UNIT MANAGEMENT PLAN**

APPROVED

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Recreation and Parks**

OCTOBER 27, 2008

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INTRODUCTION

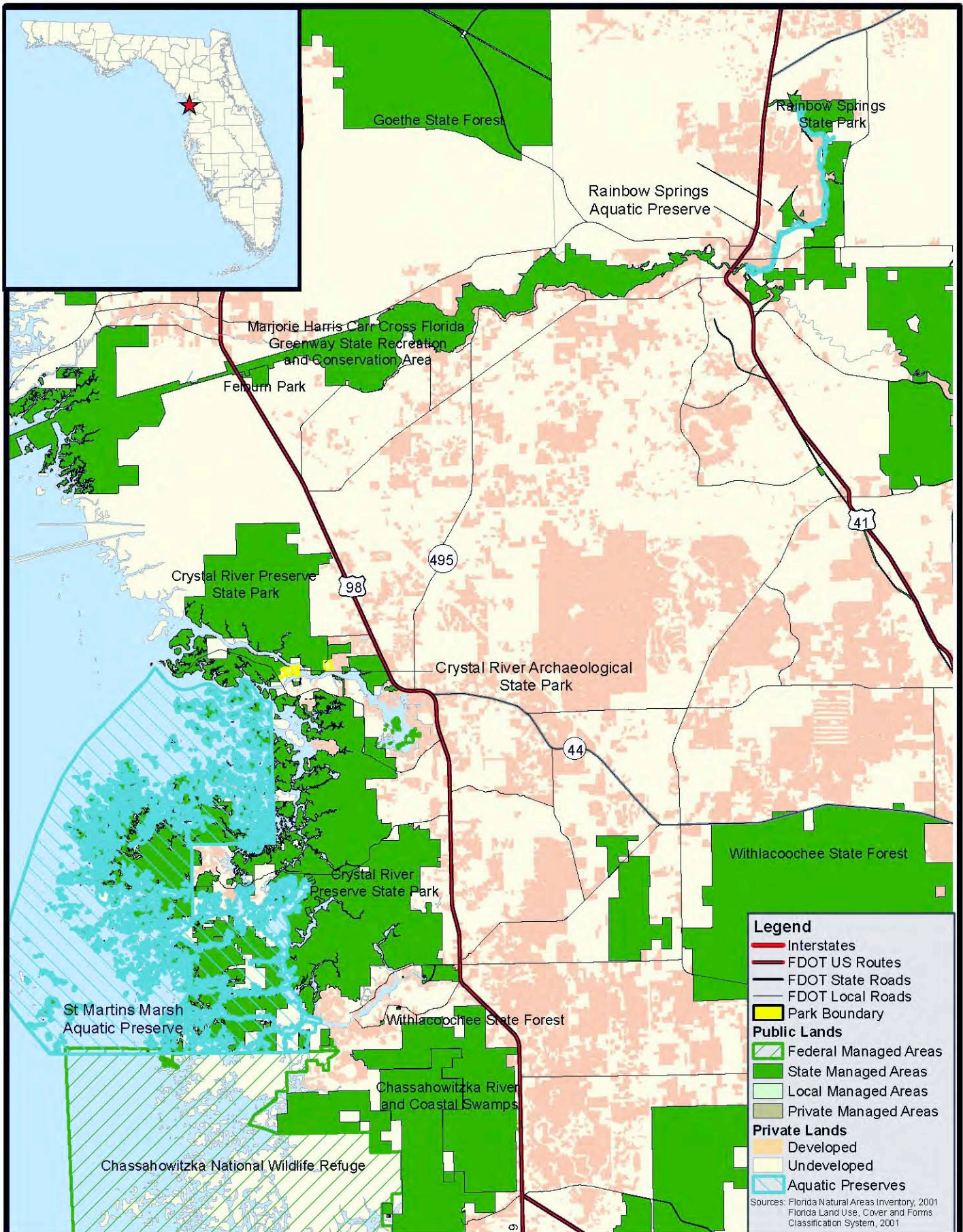
Crystal River Archaeological State Park is located within Citrus County, a portion of which lies within the Crystal River city limits (see Vicinity Map). Other significant land and water resources existing near the park are delineated on the Vicinity Map. Access to the park from the north or south is via U.S. Highway 19/98, then west on State Park Road and south on Museum Point Drive (see Reference Map).

Crystal River Archaeological State Park has been designated single use to provide public outdoor recreation. There are no legislative or executive directives that constrain the use of this property. On August 6, 1962, Crystal River Archaeological State Park was acquired through a donation of 14.5 acres. Since the donation, additional parcels were acquired and incorporated into Crystal River Archaeological State Park. This park presently comprises 61.55 acres (see Addendum 1). The park is jointly administered with Crystal River Preserve State Park and Yulee Sugar Mill Ruins Historic State Park.

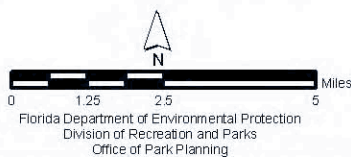
The park is significant for its concentration of archaeological resources. Consisting of temple, burial, shell and sand mounds, the park is a complex ceremonial center and burial site. The site is believed to be one of the longest continuously occupied pre-Columbian sites in Florida, representing 2,000 years of human settlement during the Deptford, Weeden Island and Safety Harbor prehistoric periods. The site has played a significant role in the development of archeological method and theory by helping explain the relationship between early mound building groups in the Gulf of Mexico coastal areas of Florida and the Hopewellian cultures in the Ohio River Valley. The national significance of the park was formally recognized on June 21, 1990 when it received a National Historic Landmark designation.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Crystal River Archaeological State Park as a unit of Florida's state park system. It identifies the objectives, criteria and standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2000 approved plan. All development and resource alteration encompassed in this plan is subject to the granting of appropriate permits; easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code.



**CRYSTAL RIVER
ARCHAEOLOGICAL STATE PARK**



**VICINITY
MAP**

Legend

- Interstates
- FDOT US Routes
- FDOT State Roads
- FDOT Local Roads
- Park Boundary

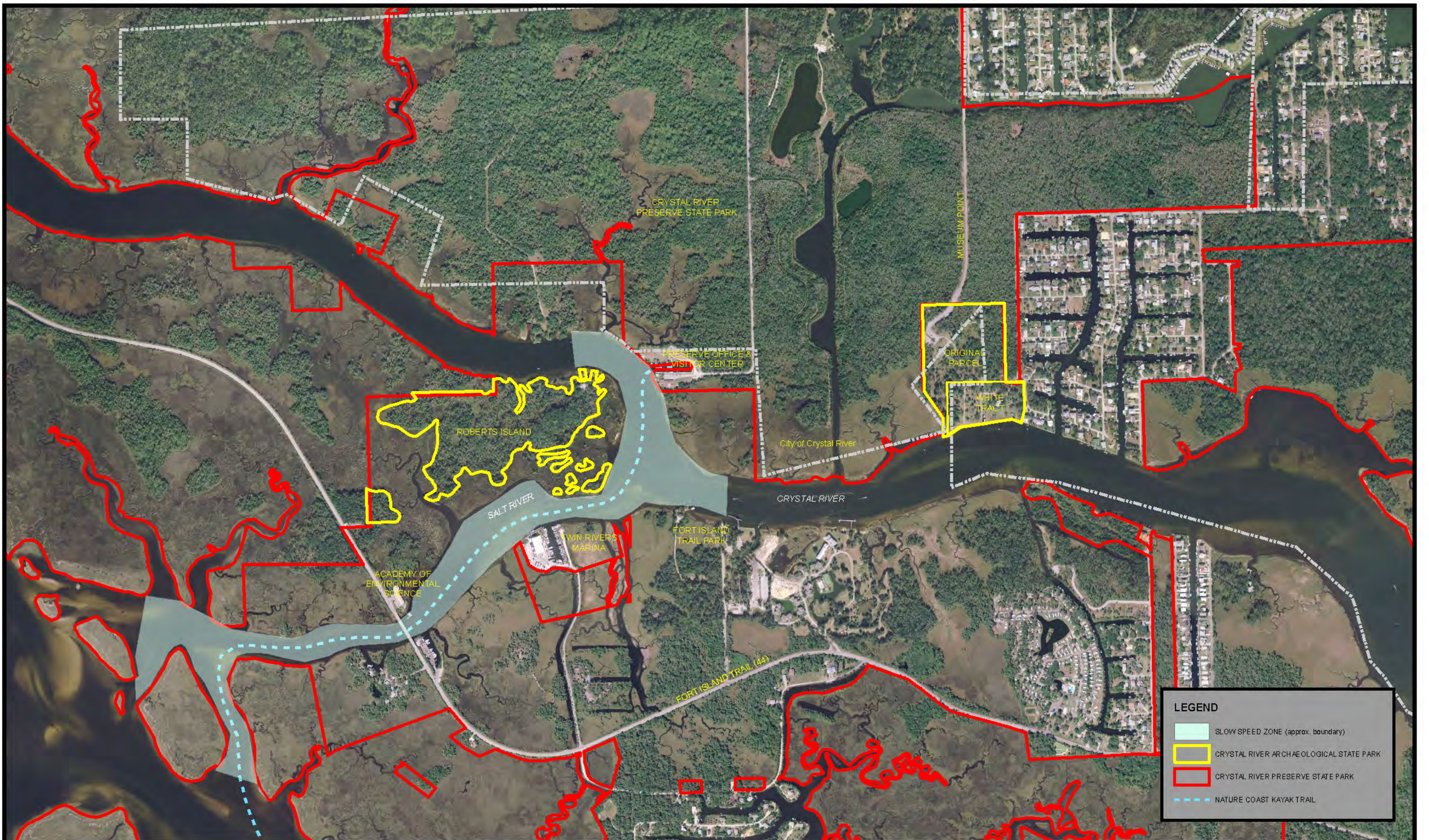
Public Lands

- Federal Managed Areas
- State Managed Areas
- Local Managed Areas
- Private Managed Areas

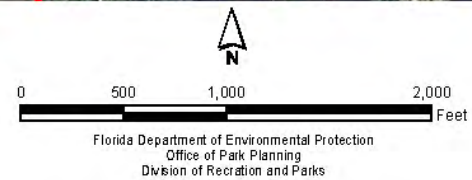
Private Lands

- Developed
- Undeveloped
- Aquatic Preserves

Sources: Florida Natural Areas Inventory, 2001
Florida Land Use, Cover and Forms
Classification System, 2001



CRYSTAL RIVER ARCHAEOLOGICAL STATE PARK



REFERENCE MAP

LEGEND

- SLOW SPEED ZONE (approx. boundary)
- CRYSTAL RIVER ARCHAEOLOGICAL STATE PARK
- CRYSTAL RIVER PRESERVE STATE PARK
- NATURE COAST KAYAK TRAIL

The plan consists of two interrelated components. Each component corresponds to a particular aspect of the administration of the park. The resource management component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management problems and needs are identified, and specific management objectives are established for each resource type. This component provides guidance on the application of such measures as prescribed burning, exotic species removal and restoration of natural conditions.

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

In the development of this plan, the potential of the park to accommodate secondary management purposes (“multiple uses”) was analyzed. These secondary purposes were considered within the context of the Division’s statutory responsibilities and an analysis of the resource needs and values of the park. This analysis considered the park natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For Crystal River Archaeological State Park, it was determined that no secondary purposes could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

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

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

MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes, and Chapter 62D-2, Florida Administrative Code, the Division of Recreation and Parks (Division) is charged with

the responsibility of developing and operating Florida's recreation and parks system. These are administered in accordance with the following policy:

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

The Trustees have also granted management authority of certain sovereign submerged lands to the Division under Management Agreement MA 68-086 (as amended January 19, 1988). The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation. The agreement is intended to provide additional protection to resources of the park and nearshore areas and to provide authority to manage activities that could impact public recreational uses.

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

Crystal River Archaeological State Park is classified as a special feature site. In the management of special feature sites, primary emphasis is on protection and maintenance of the special feature for long-term public enjoyment, and in the case of conflicts, resource considerations should prevail over user considerations. Suitable buffer areas are provided and areas with an appropriate outdoor setting maintained. Development is geared toward protection and maintenance, access, safety and convenience of the user. Program emphasis is directed toward the interpretation of the special feature for general public enjoyment.

Park Accomplishments

Since the 2000 approved plan, significant work has been accomplished and progress made towards meeting the Division's management objectives for the park. The following is a summary of activity since the last plan update related to resource

management, protection, maintenance and visitor services.

- Acquired monitored alarm system for museum.
- Significant progress has been made on removing woody vegetation to reveal the architectural design of the mound complex.
- Fences that created an artificial division of the mound complex have been removed.
- Laser scan has been completed of all features of the mound complex to produce highly accurate, three-dimensional surface measurements.
- Plan currently being developed for pinning and stabilizing portions of Mound A.
- Condition assessment and laser scan completed of Stele 1 to determine threat posed by erosion and loss of surface patina.
- Currently participating in discussions with Florida Fish and Wildlife Conservation Commission to expand slow speed zone along shore of Robert's Island to protect cultural resources.
- Photopoints established to monitor cultural resource conditions over time.
- Conducted regular monitoring of all known cultural resources and recorded conditions.
- Acquired additional information through archaeological investigations within the boundary of the Crystal River Preserve State Park with the goal of providing a better understanding of the regional context of the mound complex.
- Completed initial level of research to address the need for exhibit upgrades in the museum.
- Initiated biological and cultural resource surveys of Roberts Island.
- Species lists have been continuously revised to reflect current knowledge.
- Additional interpretive exhibits added to grounds and digital audio repeaters replaced in audio stations.
- Park Citizen Support Organization was expanded to include Crystal River Preserve State Park.

