

LAKE LOUISA STATE PARK

UNIT MANAGEMENT PLAN

APPROVED

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

OCTOBER 14, 2005



Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
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Colleen Castille
Secretary

November 7, 2005

Ms. BryAnne White
Office of Park Planning
Division of Recreation and Parks
3900 Commonwealth Blvd.; M.S. 525
Tallahassee, Florida 32399

Re: Lake Louisa State Park

Lease # 2741

Dear Ms. White:

On **October 14, 2005**, the Acquisition and Restoration Council recommended approval of the **Lake Louisa State Park** management plan. Therefore, the Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, approved the management plan for the **Lake Louisa State Park**. Pursuant to Sections 253.034 and 259.032, Florida Statutes, and Chapter 18-2, Florida Administrative Code this plan's ten-year update will be due on **October 14, 2015**.

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

Sincerely,

Paula L. Allen
Office of Environmental Services
Division of State Lands
Department of Environmental Protection

TABLE OF CONTENTS

INTRODUCTION	1
PURPOSE AND SCOPE OF PLAN	1
MANAGEMENT PROGRAM OVERVIEW	4
Management Authority And Responsibility.....	4
Park Goals And Objectives	5
Management Coordination	7
Public Participation	8
Other Designations	8

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION	9
RESOURCE DESCRIPTION AND ASSESSMENT	9
Natural Resources.....	9
Cultural Resources.....	20
RESOURCE MANAGEMENT PROGRAM	21
Special Management Considerations	21
Management Needs And Problems	23
Management Objectives	23
Management Measures For Natural Resources	24
Management Measures For Cultural Resources	29
Research Needs	29
Resource Management Schedule.....	30
Land Management Review	30

LAND USE COMPONENT

INTRODUCTION..... 33

EXTERNAL CONDITIONS 33

Existing Use Of Adjacent Lands 34

Planned Use Of Adjacent Lands..... 34

PROPERTY ANALYSIS 35

Recreation Resource Elements 35

Assessment Of Use..... 36

CONCEPTUAL LAND USE PLAN 39

Potential Uses And Proposed Facilities..... 39

Facilities Development..... 43

Existing Use And Optimum Carrying Capacity 44

Optimum Boundary 44

TABLE

TABLE 1 - Existing Use And Optimum Carrying Capacity 45

LIST OF ADDENDA

ADDENDUM 1

Acquisition History and Advisory Group Report..... A 1 - 1

ADDENDUM 2

References Cited..... A 2 - 1

ADDENDUM 3

Soil Descriptions A 3 - 1

ADDENDUM 4

Plant And Animal List..... A 4 - 1

ADDENDUM 5

Designated Species..... A 5 - 1

ADDENDUM 6

Timber Management Analysis A 6 - 1

ADDENDUM 7

Priority Schedule and Cost Estimates..... A 7 - 1

ADDENDUM 8

Additional Information
FNAI Descriptions
DHR Cultural Management Statement
Land Management Review Final Report A 8 - 1

MAPS

Vicinity Map 2
Reference Map 3
Topographic Map..... 10
Soils Map 12
Natural Communities’ Map 14
Burn Zones Map 26
Base Map 37
Conceptual Land Use Plan..... 40
Optimum Boundary 46

INTRODUCTION

Lake Louisa State Park is located in Lake County about 3.5 miles south of Clermont and 14 miles west of Orlando. Main access to the park is from U. S. Highway 27 with limited park access from Lake Nellie Road, which is off County Road 561. The Vicinity Map and Reference Map provide a geographic context for the park; delineate major roads, developed areas and significant land and water resources either within or nearby the park.

Currently the park contains 4,407.77 acres. Acquisition began on August 29, 1973 through the Land Acquisition Trust Fund (LATF) Program and has continued under the P2000/CARL and Division and Recreation and Parks' Acquisition and Inholdings Program. At Lake Louisa State Park, public outdoor recreation and conservation is the designated single use of the property (see Addendum 1).

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Lake Louisa 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 January 28, 1997, approved plan. All development and resource alteration encompassed in this plan is subject to the granting of appropriate permits; easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes, and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code.

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

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

In the development of this plan, the potential of the park to accommodate secondary management purposes ("multiple uses") was analyzed. These secondary purposes were considered within the context of the Division's statutory responsibilities and an analysis of the resource needs and values of the park. This analysis considered the park natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that timber management and orange grove management could be accommodated in a manner that would be compatible and not interfere with the primary purpose of resource-based outdoor recreation and conservation. These compatible secondary management purposes are addressed in the Resource Management Component of the plan. Uses such as, water resource development projects, water supply projects, stormwater management projects, linear

Vicinity Map

Reference Map

facilities and sustainable agriculture (other than those agricultural activities specifically identified in this plan) and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan or the management purposes of the park.

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

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 adversely 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.

In the management of Lake Louisa State Park, a balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management and restoration of natural

systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation on the park's natural, aesthetic and educational attributes.

Park Goals and Objectives

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. Protect, restore and maintain natural and highly altered communities.
 - A. Develop a restoration plan that identifies methods and a timeline.
 - B. Replant longleaf pines on one-fifth (approximately 250 acres) of ruderal sandhill acreage (former citrus areas) every two years.
 - C. Replant ruderal and under-stocked flatwoods with longleaf pine.
 - D. Initiate groundcover restoration on ruderal sandhills (former citrus and pasture areas).
 - E. Establish seed collection agreements with suitable sandhill donor sites.
 - F. Pursue management agreements on the nearby Schofield sandhill site to facilitate seed material collections for upland restoration.
 - G. Seek funding to establish and operate a large on-site native nursery for groundcover restoration and rare species propagation.
 - H. Continue to seek opportunities to transplant and propagate rare Lake Wales Ridge plants at the park.
 - I. Play an active role in the recovery of rare Lake Wales Ridge plant species.
 - J. Prescribe burn all fire-type communities on a 2 – 5 year rotation.
 - K. Apply mechanical treatments and fire to scrub areas to remove overgrown oak component.
 - L. Apply mechanical treatments and fire where necessary to restore wet flatwoods areas.
 - M. Monitor and provide comments on surrounding land use changes and their potential impacts to surface water and groundwater.
 - N. Seek ways to increase connectivity of park to other natural areas and functions.
 - O. Seek mitigation and/or grant monies to initiate hydrological restoration in former citrus areas.
 - P. Develop a hydrological restoration plan for the park.
2. Protect, monitor and improve habitat conditions for designated species.
 - A. Monitor scrub morning glory (*Bonamia grandiflora*), Curtiss' milkweed (*Asclepias curtisii*), and hooded pitcher plant (*Sarracenia minor*) populations.

- B. Survey for sand skinks (*Neoseps reynoldsi*), Florida worm lizard (*Rhineura floridana*), and gopher tortoises (*Polyphemus gopherus*).
- C. Monitor Florida scrub-jay (*Aphelocoma coerulescens*) visits to the park.
- 3. Establish and maintain exotic species removal program.
 - A. Treat exotic plants on one-fifth (approximately 250 acres) of ruderal sandhills per year.
 - B. Remove exotic plants from natural areas of the park on a consistent basis.
 - C. Maintain a high level of removal of feral hogs in order to protect natural areas and restoration projects.
- 4. Improve basic knowledge on species occurrences and general biotic and abiotic conditions in the park.
 - A. Redo 1997 water quality assessments of Dixie and Hammond lakes; expand to include Bear Lake.
 - B. Conduct a monthly bird survey for at least 12 months in the park.
 - C. Improve the plant list for the park.
 - D. Add invertebrates to the park's species list.
 - E. Continue groundwater monitoring agreements with St. Johns River Water Management District.
- 5. Protect, restore and maintain cultural resources.
 - A. Develop and implement a written plan to protect and preserve the recorded archaeological sites from erosion, slumpage, animal burrowing, root damage, tree fall and vandalism.
 - B. Establish monitoring measures for recorded sites to monitor erosion, vegetation intrusion, and animal and human disturbances.
 - C. Complete archaeological reconnaissance survey of the park utilizing GPS technology.
 - D. Seek grant funding to research the history of the park and surrounding area.

Recreation

- 6. Continue to provide quality resource based outdoor recreational and interpretive programs and facilities at the state park.
 - A. Maintain overnight accommodations, including RV and tent camping.
 - B. Maintain opportunities for picnicking, swimming, fishing, non-motorized boating, nature observation, hiking, biking and horseback riding.
 - C. Interpret park natural and cultural resources and resource management actions through static displays, guided tours, ranger-led talks and guest speakers.
- 7. 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. Develop cabin accommodations to provide alternative means for extended stays at the park.
 - B. Improve the park trail system by expanding shared-use trails and constructing a paved loop trail around Dixie and Hammond Lakes.
 - C. Enhance interpretive and recreational opportunities by establishing an education center that focuses on promoting an understanding of park restoration activities and natural and cultural resources with opportunities for hands-on learning.
 - D. Establish static interpretive displays at trailheads and use areas.
 - E. Enhance shoreline access at Dixie Lake with an additional dock/fishing platform and screened lakeside shelter.
 - F. Expand the Dixie Lake use area to include additional picnic facilities, a playground and a recreation hall.
 - G. Expand existing camping opportunities with an additional campground on Dixie Lake,

- and upgrades to the equestrian campground and primitive group camp near Bear Lake.
- H. Enhance access to Bear Lake by replacing the existing dock and providing a small designated parking area.
- I. Improve access to the Group Camp and Equestrian Camping areas by stabilizing the road surface.

Administration/Operations

- 8. Provide efficient and effective management of park resources and facilities while maintaining a high level of visitor service.
 - A. Pursue funding to meet growing operational needs associated with routine maintenance, and visitor services.
 - B. Seek funding to meet staff residence needs and construct/upgrade support facilities, including restrooms, shops, storage facilities and a native plant nursery.
 - C. Provide universally accessible facilities in compliance with the Americans with Disabilities Act.
 - D. Assure that appropriate training is provided to all staff in visitor services, park information and emergency procedures.
 - E. Maintain high maintenance standards and conduct routine safety inspections to provide clean and safe facilities and use areas.
 - F. Partner with other land managers to share information and provide increased recreational opportunities on adjacent lands.
 - G. Periodically evaluate park interpretive programs and tours to ensure up-to-date quality programming.
 - H. Continue to recruit and maintain volunteer support to assist park staff with the maintenance of park facilities, protection of park resources and implementation of park programs.
 - I. Assure compliance with Division, state and federal safety guidelines and training requirements.

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, with silvicultural consultations, and with authorizations for prescribed burning. The Division and DOF cooperate on the management of the ecologically significant *Warea* parcels. The park will continue to play an active role in the recovery of *Warea* and other rare Lake Wales Ridge endemics. 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) assists 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. The DEP Bureau of Invasive Plant Management assists with exotic plant control. The St Johns River Water Management District and U.S. Geological Survey aids with surface and groundwater monitoring. Wetlands mitigation related to widening U. S. Highway 27 is coordinated with Florida Department of Transportation and the Water Management District. The park also collects official weather data for the National Weather Service.

Public Participation

The Division provided an opportunity for public input by conducting a public workshop and an advisory group meeting. A public workshop was held on November 22, 2004. The purpose of this meeting was to present this management plan to the public. An Advisory Group meeting was held on November 23, 2004. The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss this management plan.

Other Designations

The portion of the park located to the east of Big Creek is included in the Green Swamp Area of Critical State Concern (ACSC) and is subject to regulations associated with the designation. The original 1,790 acres comprising Lake Louisa State Park were specifically excluded from the ACSC boundary. The park is a component of the Florida Greenways and Trails System.

All waters to the west of Big Creek including Big Creek itself have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code. Surface waters in this unit are also classified as Class III waters by DEP. This unit is not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes).

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

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

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

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

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

RESOURCE DESCRIPTION AND ASSESSMENT

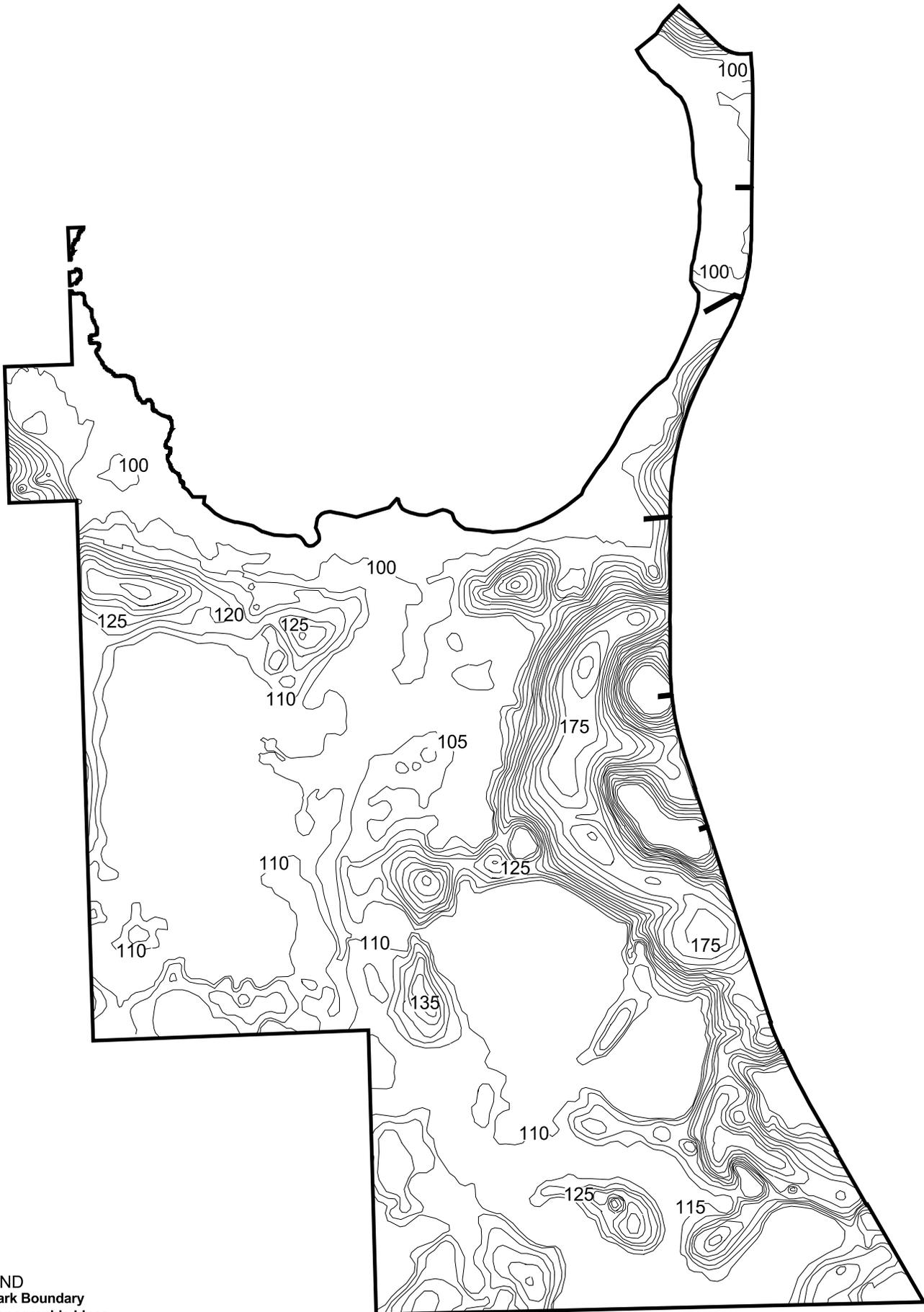
Natural Resources

Topography

The terrain of much of Lake Louisa State Park is typical of the Green Swamp area. Elevations for most of the low-lying areas of the unit range from 100 to 110 feet above mean sea level (m.s.l.). Extremes range from 185 feet above m.s.l. in the eastern section to less than 100 feet above m.s.l. along the shore of Lake Louisa (see Topographic Map). The unit lies within the Groveland Karst subdistrict of the Central Lake District (Brooks 1981a). Characteristics of this classification, such as linearly oriented low hills and solution lakes, are present within the unit. The Groveland Karst subdistrict contains lower lying areas of prairies, swamps and lakes that surpass the xeric sandhills in area. The eastern portion of the unit, which is predominantly hilly, contains areas of the highest elevations, and the western portion generally consists of lower elevations.

Geology

The major geological formation underlying the unit is the Hawthorne Formation of the middle to upper Miocene (Brooks 1981b). The formation has Groveland Park facies and is deeply weathered clayey sand and granular sand with beds of kaolinitic sand. The unweathered lower portion is greenish phosphatic sand and sandy clay.



LEGEND
[Thick black line] Park Boundary
[Thin black line] Topographic Lines



LAKE LOUISA
STATE PARK

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

TOPOGRAPHIC
MAP

Soils

The U.S. Soil Conservation Service identified 23 soil types (see Soils Map) in Lake Louisa State Park in the 1975 Soil Survey of Lake County (Furman et al. 1975). The locations of these types within the unit are shown on the soils map. Addendum 3 contains detailed descriptions of the soil types within this unit. Management activities will follow generally accepted best management practices to prevent soil erosion and conserve soil and water resources on site. Because Lake Louisa State Park has quite a bit of topographic relief, development and resource management projects will need to take consideration of slope into account. Placement of facilities, roads, reforestation schemes and timber harvesting will need to address slope and erosion considerations.

Minerals

Deposits of kaolin are found throughout the area, but there are no known deposits of commercial value at Lake Louisa State Park.

Hydrology

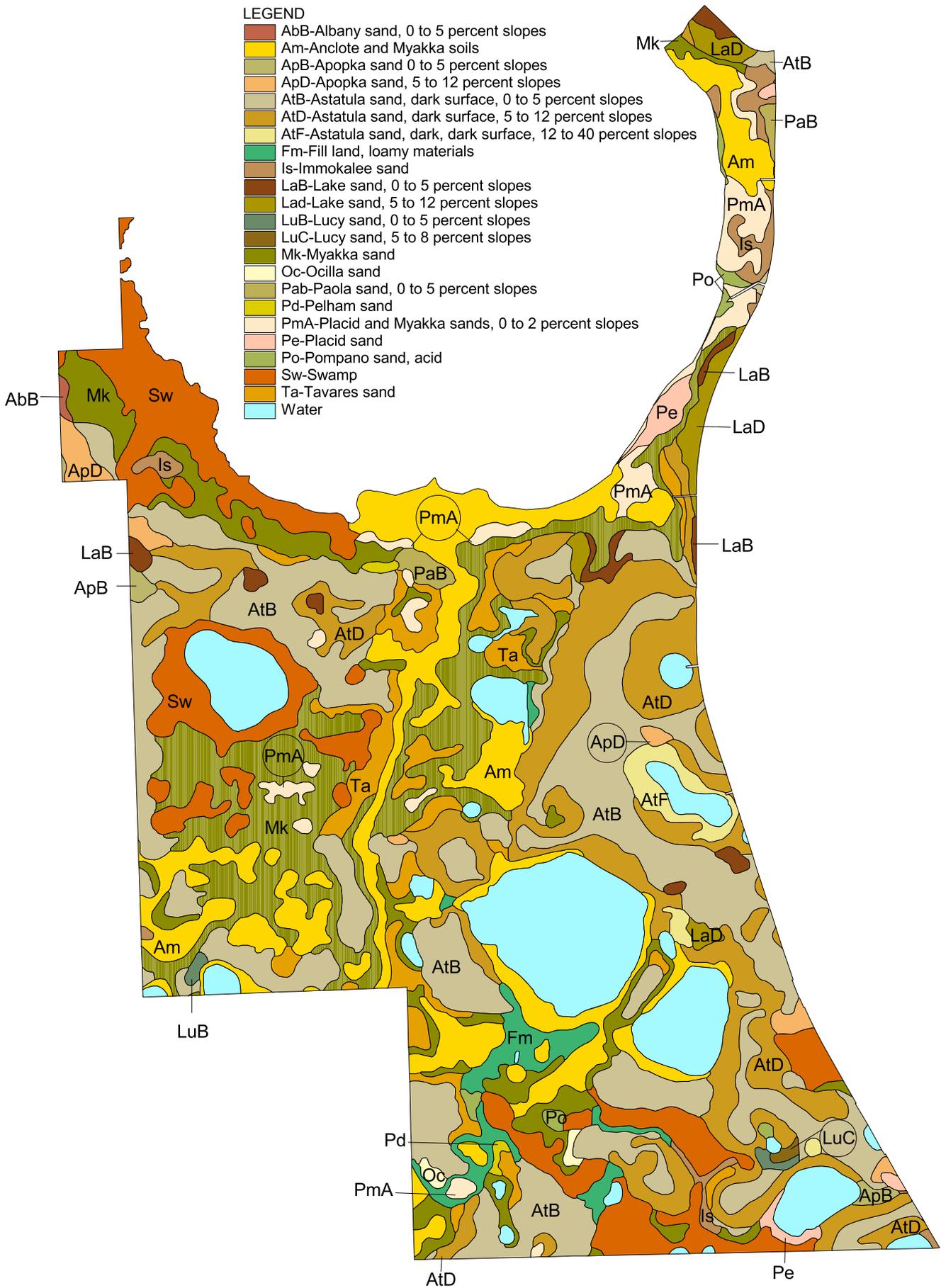
Regional hydrology. Lake Louisa State Park lies within the region known as the Green Swamp, an area of approximately 870 square miles located in central Florida about 20 miles west of Orlando and about 30 miles northeast of Tampa. The Green Swamp is a series of swamps interspersed with slightly elevated flat lands and bordered by sandy ridges on the east, west and south. It encompasses portions of Lake, Polk, Pasco, Hernando and Sumter counties. In 1974, the Green Swamp was designated as an Area of Critical State Concern. Four major river systems, the Hillsborough, Withlacoochee, Peace and Ocklawaha Rivers, originate in the wetlands of the Green Swamp. Many small streams and tributaries provide additional aquatic habitat. The basin-like topography of the Green Swamp allows the area to act as a natural water storage and flood control area. Lake Louisa State Park is situated on the northeastern boundary of the Green Swamp. The unit is within the 65 square mile Palatlahaha River drainage basin. This basin forms the headwaters of the Clermont Chain of Lakes. The basin begins at Lake Lowery in Polk County, and the flow is in a northerly direction between State Roads 27 and 33. The overflow from Lake Lowery and the normal basin drainage form Big Creek that flows through the park into Lake Louisa.

Park hydrology. Six lakes are completely within the boundaries of Lake Louisa State Park and portions of four other lakes lie within the park. Bear Lake is located in the western part of the unit and Smokehouse Lake, Hammond Lake, Dixie Lake, Long Lake and a nameless lake are found towards the eastern boundary of the unit. Lake Louisa, Hook Lake, Dude's Lake and Keene Lake are partially within the unit. There are also two streams or creeks that form permanent water features on the property. Big Creek flows through the property in a northerly direction into Lake Louisa. Little Creek flows through the northwestern corner of the property in a northeasterly direction into Lake Louisa. During periods of heavy rainfall, Bear Lake overflows into a large marshy area adjacent to its southwestern rim. Because of its low elevation, much of the western part of the unit is flood-prone. Runoff there is through a series of wet weather ponds, cypress swamps and domes. The length of the hydroperiod has been shortened due to the man-made ditches that interconnect the cypress domes with Big Creek. They may facilitate more rapid drainage of the domes and slash pine invasion.

Several drainage ditches occur in the eastern part of the unit and most of the eastern wetland features have some type of ditching around them. These are products of the previous owners who used the area for growing citrus. Stormwater runoff from U.S. Highway 27 drains into a marshy area to the east of Lake Louisa in the northeast corner of the park. Throughout most of this

LEGEND

- AbB-Albany sand, 0 to 5 percent slopes
- Am-Anclote and Myakka soils
- ApB-Apopka sand 0 to 5 percent slopes
- ApD-Apopka sand, 5 to 12 percent slopes
- AtB-Astatula sand, dark surface, 0 to 5 percent slopes
- AtD-Astatula sand, dark surface, 5 to 12 percent slopes
- AtF-Astatula sand, dark, dark surface, 12 to 40 percent slopes
- Fm-Fill land, loamy materials
- Is-Immokalee sand
- LaB-Lake sand, 0 to 5 percent slopes
- LaD-Lake sand, 5 to 12 percent slopes
- LuB-Lucy sand, 0 to 5 percent slopes
- LuC-Lucy sand, 5 to 8 percent slopes
- Mk-Myakka sand
- Oc-Ocilla sand
- Pab-Paola sand, 0 to 5 percent slopes
- Pd-Pelham sand
- PmA-Placid and Myakka sands, 0 to 2 percent slopes
- Pe-Placid sand
- Po-Pompano sand, acid
- Sw-Swamp
- Ta-Tavares sand
- Water



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Office of Park Planning

SOILS
MAP

eastern section of the unit, surface drainage is minimal due to the hilly topography and sandy soils.

There are intense development pressures all around the park. In addition, lands to the south of the park, in the Big and Little Creek drainage system, are impacted by sand mine operations. There is tremendous growth pressure along the U.S. Highway 27 corridor both north, south, and east of the park. A large (2,100 acres) Development of Regional Impact is proposed east of the park with a 4-lane road intersecting U.S. Highway 27 opposite the park's entrance. This growth as well as sand mine operations have the potential to impact groundwater levels and negatively affect existing natural communities and restoration plans in the park. It is important for the park to be an active participant in land use decisions, to monitor proposed development changes, and to provide comments to protect water resources and natural communities at the park.

Natural Communities

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

The park contains 11 distinct natural communities (see Natural Communities Map) in addition to ruderal and developed areas. Park specific assessments of the existing natural communities are provided in the narrative below. A list of plants and animals occurring in the unit is contained in Addendum 4.

Scrub. The scrub community at Lake Louisa State Park occurs as isolated patches grading into ruderal areas that were historically sandhill and basin swamp communities. There are no sand pines and few rosemary plants in the community; oaks are the dominant plant species. Some portions of the community are approaching xeric hammock. There is no recent record of extensive fire in this community, although attempts at prescribed burning have been made. The understory vegetation is very thick. Mechanical treatment of the oak trees is necessary to restore this community to a condition where a prescribed burning program can be an effective management tool. The scrub also needs an updated inventory of rare species. Mechanical treatment (mowing) of portions of the scrub occurred in 2004. Curtiss' milkweed (*Asclepias curtissii*) has been documented from the scrub on the west side of Big Creek and from a patch of scrub along U.S. Highway 27. Sand skinks (*Neoseps reynoldsi*) have been documented from the scrub on the west side of Big Creek (Lizard City).

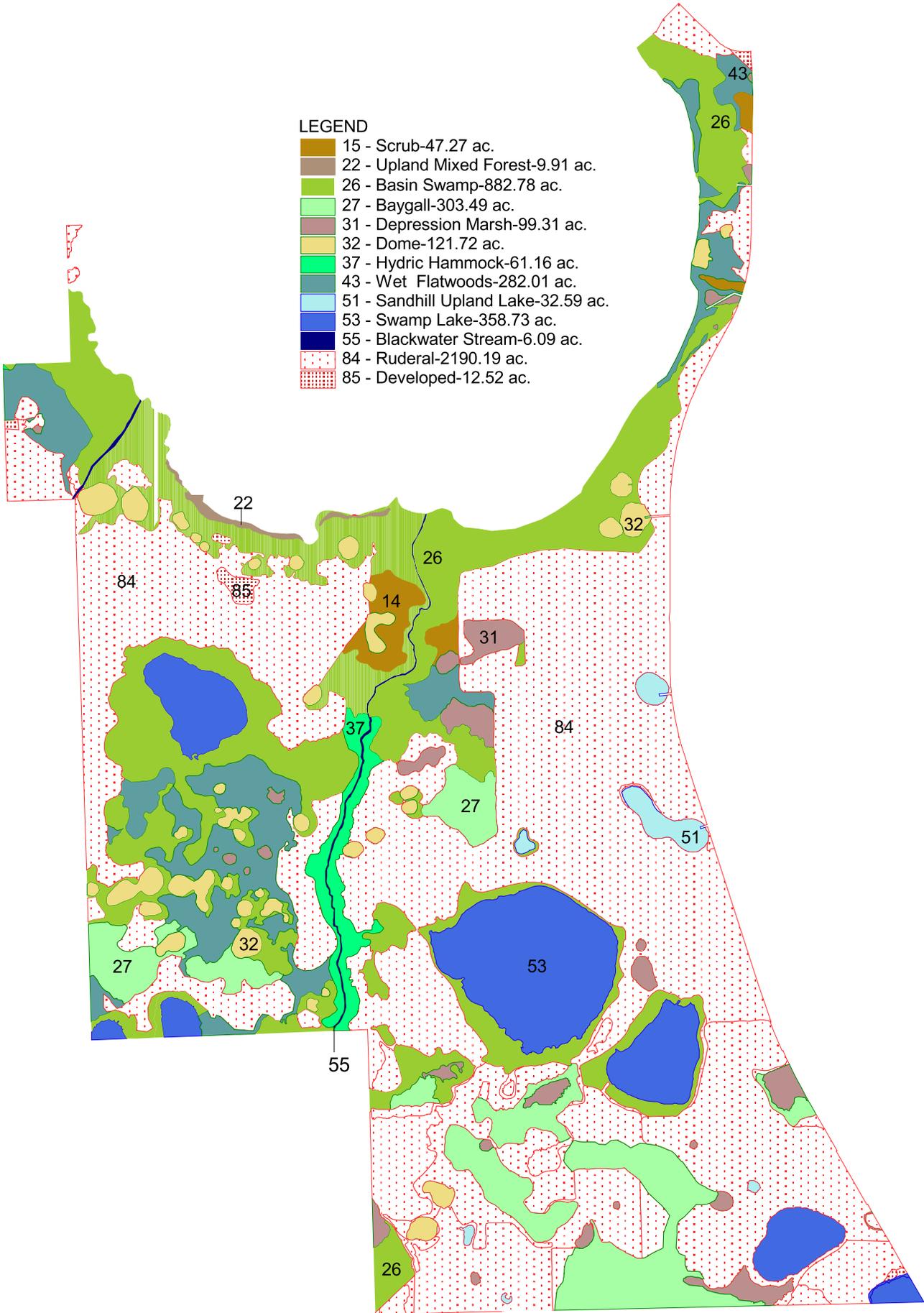
The desired future ecological condition of the scrub at Lake Louisa can be described as follows:

- Scrub oak canopy varying in height from 3 to 8 feet
- Variety of oak ages classes/heights between different scrub patches
- Scattered openings in canopy and open patches on the ground populated by rare plant species.

Upland mixed forest. Upland mixed forest occurs in a thin band along a natural berm on the

LEGEND

- 15 - Scrub-47.27 ac.
- 22 - Upland Mixed Forest-9.91 ac.
- 26 - Basin Swamp-882.78 ac.
- 27 - Baygall-303.49 ac.
- 31 - Depression Marsh-99.31 ac.
- 32 - Dome-121.72 ac.
- 37 - Hydric Hammock-61.16 ac.
- 43 - Wet Flatwoods-282.01 ac.
- 51 - Sandhill Upland Lake-32.59 ac.
- 53 - Swamp Lake-358.73 ac.
- 55 - Blackwater Stream-6.09 ac.
- 84 - Ruderal-2190.19 ac.
- 85 - Developed-12.52 ac.



**LAKE LOUISA
STATE PARK**



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Division of Recreation and Parks
Office of Park Planning

**NATURAL COMMUNITIES
MAP**

shore of Lake Louisa. This community has been disturbed by the placement of the beach picnic area. Due to the small size of this community and the facilities, it does not really function in the way a larger forest would. There are no management actions proposed for the upland mixed forest except to remove exotic species as needed.

Baygall. The baygall community at Lake Louisa State Park grades into wet flatwoods, basin swamp, dome and ruderal communities. Most of the baygall areas located adjacent to former grove areas have been rim ditched. Except for the slight alteration of the hydroperiod due to artificial drainage, this community is functioning in a natural state. An increase in the length of the interfire interval in the surrounding wet flatwoods is allowing the baygall community to expand past its typical boundaries into the wet flatwoods. A more active prescribed fire program will return the baygall to its more historic distribution. Baygalls will also benefit from wetlands restoration projects.

Depression marsh. Depression marshes are scattered throughout the unit. These areas vary in size with some covering less than an acre. Due to the lack of fire and low water levels (related both to recent drought and expedited drainage); many of the small depressions are undergoing rapid succession. Changes in hydrology are causing a vegetation shift away from wetland plant species. Ruderal areas that, at present, are in pastures or cleared orange groves surround most of these areas. Historically, the surrounding biological communities were wet flatwoods and sandhills. The depression marshes are generally shallow, without open water areas and have thickets of herbaceous plants toward their centers. Several of the marshes have been deepened to facilitate agricultural operations; accordingly, these marsh areas do have deeper, open water areas. The depression marsh in the northeast corner of the park has stormwater drainage entering the marsh from U.S. Highway 27. The effects of this input are unknown. In general, the depression marshes are suffering from lowered water levels that are resulting in hardwood shrub invasion. All of the depression marshes need to be subjected to a more regular burning rotation. In addition, the hydrology of some of the depression marshes needs to have the natural hydrology restored by removing the ditches that drain them and shorten the hydroperiod.

The desired future ecological condition of depression marshes at Lake Louisa can be described as follows:

- Less than 20% coverage by hardwood shrub component
- At least 80% coverage by herbaceous species and open water
- Extended hydroperiod to favor herbaceous over shrub component.

Dome and basin swamp. The dome community is largely interspersed within the basin swamp community throughout the unit. The basin swamp grades into dome, wet flatwoods, scrub, blackwater stream and ruderal communities. Much of the dome community has been logged but does have a second growth of mature trees. Some of the domes have small open water areas in their centers. There are human-enhanced channels that may expedite drainage from some of the domes towards Bear Lake and Big Creek. These deeper channels, combined with long inter-fire intervals, facilitate slash pine invasion into the domes and along the edges of the domes. Basin swamp is likewise functioning in a natural state except for limited changes to the hydroperiod in areas where drainage may be expedited.

Hydric hammock. At Lake Louisa State Park, hydric hammock occurs in a continuous band along Big Creek, grading into wet flatwoods. Water sits on the surface when Big Creek overflows its banks and after extreme rains. Live oaks (*Quercus virginiana*) and cabbage palms

(*Sabal palmetto*) with an understory of saw palmetto (*Serenoa repens*) occur throughout the community. This community is functioning in a natural state and should continue. This is contingent on hydroperiods not being altered.

Wet flatwoods. Wet flatwoods are found primarily on the west side of Big Creek, grading into basin swamp, baygall and ruderal areas. There is a very narrow band of wet flatwoods located in the northeast corner of the park. A burn rotation has not been well established for the wet flatwoods community, and a portion of the area is recovering from wildfire damage that occurred in the mid to late 1980s. Due to past wildfires and long interfire intervals, some areas of the wet flatwoods community have a low number of pine trees and pine regeneration is limited. These areas should be considered for possible mechanical treatments to reduce shrub and saw palmetto cover and for hand planting of longleaf pine (*Pinus palustris*) trees. In several areas along the ecotone between the wet flatwoods and cypress dome communities, hooded pitcher plants (*Sarracenia minor*) occur. These plants have been severely impacted by the lack of burning and by feral hog (*Sus scrofa*) rooting. During the status survey, it was determined that feral hogs had decimated the plants in burn zone LL12 (Johnson 2001). Subsequently, a hog removal contract was established at the park. This is a significant issue since this is only one of two places where pitcher plants are found in the park. Re-establishing an active prescribed fire program and controlling feral hogs is the best management strategy for the pitcher plants. Additional locations may be found once prescribed fire is more regularly applied to this community.

The desired future ecological condition of the wet flatwoods at Lake Louisa can be described as follows:

- Widely scattered longleaf pine overstory of at least 3 age classes
- Herbaceous groundcover covering at least 80% of the ground
- Saw palmetto coverage of 50% or less.

Sandhill upland lake. There are a number of sandhill upland lakes at the park, lying on the eastern side of the Big Creek drainage. The surrounding natural community was sandhills before being cleared for citrus production. These lakes are highly dependent on lateral ground seepage. All of these lakes are threatened by the ongoing development surrounding the park. In addition, some of the lakes are threatened due to stormwater runoff from U.S. Highway 27. The St. Johns River Water Management District has several monitoring wells on the park to monitor potentiometric surfaces at different aquifer levels as well as levels of lateral groundwater near the lakes. These wells will provide trend information over time. Due to the steep slopes surrounding many of these lakes, park development must consider soil erosion on all projects. Downslope runoff and siltation would have a severe impact on these lakes. These lakes should be surveyed to determine whether any listed species, such as gopher frogs (*Rana capito aesopus*) are utilizing them. Due to the disturbed nature of the surrounding ruderal communities, the chances of listed species occurrences are greatly reduced. However, as the surrounding uplands are restored, these lakes may again become an important herptile resource.

Swamp lake. Swamp lake is used to describe the water bodies that either receive input from a flowing stream or overland sheet flow through basin swamps. At the park, swamp lake includes Lake Louisa, Dixie and Hammond Lakes, and Dude's, Hook, Bear, Keene, and Smokehouse Lakes. Bald cypress (*Taxodium distichum*) trees ring many of the swamp lakes. A large portion of the Lake Louisa shoreline has been protected due to the park's boundary. The water in Lake Louisa and the other swamp lakes is highly colored by tannins. Lake Louisa's water quality is extremely high although the lake has been subjected to agricultural and residential runoff. There

is a natural berm along the lake's south shore that has a few breaks in it that allow the area behind it to flood during periods of high water. Water quality is also high in Bear Lake, and Lake County has used the lake as a standard of comparison for water quality of other lakes in the area. Dude's and Hook Lakes are two small lakes bisected by the park's southern boundary. Water quality in these two lakes is compromised by the proximity of a county-maintained clay road that runs very close to the lakes' edges. Road runoff is a great concern to the integrity of these two lakes.