Park Goals and Objectives

The following park goals and objectives express the Division's long-term intent in managing the state park. At the beginning of the process to update this management plan, the Division reviewed the goals and objectives of the previous plan to determine if they remain meaningful and practical and should be included in the updated plan. This process ensures that the goals and objectives for the park remain relevant over time.

Estimates are developed for the funding and staff resources needed to implement the management plan based on these goals, objectives and priority management activities. Funding priorities for all state park management and development activities are reviewed each year as part of the Division's legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also aggressively pursues a wide range of other

funds and staffing resources, such as grants, volunteers and partnerships with agencies, local governments and the private sector, for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Natural and Cultural Resources

1. Preserve, protect and maintain cultural resources within the park.
 - A. Continue efforts to improve the condition of all cultural resources in the park.
 - B. Consult with personnel at the Division of Historic Resources to determine the most appropriate means of stabilizing Mound A; then implement their recommendations.
 - C. Pursue measures to stabilize the stelae. Seek professional expertise to determine the best course of action to halt further deterioration of the stelae and to develop Best Management Practices (BMPs) for their maintenance and stabilization. To the extent possible, implement the recommendations that are proposed.
 - D. Continue to implement and expand the program of vegetation management and general maintenance of the mounds. In order to minimize impacts to earthen structures and gravesites, generally follow guidelines set forth in Appendices B and C of the 1997 Resource Management Audit conducted in the park by the Bureau of Natural and Cultural Resources (Warzeski 1998). The park should consult District 2 biological staff before implementing any vegetation management practices on Roberts Island due to occurrences of uncommon plants there.
 - E. Support boater education and regulatory initiatives aimed at minimizing erosion of shoreline cultural resources due to boat wakes.
 - F. Continue to monitor cultural resources on all the park properties. Continue to use photopoint technology to monitor archeological resources, focusing on the endangered resources, particularly Mound A, Mound H, and Ci00576.
2. Continue to support the identification and additional documentation of cultural resources in the park.
 - A. Pursue a comprehensive, professional survey of Roberts Island and the White addition to at least level II.
 - B. Use the results of this much-needed work to guide management activities at the park, including construction projects on either of these properties or improvements to interpretive programs. Surveys and research should incorporate a regional focus, and where possible, should be coordinated with work conducted on surrounding properties managed by the Division of Recreation and Parks.
 - C. Use High Definition Documentation Survey (HDDS) techniques to document the current conditions at the site and provide baselines for the evaluation of future preservation and restoration projects within the park.

3. Manage collections objects according to current Division standards.
 - A. As a necessary step toward meeting Division collection standards, the park should work toward achieving specific goals recommended in the 1997 Resource Management Audit conducted by Division personnel. These goals include development of a scope of collections statement, cataloging of formal and informal collections, development of cleaning schedules for display objects, tracing of missing records, and revision of file organization.
4. Protect, restore and maintain natural communities in the park.
 - A. Conduct field surveys to more accurately delineate the natural community boundaries on Roberts Island.
5. Protect, restore and maintain native plant diversity and natural relative abundance in the park.
 - A. Conduct additional field surveys to identify native plants that occur in the park and update species lists as needed.
6. Protect, restore and maintain native animal diversity and natural relative abundance in the park.
 - A. Conduct additional field surveys to identify native animals that occur in the park and update species lists as needed.
7. To the extent practical, establish and maintain a prescribed fire program at the park.
 - A. Coordinate with staff of the Crystal River Preserve State Park to allow prescribed fires conducted in tidal marshes within the preserve to cross the boundary into small areas of tidal marsh contained within Crystal River Archaeological State Park.
8. Establish and maintain a removal program for invasive exotic plant species.
 - A. Continue the active treatment of exotic plants at the park, especially Chinese tallowtree and skunk vine.
 - B. Develop a more detailed exotic plant control plan for the park.
9. Protect, restore and maintain natural hydrological regimes in the park.
 - A. Maintain or replace existing culverts as needed to minimize retention of surface waters that may become impounded by asphalt trails in the park.

Recreational Goals

1. Continue to provide quality, resource-based outdoor recreational and interpretive programs and facilities at the state park.
 - A. Provide controlled public access to the park's mounds, middens and other archaeological features.
 - B. Interpret the cultural history of the park through Visitor Center exhibits, static interpretive displays, personal programs, tours and special events.
 - C. Provide access and interpretive opportunities to visitors of all ages and abilities.
2. Seek funding to expand recreational and interpretive opportunities through the improvement of programs and the development of new use areas and facilities, as

outlined in this management plan.

- A. Continue to review current research and expand/modify interpretive programming content as necessary to reflect current understanding of the cultural resources of the park and the local area.
- B. Upgrade the Visitor Center's interpretive exhibits to modern professional standards.
- C. Improve and expand trailside interpretive stations and signage.
- D. Provide picnic and restroom facilities to enhance use of the White tract.

Park Administration/Operations

1. Pursue funding, education, training and partnership opportunities to support the management needs of the park.
 - A. Provide staff and volunteers with ongoing training opportunities in visitor services, resource management, operations, general maintenance and interpretation.
 - B. Continue to seek local volunteers to augment staff, and promote grassroots support for the park.
 - C. Continue expansion of the existing Citizen Support Organization to promote fund raising, to foster citizen-based support and to enhance local and state awareness of the park.
 - D. Pursue funding alternatives to the legislative budget appropriation process.
 - E. Actively educate the public and local governments about the natural resources, management activities, needs and problems and recreational opportunities of the park.
 - F. Continue participation in Nature Coast ecotourism efforts to promote Crystal River Archaeological State Park as one of the major cultural resource attractions in the area.
2. Provide convenient, accessible, safe and well-maintained public facilities.
 - A. Conduct regular inspections of use areas and facilities and correct deficiencies when necessary.
 - B. Improve universal access to park programs and facilities in all public use areas.
3. Pursue measures to protect park resources, control access and maintain public health and safety.
 - A. Maintain boundary fencing where necessary and feasible to delineate park property.
 - B. Coordinate with Florida Park Patrol, Florida Fish and Wildlife Conservation Commission and local governments to meet the law enforcement needs of the park.
4. Support land use planning policies, regulations and acquisition initiatives that serve to enhance management and protection of park resources.
 - A. Network with other land and water management and regulatory entities to coordinate and enhance regional resource management and protection efforts.

- B. Monitor proposed land use changes in the vicinity that may impact resource integrity, and engage in the land use planning process, when necessary, to advance the long-term interests of the park.
- C. Pursue acquisition of areas deemed important to be managed as part of the park.

Management Coordination

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

The Department of Agriculture and Consumer Services, Division of Forestry (DOF), assists Division staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FFWCC), assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within park boundaries. In addition, the FFWCC aids the Division with wildlife management programs, including the development and management of Watchable Wildlife programs. The Department of State, Division of Historical Resources (DHR), Gulf Archeology Research Institute, Florida Public Archeological Network, University of South Florida and University of West Florida assist staff to assure protection of archaeological and historical sites. The DEP, Bureau of Beaches and Wetland Resources aids staff in the development of erosion control projects.

Public Participation

The Division provided an opportunity for public input by conducting a public meeting on September 4, 2008. The purpose of the meeting was to present the draft management plan to the public.

Other Designations

Crystal River Archaeological State Park received National Historic Landmark status in 1990. The park is not within an Area of Critical State Concern as defined in section 380.05, Florida Statutes and it is not under study for such designation.

Crystal River Archaeological State Park is a component of the Florida Greenways and Trails System and is a designated stop on the Trail of Florida's Indian Heritage and the West Section of the Great Florida Birding Trail.

Surface waters in this unit are classified as Class III - Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife by DEP. This unit is not adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes). St. Martins Marsh Aquatic Preserve is located over .5 miles southwest of Roberts Island.

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

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

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

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

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

Crystal River Archaeological State Park is recognized as a major center of aboriginal activity in Florida. The park contains several structures of monumental scale, mounds of shell and soil dating from the first millennium. The importance of the site was formally endorsed in 1970 with its listing on the National Register of Historic Places, and more recently in 1990 with its designation as a National Historic Landmark. The recent addition of the White property, formerly a mobile home park, has helped protect an important temple mound. Acquisition of Roberts Island has brought additional resources, comparable to those of the original park, under Division management. The combined cultural resources of Roberts Island, the White addition, and the original park property are probably without peer in Florida.

RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

Topography

Crystal River Archaeological State Park is situated in the physiographic province known as the Gulf Coastal Lowlands, which includes most of the broad coastal plain between the Brooksville Ridge and the Gulf of Mexico. The lowlands generally are level, although ancient dunes of higher elevation occasionally provide some relief. In the lowlands, there are coastal swamps and marine terraces of Pleistocene age (10,000 to 1.6 million years ago). The marine terraces are gently sloping features with escarpments that face seaward. These features formed when sedimentary materials were alternately deposited and eroded as sea levels rose and fell.

Most of the park lies at five feet above sea level or less, with the lowest points occurring along the Crystal and Salt Rivers. The topography of the area was significantly altered by aboriginal Americans, who created temple mounds, middens (refuse mounds), and burial mounds over the course of a millennium or more. The highest elevation in the park, 29 feet above sea level, occurs at the flattened top of Mound A, the southern temple mound.

Geology

The park lies within the limestone shelf of the Pamlico marine terrace, which occurs at elevations below 25 feet. This terrace is composed of sand and clayey sand, and is underlain by limestone and dolomite of Eocene and Oligocene age. The region lies on a geologic feature known as the Ocala Platform, which controlled deposition during the Tertiary Period. Although no site-specific data are available, wells in the region suggest that the shallow stratigraphy of the park is as described below:

1. **The Ocala Group** - Upper Eocene, 0 to 100 feet below land surface (bls), typically a white to cream limestone ranging in texture from chalky to somewhat grainy and commonly containing benthic foraminifers such as *Lepidocyclina* sp. and miliolids.
2. **Avon Park Formation** - Middle Eocene, 100 to 1300 feet bls, typically a tan to brown, silt-sized dolostone with occasional organic-rich laminations, and generally containing foraminifers such as miliolids and *Dictyoconus* sp. and echinoids such as *Neolaganum dalli*.
3. **Underlying the Avon Park Formation** - carbonates and clastics from 1300 feet to approximately 5000 feet bls, ranging in age from Upper Jurassic to Middle Eocene. Basement rocks in the region are Paleozoic sedimentary rocks at depths greater than 5000 feet bls (Arthur 1992).

Soils

Eight soil types have been recorded at Crystal River Archaeological State Park (see Soils Map, Pilny et al. 1988). A complete description of these soils is found in Addendum 3.

Most soils at the park are characterized as poorly drained to very poorly drained. The origins of two of the soils, namely Quartzsammets and Matlacha, limestone substratum-Urban land complex, have been attributed to earthmoving operations at the site (Pilny et al. 1988). Although that interpretation may be partially accurate, soils on higher portions of the site were certainly influenced, and perhaps created, by the activities of prehistoric humans. The exact soil profiles of structures created by prehistoric humans at the site are not well understood. It is known, however, that the soils in some of the structures have definitely been altered by heavy machinery. For example, a portion of temple mound A was used as fill on the former White property when it was developed into a trailer park in the 1960s. The Soil Survey of Citrus County (Pilney et al. 1988) describes the Hallandale-Rock Outcrop complex as the only soil type in the uplands of Roberts Island. On the island, however, are also areas of soil that owe their origins to the activities of prehistoric humans.

Soil erosion at the park occurs on the slopes of certain shell mounds and along shorelines exposed to wave action from boat wakes. Managing visitor access and maintaining grasses or herbaceous plants on the mound slopes should suffice to control erosion in these areas. The significant erosion-impacting Mound A will be addressed later in this plan. Boat wakes are affecting cultural deposits and undermining seawalls on Roberts Island and on the former White property. Management activities will follow generally accepted best management practices to prevent soil erosion and conserve soil and water resources on site.

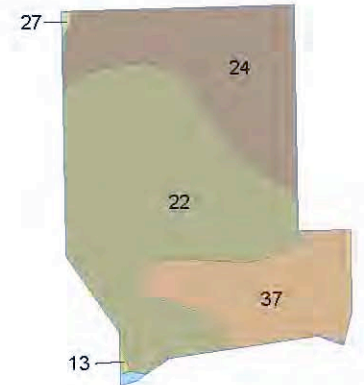
Minerals

No minerals of commercial value are known to occur at this park.










Hydrology

Crystal River Archaeological State Park lies within the Crystal River-St. Petersburg Beach Basin. This coastal watershed contains many short meandering streams, including the Crystal River and Salt River, both of which skirt the boundaries of the park. The Crystal River originates southeast of the park at a series of springs in Kings Bay. It then flows northwest for approximately five miles before emptying into the Gulf of Mexico. The Salt River diverges from the Crystal River at the eastern end of Roberts Island and connects to the Gulf of Mexico. Both rivers exhibit tidal characteristics. Water quality in the watershed as a whole is good (Hand et al. 1996). Nitrates in the springs at Kings Bays, however, have been increasing in recent years (Jones and Upchurch 1994).