In 1997, Dixie and Hammond Lakes were surveyed by FDEP Central District staff to provide a biological assessment. The park was specifically interested in impacts that prior long-term agricultural activities may have had on these two lakes. This analysis should be redone during the 10-year cycle of this unit plan. The results of this analysis found that Hammond Lake had sediment values for copper of 87 and 110 mg/Kg (ppm) respectively for the center and shoreline of the lake while Dixie Lake had copper sediment values of 2.2 mg/Kg and 2 mg/Kg respectively. These results were compared to the Department's Sediment Quality Assessment Guidelines developed for coastal waters (there are no assessment guidelines for freshwater lakes). Two screening levels were used: Threshold Effects Level or TEL and Probable Effects Level or PEL. TEL is the value below which no adverse biological effects are likely. PEL is the value above which there is a probability of adverse biological effects. The TEL for copper is 18.7 mg/Kg, and PEL is 108 mg/Kg. Accordingly, Hammond Lake's copper levels were above both of these measures while Dixie Lake's levels were below the measure. Despite the copper findings for Hammond, there was dense growth of numerous aquatic macrophytes. Furthermore, the macroinvertebrate data show the lake supports a healthy and diverse assemblage of benthic species. Hammond Lake was in the 95th percentile for overall lake quality while Dixie was in the 50th percentile due to lower number of macroinvertebrates and a preponderance of one species of midge larva. In addition to copper, the analysis also measured pesticide levels. In Hammond Lake, 31 ug/Kg and 14 ug/Kg of p, p'DDE was found in the center and on the shoreline respectively. Dixie Lake had 1.4 ug/Kg of p, p'DDE for both locations (this is below the minimum quantitative limit for this test). The TEL for this contaminant is 2.07 ug/Kg and the PEL is 374 ug/Kg. Both lakes had low nutrient levels with corresponding low values for chlorophyll and algal growth potential. Hammond Lake was slightly acidic (pH 6.5) while Dixie was moderately acidic (pH 5.6). These values are indicative of the tannins found in these lakes. The fecal coliform levels for both lakes were at or below 2 cfu/100ml. Class III waters must have less than 200 units for a monthly average.

Blackwater stream. There are two blackwater streams at Lake Louisa State Park: Big Creek and Little Creek. Big Creek flows in a northerly direction following a narrow, twisting streambed through most of the unit, spreading out into a swampy area before flowing into Lake Louisa. It goes dry for approximately two months per year during the dry season. Outside the park, citrus groves and farmland border the creek. Several sand mines are also in operation near the creek south of the park, making it vulnerable to both agricultural and industrial pollution.

Little Creek, on the northwest side of the park, enters the park for a short distance as it flows into Lake Louisa. Little Creek originates as general overland swamp surface drainage to the southwest of the park. It attains a definite channel just before entering the park. It has a definite opening into Lake Louisa, but it is very overgrown with vegetation, and navigation is limited. Little Creek is wider than Big Creek and is dry only during extreme drought conditions. Tannins darkly stain the water. The park protects only a short length of the Little Creek drainage basin. Outside of the park, Little Creek is subject to stormwater runoff from Lake Nellie Road and yard runoff.

Ruderal and developed. At Lake Louisa State Park, there is extensive acreage of ruderal areas. These areas were once sandhills and pine flatwoods but were converted to citrus groves and pastures. All the trees, except scattered oaks, were removed from the uplands when they were converted to pasture. These pasture areas are presently vegetated in bahiagrass (*Paspalum notatum*) with a few native species of groundcover starting to re-establish. Patches of longleaf pine have been planted in some of the pasture areas. All native vegetation was removed from the sandhill areas when they were converted to citrus groves. There are still numerous citrus sprouts and citrus trees in these ruderal areas as well as problem exotics such as rosary pea (*Abrus precatorius*) and lantana (*Lantana camara*). There is an extensive groundcover of Natal grass (*Rhynchelytrum repens*) throughout the old grove sandhills. A portion of the ruderal flatwoods and sandhills communities have active orange groves, while several portions of the ruderal sandhills have been planted in slash pine and sand pine plantations (approximately 14 years old). The active citrus areas are currently under a 10-year management contract; accordingly, there are no restoration plans during this unit plan cycle for the active grove areas. Initiation of restoration in the ruderal sandhills and flatwoods area is planned for this unit plan cycle and will be discussed under Special Management Considerations and as part of the Timber Management Analysis. Developed areas consist of natural communities that have been replaced or nearly replaced by structures or permanently cleared areas for the purpose of roads, visitor facilities, campgrounds, recreation areas, parking lots or concessions. Developed areas include the visitor day use areas at Lake Louisa and Dixie Lake, the main park drive, the overnight facilities in the campground and cabin areas, the ranger station, and the shop, office, and residence compound.

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.

Designated species occur within intact natural plant communities that are managed with fire where applicable and in ruderal areas where fire also needs to be incorporated into the management strategy. The park has a large gopher tortoise (*Gopherus polyphemus*) population, with the most densely populated areas occurring in ruderal pasture and grove areas on the west side of Big Creek. Florida mice (*Podomys floridanus*) have also been documented at the park in association with gopher tortoise burrows.

Florida bonamia (*Bonamia grandiflora*) occurs in a small ruderal area. Curtiss' milkweed occur in at least two scrub patches. These plants are considered remnants of what may have been a more extensive distribution of rare northern Lake Wales Ridge species. The presence of these two species suggests that other rare species may have at one time occurred at the park. Sand skinks and Florida worm lizards (*Rhineura floridana*) have been documented at the park. This is more evidence that at one time Lake Louisa most likely harbored rare Lake Wales Ridge species consistent with those found on other nearby south Lake County northern Lake Wales Ridge sites. These nearby sites are part of the CARL Lake Wales Ridge Ecosystem project including the Schofield sandhill site, the Seminole State Forest's Warea site, and the Castle Hill site. Acquisition and active management of these sites is critical to the management success of Lake Louisa State Park. These sites serve as templates and seed sources for the extensive restoration efforts that need to be undertaken at the park. The park needs to play an active role in facilitating the continued survival of these rare Lake Wales Ridge species and should act as a site to establish new populations of these extremely rare plants.

As discussed in the wet flatwoods section, two populations of pitcher plants have been located at the park. The plants have suffered greatly from the lack of an active prescribed fire program, becoming suppressed by encroaching shrubs and palmetto. More recently, feral hog rooting decimated one of the populations. Whether this population can recover is unknown. A hog removal contract is in place to reduce the hog population, and prescribed burning has increased.

The park also has a population of cutthroatgrass (*Panicum abscissum*) found in the very overgrown flatwoods area in the northwestern corner of the park. It is the only occurrence of cutthroatgrass known for Lake County and constitutes the northernmost population and a range extension for the species.

The primary management tool for many of the designated species found at Lake Louisa is prescribed burning, which is used to maintain the plant communities while enhancing the habitat for designated species and to facilitate exotic removal, which eliminates competition from exotic species. Exotic animals such as domestic cats and dogs and feral hogs should be removed when encountered because they prey on designated species such as gopher tortoises and Florida mice and root up plants such as pitcher plants. Gopher tortoise burrow surveys should be conducted periodically to ascertain population density and age structure, as well as to search for other rare species associated with tortoise burrows. Following each flatwoods burn, new and old areas should be searched for undocumented occurrences of pitcher plants and to monitor current population levels.

Management practices for Florida bonamia and Curtiss' milkweed will include burning and the removal of exotic grasses, invasive hardwoods and vines. Population monitoring needs to continue. Because these species occur in limited areas of the park, management activities affecting them must be carefully planned and implemented. Introduction of these species into other suitable areas of the unit will be pursued.

The introduction of other rare northern Lake Wales Ridge plant species should be part of the restoration plan for the park, and the park needs to play an active role in the establishment of new populations of these rare plants. Seed sources for these introductions need to come from the nearby CARL sites. The acquisition and active management of these nearby sites is critical to the successful restoration of rare plant species at Lake Louisa. In 2000, a small introduction of salvaged rare plants took place near the scrub morning glory population. Plants that had been dug from a development site and hardened at local nurseries were then planted in the park. These plantings included the threatened Florida beargrass (*Nolina atopocarpa*) and the endangered scrub-buckwheat (*Eriogonum floridanum*). Activities such as these must occur as frequently as possible to continue rare plant restoration at the park. Attempting to establish new populations of some of these rare scrub plants is consistent with the objectives set forth by the U. S. Fish and Wildlife Service in their recovery plan for 19 Florida scrub and high pineland plants (USFWS 1996).

Special Natural Features

There are several very important natural features which lie just a short distance outside the boundary of Lake Louisa State Park that are absolutely critical to the long-term restoration of the ruderal sandhills at the unit. These special natural features include three of the Lake Wales Ridge Ecosystem CARL acquisition sites (Seminole State Forest's Warea tract, Castle Hill and Schofield Sandhill). These sites provide the template for the biological communities that once occurred on the park. They are the best sources of material to restore the species that once occurred on Lake Louisa State Park. The successful restoration of the unit is intricately linked to these sites. As such, these sites need to be purchased and actively managed to restore each

individual site and to provide the germ plasm for restoration at Lake Louisa State Park. The restoration of these species at Lake Louisa will not only benefit the park but will also create new populations of very rare species, thereby affording them additional security for their continued survival.

Cultural Resources

Evaluating the condition of cultural resources is accomplished using a three part evaluative scale, expressed as good, fair, 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 quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action to reestablish physical stability.

Lake Louisa State Park saw occupation and/or use by a cultural sequence of Paleo Indian, Archaic, Mount Taylor, Orange, Transitional, St. Johns, First Spanish Period, British Period, Second Spanish Period, Territorial and Seminole (Milanich and Fairbanks 1980). The Lake Louisa area was probably occupied by the Mayaca, one of the St. Johns cultures (Milanich 1995). In recent times, Seminoles utilized the Lake Louisa area. Settlers then followed the Seminoles.

The Florida Master Site File (FMSF) lists twelve sites within the unit. Big Creek Site, 8LA1067, is a preceramic lithic scatter (Florida Department of State: 8LA1067, Parker 2000). The condition assessment is poor. Bear Lake 1 Site, 8LA1068, is a large ceramic site, dating to the St. Johns II period (Florida Department of State: 8LA1068, Parker 2000). Land clearing and citrus planting previously affected the site, and the condition assessment is poor. Bear Lake 2 Site, 8LA1069, is a prehistoric nonceramic subsurface lithic scatter that has not been dated (Florida Department of State: 8LA1069, Janus 1996, Parker 2000). The condition assessment is fair. The Lake Louisa Site, 8LA1070, is a multicomponent prehistoric and historic site, a preceramic lithic site with deposits of historic debris from the Hammond Still commissary (Florida Department of State: 8LA1070, Parker 2000). The condition assessment is fair. The Turpentine Barge Site, 8LA2569, is the remaining hulk of a turpentine barge, submerged in park waters in Lake Louisa and partially buried under sand (Florida Department of State: 8LA2569). The barge probably dates to the late 19th to early 20th century. The condition assessment is poor. Dude's Lake Site, 8LA2272, is a ceramic surface scatter along the shores of Dude's Lake (Florida Department of State 8LA2272, McIntire pers. comm.). The site is prehistoric with no evidence of a historic component. Park staff has closed lake access to protect the site, but it is still threatened by unauthorized human and horse access to the lake and low water levels. The condition assessment is poor. An isolated artifact find, consisting of a single waste flake, was collected during the Janus survey; the condition assessment of the site is unknown (Janus 1996). Six sites were identified and recorded during two surveys conducted in 2002 prior to park improvement projects (Panamerican 2002a, b). Dixie Lake, 8LA2630, contains a prehistoric lithic scatter and 20th century historic artifact scatter that has been disturbed by past agricultural activity. The DHR determined that not enough information is available to assess site significance yet, and agreed with the consultant's recommendation that ground-disturbing activity be monitored potentially sensitive portions of the site. East Dixie Lake, 8LA2631, Grove Road, 8LA2632, Parking Lot South, 8LA2633, New Road, 8LA2634 and Cabin Site 8LA22635 are prehistoric artifact scatters that have all been disturbed by past agricultural and land clearing activity. The

consultant determined that these five sites did not meet minimum criteria for National Register eligibility, and recommended that no further testing or preservation was needed. All known archaeological sites would benefit from further archaeological investigation and analysis to assess their significance.

During an extreme low water period at Lake Louisa in the summer of 2001, several mechanical pieces of a U.S. Navy fighter airplane were recovered. The plane had accidentally crashed in the lake during WWII, killing the pilot, and most of the plane had been salvaged at that time. That same summer, staff found the remains of two dugout canoes buried in the exposed lake bottom. With the assistance of Dr. Ryan Wheeler, Division of Historical Resources, staff examined both canoes, took pictures, made measured drawings, and took samples for radiocarbon dating. The canoes were both in very poor condition, too deteriorated to move or handle in any way, so they were reburied to protect them until the rising water level covered their locations (Edwards 2001).

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.

During the development of this plan, an analysis was made regarding the feasibility of timber management activities for this park. It was then determined that timber management activities were appropriate as part of ongoing restoration at Lake Louisa and will be a continuing component in future management plans. Addendum 6 contains the timber management assessment and reforestation plan that not only addresses management of the current pine plantations, but also includes restoration of ruderal areas. A more detailed discussion of restoration needs is included under Additional Considerations.

The general timber strategy is to clear-cut the sand pine plantations at an appropriate future date; to thin the slash pine plantations and inter-plant with longleaf pines; and to plant longleaf pine in all former sandhill areas that were converted to, and subsequently cleared of, citrus. Cutting of timber will only occur in the plantations. Groundcover restoration will have to take place in all locations.

Additional Considerations

There are several additional considerations at Lake Louisa State Park. They involve the active citrus groves, the mitigation sites created as part of the main park drive and parking lot construction, upland restoration needs at the park, and the importance of the park despite its considerable ruderal acreage. Although a significant amount of Lake Louisa State Park has been altered by past human practices, the site provides for excellent water quality in the Clermont Chain of Lakes. The park also provides for an important habitat function due to its proximity to the Green Swamp and the Lake Wales Ridge. It is the transitional ecological area between those

two eco-regions. The park is also subject to the tremendous development pressures characteristic of South Lake County. Accordingly, resource restoration and protection of resources in perpetuity becomes ever so more critical.

There are approximately 166 acres of active orange groves at the park. The groves are being managed under a 10-year contract. The groves were in poor condition and are being revitalized; accordingly, revenue is minimal. The groves will be maintained until they freeze out. If the groves freeze, they will not be re-established. Any proceeds generated from the groves will be used for land restoration at the park. The groves are managed using Best Management Practices developed in concert with the University of Florida's IFAS citrus program. The groves are slated to be restored to sandhills but will be restored after all other restoration areas have been accomplished.

During the extension of the main park drive from Dixie Lake to Lake Louisa, certain wetland impacts were unavoidable. As a permit condition, these wetland impacts required mitigation by the St. Johns River Water Management District. Mitigation in the form of wetland restoration took place in two areas (see Reference Map). Near the Lake Louisa parking lot, an old road was removed from a wetland area and reforested with cypress, maples, and bays. At the bridge crossing Big Creek, bald cypress trees were planted in the floodplain. These designated mitigation areas are considered as conservation areas and are protected in perpetuity (marked on Reference Map).

A portion of the park is included in the Green Swamp Area of Critical State Concern. The park is subject to regulations associated with this designation. Restrictions are discussed in the Land Use Component.

There is a substantial amount of upland restoration necessary at Lake Louisa State Park. Restoration techniques for uplands are very much in the infancy of their development. Restoration moves forward slowly due to the enormity of the task and as more is learned in the area of upland restoration. The plans are adaptive and are adjusted as new information and techniques are developed. Research opportunities should be supported. One research project was conducted by Buchanan (1999), and the techniques tested are being used in the park. The park contracted to have an extensive timber analysis done which concentrated on restoration options. The analysis provided a variety of options with the preferred option (Restoration Emphasis) detailed in Addendum 6.

The initial plan is to re-establish the longleaf pine overstory that characterized these rolling sandhills through the 1940s. As the overstory is replanted, the focus will shift to groundcover plantings. In the 10-year cycle of this plan, the objective is to replant all of the ruderal acreage in longleaf pine, depending on whether annual funds can be obtained to fund this plan. The planting scheme will incorporate strips of native ground cover plantings. Initially, these strips will be subjected to direct seeding of appropriate species, again dependent upon annual restoration funding. As the pine trees grow to a harvestable size, patches and/or row of pines will be removed if necessary based on density objectives, creating light openings and allowing the groundcover to spread further into the planted longleaf pine areas. If necessary, the pines can be thinned to approximate a less dense and widely spaced pine distribution, and new areas of ground cover can be planted in areas where pines are removed. In general, thinning due to natural attrition and fire mortalities will probably be adequate to create an open density of pines. Gradually over time, the groundcover will expand in its coverage, and the distribution of longleaf pine will approach a much lower density stocking and a more scattered distribution typical of the

northern Lake Wales Ridge sandhill community.

The eventual land use proceeds generated from timber harvests of the pine plantations will be directed back into groundcover plantings and exotic control.

The composition of the groundcover plantings will include the rare species typically found in northern Lake Wales Ridge sandhill locations. Seed collections will take place at nearby sites depending on owners' permissions. In addition, seeds will be collected from other natural areas with an emphasis placed on staying as geographically close as possible to Lake Louisa. An attempt will be made to stay within 50 miles of the park for all plant material. However, availability and community type compatibility may have more bearing on selection than actual distance.

The initial focus of restoration will be on the former sandhill grove areas with the intent of having these areas planted in longleaf pine by the end of the 10-year cycle of this unit plan. This strategy will have the park contracting for planting of approximately 250 acres every two years for 10 years. At the end of the 10-year cycle, overstory planting of the currently vacant groves will be completed. Simultaneously, there will be initial ground cover plantings associated with each year's overstory plantings. Ground cover restoration will be a longer-range process based on seed availability and exotic grass control.

The current slash (*Pinus elliotii*) and sand (*Pinus clausa*) pine plantations (planted around 1991) will remain in a holding pattern until they reach the size where they need to be thinned. At the time of thinning, the gradual conversion to a longleaf stand will begin. The general approach will be similar to the new pine plantings, incorporating strips of ground cover seeding as well as planting of longleaf pines.

Exotic grasses dominate Lake Louisa's ruderal areas. It is unrealistic to think that the restoration process will eliminate these grasses. A more realistic approach is to accept the presence of these exotic grasses and work towards an ever-increasing percent cover of native species. In the case of the Natal grass, it carries fire very well, and in function, it may act similar to wiregrass. The restoration areas will be burned on a sandhill fire rotation (every 2 – 5 years) with allowances made during critical times for longleaf pine growth. This burn rotation will favor the spread of the re-introduced natives and contribute to the reduction in the percent cover by exotics.

Management Needs and Problems

This property provides the unique opportunity and formidable challenge of restoring a considerable acreage of upland community types. Upland restoration experimentation needs to take place on this property. Unfortunately, restoration is a long-term process and funding is an annual endeavor. Funding for restoration needs to come on a consistent and reoccurring basis to accomplish the restoration of this unit. Land use proceeds will not provide monies anytime in the near future to fund the restoration of Lake Louisa State Park; accordingly, there needs to be a consistent funding mechanism to accomplish the restoration.

Additionally, much still needs to be learned about uplands restoration and control of invasive exotic grasses in these harsh disturbed upland sites. As that knowledge increases, more restoration options will become available for the park.

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.

Natural Resources

1. Develop and implement an upland restoration plan for the park.
2. Re-establish a regular interfire interval on all intact and ruderal fire-type communities.
3. Treat exotics throughout the park.
4. Initiate ground cover restoration in the park's uplands.
5. Apply for grants and mitigation funds to begin hydrological restoration of depression marshes and baygall swamps.
6. Build and operate an on-site native plant nursery on a scale to provide sufficient ground cover materials for annual restoration.
7. Monitor rare plant and animal species.
8. Apply mechanical treatments where necessary to restore fire-type communities.
9. Redo 1997 water quality assessments on Dixie and Hammond Lakes and add Bear Lake.

Cultural Resources

1. Develop a plan to protect and monitor currently identified sites
2. Develop a phased plan for managing the currently identified cultural resources in the context of their surroundings
3. Conduct a reconnaissance survey of the entire park

Management Measures for Natural Resources

Hydrology

Groundwater. The water table is generally 3.5 to 5.0 feet below the surface; during wet periods, it is 12 to 14 inches below the surface. The unit is an important part of the aquifer recharge system in central Florida. Influences on groundwater levels come from outside the unit and, accordingly, are not controlled by the park's management areas. The park's hydrology is functioning in as natural a state as possible without changes in practices outside of unit boundaries. The park will continue to cooperate with the St. Johns River Water Management District in their aquifer and surface water monitoring efforts. The park will monitor surrounding land use changes and their potential impacts on groundwater levels.

Surface water. Surface water drains from areas in the eastern part of the park into Big Creek via wet weather ponds and man-made ditches. St. Johns River Water Management District is responsible for water control in the park; while in the surrounding Green Swamp area, both the St. Johns and Southwest Florida Water Management Districts are responsible. Management of surface water is facilitated by unit staff efforts to assure that the natural flow of surface water is not impeded. A restoration plan for the park's surface water flow needs to be developed.

The deepened channels in the western part of this unit were dug through natural drainage connections to increase drainage of the cypress domes and baygalls. The ditches connect to each other and ultimately drain into Big Creek's floodplain. These ditches are slowly filling in with organic material, but it will be decades before they are filled in by natural means. This change in hydrology, coupled with the lack of frequent prescribed burning of the surrounding wet flatwoods community, impacts the cypress domes. Slash pines and bay trees are invading the cypress domes. Over time, the slash pine may outcompete the cypress. A more natural surface water flow might be obtained by slowing the water flow in the ditch that drains the area between

Bear Lake and Big Creek. Blocking this ditch would raise the water level in Bear Lake and hold water longer in the wetlands surrounding the lake. Methods to raise the water level will be explored.

Several of the lakes and bayheads on the east side of Big Creek have been rim ditched to facilitate irrigation of citrus groves and to facilitate citrus grove road construction. These ditches, stormwater runoff and other impacts on the hydrology of the eastern part of the unit should be looked at for possible restoration and mitigation projects. A determination should be made as to the appropriate measures needed to restore these ditches and the surrounding areas to their native habitat.

The depression marshes have also been impacted by ditches to expedite drainage, by roads that block flow, and by the lack of prescribed burning in the adjoining fire type communities. Efforts need to be made to remove or place ditch blocks in the ditches, to remove roads or to place culverts under the road to restore flow, and to become more active in prescribed burning.

Stormwater runoff from the clay surface of Lake Nellie Road affects Hook and Dude's Lakes. An agreement and restoration plan needs to be pursued with Lake County to moderate this impact. It is unlikely that this section of Lake Nellie Road will be paved, but it might be possible to install roadside swales to catch stormwater runoff even without paving the road. General runoff from surrounding roads and house lots into Lake Louisa is lowering its overall quality. While such impacts are hard to detect, cumulative effects over time will lower water quality. Efforts need to be made to educate homeowners on the long-term impacts of their actions on lake ecology.

Stormwater runoff from U.S. Highway 27 is affecting several wetland areas along the unit's eastern boundary. Consultations will be undertaken with the St. Johns River Water Management District and the Florida Department of Transportation (FDOT) concerning ways to remove these impacts, and these impacts will have to be removed when Highway 27 is widened. The Division has already provided comments to FDOT stating that there will be no retention ponds in the park.

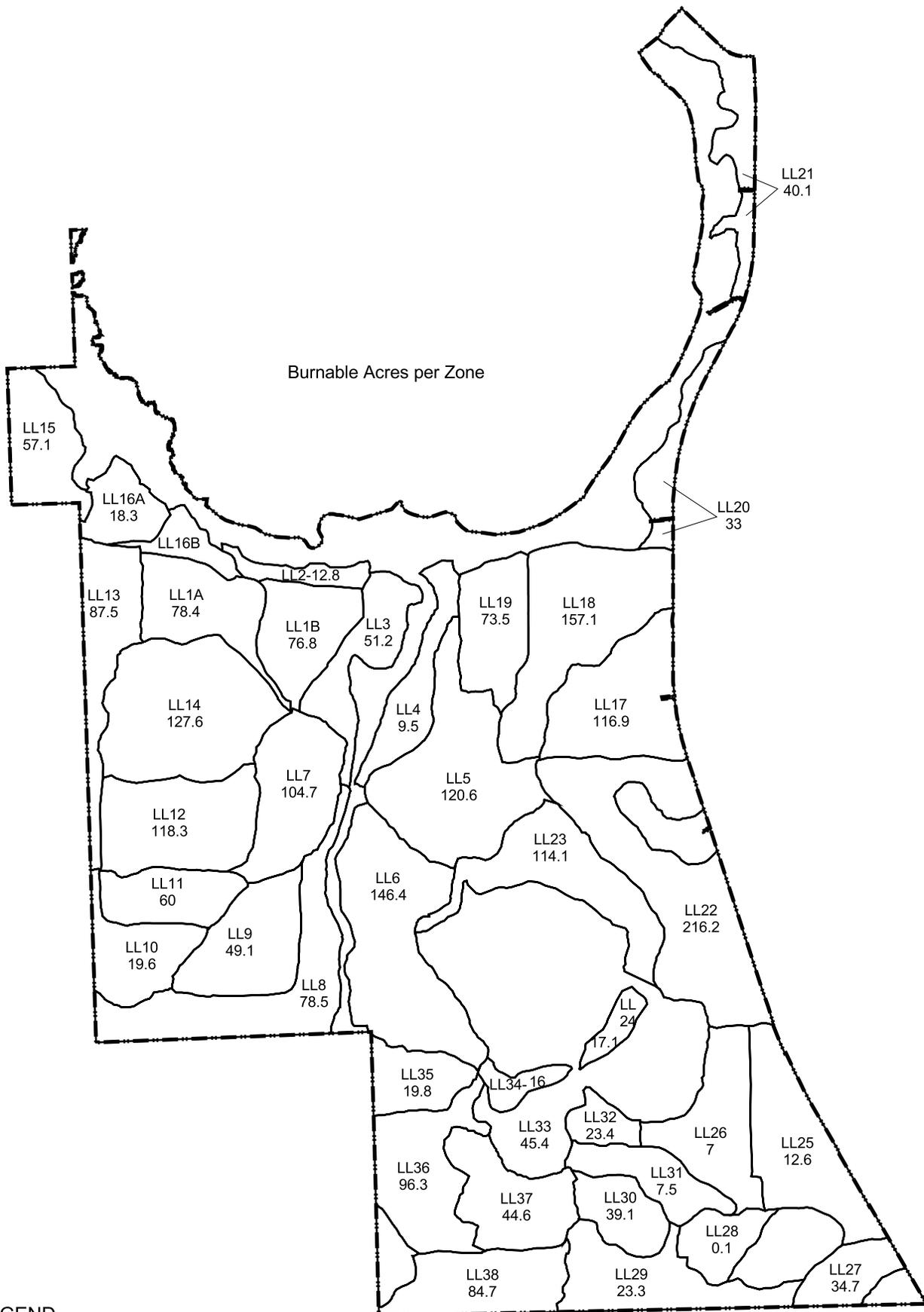
During the widening of U.S. Highway 27, wetland impacts are inevitable, and FDOT is required to mitigate for those impacts. Lake Louisa State Park has been approved as the mitigation site for those impacts. These mitigation sites in the park will be restored and managed as conservation areas to remain in their natural state in perpetuity. These funds will also assist in developing a hydrological restoration plan for the entire park.

In all of the park's management efforts, the Division will take measures to prevent soil erosion or other impacts to the unit's 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.

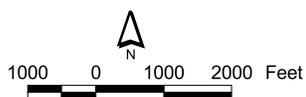
Lake Louisa State Park is divided into a number of burn zones (see Burn Zone Map). Much of the fire type communities at Lake Louisa were in an overgrown condition due to the lack of an



Burnable Acres per Zone

LEGEND

-  Park Boundary
-  Burn Zones LL1- LL38



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

LAKE LOUISA
STATE PARK

BURN ZONE
MAP

aggressive fire management program at the park. From 2002 – 2005, park staff has made a great effort to burn every zone after years of neglect. All of the burn zones need to be burned three times in a 10-year plan cycle. Emphasis needs to be placed on burning natural areas first, with ruderal areas being of secondary concern unless a burn is necessary to facilitate restoration plans. Some of the park's fire type communities are sufficiently overgrown with oaks and palmettos to need more than just prescribed fire to restore them. Emphasis needs to be placed on lightning season burning to the greatest extent possible for the natural communities in the park.

The scrub community at Lake Louisa is a mature scrub dominated by oaks with no sand pines in the overstory. Some portions of this community are approaching xeric hammock. Although this community needs to be burned and should be burned as soon as possible, mechanical treatment of hardwoods needs to be done before fire can again be an effective management tool.

Mechanical treatments and fire will focus on reducing the total amount of hardwood cover and restoring the community to an earlier successional stage. A long-term goal is to restore the scrub for possible use by the Florida scrub-jay that occasionally visit, but do not reside, in the park. The closest jays occur immediately east of the park across U.S. Highway 27 near North Bradshaw Road.

There are wet flatwoods areas at the park that have high levels of shrubs and saw palmetto. Fire may need the assistance of other vegetation management measures such as mowing or chopping, release ground cover vegetation from the shading effects of the shrub community. These areas may also need hand planting with longleaf pines to supplement the limited remaining natural regeneration.

Many of the burn zones at Lake Louisa are ruderal. The majority of these areas were once pine flatwood or sandhill communities that were converted to cattle or citrus production. Burns in these zones will focus on site preparation for restoration activities. Areas in active citrus production will not be included within this burn plan.

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. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species.

Regular maintenance of the various communities at the park will facilitate the conservation of designated species that occur in these communities. In general, all designated species at the park would benefit greatly from a more active prescribed fire program at the park. Pitcher plants would not only benefit from fire but also from the reduction of feral hogs. Initially, some community restoration is required to enhance the habitat for protected species such as scrub morning glory and Curtiss' milkweed that are endemic to scrub and sandhills but currently growing in a ruderal area at the park. Both species are found in an area being invaded by exotic bahiagrass. The grass needs to be treated with herbicide and the area needs to be burned. Monitoring will occur in conjunction with habitat restoration and maintenance to detect any changes the resource management activities might produce.

Gopher tortoise population monitoring needs to continue to detect any negative impacts on the park's population due to recent and future park development. Testing for upper respiratory tract

disease should continue as the opportunity presents itself. Surveys need to be conducted for sand skinks and Florida worm lizards to determine if they still occur at the park. Scrub management plans need to consider sand skinks.

The cutthroatgrass occurs in an overgrown and fire-suppressed flatwoods area. The canopy needs to be opened to release the grass from light suppression. Individual trees can be chainsawed down, and fire needs to be re-introduced. It is very important to assure that the soil is sufficiently wet before burning to protect the roots of the cutthroatgrass. It is easy to burn the grass out from the roots if it is burned under dry conditions.

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.

Plants. In general, the exotic trees and shrubs at the unit are not species that threaten to form monocultures (e.g. Brazilian pepper or melaleuca), but are instead persistent and widespread species that tend to encroach upon, but not exclude, native species. All the exotics are a threat to the integrity of the unit's natural communities and are in conflict with the Division of Recreation and Parks' goal of preserving and maintaining examples of the natural Florida.

Of the exotic plant species that occur at Lake Louisa, rosary pea, chinaberry (*Melia azedarach*), Brazilian pepper (*Schinus terbinthifolius*), cogongrass (*Imperata cylindrica*), and ear-pod tree (*Enterolobium contortisiliquum*) pose the greatest threat, due to their ability to readily invade and disrupt natural communities. Of these, cogongrass, rosary pea and Brazilian pepper have the highest priority for removal. Rosary pea can be removed through either hand-pulling or foliar herbicide spraying. Brazilian pepper should be treated with Garlon 4 with basal bark application. Chinaberry and ear-pod tree should be treated by cutting the tree and immediately treating the cut surface with Garlon 3A; smaller individuals may be hand-pulled. Cogongrass can be treated with Roundup over several successive applications with the fall being the most effective treatment time.

Natal grass and bahiagrass occur in ruderal communities throughout the unit. The bahiagrass occurs primarily in former pasture areas while Natal grass occurs in former citrus groves. Due to the extensive distribution of these two species within the park, removal is not presently a viable option. Instead, they will be incorporated into restoration plans with efforts being made to reduce their percent cover over time by replanting with native species.

Skyrocket (*Clerodendrum indicum*) and citrus (*Citrus aurantium*) also occur in ruderal areas within the park; the citrus occurs primarily in the former grove areas. Treatment of citrus will be incorporated into the replanting plans for the ruderal sandhill areas. Before longleaf pine planting in an area, it will be treated for exotics. Follow-up treatments will be made after planting is in place. In some areas, large citrus trees will require mechanical removal, followed by treatment of stump sprouts. Wax begonia (*Begonia cucullata*) occurs in small amounts within some wetland communities of the park; it should be hand-pulled when encountered.

Animals. Nine-banded armadillos (*Dasypus novemcinctus*) and feral hogs are removed on a consistent basis. Feral cats and dogs are occasionally found on the unit and are removed. House mice (*Mus musculus*) occurring in association with houses and offices should be removed with

snap-traps. Coyotes (*Canis latrans*) occur sporadically within the park; no control methods are proposed for them. House sparrows (*Passer domesticus*) occur throughout the unit in small numbers; there is no control measures used on them. Two exotic ant species occur at the park.

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.

The only problem species occasionally encountered at Lake Louisa State Park is the American alligator. Very occasionally, an alligator will lose its fear of man and frequent the swimming area. This is usually in response to people feeding it. Eventually, the alligator associates people with food and frequents the area where a handout is likely. When the above problem occurs, it becomes necessary to remove the alligator. The Florida Fish and Wildlife Conservation Commission handle removal. Removal is not indiscriminate; only the offending alligator is removed. Interpretive efforts should be used to educate people. Effective interpretation should eliminate the continued need for removal of alligators.

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 (see DHR Cultural Management Statement).

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

The general objective for the management of cultural resources of Lake Louisa State Park is to protect, preserve and interpret the prehistoric and historic resources of the park. Because of the known prehistoric and historic archaeological resources within the park, management measures for cultural resources include continuing the monitoring of these identified archaeological resources. Ground disturbing activities should be conducted in accordance with DHR policy and Division guidelines that specify that such activities will be subjected to review according to the Division's Cultural Resource Matrix and that appropriate activities are submitted for comment to the Division of Historic Resources. Management measures for cultural resources should develop a phased plan for managing the currently identified cultural resources in the context of their surroundings. This should include developing a workable written plan for the physical management of the identified cultural resources. The plan should outline approved methodologies for executing the plan and training staff and volunteers in managing the park's cultural resources. As the composition of park staff changes over time, efforts should be made to insure that there is always at least one staff member certified as an archaeological monitor.

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.

Ongoing research at the park includes the continued monitoring of research plots established as part of a master's thesis on restoration of sandhills on former agricultural lands, and trapping of oldfield mice (*Peromyscus polionotus*) to study weight loss due to trap stress. Periodic monitoring of scrub morning glory, hooded pitcher plants and gopher tortoises are ongoing. Hydrological monitoring is being conducted by the St. Johns River Water Management District and the U. S. Geologic Survey. St. Johns River Water Management District has a number of monitoring wells looking at water levels at different aquifer depths and looking at the interaction between surface lake levels and the surficial aquifer. This data collection will provide baseline information as water withdrawals continue to increase in this rapidly growing area. Research on upland restoration techniques should be supported.

The most pressing research need for the park is in the area of ruderal upland restoration and the establishment of rare plant species at the park. Water quality information is needed for the swamp lakes distributed throughout the property. Surface water testing of lakes on the perimeter should be initiated to provide baseline information on water quality to use as a comparison through time to document any changes in water quality related to surrounding development pressures.

Research on the impacts of new park development on gopher tortoises should be pursued. The park has a high density of gopher tortoises that in the past have tested negative for upper respiratory tract disease. Research should continue to determine if the population is negatively impacted by the new facilities development happening at the park.

Cultural Resources

While specific areas of the park have benefited from focused archaeological investigations, the park as a whole has not been surveyed. Accordingly, the next step is to do a reconnaissance survey of the entire park. Archaeological and historic sites should be further protected through the implementation of qualified research projects and measures for their further study and interpretation. Research is needed on environmental change and prehistoric adaptation, development of prehistoric communities and social complexity, and aboriginal cultural history. Research is needed to document the history of the Lake Louisa area, the timbering, turpentine, and citrus industries, and the acquisition and operational history of Lake Louisa State Park. This would facilitate effective interpretation of park history to visitors through interpretive brochures, programs and exhibits.

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 7. Cost estimates for conducting priority management activities are based on the most cost effective methods and recommendations currently available (see Addendum 7).

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.

This park was subject to a land management review on September 21, 2000 (see Addendum 8). 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, adjacent land uses and the park interaction with other facilities.

Lake Louisa State Park is located in southeastern Lake County, a few miles south of Clermont. The park is located in close proximity to central Florida theme parks, with Walt Disney World situated a mere five miles east. Over 3.1 million people reside within 50 miles of the park, which includes the Orlando metropolitan area (Orange, Lake, Seminole and Osceola County) (BEBR, University of Florida, 2003). The population of the Orlando metro area increased over 34 percent from 1990-2000 and is estimated to grow an additional 29 percent by 2015 (BEBR, University of Florida, 2003). With the exception of Lake County, median ages are lower for metro area counties than for the state of Florida. The high median age in Lake County (46.5 years) reflects a resident population where more than one in four residents are aged 65 and over (BEBR, University of Florida, 2003).

Visitation at the park has fluctuated over the last ten years with a general downward trend between fiscal years 1993-94 and 1998-99. However, visitation has increased substantially over the last five years, with a high of 67,173 visitors in fiscal year 2004-05. This growth in visitation has coincided with the development of park facilities that enhance public access. The park was the eleventh most visited of the 29 units in DRP District 3 during 2004-05. By DRP estimates, these visitors contributed over 5.2 million dollars in direct economic impact and the equivalent of 105 jobs to the local economy (Florida Department of Environmental

Protection, 2005).