Two aquifers are found in the region, the Floridan and the surficial. The Floridan



LEGEND

-  13-Okeelanta muck
-  22-Quartzipsamments, 0 to 5 percent slopes
-  23-Weekiwachee-Durbin mucks
-  24-Okeelanta-Lauderhill-Terra Ceia mucks
-  27-Pomello fine sand, 0 to 5 percent slopes
-  37-Matlacha, limestone substratum-Urban land complex
-  39-Hallandale-Rock outcrop complex, rarely flooded
-  49-Terra Ceia-Okeelanta association, very frequently flooded
-  Water



CRYSTAL RIVER
ARCHAEOLOGICAL STATE PARK

SOILS
MAP

Aquifer is the principle source of most of the water used in the area. Flow within this aquifer is generally from east to west. Recharge of the Floridan aquifer from the overlying surficial aquifer occurs in areas either where the two aquifers are in direct contact or where the confining beds between the aquifers are leaky. Recharge may also take place in locations where limestone is exposed at the surface or is overlain by a thin veneer of sand, and where lakes, sinkholes and rivers occur. In areas where the potentiometric surface of the Floridan aquifer is higher than that of the surficial, the Floridan may actually discharge into the surficial aquifer. Discharge from the Floridan may also occur at springs, seeps and water wells.

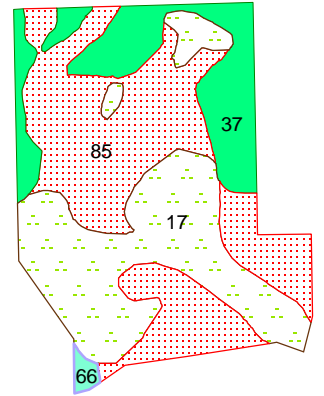
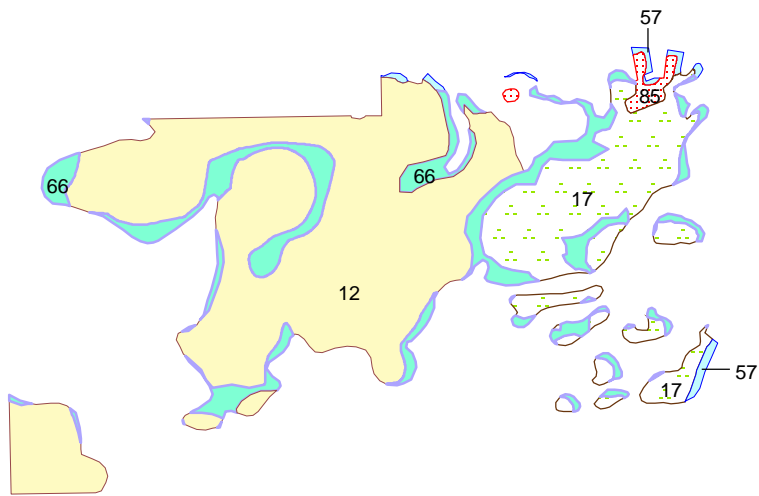
The surficial aquifer occurs where sands of varying thickness overlie the limestone and dolomite of the Floridan aquifer. Recharge is almost entirely from local rainfall except in those areas where a hydraulic connection to the Floridan aquifer exists. Discharges from the surficial aquifer may include downward percolation into the Floridan aquifer; seepage into streams, lakes, and sinkholes; and pumping from wells.

For the most part, drainage at the Crystal River Archaeological State Park ranges from moderate to poor, although soils having a cultural origin are generally well drained. During high water events, much of the site may flood, and saltwater may persist long enough to kill some types of vegetation. Twice a day the Crystal River rises with the tide, and low areas throughout the site have standing fresh water. In the main parcel of the park, several culverts located along the interpretive trail were installed to improve the drainage of rainwater from the site. The culverts connect low areas in the park to the Crystal River, and prevent the park from holding water for extended periods. These culverts, however, also allow tidewater to enter. Conditions at the site now appear to be wetter than in recent history, perhaps the result of sea level rise. Marsh vegetation is now becoming established in low areas within the developed portion of the site.

Natural Communities

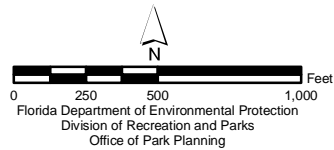
The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors, such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and 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 five distinct natural communities (see Natural Communities Map) in addition to developed areas. Park specific assessments of the existing natural communities are provided in the narrative below. A list of plants and animals



LEGEND

- 12 - Prairie Hammock-21.96 ac.
- 17 - Shell Mound-15.98. ac.
- 37 - Hydric Hammock-4.64 ac.
- 57 - Spring-Run Stream-0.39 ac.
- 66 - Estuarine Tidal Marsh-5.74 ac.
- 85 - Developed-11.43 ac.



**CRYSTAL RIVER
ARCHAEOLOGICAL STATE PARK**

**NATURAL COMMUNITIES
MAP**

occurring in the unit is contained in Addendum 4.

Prairie hammock. This natural community occurs on Roberts Island above the estuarine tidal marsh in places where shell mound deposits are absent. Although prairie hammock has been mapped on Roberts Island, additional field surveys will be required to achieve a more accurate delineation of the complex interface of prairie hammock, estuarine tidal marsh and shell mound at the site. Topographic elevation, tidal influence and aboriginal activity were all critical elements in the development of these three natural communities on Roberts Island.

Shell mound. The shell mound natural community occurs in several disjunct locations in the park. Shell mound communities are anthropogenic in origin and occur on cultural soils in areas that have experienced human activity for thousands of years. The shell mounds at Crystal River and Roberts Island were probably created within preexisting hydric hammock or prairie hammock communities that had limestone outcrops. Some of the shell mounds may have also been created within estuarine tidal marsh, particularly along the margins of the Crystal and Salt Rivers.

Most of the shell mound community in the main part of the park has been cleared of native vegetation. This clearing began during the earliest archaeological excavations and continues to the present day as part of the Division's regular maintenance of the mounds. The mounds in the main part of the park are kept largely clear of small to medium-sized woody vegetation in order to minimize possible adverse impacts from growing and expanding root systems. Most of the cleared mounds are now carpeted with exotic turf grasses such as St. Augustine grass.

Before the development of the adjacent White property as a mobile home park, temple mound A and other shell mound structures in the park extended across the boundary onto the private property. As previously discussed, portions of temple mound A that existed on the White property when it was developed were used as fill material, but it is thought that portions of other shell mound structures may have been left undisturbed. While all of the White addition today has the appearance of a developed tract, soil profiles below the developed surface may still be relatively intact. Consequently, the former shell mounds on the White addition have been mapped as such on the Natural Communities Map, distinguishing them from the developed portions of the property.

The shell mound community on Roberts Island is entirely different from that on the main parcel. It is largely a closed canopy forest and is in very good condition. The two modern dwellings that are located on the shell mounds of Roberts Island are designated as developed areas.

Hydric hammock. Hydric hammock lines the boundaries of the main part of the park. It is in very good condition. Hydric hammock is now expanding into developed areas

of the park where mowing has been discontinued. Extensive tracts of hydric hammock also occur on properties adjacent to the park. Much of this land is currently under state ownership and is managed by the Division of Recreation and Parks.

Spring-run stream. Boundaries of the park encompass small portions of the Crystal and Salt Rivers, primarily in the area adjacent to Roberts Island. These are primarily freshwater streams, although they are tidally influenced. Water quality is generally good, although surface runoff and groundwater contamination can easily degrade spring-run streams.

Estuarine tidal marsh. A small fringe of estuarine tidal marsh occurs in the southwest corner of the main parcel, along the Crystal River. A much larger area of estuarine tidal marsh is associated with the Roberts Island parcel. Presently this community is in very good condition, though the marsh system could be affected if water quality within the Crystal River deteriorates over time.

Developed. Developed areas within the park include the parking lot, visitor center, interpretive trail and plaza area between the shell mounds. Most of the White addition is considered developed, as are the park shop and residence areas, including two residences located on Roberts Island.

Designated Species

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

Manatees occur in both the Crystal and Salt Rivers, and a large population overwinters in the Kings Bay region of the Crystal River. Crystal River Archaeological State Park has occurrence records for the eastern indigo snake, bald eagle, brown pelican and several wading bird species, but the park's limited size means that only a small fraction of the habitat needed by local individuals of these species is available there. The gopher tortoise, also observed at the park, seems to occur only as a transient.

The five listed plant species recorded in the park to date occur mainly on Roberts Island. These do not appear to be threatened by either park development or human activity. More detailed plant surveys in the park, especially on Roberts Island, may discover additional listed species.

Special Natural Features

The unit contains no outstanding natural features.

Cultural Resources

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

The Florida Master Site File (FMSF) lists seven recorded archaeological sites for Crystal River Archaeological State Park, including 8Ci00001 in the main part of the park and 8Ci00036, 8Ci00037, 8Ci00039, 8Ci00040, 8Ci00041, and 8Ci00576 on Roberts Island. The site locations are delineated on the accompanying Cultural Resource Map. Of these resources, the best known and most completely documented are the ten large features (mounds, middens and shell embankments) that comprise the multi-acre site 8Ci00001. Professional and avocational archaeologists have studied the components of 8Ci00001, generally known as the Crystal River Site or the Crystal River (Indian) Mounds, for more than 100 years. The significance of the site led to national recognition in September 1970 when it achieved listing on the National Register of Historic Places. In June 1990, it was also designated a National Historic Landmark for its role as an arena in which archaeological methods and theory were advanced and for its contributions to the understanding of burial mound cultures in the southernmost portion of the Hopewellian Interaction Sphere. The geographic limits of both listings were the boundaries of the park at that time, which did not change between 1970 and 1990.

Unsurveyed and unrecorded cultural resources exist on the White property, a former mobile home community that was added to the park in 1997. The White addition abuts the original park along its east and south sides. Other recorded and unrecorded resources in the park are located on Roberts Island, which was added to the park in 1996, or in waters adjacent to Roberts Island. Two stone stelae of uncertain origin are located in the original part of the park. A third stele is located on the White addition, and there may even be another one there.

The White addition once contained important elements of the Crystal River Mounds, including the ramp and about one-half of a temple mound (Mound A), and a shell embankment or ridge. This shell ridge was a continuation of the midden deposit that underlies the present park trail to Mound A, south and east of midden mounds J and K.

When the White property was developed, elevated mound elements on the site were redistributed to provide an area suitable for the placement of mobile homes, creating a flat aspect that contrasted sharply with the mound complex still in existence on park property to the west.

Of the six recorded sites on Roberts Island, Ripley and Adelaide Bullen first described five of them (8Ci00036, -37, -39, -40, -41, and -576) in the 1950s (Bullen 1953). Gary Ellis recorded site 8Ci00576 in 1993. The Bullens described the Roberts Island resources as part of a series of sites encountered along the Crystal River. 8Ci00036, formerly known as Crystal River 2 or CR-2, is a 75-foot diameter shell midden that has not yet been examined systematically. 8Ci00037, formerly Cr-3, is a shell midden, 150 feet in diameter, that contains aboriginal pottery from the Weeden Island and Safety Harbor periods (400 - 1600 AD). 8Ci00039, formerly Cr-5, is a narrow shell ridge that contains Deptford, Weeden Island and Safety Harbor pottery, including some of the following types: Deptford Check Stamped, Wakulla Check Stamped, Little Manatee Zoned Stamped, Carrabelle Punctated and St. Johns Check Stamped. 8Ci00040, formerly Cr-6, is a temple mound that the Bullens described as well preserved with steep, straight sides and a top measuring 40 feet by 60 feet. The Bullens did not make any diagnostic collections there. 8Ci00041, formerly Cr-7, is a large shell mound area containing several mounds that protrude above the general mound elevation. The Bullen's limited collecting at this site produced several artifacts from the Weeden Island period. Ellis' description of site 8Ci00576 (Ellis 1993) was based on an inspection of exposed shoreline along the north side of Roberts Island. Ellis did not collect any materials, but conducted an on-site evaluation that yielded ceramic and lithic artifacts from the Deptford and Weeden Island periods.

Brent Weisman of the Florida Bureau of Archaeological Research revisited these resources in a 1994 CARL survey, producing a report for the FMSF in July 1995 (Weisman 1995). Weisman proposed that the Roberts Island site complex might have had dual functions, both as a ceremonial center and as a village. Weisman was enthusiastic about the preservation quality of the sites, but indicated the need for comprehensive survey in order to increase our understanding of them.

The remaining cultural resources in the park consist of collection objects located in the Visitor Center. The majority of the objects are artifacts or reproductions of artifacts recovered at Crystal River or nearby during the course of archaeological work. Most of these are objects that have been on loan from the Florida Museum of Natural History (formerly the Florida State Museum) since the mid-1960s, but some are the property of the Division of Recreation and Parks. Most of the objects are housed within exhibit cases and are used to interpret prehistoric and historic cultures of the area to visitors. A few objects are reserved for use in hands-on interpretive programs.

The Visitor Center was constructed in 1965 and will become eligible to be managed as

an historic resource during the period of the approved plan. The building will be managed as an historic resource for the purposes of this plan and will require a review by the Florida Division of Historical Resources. The building is architecturally significant as an example of mid-century modern architecture, designed by Dan P. Branch and David Reaves of Gainesville, FL in cooperation with Division Architect Warren Dixon.

The resources of the original park, 8Ci1, are generally in fair condition. Nevertheless, a few management problems exist. The condition of Mound A is poor. The most serious degradation of Mound A occurred when a large portion of it was used as fill on the White property prior to its acquisition by the state. Subsequent to that, visitors' ascent of the mound from the White addition may have caused accelerated deterioration of exposed slopes. More recently, however, fencing designed to redirect visitors to stairs that climb the mound may have mitigated the problem. Unfortunately, the southern slope of Mound A, the side that heavy machinery had cut into, continues to deteriorate due to uneven weathering of exposed layers in the mound (G. Ellis personal communication). Past measures to protect this large temple mound have included the construction of stairs to facilitate visitors' ascent of the mound, provision of a wooden platform at the summit, and management of vegetation on the slopes. These measures, however, may be insufficient to halt further long-term deterioration of the mound.

The condition of the ramp and top areas of Mound H, a lozenge-shaped temple mound in the northeast portion of the park, has been rated as poor in the past. Steady foot traffic over the 35-year existence of the park had compacted surface materials in some areas of the mound and loosened them in others. Vegetative cover on the sloped sides of Mound H is sparse even today, reflecting the high shell content of the soil and the steep angle of the slopes. Thinness of vegetative cover had once been an issue in areas where a few informal pathways had appeared. More recently, however, vegetation has increased, and the condition of Mound H has been upgraded to fair. Mound H is a delicate resource, and a significant decrease in vegetative cover or increase in active erosion on the mound could lead to a reassessment of its condition.

Mounds C, D, E and F are currently considered to be in fair condition. Interpretive paths or trails through the mound complex are paved with asphalt. This material has worn well and has protected the resources traversed by the trails. Several culverts along the trails apparently function to facilitate drainage. In recent years, surface water has begun to pool on site. There may be natural reasons for on-site pooling or trapping of water, including a slow rise in the water table or a rise in sea level. On the other hand, the drainage culverts themselves may be contributing to the problem in that they may be too small, their placement may not be optimal or they may be clogged with debris. Although the culverts and trails are modern site intrusions, their condition has a direct bearing on the condition of mounds C - F. If the pooling of water continues, it will eventually affect those mounds.

The two stelae in the original part of the park are in poor condition. Stele 1, the easternmost of the two stelae has been "protected" by a roofed shelter. Despite the shelter, or possibly because of the shelter, the condition of the stele continues to decline.

The unknown cultural resources of the White addition are considered to be in fair condition. They may be threatened by the very cleanup of the mobile home park that was intended to protect them. Until completion of a comprehensive survey, any resources that may have survived the placement of the mobile home park atop them are considered highly endangered. Recent investigations associated with the repair of a collapsed seawall at the park's boat slip have revealed that intact cultural deposits exist at the shoreline of the White addition and that these deposits extend into the river (Ellis 1999). The deposits lie below fill materials that were extracted from other cultural deposits, likely Mound A. These intact strata are only in fair condition due to their endangerment from boat wakes and the structural instability of some segments of the seawall. In 2003, Ellis and Gulf Archaeology Research Institute colleagues performed an emergency processing of the spoil pile produced during the dredging of the boat slip. Their recovery operations revealed the presence of intact but horizontally displaced midden soils containing cultural material and associated flora and fauna (Ellis, Dean and Martin 2003).

The cultural resources of Roberts Island are currently rated as fair. While they appear to be only slightly disturbed, no comprehensive overview of the resources exists. Once mapping and controlled testing have established the identity of the island's resources, the assessment of resource condition may be upgraded to good. Achieving a better understanding of the Roberts Island resources may lead to a modification of our interpretation of the original Crystal River site and its relationship to the Roberts Island sites, or a redefinition of the regional or national significance of either resource or both. The specific site 8Ci576 is in poor condition. It is eroding into the Crystal River and vessels passing at even slow speed cause additional washing. The site is located along a beach, which makes it accessible to visitors who come ashore to picnic, hike, or explore the dilapidated dwelling which sits atop part of the site, and which itself is the site's most recent cultural deposit. There may be no practical solution to the erosive washing or to souvenir hunting at the site. Planning decisions that determine the extent of public access, however, should consider the potential degree of endangerment to Roberts Island resources.

Collection objects in the Visitor Center are in good condition, with the exception of a few reproduction metal artifacts with copper components. These consistently deteriorate and have to be replaced. The exhibits in which the artifacts are displayed are physically in fair condition.

RESOURCE MANAGEMENT PROGRAM

Special Management Considerations

Timber Management Analysis

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

A timber management analysis was not conducted for this park. The total acreage for the unit is below the 1,000-acre threshold established by Florida Statutes. Timber management possibilities will be reevaluated during the next revision of this management plan.

Additional Considerations

Uncertainties regarding the exact boundary of the Roberts Island parcel will continue to be handled by cooperation with the adjacent land manager. Lands adjacent to the Roberts Island parcel are state-owned and under the management of the Division of Recreation and Parks, except for property to the south where a Citrus County environmental education center is located.

Management Needs and Problems

1. The condition of some of the park's cultural resources is only poor or fair.
 - A. Mound A in particular requires extensive stabilization to improve its condition.
 - B. The two stelae, while considered to be in fair condition, also need stabilization work.
 - C. Other mounds, especially Mound H, require constant maintenance of their vegetative cover to protect mound integrity.
 - D. Boat wakes continue to produce wave action that is currently destabilizing seawalls and endangering some of the park's cultural resources.
 - E. Given the constant threat to park resources, the systematic monitoring of all cultural resources needs to continue, with more detailed monitoring instituted as needed.
2. Documentation of some of the park's cultural resources is inadequate.
 - A. The resources of Roberts Island, in particular, are not well documented. Although numerous sites have been recorded on the island, little specific

information exists on the condition, function, extent or regional role of these sites.

- B.** The unknown resources of the White addition need additional documentation.
- 3.** The program for managing collections objects needs to adapt to current Division standards.
- 4.** Interpretive displays need revision.
 - A.** Narrative portions of interpretive displays need updating to reflect the results of recent research about cultures of the southeast and the Gulf Coast. Additional survey work on Roberts Island and the former White property would facilitate revision of the displays by increasing our knowledge of the physical aspects of the resources located there.
- 5.** Exotic plants occur in the park.
 - A.** Some exotic plants persist as ornamentals around park residences and on the White addition.
 - B.** Exotic plants have become established in natural areas of the park. The most invasive of the naturalized species are Chinese tallow, air potato and skunk vine.

Management Objectives

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

- 1.** Preserve, protect and maintain cultural resources within the park.
 - A.** Continue efforts to improve the condition of all cultural resources in the park.
 - B.** Consult with personnel at the Division of Historic Resources to determine the most appropriate means of stabilizing Mound A; then implement their recommendations. During the stabilization process, determine the feasibility of constructing an educational display to interpret the currently exposed profile of the mound. If it is determined that such a display is feasible, alter the interpretive plan of the park to reflect that.
 - C.** Pursue measures to stabilize the stelae. Seek professional expertise to determine the best course of action to halt further deterioration of the stelae and to develop Best Management Practices (BMPs) for their maintenance and stabilization. To the extent possible, implement the recommendations that are proposed.
 - D.** Continue to implement and expand the program of vegetation management and general maintenance of the mounds. In order to minimize impacts to earthen structures and gravesites, generally follow guidelines set forth in

Appendices B and C of the Resource Management Audit conducted in the park by the Bureau of Natural and Cultural Resources (Warzeski 1998). The park should consult District 2 biological staff before implementing any vegetation management practices on Roberts Island due to occurrences of uncommon plants there.

- E. Pursue expansion of the No Wake Zones near the park to minimize impacts of boat wakes on cultural resources. Park staff and other appropriate personnel should work with the proper authorities to expand the No Wake Zones.
 - F. Continue to monitor cultural resources on all the park properties. Implement photopoint monitoring at the park, focusing on the endangered resources, particularly Mound A, Mound H, and Ci00576.
2. Continue to support the identification and additional documentation of cultural resources in the park.
 - A. Pursue a comprehensive, professional survey of Roberts Island and the White addition to at least level II.
 - B. Use the results of this much-needed work to guide management activities at the park, including construction projects on either of these properties or improvements to interpretive programs. Surveys and research should incorporate a regional focus, and where possible, should be coordinated with work conducted on surrounding properties managed by the Division of Recreation and Parks or by Coastal and Aquatic Managed Areas (CAMA).
 - C. Use High Definition Documentation Survey (HDDS) techniques to document the current conditions at the site and provide baselines for the evaluation of future preservation and restoration projects within the park.
 3. Manage collections objects according to current Division standards.
 - A. As a necessary step toward meeting Division collection standards, the park should work toward achieving specific goals recommended in the 1997 Resource Management Audit conducted by Division personnel. These goals include development of a scope of collections statement, cataloging of formal and informal collections, development of cleaning schedules for display objects, tracing of missing records, and revision of file organization.
 4. Improve the interpretation of cultural resources at the park.
 - A. Review recent research and revise the park's interpretive programs as necessary to reflect current knowledge of the cultural resources of the park and the local area.
 - B. Modernize the park's interpretive displays.
 5. Protect, restore and maintain natural communities in the park.
 - A. Conduct field surveys to more accurately delineate the boundaries of natural communities on Roberts Island.
 6. Protect, restore and maintain native plant and animal diversity and natural relative abundance in the park.
 - A. Conduct additional field surveys to identify native plants and animals that occur in the park and update species lists as needed.

7. To the extent practical, establish and maintain a prescribed fire program at the park.
 - A. Coordinate with staff of the Crystal River Preserve State Park to allow prescribed fires conducted in tidal marshes within the preserve to cross the boundary into small areas of tidal marsh contained within Crystal River Archaeological State Park.
8. Establish and maintain a removal program for invasive exotic plant species.
 - A. Continue the active treatment of exotic plants at the park, especially Chinese tallowtree and skunk vine.
 - B. Develop a more detailed exotic plant control plan for the park.
 - C. Continue to cooperate with managers of adjacent public lands in efforts to control invasive exotic plants on a regional basis.
9. Protect, restore and maintain natural hydrological regimes in the park.
 - A. Maintain or replace existing culverts as needed to minimize retention of surface waters that may become impounded by asphalt trails in the park.

Management Measures for Natural Resources

Hydrology

As mentioned above in the Management Needs and Problems section, the asphalt trails that provide visitor access to the park may at times impound water, despite the presence of cross culverts beneath the trails that allow water to follow natural gradients. Routine maintenance (cleaning) of these culverts will be necessary to alleviate the situation. If the current culverts prove inadequate to prevent pooling, the park should investigate replacing them with culverts better designed to minimize retention of surface water and tidal floodwaters. 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 or other impacts to water resources.

Prescribed Burning

The objectives of prescribed burning are to create those conditions that are most natural for a particular community, and to maintain ecological diversity within the unit's natural communities. To meet these objectives, the park is partitioned into burn zones, and burn prescriptions are implemented for each zone. The park burn plan is updated annually to meet current conditions. All prescribed burns are conducted with authorization from the Department of Agriculture and Consumer Services, Division of Forestry (DOF). Wildfire suppression activities will be coordinated between the Division and the DOF.

Crystal River Archaeological State Park contains discrete patches of estuarine tidal marsh totaling less than six acres. Under normal conditions, water, salinity and occasional fire are the influences that maintain the tidal marsh in its natural state. These factors are largely beyond the control of management personnel at the park. However, portions of the marsh habitat within the park are contiguous to larger tracts of tidal

marsh within Crystal River Preserve State Park, which is now also under DRP management. Personnel at Crystal River Preserve rarely burn the preserve's tidal marshes since they are given a low priority on the Annual Burn Plan. In the event that prescribed burning of marshes in the preserve adjacent to Crystal River Archaeological State Park does take place, fire will be allowed to cross boundaries into the marshes of Crystal River Archaeological State Park as well.

Designated Species Protection

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

Park staff should exercise caution when operating watercraft in Crystal River and Salt River, and should report violations of the No Wake and speed limit zones to the Florida Park Patrol or FFWCC Marine Patrol.

No specific management measures for designated species are necessary in the park at this time.

Exotic Species Control

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

An exception to the Division's general policy regarding exotic plant removal occurs at Crystal River Archaeological State Park. Here the area classified as developed or extensively altered is larger than is typically found in a state park. Included in this category are previously modified and mowed areas, as well as the landscaped Visitor Center and exhibit grounds. Non-invasive, ornamental exotic plant species are not automatically removed from the landscaped areas, but staff should gradually replace them with native ornamentals as circumstances allow.

Plants that are highly invasive and most threatening to native species receive the

highest priority for removal from the park. Among these targeted species are Chinese tallowtree and skunk vine. Both have the potential to spread rapidly within the park and into the nearby preserve. The White property had significant numbers of exotic ornamental plant species when it was initially acquired. These are gradually being removed. Exotic plant species on the property are controlled through mechanical removal and use of Division-approved herbicides where necessary. An exotics removal plan and schedule is regularly implemented. Staff should use caution when applying herbicides near or on shell mounds. Low volume methods such as cut-stump or hack-and-squirt should be used instead of high-volume foliar application or direct soil application.

Feral hogs and armadillos are known to pass through the park, although active rooting appears to be rare. If the feral hogs or armadillos initiate any soil disturbance on site, control measures should be instituted immediately.

Problem Species

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

Eastern coral snakes and Florida cottonmouths have been observed in the park. If these species are encountered in areas frequented by the public, they will be relocated to more isolated parts of the park, or to the adjacent preserve.

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. Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to approval of the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination.

In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case-by-case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should prepare for locating and evaluating historic resources, both archaeological sites and historic structures.

1. The park will continue its efforts to stabilize Mound A and Stele I and preserve mound H, and will investigate possible alternative approaches to stabilization that may prove more effective over time.
2. The park will pursue expansion of the No Wake Zones near the park to minimize erosion impacts from boat wakes.
3. Park staff will establish photopoints throughout the park and will continue to monitor all cultural resources systematically, but with a focus on the more endangered resources.
4. Park staff will continue to pay special attention to the condition of 8Ci576 on Roberts Island, monitoring the site regularly and formally recording its condition on at least a quarterly basis.
5. Park and district staffs will seek the necessary funding to hire professional archaeologists to conduct level II cultural resource surveys of Roberts Island and the White addition.
6. The park will continue its gradual progression toward applying Division collections management standards to all the park collections.
7. Park and district staffs will continue efforts to revise the narrative portions of interpretive exhibits in the Visitor Center so that they more accurately reflect the current understanding and interpretation of cultural resources found not only in the park and but also in the general region.