Existing Use of Adjacent Lands

Until the early 1980s, most of the adjacent property was used for agricultural production, primarily citrus groves and cattle ranching. Freezing temperatures killed many of the citrus trees prompting many growers to sell their property, which is gradually being converted to residential uses. Residential development is occurring primarily along the U.S. Highway 27 corridor. The Hilochee Wildlife Management Area abuts the southern boundary and is managed by the Florida Fish and Wildlife Conservation Commission. Citrus groves and open fields comprise most of the land uses to the west. Lake Nellie Road is an unimproved road that runs along the western boundary. Lake Louisa defines the northern boundary of the park.

Significant fee simple and less-than-fee simple conservation lands protect thousands of acres adjacent to or near the park and include lands managed by Southwest Florida Water Management District (Green Swamp, Green Swamp Land Protection Agreements), FWC (Hilochee Wildlife Management Area) and DOF (Withlacoochee State Forest). Resource-based recreational opportunities provided by these lands include hiking, off-road biking, horseback riding, boating, fishing, hunting, nature observation, swimming, picnicking, full facility, primitive and group camping.

Planned Use of Adjacent Lands

Adjacent Future Land Use (FLU) designations at the writing of this plan include Urban, Rural/Conservation, Transitional and Ridge (Lake County, 1998). Urban lands are located east of U.S. Highway 27 and allow densities of up to 7 units/acre. In addition to residential development of an urban character, commercial, light, and heavy industrial development are allowable uses so long as proposed development meets locational criteria and other related policies established within the Comprehensive Plan. Rural/Conservation, Transitional and Ridge are designations for lands located within the Green Swamp Area of Critical State Concern. Rural/Conservation lands are located along the western boundary of the park and permit residential densities up to 1 unit/10 acres. Land uses specifically excluded from this land use category include commercial and industrial development, mining (except sand mining), golf courses, tourist attractions, power plants, incinerators, landfills and airports. While Ridge and Transition lands provide for low-density residential development, they are located along the southern boundary within the Hilochee Wildlife Management Area and managed for conservation purposes.

It is anticipated that private lands adjacent to the park will continue to be developed for residential and commercial purposes. Potential impacts from future development include declines in local surface and subsurface water quality and quantity, increases in traffic, noise pollution, landscape aesthetics and the loss of remnant natural areas not in public ownership. Additional development adjacent to the park may make it more difficult to conduct prescribed burning or manage exotic species. Specific projects of concern include FDOT plans to widen U.S. Highway 27 from the Polk County line to State Road 50 and a large proposed residential development (Karlton DRI) to the east. The section of the U.S. 27 that borders the park is anticipated to receive construction funding in FY 2008. The Division will coordinate work on this project with FDOT to minimize impacts to park resources and ensure appropriate mitigation, if necessary. The proposed Karlton DRI is currently under review. Primary areas of concern for the park related to this project include traffic and circulation impacts, water use, impacts to listed species, and the added challenge of conducting resource management activities at the park as development increases. Early

project plans have expressed a desire for realigning the park entrance with a proposed parkway providing access to the development. Division concerns have been submitted for consideration and the project will continue to be monitored to minimize impacts to park resources.

PROPERTY ANALYSIS

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

Recreation Resource Elements

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

Large portions of the park are considered ruderal, being previously converted to citrus groves and pasture. The ruderal condition of the park provides opportunities for development of recreational facilities, without disturbing natural communities. The current condition of much of the park's landscape is barren since citrus groves have been removed in anticipation of restoring these areas to natural upland communities. As restoration progresses, the quality of park scenery will improve. Restoration activity also provides unique interpretive opportunities.

The park borders the entire southern edge of Lake Louisa, with nearly five miles of shoreline. With the exception of the existing swimming area, much of this shoreline is ringed by basin swamp dominated by cypress trees. The 3,634-acre Lake Louisa is part of the Clermont Chain of Lakes, which are popular with recreational boaters and anglers. Approximately 1,000 linear feet of shoreline along Lake Louisa are suitable for public access to the lake. This white sandy beach is the focus of most of the recreational activities in the park.

Bear, Dixie, Hammond, Smokehouse and Long Lakes are all entirely contained within the park boundary. Part of Dude's and Hook Lakes are also within the park. These waterbodies provide additional opportunities for water-based recreation. However, extensive wetland communities located along much of their shorelines restrict opportunities for access and tannic waters are not ideally suited for swimming. Public access for recreation should be accomplished through the careful use of boardwalks and docks to protect as much of the undisturbed shoreline around these lakes as is possible. The desire to preserve shoreline areas will be balanced with the need to provide sufficient water-based recreation for park visitors.

Big Creek and Little Creek flow through the property and into Lake Louisa. These creeks, which fluctuate with seasonal rainfall, are not suitable for canoeing or other water related recreation due to the density of existing vegetation. The wetlands surrounding these creeks were unsuitable for agricultural uses and therefore remained relatively undisturbed, providing opportunities for nature study and wildlife observation

Lake Louisa contains elevations on the eastern portion of the unit up to 185 feet above M.S.L. The land generally slopes from the east and west boundaries down to Big Creek near the center of the park. The high elevation of the eastern portion of the park provides excellent vistas down to Dixie and Hammond Lakes and Lake Louisa.

Numerous jeep trails exist throughout the park from the previous citrus farming and cattle ranching operations. These old roadways provide a network of pathways to use as a foundation for developing a system of trails. However, the park's topography, lack of natural cover and soft sands create less than ideal conditions for users.

Assessment of Use

All legal boundaries, structures, facilities, roads and trails existing in the unit are delineated on the Base Map. Specific uses made of the unit are briefly described in the following sections.

Past Uses

The majority of the park property has been used for citrus production. The freezing temperatures that occurred in the early 1980s killed most of the trees. In other areas, flatwoods and sandhill communities were converted to pasture lands. Lake Louisa has been, and continues to be, a popular location for water-based outdoor recreation.

Recreational Uses

Existing recreational activities at Lake Louisa State Park include hiking, horseback riding, swimming, picnicking, canoeing/kayaking, fishing, nature observation and camping. The use of watercraft in the park is restricted to hand-launched vessels, and the use of internal combustion engines are prohibited in park waters. However, vessels with internal combustion engines access Lake Louisa through public boat ramps and private residences to the north. Fishing is restricted on some of the smaller waterbodies of the park.

Other Uses

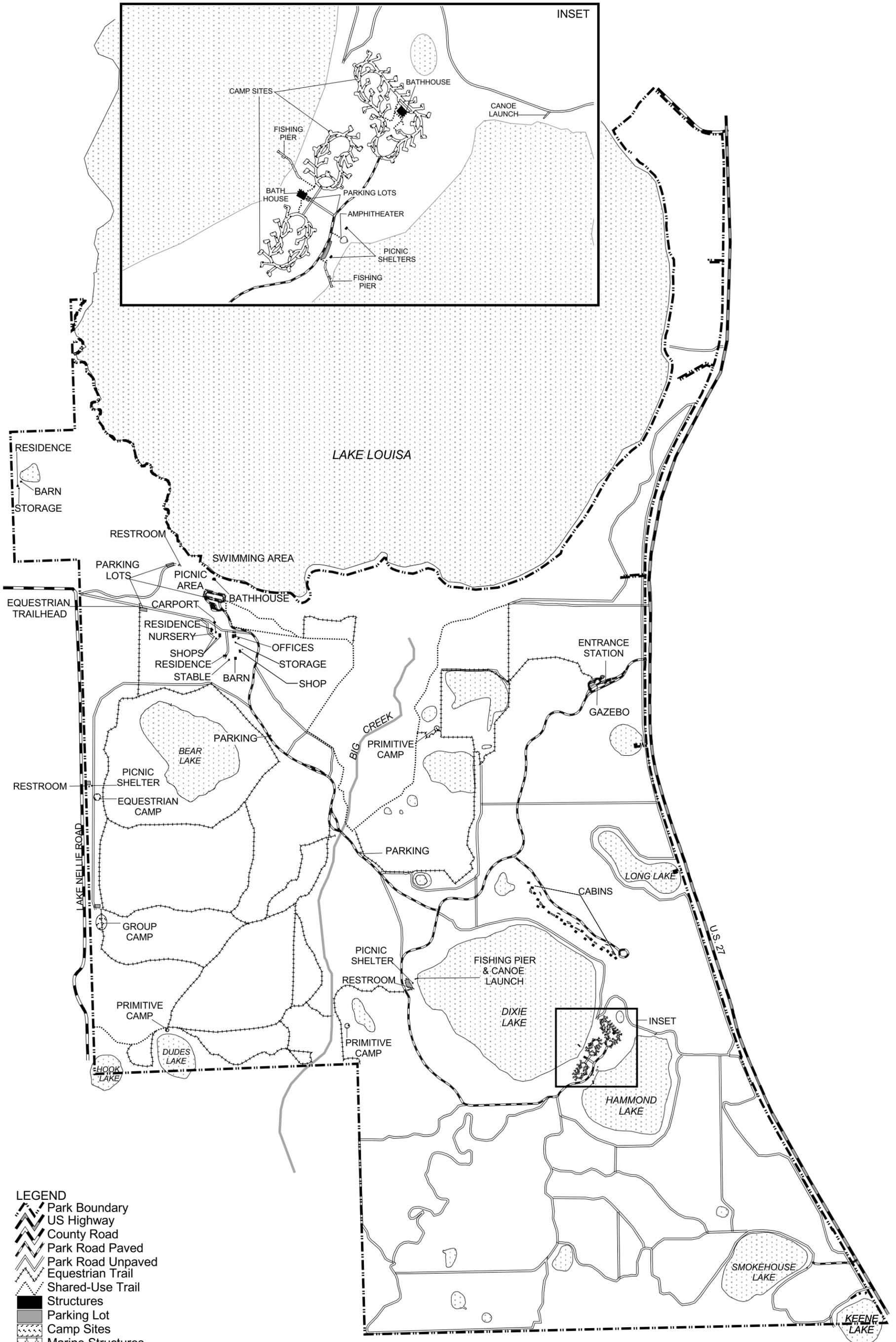
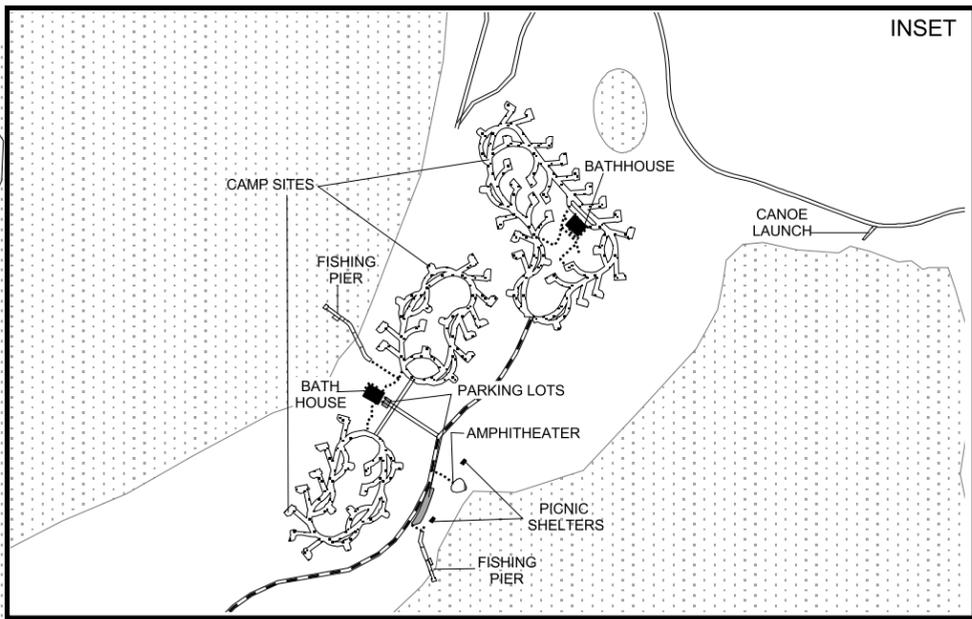
Approximately 166 acres of citrus groves remain in the park and are managed for revenue to support restoration of natural communities.

Protected Zones

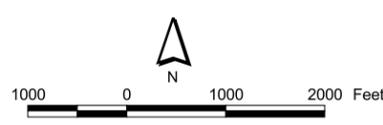
A protected zone is an area of high sensitivity or outstanding character from which most types of development are excluded as a protective measure. Generally, facilities requiring extensive land alteration or resulting in intensive resource use, such as parking lots, camping areas, shops or maintenance 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 Lake Louisa State Park the scrub, basin swamp, baygall, depression marsh, dome, hydric hammock, wet flatwoods, sandhill upland lake, and swamp lake communities have been designated as protected zones as delineated on the Conceptual Land Use Plan. Protected zones encompass nearly 50 percent of park lands.

All uplands and wetlands preserved, enhanced and/or restored as mitigation to offset permitted impacts to wetlands, including FDOT mitigation-funded areas, are designated as conservation areas to remain in their natural state in perpetuity (see Reference Map).



- LEGEND**
- Park Boundary
 - US Highway
 - County Road
 - Park Road Paved
 - Park Road Unpaved
 - Equestrian Trail
 - Shared-Use Trail
 - Structures
 - Parking Lot
 - Camp Sites
 - Marine Structures
 - Water Bodies



LAKE LOUISA
STATE PARK

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

BASE MAP

Existing Facilities

Existing recreation facilities include two-day use areas, one each on Lake Louisa and Dixie Lake, a standard campground, cabins, primitive campsites, camping areas for groups and equestrians, hiking/biking and equestrian trails. The Lake Louisa Use Area includes a swimming beach, restrooms and two parking areas. A paved parking area (156 spaces) is connected to the main park drive and a second stabilized parking area (27 vehicle capacity) is accessible off Lake Nellie Road. The Dixie Lake Use Area includes paved parking (31 spaces), a composting restroom, medium picnic shelter and combination dock and canoe/kayak launch. A 60-site standard campground was constructed in 2003 between Dixie and Hammond Lakes and provides full service camping with water, electric, dump station and bathhouses. Canoe/kayak launches and fishing docks provide access to the lakes for campers. Twenty cabin units were constructed in 2004 on the northwest side of Dixie Lake and are anticipated to be available to the public by the approval of this management plan. A primitive group camp, equestrian trailhead and camping area are located along the western boundary. Facilities are limited to potable water, small picnic shelter, composting restroom and trail directional signage. The park currently has over seven miles of shared-use trails for hiking and off-road biking, and roughly ten miles of equestrian trails. Trailheads are located at the entrance station, the main parking area at Lake Louisa and north of Bear Lake, between the shop area and western boundary. Portions of the trail system can also be accessed at two pull-offs along the park drive. Three primitive campsites are linked to the trail system.

An entrance station was constructed in 2002 just off U.S. Highway 27 on the eastern border of the park. Five miles of winding paved road with bike lanes provides access from U.S. Highway 27 to the main use areas of the park. The park administrative offices, shop and residence areas are located off the park drive just south of the Lake Louisa Use Area.

The following is a listing of recreation and support facilities at Lake Louisa State Park:

Lake Louisa Use Area

Swimming area (approx. 1,000 LF)
Scattered picnic tables and grills
Swimming area restroom
Composting restroom
Paved parking (156 spaces)
Stabilized parking (27 vehicles)
Boardwalks (2)

Dixie Lake Use Area

Dock/canoe launch
Medium picnic shelter
Interpretive sign
Paved parking (31 spaces)
Composting restroom

Camping and Cabins

Standard Campground
60 sites
Bathhouses (2)
Dock/canoe launch (2)
Medium picnic shelters (2)
Group/Equestrian Camping Area
Composting restroom
Small picnic shelter
Potable water
Primitive campsites (3)
Cabins (20 units)

Trails

Eastern trailhead (entrance station)
 Paved parking (20 spaces)
 Western trailhead (Lake Louisa Use Area parking lot)
 Roadside pull-offs (2 sites, 2-3 vehicles/site)
 Equestrian trailhead
 Equestrian trails (10 miles)
 Shared-use trails (biking/hiking) (+7 miles)

Support Facilities

Paved park drive
 Entrance station
 Administrative office
 Residences (3)
 Storage buildings (2)
 Garage
 Pole barn
 Barn
 Shop building

CONCEPTUAL LAND USE PLAN

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

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.

In 1998, the Department of Environmental Protection entered into a Memorandum of Agreement (MOA) with the Department of Community Affairs concerning development activities in Lake Louisa State Park. The MOA identifies procedures and conditions guiding future development in the park that are consistent with the Green Swamp Area of Critical State Concern Principles for Guiding Development, the Lake County Comprehensive Plan and the Lake County Land Development Regulations. The parameters of the MOA were developed in coordination with the 1997 approved unit management plan for Lake Louisa State Park. Land use and development activities addressed in subsequent management plan updates will remain consistent to the criteria established in the 1998 MOA.

Potential Uses and Proposed Facilities

Lake Louisa State Park is positioned to be a popular tourist destination for central Florida visitors. The park is strategically located within a half-hour drive of the many tourist attractions on the southwest side of Orlando. The park is also anticipated to become an important recreation destination for a burgeoning local population in an area of the state that



LAKE LOUISA

REPLACE SWIM AREA RESTROOM

EDUCATION CENTER & NURSERY

EXISTING TRAILHEAD

RELOCATE SUPPORT FACILITIES

TRAILHEAD RELOCATION

FISHING & CANOE/KAYAK ACCESS

EQUESTRIAN CAMPING AREA IMPROVEMENTS

GROUP CAMP IMPROVEMENTS

LAKE NELLIE RD

BEAR LAKE

IMPROVE ACCESS ROAD

EXISTING ENTRANCE STATION

EXISTING CABINS

DOCK & SCREENED SHELTER

27

STAFF RESIDENCE

PICNIC FACILITIES & RECREATION HALL

DIXIE LAKE

HAMMOND LAKE

PROPOSED CAMPGROUND

FUTURE TRAIL DEVELOPMENT

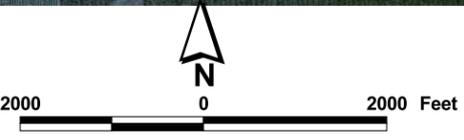
PAVED SHARED-USE TRAIL

LEGEND

- PROPOSED ROAD IMPROVEMENTS
- PROPOSED PAVED SHARED USE TRAIL
- PROPOSED DEVELOPMENT AREA
- PROPOSED FACILITY
- PROTECTED ZONES
- LAKE LOUISA STATE PARK BOUNDARY
- HILOCHEE WMA BOUNDARY

HILOCHEE WILDLIFE MANAGEMENT AREA

LAKE LOUISA STATE PARK



CONCEPTUAL LAND USE PLAN

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

is somewhat removed from other parks or recreation areas. Additional recreation development is proposed at the park to meet the growing demand for resource-based recreation in one of Florida's fastest growing and most visited areas of the state.

Current recreational activities are considered appropriate and should be continued. The plan proposes expanding camping opportunities and improving existing camping facilities for groups and equestrians. Additional picnic facilities are recommended along with facilities to support park programming, special events and expand opportunities for visitor education. Areas have also been identified for expansion of the park's trail system as ruderal areas are restored.