Research Needs

Natural Resources

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

A basic inventory of plant and animal species present at Crystal River Archaeological State Park is recommended, particularly for Roberts Island. The park has no other specific needs for research in the natural resources field.

Cultural Resources

Any research, which involves either surface collection of natural or cultural materials or surface disturbance, requires both a previously issued permit from the Division and a

previously issued permit from the Division of Historical Resources in accordance with 1A-31 or 1A-32 Florida Administrative Code. Copies of research results must also be forwarded to the park, district, and the Bureau of Natural and Cultural Resources.

Research needs in cultural resources include:

1. Intensive, long-term cultural resources survey of Roberts Island.
2. Cultural resources survey of the White addition.
3. Additional research at area archaeological sites, both at the park and at privately owned sites in the region. Such research could greatly increase our knowledge and understanding of the aboriginal cultures that once thrived there.
4. Research that would aid in the development of modern interpretive exhibits for the visitor center.
5. Updating of the National Historic Landmark listing to accommodate the addition of new properties to the park since the original listing took place, and to reflect additional research that taken place since the site was originally nominated.
6. Investigations into management practices at other mound sites throughout the United States for applying relevant practices to the management of Crystal River Archaeological State Park.

Resource Management Schedule

A priority schedule for conducting all management activities that is based on the purposes for which these lands were acquired, and to enhance the resource values, is contained in Addendum 6. Cost estimates for conducting priority management activities are based on the most cost effective methods and recommendations currently available.

Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation, and recreation lands titled in the name of the Board of Trustees of the Internal Improvement Trust Fund (board) are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032, the board of trustees, acting through the Department of Environmental Protection (department). The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required update of its management plan.

Crystal River Archaeological State Park was subject to a land management review on June 11, 2001. The review team made the following determinations:

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

LAND USE COMPONENT

INTRODUCTION

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

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

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

EXTERNAL CONDITIONS

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

Existing Use of Adjacent Lands

The Roberts Island parcel is bounded by Crystal River Preserve State Park and the Crystal and Salt Rivers. The administrative, research and educational offices are located directly across from Roberts Island. The park's mainland parcel is nearly surrounded by the preserve and Crystal River, with a residential development located along the eastern boundary. Preserve lands and open waters serve to buffer the park from encroaching development.

Planned Use of Adjacent Lands

Adjacent conservation lands, open water and associated tidal marshes and an

absence of undeveloped private lands limit opportunities for development next to the park. No additional land use changes of concern are anticipated adjacent to the park in the near future.

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.

The park occupies 61.55 acres on the shores of the Crystal and Salt Rivers. The park's primary resource is an Indian mound complex located on the mainland parcel. In addition to the cultural resources, the natural communities in the park include prairie hammock, hydric hammock, estuarine tidal marsh, shell mounds and spring-run stream.

The mainland parcel includes a seven-mound complex that provides exemplary opportunities for cultural resource interpretation and is where public visitation is focused. The potential visual resources of this property are exceptional. Mound "A" overlooks the Crystal River, and is one of the tallest elements when viewed from the river.

The Crystal and Salt River are heavily used by boaters. Slow speed zones on the Salt River and a portion of the Crystal River regulate boater traffic around the southern and eastern sides of Roberts Island (see Reference Map). Choppy conditions, exacerbated by boat wakes, are not conducive to boats tying up to the sea wall protecting the shoreline of the mainland parcel. There is currently no public boating access to the park.

Roberts Island is located at the confluence of the Salt and Crystal Rivers, and contains a significant mound complex. This property is accessible only by boat. Its isolation and sensitive resources currently restrict if from public access.

Assessment of Use

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

Past Uses

The White tract located just south of the park was the location of a trailer park until 1993. A severe storm damaged the area and federal regulations prohibited rebuilding in this flood prone area.

Roberts Island was transferred from private ownership to the State in 1996. The previous owners constructed a residence and a boat basin. A small structure, constructed during the 1940s, was used as a residence, and later as a fish-camp. The small spring behind this structure was filled in, probably by the early 50s.

Future Land Use and Zoning

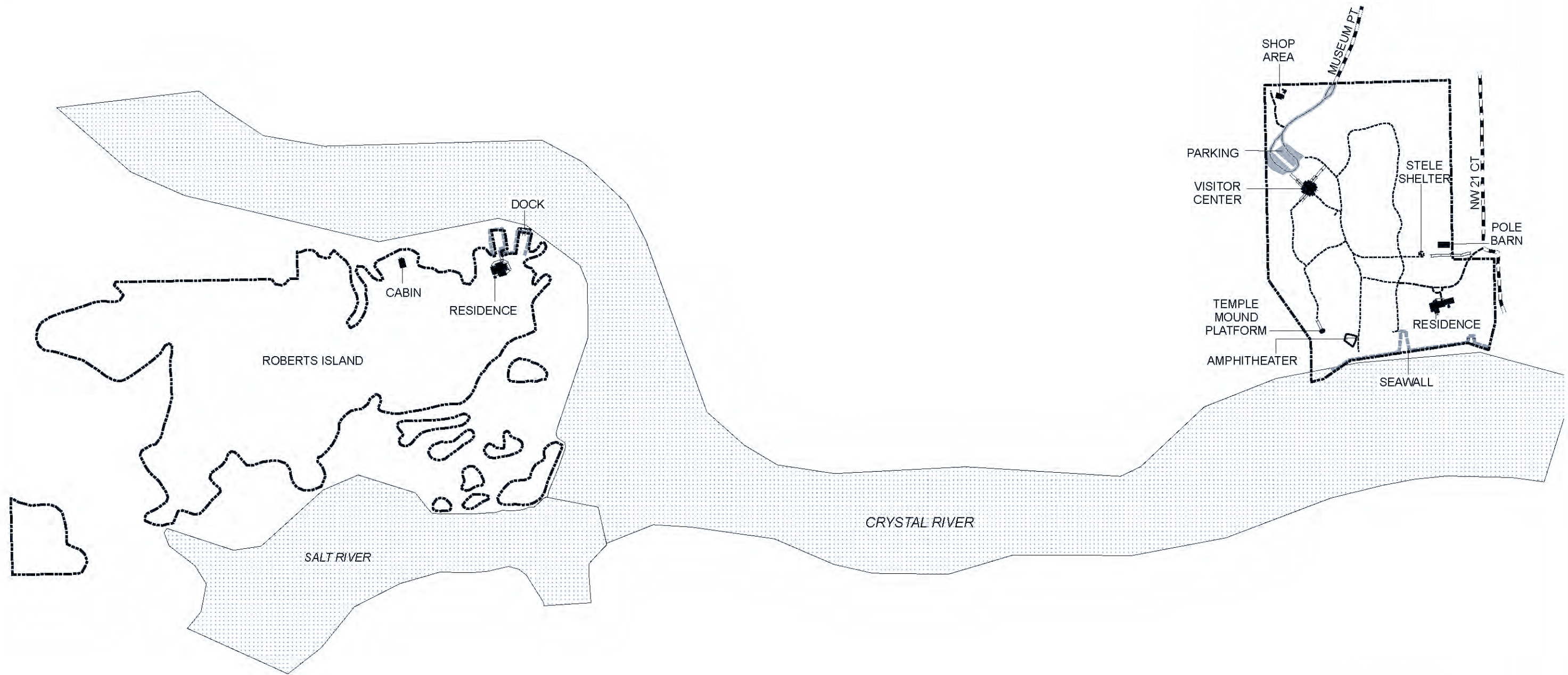
The Division works with local governments to establish designations that provide both consistency between comprehensive plans and zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation opportunities.

Citrus County Future Land Use (FLU) and zoning for Roberts Island and the original parcel is Conservation (CON). The CON district applies to publicly owned lands where management objectives are directed towards protection and conservation of sensitive land, water and other natural resources, including designated historic and archaeological sites. Development is limited to those facilities, which further the purposes of the management plan.

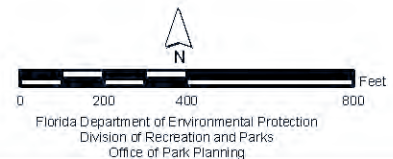
City of Crystal (White tract) FLU designation is Public/Semi-Public and zoning is Conservation. Resource-based recreation uses are permitted within these designations.

Current Recreational Use and Visitor Programs

The primary recreational use at this park is cultural resource interpretation. Other recreational uses include fishing, birding and picnicking. Boat tours of the Crystal River are available three days a week and focus on the natural and cultural history of the area. The tour boat departs from the Crystal River Preserve State Park boat basin. A variety of ranger guided talks, tours, slide programs and hands-on learning opportunities are offered both on and offsite on a scheduled and upon request basis. The park recorded 19,044 visitors in fiscal year 2006/07. It is estimated that those visitors contributed \$1,002,545 in total direct economic impact to the local community



CRYSTAL RIVER
ARCHAEOLOGICAL STATE PARK



- LEGEND
- Park Boundary
 - County Road
 - Park Road Paved
 - Park Road Unpaved
 - Hiking Trails
 - Structures
 - Parking Lots
 - Marine Structures

BASE MAP

(FDEP, 2007). Peak visitation occurs during the winter season.

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 Crystal River Archaeological State Park, all undeveloped areas have been designated as protected zones due to the presence of significant cultural resources (see Conceptual Land Use Plan).

Existing Facilities

Archaeological artifacts from the Crystal River region are exhibited in the park's Visitor Center. Interpretation of the site is enhanced by a large diorama that illustrates the extent of the cultural site in earlier periods. A paved trail leads from the Visitor Center through the mound complex to points of interest and trailside exhibits. Wooden steps provide access to the top of temple mound "A" with outstanding views of the Crystal River. A sea wall protects the mainland parcel from erosion along the river shoreline. The park manager's residence, small boat basin, shop buildings and the shell of a pole barn comprise park support facilities. The boat basin is used for service access. A service boat dock near the residence is in disrepair and no longer usable.

A ranger residence, an abandoned fish-camp structure, small boat basin and boat dock are located on Roberts Island. The following is a listing of recreation and support facilities at the park:

Mainland Parcel

Visitor Center	Flammable storage building
Paved interpretive trail (0.75 mi.)	Residence
Wooden steps and platform on top of mound A	Boat basin
Paved parking (28 vehicles)	Sea wall
Shop building	Park Drive (0.1 mi.)

Roberts Island

Residence
Old fish-camp structure
Boat basin and dock

CONCEPTUAL LAND USE PLAN

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

Site Planning and Design Process

During the development of the unit management plan, the Division assesses potential impacts of proposed uses on the resources of the property. Uses that could result in unacceptable impacts are not included in the conceptual land use plan. Potential impacts are more thoroughly identified and assessed through the site planning process once funding is available for the development project. At that stage, design elements, such as sewage disposal and stormwater management, and design constraints, such as designated species or cultural site locations, are more thoroughly investigated.

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

Proposed improvements are within an area of the park that has experienced significant past disturbance from land uses prior to state ownership. However, there remains the potential for impacts to subsurface archaeological resources. At one time Mound A extended onto the White Tract. A significant portion has been removed or redistributed as fill in the area. Past work on the seawall and boat basin have revealed intact subsurface cultural deposits along the shoreline and extending into the river. The design and construction of new facilities will remain sensitive to this fact and require close coordination with the Division's Bureau of Natural and Cultural Resources and the Division of Historic Resources. Additional archaeological surveys may be necessary prior to construction activity.

Potential Uses and Proposed Facilities

The potential inherent to Crystal River State Archaeological State Park for heritage-based recreation and education programs is tremendous as the park's unique cultural resources attract state, national and international visitors. The sensitivity of cultural resources often precludes opening them to public access, except under very controlled conditions. The park is unique in that it affords the public an opportunity to walk



SEE ENLARGEMENT

UPGRADE VISITOR CENTER EXHIBITS

LANDSCAPE & TRAIL IMPROVEMENTS
 *Improve/expand signage
 *Reestablish open vista of mound complex

RESTROOM

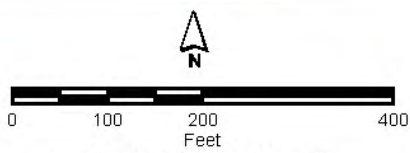
PICNIC SHELTERS

(STRUCTURE NO LONGER EXISTS)

LEGEND

- EXISTING TRAIL
- ▭ STATE PARK BOUNDARY
- ★ PROPOSED FACILITIES

CRYSTAL RIVER
 ARCHAEOLOGICAL
 STATE PARK



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

CONCEPTUAL
 LAND USE PLAN

openly among an astounding concentration of visible cultural features representing over two thousand years of human occupation of the site. As such, improvements of the educational and interpretative facilities to raise public awareness of the importance of the resources at the park are at the core of this plan.

Interpretive Improvements. The park Visitor Center is the focal point of interpretation at the park. Existing exhibits provide a wealth of information about the cultural history of the site. However, they were developed decades ago and are not currently up to modern interpretive standards. It is recommended that the exhibits be replaced to reflect current knowledge of the site and enhance their interactivity and interest to the public.

The park interpretive trail should be evaluated for opportunities to provide additional information, signage and displays to facilitate an understanding of individual features and the overall planned design of the mound complex. Interpretive stations and signage should be extended onto the White tract. This area provides an opportunity to discuss the importance of archaeological stewardship and land use impacts to cultural resources. Vegetation that obscures the architectural design of the site should continue to be removed consistent with Division guidelines for managing earthen structures. These actions, combined with a restored Mound A, would significantly improve the public's understanding and appreciation of the site.

Picnicking. This activity is currently utilized primarily by scheduled educational demonstrations but has the potential to provide recreational opportunities to a broader section of the public. Two large picnic shelters are proposed near the shoreline east of Mound A. In addition, a restroom is recommended to serve users in this area and should be located to take advantage of existing sewer lines running to the nearby manager's residence.

Facilities Development

Preliminary cost estimates for the following list of proposed facilities are provided in Addendum 6. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist the Division in budgeting future park improvements, and may be revised as more information is collected through the planning and design processes.

Interpretive Improvements

Upgrade Visitor Center exhibits

Expand/upgrade trail signage

Picnicking

Picnic Shelters (2)

Restroom

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.

Table 1--Existing Use And Optimum Recreational Capacity

Activity/Facility	Existing Capacity		Proposed Additional Capacity		Estimated Recreational Capacity	
	One Time	Daily	One Time	Daily	One Time	Daily
	Museum & Interpretive Trail	120	480			120
Picnicking	75	300			75	300
TOTAL	195	780	0	0	195	780

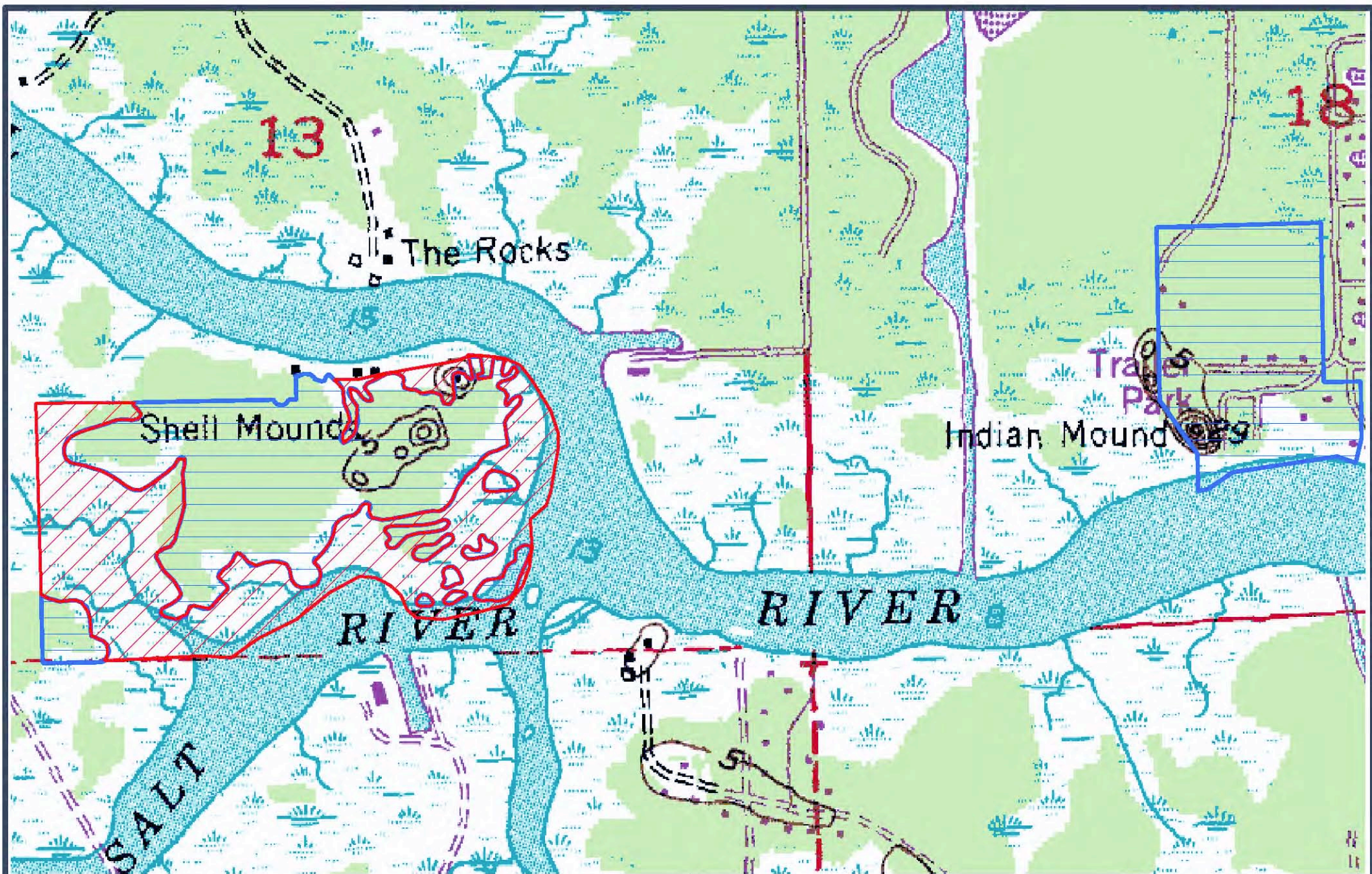
Optimum Boundary

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

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

land use or zoning regulations. Identification is not to be used as the basis for permit denial or the imposition of permit conditions.



The park's optimum boundary includes submerged lands surrounding Roberts Island. These lands contain cultural resources that are important to be managed as part of the park.



CRYSTAL RIVER ARCHEAOLOGICAL
STATE PARK



LEGEND

-  Park Boundary
-  Optimum Boundary

OPTIMUM BOUNDARY MAP

Addendum 1 – Acquisition History

Crystal River Archaeological State Park – Acquisition History

Purpose of Acquisition

The State of Florida acquired Crystal River Archaeological State Park to protect, develop, operate and maintain the park for public outdoor recreational, park, conservation, historic and related purposes.

Sequence of Acquisition

On August 6, 1962, the Florida Board of Parks and Historic Memorials (FBPHM), obtained title to a 14.5-acre property through a donation. This property became Crystal River Archaeological State Park. Since the donation, the State acquired additional parcels and incorporated them into Crystal River Archaeological State Park. This park contains 61.55 acres.

On September 28, 1967, FBPHM transferred and conveyed title to Crystal River Archaeological State Park to the Board of Trustees of the Internal Improvement Trust Fund (Trustees). On January 23, 1968, the Trustees conveyed management authority of the park to the Department of Environmental Protection, Division of Recreation and Parks (Division) under Lease No. 2324 for a period of ninety-nine (99) years.

On December 21, 1984, the term of this lease was amended to 50 years commencing on the same date as the lease amendment. In 1988, the Trustees assigned a new lease number to the park without making any changes to the terms and conditions of Lease No. 2324. The Division manages the park under Lease No. 3614. The lease will expire on December 20, 2034.

Title Interest

The Trustees hold fee simple title to Crystal River Archaeological State Park.

Outstanding Reservations

Lease No. 3614 stipulates that all the property be used for public outdoor recreation and related purposes. The park has been designated single use to provide public outdoor recreation. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

Crystal River Archaeological State Park – Acquisition History

Following is a listing of outstanding rights, reservations and encumbrances that apply to Crystal River Archaeological State Park.

Instrument:Deed
Instrument Holder:S. M. & E. A. Whitcraft and G. C. & I. Dyer.
Beginning Date:.....August 6, 1962
Ending Date:.....There is no specific ending date given.
Outstanding Rights, Uses, Etc.:The deed was executed and delivered subject to that the premises be used exclusively for public park and related purposes. Should the property cease to be used for these purposes for a period of five consecutive years, the title shall revert to the grantors.

Addendum 2 – References Cited

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(Includes Additional References Not Cited In Text)

Addendum 3 – Soil Descriptions

Crystal River Archaeological State Park Soil Descriptions

(13) Okeelanta muck - This soil is nearly level and very poorly drained. It is in depressions and freshwater coastal swamps. It receives drainage from other soils and retains the water form long periods. The mapped areas are irregular in shape and range from about 5 to 150 acres. The slopes are less than 2 percent.

Typically, the surface layer is well decomposed, black muck about 8 inches thick. Below that layer, very dark gray muck extends to a depth of 35 inches, and very dark grayish muck extends to a depth of 38 inches. The underlying material to a depth of 80 inches or more is light grayish brown and light gray fine sand.

Included with this soil in mapping are small areas of depressional phases of Basinger, EauGallie, and Pompano soils and some small areas of Lauderhill and Terra Ceia soils. The included soils make up about 25 percent of the map unit.

This soil is ponded for 6 to 12 months. The water table recedes to a depth of less than 10 inches during dry periods. Internal drainage is slow. The organic material is exposed to oxidation by the removal of the water, and subsidence occurs. With continued artificial drainage for and extended period, only a small part of the original organic surface layer may remain, and the mineral layer may be near the surface or exposed. Permeability is rapid. The organic material is height absorbent and has a very high available water capacity. The underlying sands have a low or very low available water capacity. Natural fertility is moderate.

(22) Quartzipsamments - Quartzipsamments soil is nearly level to gently sloping. It has been reworked and shaped by earthmoving equipment. This map unit commonly is adjacent to urban lands but can occur throughout the country. Many areas of this soil were formerly sloughs, marshes, shallow ponds, or other areas of standing water. These areas have been filled with sandy soil material to the level of the surrounding landscape, or higher. In a few areas, this soil originally was on the high ridges that were excavated to below natural ground level. Smoothing and shaping have made the soil better suited to use as sites for buildings, roads and streets, recreation areas, and other related uses.

The color and thickness of the various layers of this soil are variable. One of the more common profiles has a surface layer of mottled, brownish-yellow and pale brown, fine sand 54 inches thick. The upper part of the underlying material, to a depth of 59 inches, is dark gray, fine sand. The lower part to a depth of 80 inches is brownish-yellow, fine sand.

The depth of the water table is variable, but ranges from about 20 inches to more than 72 inches depending on the thickness of the fill material and drainage of the underlying soil. In most excavated areas, the water table is at a depth of more than 72 inches. Permeability is variable, but generally is very rapid. The available water capacity is also

Crystal River Archaeological State Park Soil Descriptions

variable, but generally is very low. Natural fertility is very low.

In most parts of the county, the soil has slight limitations to use as septic tank absorption fields if sufficient fill material has been added to lower the water table to a suitable depth. If the fill layer is too thin and the area was formerly a ponded site, this soil has severe to moderate limitations to use as septic tank absorption fields if a drainage system has not been installed to remove the excess water. Seepage is a severe limitation if this sandy soil is used for sanitary landfills or sewage lagoons unless the facilities are sealed to help prevent ground water contamination.

(23) Weekiwachee-Durbin mucks - This complex consists of very poorly drained, well decomposed soils that contain sulfur. These soils occur along the coast at about sea level in broad, flat tidal marshes. The soil area is a transition zone between freshwater and marine water. Weekiwachee soil occurs in parts that are adjacent to mineral soils or rock outcrop. Durbin soil is mainly exposed to open water and along tidal flood channels and streams.

Weekiwachee soil typically has a surface layer of black muck that extends to a depth of 34 inches. The underlying material is gray fine sand that extends to a depth of 38 inches. The next underlying layer is white, soft limestone bedrock underlain by hard limestone bedrock.

Durbin soil has a 7-inch surface layer of very dark gray muck. The underlying layer is black muck that extends to a depth of 80 inches. Lauderhill, Okeelanta, and Terra Ceia soils, and rock outcrop are also included in small areas of this complex. A soil similar to Weekiwachee soil occurs near inland areas. It has a sandy substratum up to 30 inches thick between the organic layers and the bedrock.

Most of the soils in this complex are flooded daily at normal high tide and all are flooded during storm tides. The organic soils remain nearly saturated between high tides. The available water capacity is very high.

The soils in this unit are not suited to urban development, cultivated crops, improved pasture, rangeland, or commercial tree production. Drainage of these soils causes extreme acidity due to the oxidation of the sulfur content.

(24) Okeelanta-Lauderhill-Terra Ceia mucks - Okeelanta-Lauderhill-Terra Ceia mucks consist of nearly level, very poorly-drained, well-decomposed organic soils. These soils are in broad freshwater swamps that parallel the coast. Most of the area is less than five feet above sea level, and limestone bedrock is frequently within 80 inches of the surface layer. Mineral soils on small, slightly elevated islands are adjacent to these organic soils. Poorly defined, small ponds and streams are common during dry periods. Water covers most of the area during wet periods. A few freshwater springs are present.

Crystal River Archaeological State Park Soil Descriptions

The soils in this complex are ponded for six to twelve months. The water recedes to a depth of less than ten inches during extended periods of drought. Internal drainage is slow. Surface outlets are limited. Permeability is rapid in the organic layers and is very rapidly permeable in pedons that have sandy mineral layers. The available water capacity is very high in the organic layers and is low in the mineral layers. Natural fertility is high. Vegetation is limited to water-tolerant plants. With artificial drainage, these soils are subject to excessive oxidation resulting in subsidence and as such, have severe limitations with respect to development.

(27) Pomello fine sand, 0 to 5 percent slopes - This soil is nearly level to gently sloping and moderately well drained. It is on low ridges and knolls on the flatwoods and also occurs in areas adjacent to some streams and water areas. The mapped areas are mainly oval to oblong and range from 5 to 20 acres.

Typically, the surface layer is dark gray and light brownish gray fine sand 5 inches thick. The subsurface layer, to a depth of 31 inches, is white fine sand. The upper part of the subsoil, to a depth of 52 inches, is black and dark brown fine sand. The lower part to a depth of 80 inches is brown fine sand.

Included with this soil in mapping are small areas of Basinger, EauGallie Immokalee, Myakka Orsino, and Paola soils. Also included are small areas of soils that have limestone cobbles and boulders at a depth of more than 60 inches. These buried rocks and boulders are mainly in areas adjacent to soils that are underlain by bedrock within 80 inches of the surface layer or adjacent to rock outcrop areas. The included soils make up less than 20 percent of the map unit.