Recreation Facilities

Camping. Ninety full-service campsites are recommended for eventual development at the park. A 60-site campground was constructed in 2002 between Dixie and Hammond Lakes. Playground equipment is recommended to be added to the campground to improve the family-friendliness of this facility. An additional standard 30-site campground is recommended for eventual development in a ruderal area on the west side of Dixie Lake. A conceptual location that includes an area east and west of the campground road has been identified. Additional site design work is needed to determine the feasibility of locating sites between the road and Dixie Lake shoreline.

Improvements are also proposed for the existing equestrian and group camp area. Trailer sites for up to 20 rigs, barn, bathhouse, horse wash area, BBQ pit and large picnic shelter are recommended to support equestrian camping. Facilities for the group camp are proposed an appropriate distance south, include a restroom, outside showers and fire pit. The open grass field along the boundary is also large enough to accommodate special events and has been identified as a potential staging area for a future concession-operated horse rental service.

Cabins. Construction was recently completed on 20 rental cabins, which are anticipated to be a popular amenity for visitors interested in extended park stays. Other recommended improvements in this area include an accessible pathway connecting the cabin area to a dock/fishing platform and screened shelter on Dixie Lake. A boardwalk through the cypress-ringed shoreline will allow lake access and limit environmental impacts. The pathway will also provide a direct linkage for cabin visitors to a proposed paved shared-use trail circumnavigating Dixie and Hammond Lakes (see Trails and Interpretation). The design of this pathway should strive to limit impacts to the viewshed between the cabins and Dixie Lake by following contours, limiting grade changes and the need for safety structures such as handrails. A sensitively designed connecting pathway will avoid having cabin visitors' drive to other use areas for water access and the blazing of social trails down the slope to the lake and shared-use trail, while maintaining the impressive vista overlooking Dixie Lake.

Dixie Lake Use Area. To enhance day use of this area, additional picnic shelters and playground equipment are recommended. At least one large pavilion should be provided that could be rented by large groups. Given its proximity to the Orlando metro area and local attractions, the park is anticipated to be utilized regularly by organized groups of recreationists. A recreation hall is also proposed that would provide a climate-controlled meeting space for groups, special functions and park programs. The existing restroom should be upgraded and connected to central sewer lines and the parking area expanded sufficiently to meet increased use as facilities are built.

Bear Lake. It is recommended that the existing fishing dock be replaced with a facility to

enhance fishing and boating access for hand-launched vessels. A stabilized parking area for up to 5 vehicles is also recommended just outside the wetland fringe of the lake shoreline. A wetland boardwalk through the basin swamp is proposed to connect the parking area and dock and minimize resource impacts.

Trails and Interpretation. A network of trails to facilitate hiking, biking and horseback riding is envisioned to encourage exploration of the park and non-vehicular transportation between use areas. Equestrian use is considered appropriate at the park but recommended to remain west and south of the park drive to avoid conflicts with vehicles and areas slated for restoration. While much of the park is currently in a ruderal condition, planned restoration efforts will eventually improve the aesthetics of the landscape and enhance the trail user experience. Trail design and layout should be coordinated with restoration activities and avoid sensitive areas known to support listed species. Existing jeep trails may be utilized but new pathways should also be constructed to enhance the trail experience. Wet areas will require bridging or boardwalks to allow connectivity and minimize user impacts. Changes to the layout of trails may be necessary in the future, as progress is made on restoration of natural communities.

The existing equestrian trailhead is proposed to be relocated a short distance south once the road that provides access to the equestrian and group camping areas has been improved. The road is currently difficult to drive due to soft sand. The area proposed for relocation is the site where starter kit facilities (water, small shelter, composting restroom) are located, which would support trail users.

An expansion of the existing trail system is proposed to provide roughly five miles of additional shared-use trail south of Dixie and Hammond Lakes for hiking, biking and equestrian use. There is also the potential to expand the trail system by connecting with the Hilochee Wildlife Management Area south of the park. The Division will explore the possibility of this connection with the FFWCC.

An approximately three mile paved shared-use trail is proposed that would provide a safe, accessible route for bicyclists and pedestrians around Dixie and Hammond Lakes. The proposed trail would connect existing and proposed campgrounds, cabins and the Dixie Lake Day Use Area. While park roads provide paved shoulders for biking, they are generally more suited to the experienced cyclist. A paved trail, separate from existing roads, will provide a safe, universally accessible facility that is well suited for families and children.

Planning sufficient recreational opportunities in highly altered landscapes, as found at Lake Louisa State Park, presents unique challenges. Opportunities for learning can add another dimension to the visitor experience. Despite the level of disturbance at the park, many opportunities exist for interpretation. For instance, the park is a working model for uplands restoration and could become an outdoor classroom of sorts for schools and other groups to study the impacts of various human uses on the landscape. Potential interpretive themes are numerous and could include:

- A changed landscape: historic uses of the land.
- Restoring sandhills and flatwoods communities.
- Geology, flora and fauna of the Lake Wales Ridge.
- Hydrology and the Green Swamp.

- Freshwater ecology.
- Evidence of prehistoric people at Lake Louisa.

Static interpretive displays are recommended at each trailhead and use area to inform visitors about park resources and management activities, particularly related to restoration of upland communities. However, in order to develop the full potential for interpretation at the park and provide additional recreation opportunities, it is proposed that an education center be established in what is currently the location of park support facilities. While it is recommended that the center's program focus be natural community restoration, a variety of topics could be addressed related to natural and cultural history. The center would target youth groups with a mix of classroom and hands-on field experiences, which might include actively participating in restoration projects. While the park office would remain in its current location, it is recommended that other buildings be evaluated for their ability to be reused for this purpose once a new shop and residence area is established (see discussion that follows under Support Facilities). Facilities should be designed to allow for learning by the casual visitor or through structured sessions and staff-led interpretive programs and could include a hands-on education building with exhibits, audiovisual space, classrooms, wet lab, and an open-air interpretive center. Program development should be integrated with local school curricula to encourage participation by school groups.

Support Facilities

Structures associated with the shop area are in direct line of sight for visitors approaching Lake Louisa. This detracts from the visual quality of the surrounding area and will be difficult to buffer with vegetation or even a constructed berm. It is recommended that a new shop and residence compound eventually be established further west out of view of the park drive. Unless otherwise noted, additional support facilities called for in this plan should be located in this area. Once new facilities have been constructed, the current shop facilities, and office complex are proposed to become a center for interpretation at the park as discussed under Trails and Interpretation.

The park currently needs a 4-bay shop and an expanded native plant nursery. Consideration will be given to converting an existing shop structure for use as a nursery and proposed education center. One existing residence needs upgrading and two additional residences should be constructed to meet staff housing needs. The additional residences are proposed east of Hammond Lake just off U.S. Highway 27 and within the relocated shop area. New facilities for the storage of equipment and flammable materials are also recommended to allow for a complete relocation of support functions.

Central sewer lines are planned to service the proposed development around Dixie Lake. The existing bathhouse at the Lake Louisa swim area is recommended to be upgraded. The replacement of existing and construction of new waste disposal facilities will comply with criteria established in the MOA between DEP and the Department of Community Affairs concerning development activities in the park.

Improvements are also recommended to the access road just north of Bear Lake to enhance public access from the main park drive to the equestrian and group camping areas and Bear Lake.

Facilities Development

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

Addendum 7. 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.

Camping

- Proposed Campground:
 - 30 sites with bathhouse
- Existing Campground:
 - Playground equipment
- Equestrian Camping Area:
 - Horse trailer campsites (20 rigs)
 - Barn
 - Bathhouse
 - Horse wash
 - Large picnic shelter
- Group Camp:
 - Restroom with outside showers
 - Fire pit
 - Picnic shelters
- Cabins:
 - Accessible pathway
 - Shoreline boardwalk
 - Dock/fishing platform
 - Screened shelter

Dixie Lake Use Area

- Picnic shelters
- Recreation hall
- Scattered tables and grills
- Playground equipment
- Replace restroom
- Expanded parking

Bear Lake

- Replace fishing dock
- Wetland boardwalk
- Boat launch
- Stabilized parking (up to 5 vehicles)

Trails and Interpretation

- Natural surface shared-use trails (+/-5 miles)
- Paved shared-use trail (3 miles)
- Education Center
- Interpretive kiosks
- Relocate equestrian trailhead

Support Facilities

- Residences (3)
- 4-bay shop
- Flammable storage building
- Equipment shelter

- Native plant nursery
- Central sewer
- Replace swim area bathhouse
- Bear Lake access road improvements

Existing Use and Optimum Carrying Capacity

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

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

Optimum Boundary

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

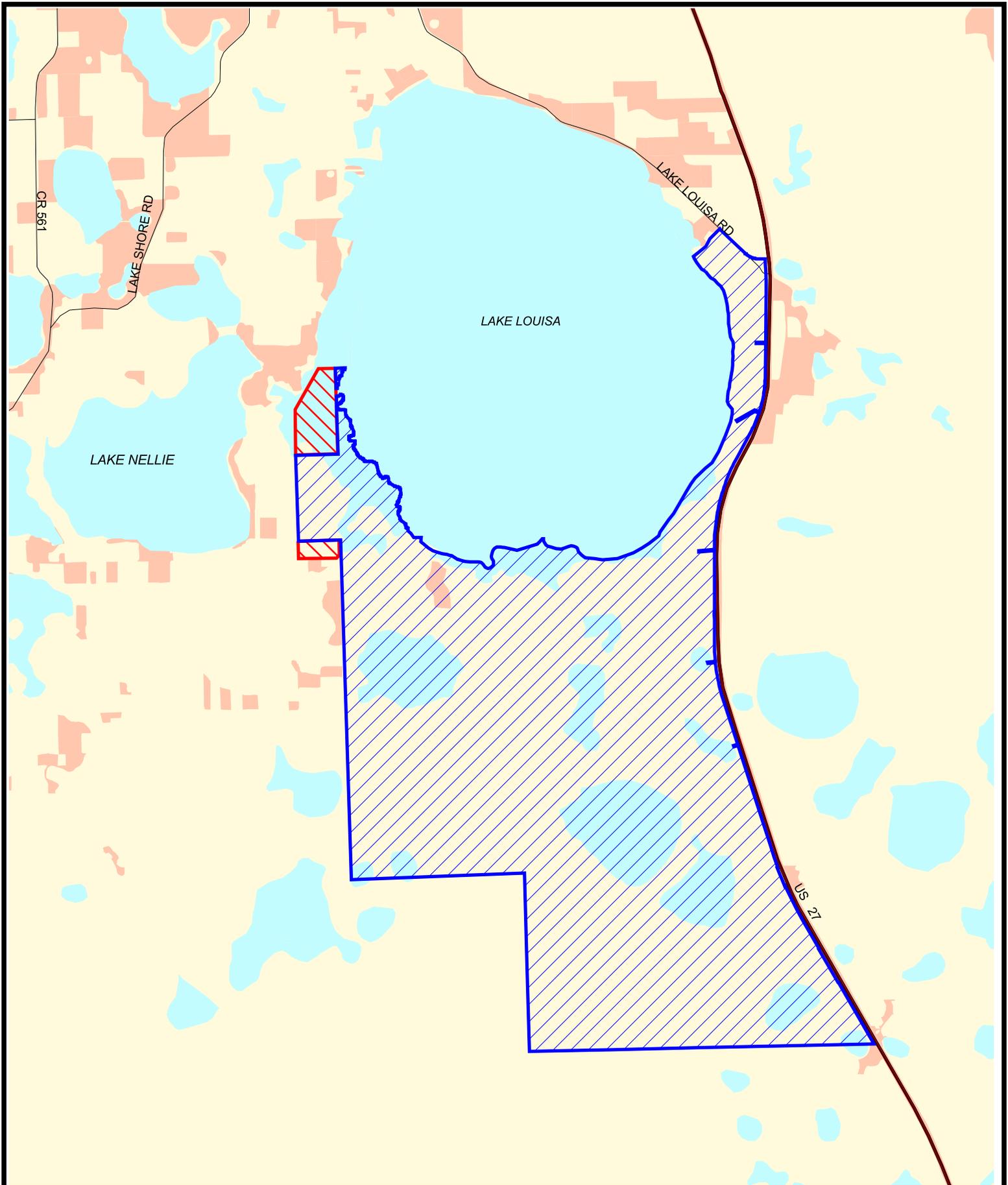
Table 1--Existing Use And Optimum Carrying Capacity

Activity/Facility	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
	One Time	Daily	One Time	Daily	One Time	Daily
Trails						
Shared Use (unpaved)	70	140	55	110	125	265
Shared Use (paved)			60	240	60	240
Equestrian	100	200			100	200
Picnicking/Swimming	350	700	112	224	462	924
Education Center			75	150	75	150
Fishing						
Shoreline	27	54			27	54
Boating						
Canoeing/kayaking	48	96	12	24	60	120
Camping						
Standard	480	480	240	240	720	720
Group	60	60			60	60
Equestrian	60	60			60	60
Primitive	24	24			24	24
Cabins			160	160	160	160
TOTAL	1,219	1,814	714	1,148	1,933	2,977

improve the continuity of existing park lands, provide additional natural and cultural resource protection, and/or allow for future expansion of recreational activities. As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency.

Identification of lands on the optimum boundary map is solely for planning purposes and not for regulatory purposes. Property identified 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 or to use as the basis for permit denial or the imposition of permit conditions.

At Lake Louisa State Park, acquisition of identified parcels would provide additional protection for the shoreline of Lake Louisa and Little Creek, facilitate use of prescribed fire and buffer against future residential development adjacent to the park.



LAKE LOUISA
STATE PARK



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

LEGEND

-  Park Boundary
-  Optimum Boundary

OPTIMUM BOUNDARY MAP

Addendum 1—Acquisition History and Advisory Group Report

Lake Louisa State Park

Acquisition History

Purpose and Sequence of Acquisition

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) acquired Lake Louisa State Park to protect, develop, operate, and maintain the property for public outdoor recreational, park, conservation, historic and related purposes. The initial acquisition took place on August 29, 1973, as the result of a purchase by the Trustees funded under the LAFT Program. Since the initial purchase, the Trustees have acquired several parcels under P2000/CARL and P2000/A and I programs and added to the park.

On March 14, 1974, the Trustees leased Lake Louisa State Park to the Division of Recreation and Parks (Division) under lease No. 2741. The lease is for a period of ninety-nine (99) years and will expire on March 13, 2073. According to this lease, the Division is to manage the park for the conservation and protection of natural, historic and cultural resources and to provide resource-based public outdoor recreation compatible with the conservation and protection of the property.

Title Interest

The Trustees hold fee simple title to Lake Louisa State Park.

Special Conditions on Use

Lake Louisa State Park is designated single-use to provide resource-based public outdoor recreation and other related uses. Uses such as, water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture (other than those agricultural activities specifically identified in this plan) and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

Outstanding Reservations

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

Instrument:	Warranty Deed
Instrument Holder:	Combank/Winter Park
Beginning Date:	August 29, 1973
Ending Date:	There is no specific ending date given.
Outstanding Rights, Uses, Etc.:	The deed is subject to a certain an access easement granted to Sumter Electric Cooperative, Inc.

Instrument:	Warranty Deed
Instrument Holder:	Lykes Bros Inc.
Beginning Date:	September 21, 1995
Ending Date:	There is no specific ending date given.
Outstanding Rights, Uses, Etc.:	The deed is subject to a certain Utility Agreement to Lake Grove Utilities, Inc. and a certain easement

Lake Louisa State Park
Acquisition History

that allows Sumter Electric Cooperative, Inc. to construct, operate and maintain an electric distribution system.

Instrument: Warranty Deed
Instrument Holder: Gloria and R. E. Oswalt
Beginning Date: March 15, 1995
Ending Date: There is no specific ending date given.
Outstanding Rights, Uses, Etc.: The deed is subject to a certain easement that allows Sumter Electric Cooperative, Inc. to construct, operate and maintain an electric distribution system.

Instrument: Warranty Deed
Instrument Holder: Charles E. Bradshaw Jr.
Beginning Date: May 31, 1994
Ending Date: There is no specific ending date given.
Outstanding Rights, Uses, Etc.: The deed is subject to a certain right of way easement to Sumter Electric Cooperative, Inc and a certain easement to American Telephone and Telegraph Company.

Instrument: Warranty Deed
Instrument Holder: Palm Lake Groves, Inc.
Beginning Date: February 25, 1994
Ending Date: There is no specific ending date given.
Outstanding Rights, Uses, Etc.: The deed is subject to a certain easement that allows Sumter Electric Cooperative, Inc. to place two anchors off existing power line.

Instrument: Well License Agreement
Instrument Holder: Trustees
Beginning Date: September 3, 1996
Ending Date: For a period of thirty (30) years.
Outstanding Rights, Uses, Etc.: The agreement allows the St. John River Water Management District to locate, construct, install operate, inspect, alter, improve, maintain, repair, remove and rebuild equipment for research and scientific purposes.

Lake Louisa State Park

Advisory Group List

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Highlanders Chapter
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Lake Louisa State Park
Advisory Group List

Lake Louisa State Park
Advisory Group Staff Report

The Advisory Group appointed to review the proposed land management plan for Lake Louisa State Park met at the park administrative office complex on November 23, 2004.

The Honorable Debbie Stivender, Frank Paulhamus, Mike Woods, Barbara Prynosi, and Jerry Bohmann did not attend. All other appointed Advisory Group members were present. Attending staff included Larry Fooks, Rosi Mulholland, Chuck McIntire, Andy Noland and Michael Kinnison.

Summary Of Advisory Group Comments

Rebecca Jetton (Department of Community Affairs) expressed support for proposed hydrological improvements that could improve water quality and the functioning of natural communities at the park. She identified stormwater impacts from US 27 as a concern and offered to facilitate communication with the Department of Transportation to address the issue. Rosi Mulholland explained that the District was communicating with DOT on needed stormwater improvements and that the park would be benefiting as a mitigation site as part of the planned widening of this roadway. Ms. Jetton discussed the potential water quality impacts of sand mining, current DCA review of permits, and the need to revise the statutory rule related to wetland impacts. She suggested that there was also a need to strengthen county land use regulations related to wetlands. Ms. Jetton expressed interest in the use of cold paving to address improvements to Lake Nellie Road between Duke and Hook Lake. Rosi Mulholland explained that this area was outside the proposed Lake Nellie Road paving project adjacent to the park. Ms. Jetton asked for clarification of the plan's reference to the pumping of water out of Lake Lowery. Ms. Mulholland explained that, while the current status of pumping was unclear, the issue was still identified in the plan to raise awareness of a potential hydrological impact to the park.

Debbie Almy (Florida Trail Association - FTA) stated that the FTA supports hiking opportunities at the park. She discussed the need for minimizing environmental impacts from trails and suggested routing trails around wet areas. Peggy Cox added that she was concerned about wetland impacts from the proposed paved shared-use trail and was opposed to the concept of an impervious trail surface. Michael Kinnison explained that the proposed paved trail was intended as a loop around Dixie and Hammond Lakes and would not extend to other areas in the park. He added that this facility would provide a safe, universally accessible trail experience for a variety of users and would connect the camping, cabin and day use areas located on Dixie Lake. Keith Schue suggested utilizing the corridor of existing access roads, limiting paving to a loop around Dixie Lake and moving the proposed trail routing upslope and back from the shoreline. He also felt cold-pavement should be considered for sections that would eventually be paved. Ms. Almy agreed and felt that a mix of trail surfaces would provide a more diverse trail experience. Mr. Kinnison indicated that limiting the paved loop to Dixie Lake could present operational problems for the park since trail users would be channeled through the campground. Larry Fooks stated that the trail would be designed to follow existing paths and future utility corridors to minimize impacts. Chuck McIntire added that cold-paving leaves a roughened surface that may not be an appropriate surface for recreational trail. Ms. Almy asked for clarification regarding boating on park water bodies. Mr. McIntire stated that boating access within the park was restricted to the launching of vessels with non-internal combustion engines only. Mr. Schue recommended clarifying boating access in the plan.

Lake Louisa State Park
Advisory Group Staff Report

Cyndi Gates (Florida Fish and Wildlife Conservation Commission) pointed out that although the park is a highly disturbed landscape it provides important water quality and habitat functions given its proximity to the Green Swamp and Lake Wales Ridge. She expressed support for park restoration initiatives and offered to share information related to hydrological restoration projects completed on Big Creek in the Hilochee Wildlife Management Area.

Dan Cleary (Friends of Lake Louisa State Park, Inc.) questioned the level of specificity of management goals related to restoration without having developed a plan that identifies restoration areas, prioritizes actions and guides the pursuit of funding. He added that the plan's management objectives are not completely reflected in the priority schedule and cost estimate. Ms. Mulholland responded that specificity is important in order to make progress and considered plan goals related to planting as realistic and achievable. Joe Bishop stated that the plan's language allows for adaptive management as park staff learn from their efforts. Mr. Kinnison suggested that the plan identify the need to develop a detailed restoration plan for the park. Peggy Cox suggested restoring areas with high public visibility first to foster public understanding and support for restoration. Ms. Almy recommended the use of signage on US 27 to promote restoration efforts. Kathleen Young stated that the current condition of the park landscape does little to entice people traveling on US 27. Mr. Schue added that replanting in this area would provide buffering from development and traffic along US 27. Mr. Cleary felt the plan should identify the need to upgrade existing facilities, particularly the Lake Louisa swim area restroom. He recommended adding another day use area in the vicinity of Smokehouse and Keen Lakes. Mr. McIntire expressed concern about the operational demands of managing another entrance in this area. Staff concurred and indicated that this was not considered appropriate at this time. Mr. Cleary recommended locating referenced CARL sites on the Vicinity Map. Taylor Flowers asked who was responsible for enforcing terms of conservation easements on CARL lands in this area. Mr. Kinnison indicated he would check with the Division of State Lands and provide a contact. Mr. Cleary and Mr. Flowers asked for clarification on funds generated from harvesting pines at the park. Ms. Mulholland explained that timber harvesting was to be used as a restoration tool with revenue generated from timber sales to be used for restoration work onsite. Mr. Cleary discussed the need to conduct cultural resource surveys prior to developing new areas of the park. Mr. Schue asked for a clarification on future plans for providing public swimming in park lakes. Mr. McIntire explained that public health regulations have forced the periodic closure of the Lake Louisa swimming area due to limited visibility in tannic water. Staff clarified that there were no plans to expand swimming to other water bodies of the park. Mr. Cleary noted that equestrian camping area improvements would need to proceed with caution due to the presence of gopher tortoises and other listed species in the vicinity.

Kathleen Young (equestrian) recommended the use of covered pens instead of a barn in the equestrian camping area for maintenance reasons. She expressed concern about potential impacts (waste handling, water use, safety risks) related to operating an equestrian concession at the park, and stated that the costs of such an operation may outweigh its benefits. Ms. Young suggested adding spur trails to provide more challenging rides and mile markers to existing trails to improve navigation. Andy Noland explained that challenge rides were limited to sanctioned events due to liability concerns. He welcomed assistance with marking trails.

Lake Louisa State Park
Advisory Group Staff Report

Taylor Flowers (adjacent landowner) asked about progress on acquiring property identified on the Optimum Boundary Map. (Staff were unsure about the status of acquisition efforts in this area at the time of the meeting. Follow up indicates that no parcels in this area have been added to the park since the last plan update in 1999.) He expressed concern about wildfires and asked about the status of the park's prescribed fire program. Mr. McIntire responded that while progress has been made in recent years, it is becoming increasingly difficult to burn due to smoke management issues. Mr. Flowers encouraged park staff to assist with controlling coyotes and asked about the presence of poachers and pot hunters. Mr. Noland and Mr. McIntire explained that illegal uses of park property will always be an issue given the size of the boundary, but that staff work with FWC and local law enforcement agencies to enforce the law. Staff added that neighbors assist with keeping tabs on unauthorized uses in more remote areas. Mr. Flowers asked how hunters in the adjacent WMA know if they are approaching park property. Ms. Gates indicated that most hunters are familiar enough with the area that they stay clear of the park. Mr. McIntire explained that the park boundary is posted and that natural features restrict the locations someone could cross between the properties. Mr. Flowers stated that residents on the west side of the park have to drive a significant distance to reach the park entrance and requested consideration be given to improve access in this area. Mr. Noland responded that vehicular access was not appropriate since it would simply be used as a cut through to US 27. Ms. Mulholland suggested that a trailhead connection was possible that would allow pedestrian or biking access only. Mr. Flowers shared his daughter's experience with the death of a horse she was riding on the park's equestrian trail and suggested addressing equine emergencies in the plan. He also recommended adding emergency phone numbers on the trail. Mr. McIntire responded that staff are trained in how to deal with equine emergencies and that this type of operational issue is best dealt with on a case by case basis. He added that emergency numbers are provided on the park brochure and that the park has an effective system for checking trails for missing visitors.

Peggy Cox (Orange Audubon Society) stated that the local Audubon chapter was interested in conducting a bird survey of the park. She discussed the opportunity to partner with the Native Plant Society and other environmental organizations in the development of a native plant nursery and education center programming.

Keith Schue (Central Florida Group, Sierra Club) requested clarification in the plan of park's timber management objectives given the range of options provided in the Timber Management Analysis. Ms. Mulholland agreed to add language to the plan that clarifies the management emphasis to be pursued at Lake Louisa. Mr. Schue encouraged the park to be actively engaged in Lake County comprehensive planning efforts currently underway. He emphasized the importance of proactive participation in the policy development process in order to influence future land use decisions that will protect park resources, and recommended providing a listing of priority resource management issues to the county. Mr. Schue suggested expanding the park Optimum Boundary to include property further north along the east and west shorelines of Lake Louisa, along the southwest boundary and sites east of US 27 that could serve as seed sources for restoration. Mr. Flowers also suggested considering an additional 25 acre citrus grove on the northwest boundary. Mr. Schue was concerned about the plan's mention of outsourcing and was opposed to outsourcing resource management functions. He also recommended providing monofilament recycling containers at park fishing locations. Mr. Schue asked about the status of

Lake Louisa State Park
Advisory Group Staff Report

pitcher plant recovery. Ms. Mulholland explained that future feral hog removal efforts and use of prescribed fire should help plants reestablish themselves. She added that pitcher plant habitat is not practical to fence since it is often under water. Mr. Schue encouraged the development of more detailed plans before moving ahead with restoration and asked for a clarification on the use of the park by Florida scrub-jays. Ms. Mulholland responded that while jays have been recorded in the area, the park has no resident population. Mr. Schue recommended removing text that could be interpreted to expand swimming to water bodies other than Lake Louisa. He closed by asking about the productivity of park citrus groves. Ms. Mulholland explained that the groves are in a rehabilitation phase and were in poor condition when the current contract was initiated. She added that the groves are anticipated to begin producing revenue during the current 10-year contract.

Joe Bishop (Division of Forestry) stated that the DOF was available to provide assistance with timber management and prescribed burning. He noted the importance of the Warea Archipelago sites, identified in the Lake Wales Ridge Florida Forever project, as seed source for restoration at the park and suggested the Schofield Sandhill Site may be appropriate to be managed by DRP. He recommended adding text that discusses the need for DOF/DRP management coordination of this site. He expressed support for efforts designed to restore longleaf pine and emphasized the opportunity for other land managers to learn from the experience of restoring uplands at Lake Louisa. He recommended clear cutting planted sand pines and the thinning of slash pines once trees reach a merchantable size. He asked about the long range plans for the citrus groves. Ms. Mulholland stated that, with the exception of maintaining representative samples for interpretive purposes, trees will not be replanted as they are lost to frost or disease. She indicated that there are provisions in the current citrus management contract that restrict the use of practices that would be harmful to the environment, and noted that revenue generated from citrus goes towards restoration projects at the park. Mr. Bishop asked if the park had sufficient habitat to serve as a scrub-jay donor site. Ms. Mulholland indicated that the park currently did not have enough suitable habitat.

Comments Submitted in Writing

Barbara Prynosi (St. Johns River Water Management District) indicated that the District's interest at Lake Louisa State Park is to assure that wetland mitigation areas are designated as conservation areas to remain in their natural state in perpetuity. She requested that language be added in the next scheduled management plan (as currently there are no mitigation-funded areas identified) stating that uplands and wetland areas preserved, enhanced and/or restored using FDOT mitigation funds are designated as conservation areas to remain in their natural state in perpetuity. She also requested that the locations of mitigation areas be identified on the Conceptual Land Use Plan Map (or its equivalent).

Staff Recommendation

Staff recommends approval of the proposed management plan for Lake Louisa State Park as presented with the following comments and revisions.

Lake Louisa State Park
Advisory Group Staff Report

Recreational Facilities/Access

- Staff recommend maintaining the concept of a paved shared-use trail as presented in the advisory group draft plan. Resource concerns raised by the group will be considered and addressed during the design phase of the project. Stormwater management will be a priority to protect water quality. Wetland areas will be avoided where possible and bridged where needed. Consideration will be given to the use of pervious materials. However, priority will be given to providing a hardened surface that is safe for a variety of users.
- Language that may be interpreted as providing swimming on water bodies other than Lake Louisa will be removed from the Recreation Resource Elements section.
- Summer storms eroded the Lake Louisa shoreline and have impeded pedestrian access from the secondary parking area. Consideration will be given to improving pedestrian access in this area. Future plans to stabilize the existing road that runs north of Bear Lake and relocate the equestrian trailhead will further improve access in this area.
- Plan will identify the need to upgrade the Lake Louisa swim area restroom during the next planning cycle.
- Plan will clarify that launching of vessels in park waters is limited to those with non-internal combustion engines.

Resource Management

- Add an objective to the plan that identifies the need to develop a restoration plan to guide the long-term restoration program at the park.
- Where possible, restoration activity will incorporate areas of high visibility to improve aesthetics and serve as opportunities for public education. However, decisions regarding the prioritizing of areas for restoration will be made based primarily on resource management needs.
- Warea Archipelago sites will be identified on the Vicinity Map.
- Include language that discusses anticipated FDOT mitigation areas at the park and that they will be managed as conservation areas to remain in their natural state in perpetuity.

Participation in Local Planning Initiatives

- Staff will provide input to Lake County on priority resource management issues of concern to Lake Louisa State Park for consideration in the process of updating the Lake County comprehensive plan.

Optimum Boundary

- No additional changes are recommended to the optimum boundary at this time. Access to the Warea sites for plant material can be achieved through cooperation with existing land managers. Private lands along the southeastern boundary are currently identified in the Lake Wales Ridge Florida Forever Project to be managed by the FWC as part of Hilochee Wildlife Management Area.

Lake Louisa State Park
Advisory Group Staff Report

Addendum 2—References Cited

Lake Louisa State Park

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Lake Louisa State Park

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Addendum 3—Soils Descriptions

Lake Louisa State Park

Soils Descriptions

Albany sand with 0 to 5 percent slopes (AbB) - This is a somewhat poorly drained sandy soil that has a sandy clay loam subsoil. The water table is at 40 to 60 inches for more than six months a year. During the wet season, it is at 15 to 40 inches. The sandy surface and subsurface layers are rapidly permeable and have very low available water capacity and low organic-matter content. The loamy subsoil is moderately permeable and has medium available water capacity. Natural fertility is low.

Anclote and Myakka soils (Am) - These consist of nearly level, very poorly drained sandy soils. These soils are in low, large depressions and poorly defined drainageways. The water table is at the surface, and the soils are covered with water most of the year. These soils are covered with dense wetland forests.

Apopka sand with 0 to 5 percent slopes (ApB) - This is a nearly level to gently sloping, well-drained sandy soil that has a sandy clay loam subsoil at about 55 inches. The water table is at a depth of more than 84 inches. The sandy surface and subsurface layers are rapidly permeable and have very low organic matter content. Permeability in the subsoil is moderate or moderately rapid, and available water capacity is medium to high. Natural fertility is low.

Apopka sand with 5 to 12 percent slopes (ApD) - This is a sloping to strongly sloping, well-drained sandy soil. Unless protected by vegetation, it is readily erodible by wind and water. The water table is at a depth of more than 84 inches. The sandy surface and subsurface layers are rapidly permeable. Available water capacity is very low, and the organic matter content is low. The loamy subsoil is moderately permeable or moderately rapidly permeable and has high to medium available water capacity. Natural fertility is low.

Astatula sand with a dark surface and 0 to 5 percent slopes (AtB) - This is a nearly level to gently sloping, excessively drained sandy soil. It is on the undulating upland ridge. The water table is at a depth of more than 120 inches. Permeability is very rapid throughout the profile, and available water capacity is very low. Organic matter content and natural fertility are low.

Astatula sand with a dark surface and 5 to 12 percent slopes (AtD) - This is a sloping to strongly sloping, excessively drained sandy soil. The water table is at a depth of more than 120 inches. Permeability is very rapid throughout the profile, and available water capacity is very low. The organic matter content and natural fertility are low. Without protective vegetation, the soil is readily erodible by wind and water.

Astatula sand, dark surface, 12 to 40 percent slopes (AtF) - This is a very steep, excessively drained sandy soil. The water table is at a depth of more than 120 inches. Permeability is very rapid throughout the profile, and available water capacity is very low. Organic matter content and natural fertility are low. The soil is easily eroded by wind and water if it has no protective cover of vegetation.

Fill land, loamy materials (Fm) - This is a loamy soil material that has been mixed, reworked, and leveled or shaped by earth-moving equipment. It is mostly 12 to 60 inches thick. No orderly sequence of layers exist and the material is highly variable within short distances. The dominant texture is sandy loam to sandy clay loam. The water table is at a depth of about 30 to 60 inches,

Lake Louisa State Park

Soils Descriptions

except in low lying areas, where it is at a depth of 10 to 30 inches, and in dry areas, where it is at a depth of more than 60 inches. Soil properties are so variable that onsite determination is needed in each area.

Immokalee sand (Is) - This soil is nearly level, poorly drained and has a layer at about 30 inches that is stained by organic matter. The water table is normally at 10 to 40 inches. The water table is within 10 inches of the surface for one to two months during rainy seasons and falls below 40 inches during prolonged drought. Immokalee sand is moderately permeable in the weakly cemented layer at depths between 38 and 56 inches and is rapidly permeable in the other layers. The weakly cemented layers have medium available water capacity, moderately high organic matter content and low natural fertility. The sandy surface and subsurface layers and the layer between depths of 56 to 68 inches have very low available water capacity and very low natural fertility. The thin surface layer is moderate in organic matter content. The other layers are very low.

Lake sand with 0 to 5 percent slopes (LaB) - This soil is nearly level to gently sloping, well drained to excessively drained. The water table is at more than 120 inches. Lake sand is very rapidly permeable and has very low available water capacity, low organic matter content and low natural fertility.

Lake sand with 5 to 12 percent slopes (LaD) - This is a sloping and strongly sloping, well-drained to excessively drained soil. The water table is at a depth of more than 120 inches. This soil is very rapidly permeable and has very low available water capacity, low organic matter content and low natural fertility.

Lucy sand with 0 to 5 percent slopes (LuB) - This is a nearly level to gently sloping soil that has a well drained, loamy subsoil. The water table is at a depth of more than 120 inches. This soil is rapidly permeable in the surface and subsurface layers and moderately permeable in the subsoil. The available water capacity is low in the sandy layers and medium in the loamy subsoil. The organic matter content and natural fertility are low.

Lucy sand with 5 to 8 percent slopes (LuC) - This is a sloping, well drained soil that has a loamy subsoil. Slopes are short and choppy in some areas and are longer and more uniform in others. The water table depth is more than 120 inches. This soil is rapidly permeable in the surface and subsurface layers and moderately permeable in the subsoil. The available water capacity is low in the sandy layers and medium in the loamy subsoil. The organic matter content and natural fertility are low.

Myakka sand (Mk) - This is a nearly level, poorly drained soil that has a layer stained by organic material at a depth of less than 30 inches. The water table is normally at 10 to 40 inches below the surface but at less than 10 inches in wet seasons and at more than 40 inches during extended dry seasons. The surface and subsurface layers and the layer at 56 to 85 inches have rapid permeability, very low available water capacity and very low natural fertility. The thin surface layer is moderate in organic matter content. The remaining layers are very low. The organic stained layers at depths between 20 and 56 inches have moderate permeability, medium available water capacity, moderately high organic matter content and low natural fertility.

Lake Louisa State Park

Soils Descriptions

Ocilla sand (Oc) - This soil is nearly level to gently sloping, somewhat poorly drained, and has a loamy subsoil. The water table is at a depth of 40 to 60 inches for about 6 months and is below 60 inches during the rest of the year. Permeability is rapid to a depth of about 33 inches and moderate below. Available water capacity is very low to a depth of 33 inches and medium at depths between 33 and 82 inches. The organic matter content and natural fertility are low.

Paola sand with 0 to 5 percent slopes (PaB) - This is a nearly level to gently sloping, excessively drained soil. It is on ridgetops and knolls on the upland ridge. It is very rapidly permeable throughout. It has very low available water capacity, organic matter content and natural fertility.

Pelham sand (Pd) - This is a nearly level, poorly drained soil that has a loamy subsoil. The water table is within a depth of 10 inches for about 2 months of the year, at 10 to 40 inches for about 6 months and below 40 inches for about 4 months. Pelham sand has very low available water capacity in the surface and subsurface layers and medium available water capacity in the subsoil. It has rapid permeability in the sandy layers to a depth of 32 inches and moderate permeability in the loamy subsoil. It is low in natural fertility and organic matter content.

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

Placid and Myakka sands with 0 to 2 percent slopes (PmA) - These are nearly level, very poorly drained and poorly drained soils in low, marshy depressions. The water table in these soils is nearer the surface for longer periods than in Myakka sand, and the soil is covered with water for 4 to 6 months in most years. The two soils occur together without regular pattern.

Pomello sand (Pn) - This is a nearly level to gently sloping, moderately well drained sandy soil. The water table is at a depth of 40 to 60 inches for about 8 months and at a depth of 30 to 40 inches for about 4 months. This soil has very rapid permeability and very low available water capacity and organic matter content in the surface and subsurface horizons. It has an organic stained layer that has moderately rapid permeability and moderate organic content. This soil is very low in natural fertility.