The water table is at a depth of 2 to 3.5 feet for 1 month to 4 months and between depths of 3.5 and 5 feet for 8 months. Permeability is very rapid in the surface and subsurface layers. It is moderate in the upper part of the subsoil and moderately rapid in the lower part. The available water capacity is moderate in the subsoil and very low in the other layers. Reaction ranges from very strongly acid, to medium acid. Natural fertility is very low. The soil rapidly becomes droughty as the water table is lowered.

(37) Matlacha, limestone substratum-Urban land complex - Matlacha, limestone substratum-Urban land complex consists of nearly level, somewhat poorly-drained Matlacha soil and areas of Urban land. Matlacha soil was formed by fill material from early earth-moving operations. Typically, Matlacha soil has a surface layer that is very dark, grayish-brown, gravelly, fine sand about six inches thick. The lower part, to a depth of about 23 inches, is mottled white, brown and yellow, fine sand mixed with 25 percent limestone fragments and scattered pockets of fine-textured clay material. Below the layers of fill material is original buried soil. The upper part of the buried soil, to a depth of about 44 inches, is a very dark grayish-brown and light gray sand. The next

Crystal River Archaeological State Park Soil Descriptions

layer, to a depth of 48 inches, is light brownish-gray, fine, sandy loam. Below the fine sandy loam is a thin layer of soft limestone bedrock underlain by hard, white, fractured limestone bedrock.

Matlacha soil has a water table between depths of two and three feet for one month to three months annually. In many areas, the high water table and depth to bedrock are moderate to severe limitations to the use of these soils for most sanitary facilities and for building site development.

(39) Hallandale-Rock Outcrop complex, rarely flooded - This complex consists of nearly level, poorly drained, mineral soil and rock outcrop. This soil is underlain by bedrock at a depth of 20 inches or less.

Typically, Hallandale soil has a surface layer that is black fine sand about 2 inches thick. The subsurface layer, to a depth of 6 inches, is grayish brown fine sand. The subsoil, to a depth of 10 inches, is yellowish brown fine sand. Below the subsoil is hard limestone bedrock. Rock outcrop is randomly scattered, and individual exposures are mostly less than 2 square feet.

(49) Terra Ceia-Okeelanta association, frequently flooded - This association consists of nearly level, very poorly drained, organic soils found along the edges of freshwater rivers and lakes. Terra Ceia soil is adjacent to the open water and makes up about 65 percent of the complex. It has a 10 inch surface layer of black muck, and a subsurface layer of black and red-brown muck that extends to a depth of 80+ inches. Okeelanta soil borders the inland side and makes up about 20 percent of the complex. This soil has a 10 inch surface layer of black muck, and a subsurface layer of dark brown muck that extends to a depth of about 27 inches. It also contains an underlying layer of light gray, fine sand that extends to a depth of 65 inches. Small areas of Basinger and Lauderhill soils, and areas of rock outcrop are also included in this association.

During low tide, the soils in this association are covered by shallow water from the adjacent streams and rivers. At high tide, flood waters are generally 2 to 3 feet above the surface. This daily fluctuation of flooding allows for discharge of the river.

Addendum 4 – Plant And Animal List

Crystal River Archeological State Park Plants

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

Giant leather fern	Acrostichum danaeifolium	63
Tuberous sword fern	Nephrolepis cordifolia *	
Resurrection fern.....	Pleopeltis polypodioides	
Virginia chain fern	Woodwardia virginica	

GYMNOSPERMS

Red cedar	Juniperus virginiana	
Slash pine	Pinus elliottii	
Pond pine	Pinus serotina	
Oriental arborvitae.....	Platyclusus orientalis *	
Yew plumpine	Podocarpus macrophyllus *	
Coontie.....	Zamia pumila.....	81, 82

ANGIOSPERMS

Monocots

Broomsedge bluestem	Andropogon virginicus	
Common asparagus-fern	Asparagus setaceus *	
Bandana-of-the-Everglades	Canna flaccida	
Jamaica swamp sawgrass	Cladium jamaicense	
Day-flower	Commelina diffusa	
String-lily	Crinum americanum	
Air-potato	Dioscorea bulbifera *	
Common water-hyacinth.....	Eichhornia crassipes *	
Green-fly orchid	Epidendrum conopseum	35, 81, 82
Fingergrass.....	Eustachys sp.	
White gingerlily.....	Hedychium coronarium *	
Prairie iris	Iris hexagona	
Carolina redroot.....	Lachnanthes caroliana	
Common banana	Musa x paradisiaca *	
Green arrow arum	Peltandra virginica	
Common reed	Phragmites australis	
Needle palm	Rhapidophyllum hystrix	82
Cabbage palm.....	Sabal palmetto	
Grassy arrowhead	Sagittaria graminea	
Bulltongue arrowhead	Sagittaria lancifolia	
Saw palmetto	Serenoa repens	

* Non-native Species

Crystal River Archeological State Park Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
Earleaf greenbrier.....	<i>Smilax auriculata</i>	
Saw greenbrier.....	<i>Smilax bona-nox</i>	
Marshhay cordgrass	<i>Spartina patens</i>	
Spring ladiestresses	<i>Spiranthes vernalis</i>	
Smutgrass.....	<i>Sporobolus indicus</i> *	
St. Augustinegrass	<i>Stenotaphrum secundatum</i>	
Ballmoss.....	<i>Tillandsia recurvata</i>	
Southern needleleaf	<i>Tillandsia setacea</i>	
Spanish moss	<i>Tillandsia usneoides</i>	
Broadleaf cattail	<i>Typha latifolia</i>	
Spanish bayonet	<i>Yucca aloifolia</i>	
Lawn orchid.....	<i>Zeuxine strateumatica</i> *	

Dicots

Boxelder.....	<i>Acer negundo</i>	
Red maple	<i>Acer rubrum</i>	
Mimosa	<i>Albizia julibrissin</i> *	
Common ragweed	<i>Ambrosia artemisiifolia</i>	
Peppervine	<i>Ampelopsis arborea</i>	
Groundnut	<i>Apios americana</i>	
Saltwater falsewillow	<i>Baccharis angustifolia</i>	
Sea myrtle	<i>Baccharis halimifolia</i>	
Rattan vine	<i>Berchemia scandens</i>	
Beggarticks.....	<i>Bidens alba</i>	
Spanish needles	<i>Bidens bipinnata</i>	
American beautyberry.....	<i>Callicarpa americana</i>	
Trumpet creeper.....	<i>Campsis radicans</i>	
Pignut hickory	<i>Carya glabra</i>	
Hackberry	<i>Celtis laevigata</i>	
Common buttonbush	<i>Cephalanthus occidentalis</i>	
Eastern redbud	<i>Cercis canadensis</i>	
Snowberry	<i>Chiococca alba</i>	
Camphortree.....	<i>Cinnamomum camphora</i> *	
Citrus.....	<i>Citrus sp.*</i>	
Virginsbower	<i>Clematis virginiana</i>	
Carolina coralbead	<i>Cocculus carolinus</i>	
Flowering dogwood	<i>Cornus florida</i>	
Swamp dogwood	<i>Cornus foemina</i>	
Leafless swallowwort.....	<i>Cynanchum scoparium</i>	
Buttonweed.....	<i>Diodia virginiana</i>	

* Non-native Species

Crystal River Archeological State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for designated species)
Common persimmon.....	<i>Diospyros virginiana</i>	
Coralbean	<i>Erythrina herbacea</i>	
American strawberrybush	<i>Euonymus americanus</i>	
Poinsettia	<i>Euphorbia pulcherrima</i> *	
Common fig	<i>Ficus carica</i> *	
Godfrey's swampprivet	<i>Forestiera godfreyi</i>	16
White ash.....	<i>Fraxinus americana</i>	
Carolina ash	<i>Fraxinus caroliniana</i>	
Green ash.....	<i>Fraxinus pennsylvanica</i>	
Dwarf huckleberry	<i>Gaylussacia dumosa</i>	
Yellow jessamine	<i>Gelsemium sempervirens</i>	
Water locust	<i>Gleditsia aquatica</i>	
Loblolly bay	<i>Gordonia lasianthus</i>	
English Ivy	<i>Hedera helix</i> *	
Dahoon	<i>Ilex cassine</i>	
Yaupon.....	<i>Ilex vomitoria</i>	
Largestem morningglory	<i>Ipomoea macrorhiza</i>	
Man-of-the-earth	<i>Ipomoea pandurata</i>	
Bigleaf sumpweed.....	<i>Iva frutescens</i>	
Flamegold.....	<i>Koelreuteria elegans</i> subsp. <i>formosana</i> *	
Canadian toadflax.....	<i>Linaria canadensis</i>	
Sweetgum.....	<i>Liquidambar styraciflua</i>	
Coral honeysuckle	<i>Lonicera sempervirens</i>	
Southern magnolia.....	<i>Magnolia grandiflora</i>	
Sweetbay.....	<i>Magnolia virginiana</i>	
Snow squarestem	<i>Melanthera nivea</i>	
White sweetclover.....	<i>Melilotus albus</i> *	
Creeping cucumber	<i>Melothria pendula</i>	
Red mulberry	<i>Morus rubra</i>	
Wax myrtle.....	<i>Myrica cerifera</i>	
Black gum.....	<i>Nyssa sylvatica</i>	
Pricklypear	<i>Opuntia humifusa</i>	
Skunkvine.....	<i>Paederia foetida</i> *	
Virginia creeper	<i>Parthenocissus quinquefolia</i>	
Purple passionflower.....	<i>Passiflora incarnata</i>	
Red bay	<i>Persea borbonia</i>	
Swamp bay.....	<i>Persea palustris</i>	
American pokeweed.....	<i>Phytolacca americana</i>	
Japanese cheesewood	<i>Pittosporum tobira</i> *	
Southern plantain	<i>Plantago virginica</i>	

* Non-native Species

Crystal River Archeological State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for designated species)
Mild waterpepper	<i>Polygonum hydropiperoides</i>	
Carolina laurelcherry	<i>Prunus caroliniana</i>	
Wild coffee	<i>Psychotria nervosa</i>	
Rougeplant	<i>Rivina humulis</i>	
Laurel oak	<i>Quercus laurifolia</i>	
Live oak	<i>Quercus virginiana</i>	
Myrsine	<i>Rapanea punctata</i>	
Carolina buckthorn	<i>Rhamnus caroliniana</i>	
Winged sumac	<i>Rhus copallinum</i>	
Carolina wild petunia	<i>Ruellia carolinensis</i>	
Smallflower mock buckthorn	<i>Sageretia minutiflora</i>	
Coastalplain willow	<i>Salix caroliniana</i>	
Elderberry	<i>Sambucus canadensis</i>	
Soapberry	<i>Sapindus saponaria</i>	
Chinese tallowtree	<i>Sapium sebiferum *</i>	
Lyre-leaved sage	<i>Salvia lyrata</i>	
Brazilian pepper	<i>Schinus terebinthifolius *</i>	
Gum bully	<i>Sideroxylon lanuginosum</i>	
Hairy leafcup	<i>Smallanthus uvedalia</i>	
Nightshade	<i>Solanum sp.</i>	
Florida hedgenettle	<i>Stachys floridana</i>	
Climbing aster	<i>Symphotrichum carolinianum</i>	
Carolina basswood	<i>Tilia americana var. caroliniana</i>	
Eastern poison ivy	<i>Toxicodendron radicans</i>	
American elm	<i>Ulmus americana</i>	
Florida elm	<i>Ulmus americana var. floridana</i>	
Giant ironweed	<i>Vernonia gigantea</i>	
Walter's viburnum	<i>Viburnum obovatum</i>	
Sweet viburnum	<i>Viburnum odoratissimum *</i>	
Early blue violet	<i>Viola palmata</i>	
Primroseleaf violet	<i>Viola primulifolia</i>	
Common blue violet	<i>Viola sororia</i>	
Summer grape	<i>Vitis aestivalis</i>	
Muscadine	<i>Vitis rotundifolia</i>	
Chinese wisteria	<i>Wisteria sinensis *</i>	
Hercules'-club	<i>Zanthoxylum clava-herculis</i>	

* Non-native Species

Crystal River Archeological State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for all species)
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INVERTEBRATES

Echo moth	<i>Seirarctia echo</i>	82
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AMPHIBIANS

Eastern narrowmouth toad.....	<i>Gastrophryne carolinensis</i>	35
Green treefrog.....	<i>Hyla cinerea</i>	35
Squirrel treefrog	<i>Hyla squirella</i>	35
Bullfrog.....	<i>Rana catesbeiana</i>	35
Pig frog	<i>Rana grylio</i>	35
Southern leopard frog	<i>Rana sphenoccephala</i>	35

REPTILES

Crocodylians

American alligator	<i>Alligator mississippiensis</i>	55
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Turtles

Florida softshell turtle	<i>Apalone ferox</i>	55
Florida snapping turtle.....	<i>Chelydra serpentina osceola</i>	55
Gopher tortoise.....	<i>Gopherus polyphemus</i>	16
Striped mud turtle	<i>Kinosternon bauri</i>	63
Florida box turtle	<i>Terrapene carolina bauri</i>	35

Lizards

Green anole	<i>Anolis carolinensis</i>	35
Brown anole	<i>Anolis sagrei</i> *	82
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>	16, 82
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>	35
Florida worm lizard.....	<i>Rhineura floridana</i>	16
Ground skink	<i>Scincella lateralis</i>	35
Southern fence lizard.....	<i>Sceloporus undulatus undulatus</i>	16

Snakes

Florida cottonmouth.....	<i>Agkistrodon piscivorus conanti</i>	MTC
Southern racer.....	<i>Coluber constrictor priapus</i>	35
Eastern diamondback rattlesnake.....	<i>Crotalus adamanteus</i>	35
Southern ringneck snake	<i>Diadophus punctatus punctatus</i>	35
Eastern indigo snake.....	<i>Drymarchon corais couperi</i>	35

* Non-native Species

Crystal River Archeological State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for all species)
Corn snake	<i>Elaphe guttata guttata</i>	35
Yellow rat snake	<i>Elaphe obsoleta quadrivittata</i>	11
Eastern mud snake	<i>Farancia abacura abacura</i>	63
Common kingsnake	<i>Lampropeltis getula</i>	35
Scarlet kingsnake	<i>Lampropeltis triangulum elapsiodes</i>	35
Eastern coral snake	<i>Micrurus fulvius</i>	35
Dusky pigmy rattlesnake	<i>Sistrurus miliarius barbouri</i>	35
Ribbon snake	<i>Thamnophis sauritus</i>	35
Eastern garter snake	<i>Thamnophis sirtalis sirtalis</i>	35

BIRDS

Ducks and Geese

Lesser Scaup	<i>Aythya affinis</i>	55, OF
Red-breasted Merganser	<i>Mergus serrator</i>	55, OF

Turkey and Quail

Northern Bobwhite	<i>Colinus virginianus</i>	82
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Grebes

Pied-billed Grebe	<i>Podilymbus podiceps</i>	55
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Pelicans

Brown Pelican	<i>Pelecanus occidentalis</i>	55, 63, OF
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Cormorants

Double-crested Cormorant	<i>Phalacrocorax auritus</i>	55, 63, OF
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Darters

Anhinga	<i>Anhinga anhinga</i>	63
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Frigatebirds

Magnificent Frigatebird	<i>Fregata magnificens</i>	OF
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Herons and Bitterns

Great Egret	<i>Ardea alba</i>	63
Great Blue Heron	<i>Ardea herodias</i>	63
Cattle Egret	<i>Bubulcus ibis</i>	MTC
Green Heron	<i>Butorides virescens</i>	63
Little Blue heron	<i>Egretta caerulea</i>	63
Snowy Egret	<i>Egretta thula</i>	63
Tricolored Heron	<i>Egretta tricolor</i>	63
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	63
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	63

Ibises and Spoonbills

White Ibis	<i>Eudocimus albus</i>	63
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* Non-native Species

Crystal River Archeological State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for all species)
Storks		
Wood Stork	<i>Mycteria americana</i>	63
Vultures		
Turkey Vulture	<i>Cathartes aura</i>	OF
Black Vulture	<i>Coragyps atratus</i>	OF
Hawks, Eagles and Kites		
Red-tailed Hawk	<i>Buteo jamaicensis</i>	11
Red-shouldered Hawk	<i>Buteo lineatus</i>	11
Northern Harrier	<i>Circus cyaneus</i>	63
Swallow-tailed Kite.....	<i>Elanoides forficatus</i>	MTC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	MTC
Osprey.....	<i>Pandion haliaetus</i>	55, 63, OF
Falcons		
American Kestrel.....	<i>Falco sparverius</i>	82
Limpkin		
Limpkin	<i>Aramus guarauna</i>	55, 63
Gulls and Terns		
Caspian Tern.....	<i>Hydroprogne caspia</i>	55, 63, OF
Herring Gull.....	<i>Larus argentatus</i>	55, 63, OF
Laughing Gull.....	<i>Larus atricilla</i>	55, 63, OF
Ring-billed Gull.....	<i>Larus delawarensis</i>	55, 63, OF
Forster's Tern.....	<i>Sterna forsteri</i>	55, 63, OF
Doves		
Common Ground-Dove	<i>Columbina passerina</i>	16
Mourning Dove	<i>Zenaida macroura</i>	11
Owls		
Great Horned Owl	<i>Bubo virginianus</i>	11
Eastern Screech-Owl.....	<i>Megascops asio</i>	35
Barred Owl.....	<i>Strix varia</i>	35
Goatsuckers		
Common Nighthawk	<i>Chordeiles minor</i>	OF
Swifts		
Chimney Swift.....	<i>Chaetura pelagica</i>	OF
Hummingbirds		
Ruby-throated Hummingbird.....	<i>Archilochus colubris</i>	82
Kingfishers		
Belted Kingfisher.....	<i>Ceryle alcyon</i>	55, 63
Woodpeckers		
Northern Flicker	<i>Colaptes auratus</i>	11, 82
Pileated Woodpecker.....	<i>Dryocopus pileatus</i>	35

* Non-native Species

Crystal River Archeological State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for all species)
Red-bellied Woodpecker.....	<i>Melanerpes carolinus</i>	11, 35
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	82
Downy Woodpecker.....	<i>Picoides pubescens</i>	11, 35
Hairy Woodpecker.....	<i>Picoides villosus</i>	35
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	11, 35
Flycatchers		
Great Crested Flycatcher.....	<i>Myiarchus crinitus</i>	35, 82
Eastern Phoebe	<i>Sayornis phoebe</i>	82
Vireos		
White-eyed Vireo	<i>Vireo griseus</i>	82
Red-eyed Vireo.....	<i>Vireo olivaceus</i>	35
Blue-headed Vireo	<i>Vireo solitarius</i>	11, 35
Jays and Crows		
American Crow	<i>Corvus brachyrhynchos</i>	MTC
Fish Crow	<i>Corvus ossifragus</i>	MTC
Blue Jay	<i>Cyanocitta cristata</i>	82
Martins and Swallows		
Barn Swallow	<i>Hirundo rustica</i>	OF
Purple Martin	<i>Progne subis</i>	OF
Tree Swallow	<i>Tachycineta bicolor</i>	OF
Titmice		
Tufted Titmouse.....	<i>Baeolophus bicolor</i>	MTC
Carolina Chickadee.....	<i>Poecile carolinensis</i>	MTC
Wrens		
Carolina Wren	<i>Thryothorus ludovicianus</i>	35
House Wren	<i>Troglodytes aedon</i>	82
Kinglets		
Ruby-crowned Kinglet.....	<i>Regulus calendula</i>	11, 35, 82
Gnatcatchers		
Blue-gray Gnatcatcher.....	<i>Poliptila caerulea</i>	11, 35, 82
Thrushes		
American Robin.....	<i>Turdus migratorius</i>	MTC
Thrashers		
Gray Catbird	<i>Dumetella carolinensis</i>	35, 82
Northern Mockingbird	<i>Mimus polyglottos</i>	82
Brown Thrasher.....	<i>Toxostoma rufum</i>	82
Starlings		
European Starling	<i>Sturnus vulgaris</i> *	MTC
Warblers		
Yellow-rumped Warbler	<i>Dendroica coronata</i>	11, 35, 82

* Non-native Species

Crystal River Archeological State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for all species)
Yellow-throated Warbler	<i>Dendroica dominica</i>	82
Palm Warbler	<i>Dendroica palmarum</i>	82
Pine Warbler	<i>Dendroica pinus</i>	82
Common Yellowthroat	<i>Geothlypis trichas</i>	63
Black-and-white Warbler	<i>Mniotilta varia</i>	11, 35
Northern Parula	<i>Parula americana</i>	11, 35
American Redstart	<i>Setophaga ruticilla</i>	11, 35, 82
Tanagers		
Summer Tanager	<i>Piranga rubra</i>	82
Sparrows and Towhees		
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	82
Cardinals, Grosbeaks and Buntings		
Northern Cardinal	<i>Cardinalis cardinalis</i>	MTC
Indigo Bunting	<i>Passerina cyanea</i>	82
Meadowlarks, Blackbirds and Orioles		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	63
Brown-headed Cowbird	<i>Molothrus ater</i> *	82
Boat-tailed Grackle	<i>Quiscalus major</i>	MTC
Common Grackle	<i>Quiscalus quiscula</i>	MTC

MAMMALS

Didelphids

Virginia opossum

<i>Didelphis virginiana</i>	MTC
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Edentates

Nine-banded armadillo

<i>Dasypus novemcinctus</i> *	MTC
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Lagamorphs

Marsh rabbit

<i>Sylvilagus palustris</i>	63
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Rodents

Southern flying squirrel

<i>Glaucomys volans</i>	35
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Eastern gray squirrel

<i>Sciurus carolinensis</i>	35
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Hispid cotton rat

<i>Sigmodon hispidus</i>	63, 82
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Carnivores

Bobcat

<i>Felis rufus</i>	35
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River otter

<i>Lutra canadensis</i>	55, 63
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Raccoon

<i>Procyon lotor</i>	MTC
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Manatees

West Indian manatee

<i>Trichechus manatus</i>	55
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Artiodactyls

Wild pig

<i>Sus scrofa</i> *	35, 63
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* Non-native Species

Crystal River Archeological State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
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Habitat Codes

Terrestrial

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

Palustrine

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

Lacustrine

45. Clastic Upland Lake
46. Coastal Dune Lake

Lacustrine—Continued

47. Coastal Rockland Lake
48. Flatwood/Prairie Lake
49. Marsh Lake
50. River Floodplain Lake
51. Sandhill Upland Lake
52. Sinkhole Lake
53. Swamp Lake

Riverine

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

Estuarine

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

Marine

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

Subterranean

82. Aquatic Cave
83. Terrestrial Cave

Miscellaneous

84. Ruderal
85. Developed
- MTC Many Types of Communities
- OF Over Flying

Habitat Codes

Addendum 5 – Designated Species List

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

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

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

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

FNAI GLOBAL RANK DEFINITIONS

- G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- G4 = apparently secure globally (may be rare in parts of range)
- G5 = demonstrably secure globally
- GH = of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
- GX = believed to be extinct throughout range
- GXC = extirpated from the wild but still known from captivity or cultivation
- G#? = tentative rank (e.g., G2?)
- G#G# = range of rank; insufficient data to assign specific global rank (e.g., G2G3)
- G#T# = rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
- G#Q = rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
- G#T#Q = same as above, but validity as subspecies or variety is questioned.
- GU = due to lack of information, no rank or range can be assigned (e.g., GUT2).
- G? = not yet ranked (temporary)
- S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
- S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
- S3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
- S4 = apparently secure in Florida (may be rare in parts of range)
- S5 = demonstrably secure in Florida
- SH = of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
- SX = believed to be extinct throughout range
- SA = accidental in Florida, i.e., not part of the established biota
- SE = an exotic species established in Florida may be native elsewhere in North America
- SN = regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine
- SU = due to lack of information, no rank or range can be assigned (e.g., SUT2).
- S? = not yet ranked (temporary)

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)

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

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

STATE

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

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

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

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

Crystal River Archaeological State Park Designated Species (Plants)

Common Name/ Scientific Name	FDACS	<u>Designated Species Status</u>	
		USFWS	FNAI
Giant leather fern <i>Acrostichum danaeifolium</i>	LT		
Greenfly orchid <i>Epidendrum conopseum</i>	CE		
Godfrey's swampprivet <i>Forestiera godfreyi</i>	LE		G2, S2
Needle palm <i>Rhapidophyllum hystrix</i>	CE		
Coontie <i>Zamia pumila</i>	CE		

Crystal River Archaeological Designated Species (Animals)

Common Name/ <i>Scientific Name</i>	FFWCC	Designated Species Status	
		USFWS	FNAI
REPTILES			
American alligator <i>Alligator mississippiensis</i>	LS	T(S/A)	G5, S4
Eastern indigo snake <i>Drymarchon corais couperi</i>	LT	LT	G3, S3
Eastern diamondback rattlesnake <i>Crotalus adamanteus</i>			G4, S3
Gopher tortoise <i>Gopherus polyphemus</i>	LT		G3, S3
BIRDS			
Limpkin <i>Aramus guarauna</i>	LS		G5, S3
Little Blue Heron <i>Egretta caerulea</i>	LS		G5, S4
Snowy Egret <i>Egretta thula</i>	LS		G5, S3
Tricolored Heron <i>Egretta tricolor</i>	LS		G5, S4
Swallow-tailed Kite <i>Elanoides forficatus</i>			G5, S2
White Ibis <i>Eudocimus albus</i>	LS		G5, S4
Bald Eagle <i>Haliaeetus leucocephalus</i>	LT	LT	G5, S3
Wood Stork <i>Mycteria americana</i>	LE	LE	G4, S2
Yellow-crowned Night-Heron <i>Nyctanassa violacea</i>			G5, S3
Hairy Woodpecker <i>Picoides villosus</i>			G5, S3
MAMMALS			
Manatee <i>Trichechus manatus</i>	LE	LE	

Addendum 6 – Priority Schedule and Cost Estimates

Crystal River Archaeological State Park Priority Schedule And Cost Estimates

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

Resource Management

1. Pursue measures to stabilize Mound A. 0-10 years. **Estimated Cost: \$40,000.**
2. Pursue measures to stabilize the stelae. 0-10 years. **Estimated Cost: \$18,000.**
3. Conduct archaeological surveys to research the cultural resources of the White addition and Roberts Island. 0-10 years. **Estimated Cost: \$150,000.**
4. Continue to practice, and expand upon, vegetation management and systematic maintenance of the mounds, and establish a program of periodic monitoring of cultural resources throughout the park. 0-10 years. **Estimated Cost: \$22,000.**
5. Continue the exotic plant removal program. 0-10 years. **Estimated Cost: \$ 10,000.**
6. Manage collections according to current Division standards. 0-10 years. **Estimated Cost: \$10,000.**

Total Estimated Resource Management Cost:.....\$250,000.00

Crystal River Archaeological State Park Priority Schedule And Cost Estimates

Capital Improvements

Development Area or Facilities	Estimated Cost
Interpretive Improvements.....	\$364,000.00
Picnicking.....	\$540,000.00
Total Cost with Contingency:.....	\$1,084,800.00