Pompano sand, acid (Po) - This soil is nearly level and poorly drained. The water table is within a depth of 10 inches for 2 to 6 months and at a depth of 10 to 40 inches for the rest of the year. Shallow water covers the lowest areas after heavy rain. The soil has very low available water capacity, low organic content and low natural fertility.

Swamp (Sw) - This consists of level, very poorly drained mineral and organic soils that have not been classified because excess water and dense vegetation have made detailed investigations impractical. Swamp occurs as broad drainageways, or broad, poorly defined streams, as large depressions having no outlets and as large bayheads. The soils are flooded with water all year

Lake Louisa State Park

Soils Descriptions

except during prolonged periods when rainfall is light.

Tavares sand (Ta) - This is a nearly level to gently sloping, moderately well drained soil. It has a very dark grayish-brown sand surface layer about seven inches thick. Below that, there is a layer of very pale brown sand that has faint yellowish-brown mottles to a depth of 25 inches. The next layer, extending to about 34 inches, is light yellowish-brown sand. Very pale brown sand that has faint yellow mottles is at depths between 34 and 61 inches. Below that there is white sand mottled with very pale brown. The water table is at 40 to 60 inches for more than 6 months of the year. During drought periods, it is below 60 inches. Tavares sand is very rapidly permeable. Available water capacity and organic matter content are very low. Natural fertility is low.

Addendum 4—Plant And Animal List

Lake Louisa State Park

Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
Rosary pea; Blackeyed susan*	<i>Abrus precatorius</i>	
Red maple	<i>Acer rubrum</i>	
Beach false foxglove	<i>Agalinis fasciculata</i>	
Flaxleaf false foxglove	<i>Agalinis linifolia</i>	
Yellow colicroot	<i>Aletris lutea</i>	
Common ragweed	<i>Ambrosia artemisiifolia</i>	
Lusterspike indigobush	<i>Amorpha herbacea</i>	
Fringed bluestar	<i>Amsonia ciliata</i>	
Splitbeard bluestem	<i>Andropogon ternarius</i>	
Wiregrass	<i>Aristida beyrichiana</i>	
Elegant dutchman's pipe *	<i>Aristolochia littoralis</i>	
Curtiss' milkweed	<i>Asclepias curtissii</i>	14
Pinewoods milkweed	<i>Asclepias humistrata</i>	
Savannah milkweed	<i>Asclepias pedicellata</i>	
Velvetleaf milkweed	<i>Asclepias tomentosa</i>	
Butterflyweed; Butterfly milkweed	<i>Asclepias tuberosa</i>	
Dwarf pawpaw	<i>Asimina pygmaea</i>	
Netted pawpaw	<i>Asimina reticulata</i>	
Pineland wild indigo	<i>Baptisia leontii</i>	
Tarflower	<i>Befaria racemosa</i>	
Wax begonia; club begonia*	<i>Begonia cucullata</i>	
Florida greeneyes	<i>Berlandiera subacaulis</i>	
Beggarticks; Romerillo	<i>Bidens alba</i>	
Florida lady's nightcap	<i>Bonamia grandiflora</i>	14
American beautyberry	<i>Callicarpa americana</i>	
Grassleaf roseling	<i>Callisia graminea</i>	
Florida scrub roseling	<i>Callisia ornata</i>	
Tuberous grasspink	<i>Calopogon tuberosus</i>	
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>	
Love vine; Devil's gut	<i>Cassytha filiformis</i>	
Southern sandbur	<i>Cenchrus echinatus</i>	
Coast sandbur	<i>Cenchrus incertus</i>	
Common buttonbush	<i>Cephalanthus occidentalis</i>	
Sensitive pea	<i>Chamaecrista nictitans</i>	
Sandmat	<i>Chamaesyce sp.</i>	
Alicia	<i>Chapmannia floridana</i>	
Mexican tea*	<i>Chenopodium ambrosioides</i>	
Sour orange *	<i>Citrus aurantium</i>	
Jamaica swamp sawgrass	<i>Cladium jamaicense</i>	
Pine-hyacinth	<i>Clematis baldwinii</i>	
Netleaf leather-flower	<i>Clematis reticulata</i>	

* Non-native Species

Lake Louisa State Park

Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
Turk's turban; Skyrocket*	<i>Clerodendrum indicum</i>	
Atlantic pigeonwings	<i>Clitoria mariana</i>	
Tread-softly; Finger-rot	<i>Cnidocolus stimulosus</i>	
Dwarf coleus*	<i>Coleus pumilus</i>	
Dayflower	<i>Commelina diffusa</i>	
Whitemouth dayflower	<i>Commelina erecta</i>	
Canadian horseweed	<i>Conyza canadensis var. pusilla</i>	
Seven-sisters; String-lily	<i>Crinum americanum</i>	
Lanceleaf rattlebox*	<i>Crotalaria lanceolata</i>	
Rabbitbells	<i>Crotalaria rotundifolia</i>	
Bermudagrass *	<i>Cynodon dactylon</i>	
Nutgrass*	<i>Cyperus rotundus</i>	
Titi	<i>Cyrilla racemiflora</i>	
Feay's prairieclover	<i>Dalea feayi</i>	
Summer farewell	<i>Dalea pinnata var. pinnata</i>	
Dixie ticktrefoil*	<i>Desmodium tortuosum</i>	
Southern crabgrass	<i>Digitaria ciliaris</i>	
Virginia buttonweed	<i>Diodia virginiana</i>	
Common persimmon	<i>Diospyros virginiana</i>	
Pink sundew	<i>Drosera capillaris</i>	
Oblongleaf twinflower	<i>Dyschoriste oblongifolia</i>	
Tall elephantsfoot	<i>Elephantopus elatus</i>	
Florida butterfly orchid	<i>Encyclia tampensis</i>	25,30,35,41
Flattened pipewort	<i>Eriocaulon compressum</i>	
Tenangle pipewort	<i>Eriocaulon decangulare</i>	
Longleaf wild buckwheat	<i>Eriogonum floridanum</i>	Introduced 81, 14
Coralbean; Cherokee bean	<i>Erythrina herbacea</i>	
Dogfennel	<i>Eupatorium capillifolium</i>	
Roundleaf thoroughwort	<i>Eupatorium rotundifolium</i>	
Slender goldenrod	<i>Euthamia caroliniana</i>	
Cottonweed; Plains snakecotton	<i>Froelichia floridana</i>	
Elliott's milkpea	<i>Galactia elliotii</i>	
Southern beeblossom	<i>Gaura angustifolia</i>	
Sweet everlasting; Rabbit tobacco	<i>Gnaphalium obtusifolium</i>	
Pennsylvania everlasting	<i>Gnaphalium pennsylvanicum</i>	
Loblolly bay	<i>Gordonia lasianthus</i>	
Toothpetal false reinorchid	<i>Habenaria floribunda</i>	
Snowy orchid	<i>Habenaria nivea</i>	41
Narrowleaf sunflower	<i>Helianthus angustifolius</i>	
Camphorweed	<i>Heterotheca subaxillaris</i>	
Clustered bushmint; Musky mint	<i>Hyptis alata</i>	
Dahoon	<i>Ilex cassine</i>	

* Non-native Species

Lake Louisa State Park

Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
Cogongrass *	<i>Imperata cylindrica</i>	
Hairy indigo *	<i>Indigofera hirsuta</i>	
Carolina redroot	<i>Lachnanthes caroliniana</i>	
Woodland lettuce	<i>Lactuca floridana</i>	
Grassleaf lettuce	<i>Lactuca graminifolia</i>	
Lantana; Shrubverbena*	<i>Lantana camara</i>	
Dickert's pinweed	<i>Lechea deckertii</i>	
Virginia pepperweed	<i>Lepidium virginicum</i>	
Chapman's gayfeather	<i>Liatris chapmanii</i>	
Gopher apple	<i>Licania michauxii</i>	
Catesby's lily; Pine lily	<i>Lilium catesbaei</i>	35,41
Canada toadflax	<i>Linaria canadensis</i>	
Piedmont false pimpernel	<i>Lindernia monticola</i>	
Sweetgum	<i>Liquidambar styraciflua</i>	
Glade lobelia	<i>Lobelia glandulosa</i>	
kyblue lupine	<i>Lupinus diffusus</i>	
Rose-rush	<i>Lygodesmia aphylla</i>	
Rusty staggerbush	<i>Lyonia ferruginea</i>	
Fetterbush	<i>Lyonia lucida</i>	
Sweetbay	<i>Magnolia virginiana</i>	
Punktree*	<i>Melaleuca quinquenervia</i>	
Chinaberrytree*	<i>Melia azedarach</i>	
Powderpuff *	<i>Mimosa strigillosa</i>	
Partridgeberry; Twinberry	<i>Mitchella repens</i>	
Balsampear*	<i>Momordica charantia</i>	
Latexplant*	<i>Morrenia odorata</i>	
Southern bayberry; Wax myrtle	<i>Myrica cerifera</i>	
Florida beargrass	<i>Nolina atopocarpa</i>	Introduced 81
Spatterdock; Yellow pondlily	<i>Nuphar lutea ssp. advena</i>	
American white waterlily	<i>Nymphaea odorata</i>	
Cutleaf eveningprimrose	<i>Oenothera laciniata</i>	
Pricklypear	<i>Opuntia humifusa</i>	
Erect pricklypear	<i>Opuntia stricta</i>	14
Goldenclub; Neverwet	<i>Orontium aquaticum</i>	
Cinnamon fern	<i>Osmunda cinnamomea</i>	25,29,51
Royal fern	<i>Osmunda regalis var. spectabilis</i>	25,29,51
Feay's palafox	<i>Palafoxia feayi</i>	
Coastalplain palafox	<i>Palafoxia integrifolia</i>	
Cutthroatgrass	<i>Panicum abscissum</i>	41
Maidencane	<i>Panicum hemitomon</i>	
Guineagrass*	<i>Panicum maximum</i>	

* Non-native Species

Lake Louisa State Park

Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
-----	<i>Panicum sp.</i>	
Bahiagrass*	<i>Paspalum notatum</i>	
Purple passionflower	<i>Passiflora incarnata</i>	
Eustis lake beardtongue	<i>Penstemon australis</i>	
Manyflower beardtongue	<i>Penstemon multiflorus</i>	
Florida false sunflower	<i>Phoebanthus grandiflora</i>	
American pokeweed	<i>Phytolacca americana</i>	
Blueflower butterwort	<i>Pinguicula caerulea</i>	41
Yellow butterwort	<i>Pinguicula lutea</i>	41
Small butterwort	<i>Pinguicula pumila</i>	
Sand pine	<i>Pinus clausa</i>	
Slash pine	<i>Pinus elliottii</i>	
Pond pine	<i>Pinus serotina</i>	
Pitted stripeseed	<i>Piriqueta caroliniana</i>	
Water-lettuce*	<i>Pistia stratiotes</i>	
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>	
Rose pogonia; Snakemouth orchid	<i>Pogonia ophioglossoides</i>	41
Showy milkwort	<i>Polygala grandiflora</i>	
Candyroot	<i>Polygala nana</i>	
Low pinebarren milkwort	<i>Polygala ramosa</i>	
Yellow milkwort	<i>Polygala rugelii</i>	
Largeflower jointflower	<i>Polygonella fimbriata var. robusta</i>	
Tall jointweed	<i>Polygonella gracilis</i>	
October flower	<i>Polygonella polygama</i>	
Mild waterpepper	<i>Polygonum hydropiperoides</i>	
Pickeralweed	<i>Pontederia cordata</i>	
Black cherry	<i>Prunus serotina var. serotina</i>	
Bracken fern	<i>Pteridium aquilinum</i>	
Blackroot	<i>Pterocaulon pycnostachyum</i>	
Carolina desertchicory	<i>Pyrrhopappus carolinianus</i>	
Sand live oak	<i>Quercus geminata</i>	
Bluejack oak	<i>Quercus incana</i>	
Turkey oak	<i>Quercus laevis</i>	
Virginia live oak	<i>Quercus virginiana</i>	
Maid marian	<i>Rhexia nashii</i>	
Winged sumac	<i>Rhus copallina</i>	
Rose natalgrass*	<i>Rhynchelytrum repens</i>	
Dollarleaf	<i>Rhynchosia reniformis</i>	
Tropical Mexican clover*	<i>Richardia brasiliensis</i>	
Rough Mexican clover*	<i>Richardia scabra</i>	

* Non-native Species

Lake Louisa State Park

Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for designated species)
Sawtooth blackberry	<i>Rubus argutus</i>	
Sand blackberry	<i>Rubus cuneifolius</i>	
Carolina wild petunia	<i>Ruellia caroliniensis</i>	
Heartwing dock; Hastateleaf dock	<i>Rumex hastatulus</i>	
Shortleaf rosegentian	<i>Sabatia brevifolia</i>	
Largeflower rosegentian	<i>Sabatia grandiflora</i>	
American cupscale	<i>Sacciolepis striata</i>	
Grassy arrowhead	<i>Sagittaria graminea</i>	
Bulltongue arrowhead	<i>Sagittaria lancifolia</i>	
Lyreleaf sage	<i>Salvia lyrata</i>	
American elder; Elderberry	<i>Sambucus canadensis</i>	
Hooded pitcherplant	<i>Sarracenia minor</i>	41
Lizard's tail	<i>Saururus cernuus</i>	
Brazilian pepper *	<i>Schinus terebinthifolius</i>	
Sand spike-moss	<i>Selaginella arenicola</i>	
Coffeeweed; Sicklepod	<i>Senna obtusifolia</i>	
Saw palmetto	<i>Serenoa repens</i>	
Bristlegrass; Foxtail	<i>Setaria sp.</i>	
Common wireweed	<i>Sida acuta</i>	
Lima*	<i>Sida cordifolia</i>	
Cuban jute; Indian hemp	<i>Sida rhombifolia</i>	
Tough bully	<i>Sideroxylon tenax</i>	
Narrowleaf blueeyed grass	<i>Sisyrinchium angustifolium</i>	
Laurel greenbrier	<i>Smilax laurifolia</i>	
American black nightshade	<i>Solanum americanum</i>	
Pinebarren goldenrod	<i>Solidago fistulosa</i>	
Lopsided Indiangrass	<i>Sorghastrum secundum</i>	
American burreed	<i>Sparganium americanum</i>	
Pineland scalypink	<i>Stipulicida setacea</i>	
Cowpea witchweed*	<i>Striga gesnerioides</i>	
Coastalplain dawnflower	<i>Stylisma patens</i>	
Bald-cypress	<i>Taxodium distichum</i>	
Florida hoarypea	<i>Tephrosia florida</i>	
Cardinal airplant	<i>Tillandsia fasciculata</i>	25,35,51
Spanish moss	<i>Tillandsia usneoides</i>	
Eastern poison ivy	<i>Toxicodendron radicans</i>	
Bluejacket; Ohio spiderwort	<i>Tradescantia ohiensis</i>	
Forked bluecurls	<i>Trichostema dichotomum</i>	
Tall redtop; Purpletop tridens	<i>Tridens flavus var. flavus</i>	
Purple sandgrass	<i>Triplasis purpurea</i>	
Broadleaf cattail	<i>Typha latifolia</i>	
Caesarweed	<i>Urena lobata</i>	

* Non-native Species

Lake Louisa State Park

Plants

Common Name	Scientific Name	Primary Habitat Codes (for designated species)
Floating bladderwort	<i>Utricularia inflata</i>	
Southern bladderwort	<i>Utricularia juncea</i>	
Shiny blueberry	<i>Vaccinium myrsinites</i>	
Wand mullein*	<i>Verbascum virgatum</i>	
Tall ironweed	<i>Vernonia angustifolia</i>	
Bog white violet	<i>Viola lanceolata</i>	
Primroseleaf violet	<i>Viola primulifolia</i>	
Muscadine	<i>Vitis rotundifolia</i>	
Sleepy morning	<i>Waltheria indica</i>	
Coastalplain yelloweyed grass	<i>Xyris ambigua</i>	
Adam's needle	<i>Yucca filamentosa</i>	

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
	INVERTIBRATES	
Pipevine Swallowtail	<i>Battus philenor</i>	MTC
Polydamas Swallowtail	<i>Battus polydamas</i>	MTC
Zebra Swallowtail	<i>Eurytides marcellus</i>	MTC
Black Swallowtail	<i>Papilio polyxenes</i>	MTC
Giant Swallowtail	<i>Papilio cresphontes</i>	MTC
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	MTC
Spicebush Swallowtail	<i>Papilio troilus</i>	MTC
Palamedes Swallowtail	<i>Papilio palamedes</i>	MTC
Checkered White	<i>Pontia protodice</i>	MTC
Great Southern White	<i>Ascia monuste</i>	MTC
Cloudless Sulphur	<i>Phoebis sennae</i>	MTC
Barred Yellow	<i>Eurema daira</i>	MTC
Sleepy Orange	<i>Eurema nicippe</i>	MTC
White M Hairstreak	<i>Parrhasius m-album</i>	MTC
Red-banded Hairstreak	<i>Calycopis cecrops</i>	MTC
Gulf Fritillary	<i>Agraulis vanillae</i>	MTC
Zebra Heliconian	<i>Heliconius charithonia</i>	MTC
Variegated Fritillary	<i>Euptoieta claudia</i>	MTC
Pearl Crescent	<i>Phyciodes tharos</i>	MTC
American Lady	<i>Vanessa virginiensis</i>	MTC
Common Buckeye	<i>Junonia coenia</i>	MTC
Viceroy	<i>Limenitis archippus</i>	MTC
Carolina Satyr	<i>Hermeuptychia sosybius</i>	MTC
Red Admiral	<i>Vanessa atalanta</i>	MTC
Queen	<i>Danaus gilippus</i>	MTC
Silver-spotted Skipper	<i>Epargyreus clarus</i>	MTC
Dorantes Longtail	<i>Urbanus dorantes</i>	MTC
Southern Cloudywing	<i>Thorybes bathyllus</i>	MTC
Northern Cloudywing	<i>Thorybes pylades</i>	MTC
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	MTC
Common/White Checkered-Skipper	<i>Pyrgus communis/albescens</i>	MTC
Tropical Checkered-Skipper	<i>Pyrgus oileus</i>	MTC
Clouded Skipper	<i>Lerema accius</i>	MTC
Least Skipper	<i>Ancyloxypha numitor</i>	MTC
Southern Skipperling	<i>Copaeodes minimus</i>	MTC
Fiery Skipper	<i>Hylephila phyleus</i>	MTC
Whirlabout	<i>Polites vibex</i>	MTC
Southern Broken-Dash	<i>Wallengrenia otho</i>	MTC

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
Sachem	<i>Atalopedes campestris</i>	MTC
Ocola Skipper	<i>Panoquina ocola</i>	MTC
Yucca Giant-Skipper	<i>Magathymus yuccae</i>	MTC
	FISH	
Florida gar	<i>Lepisosteus platyrhincus</i>	51
Blue catfish	<i>Ictalurus furcatus</i>	51
Chain pickerel	<i>Esox niger</i>	51
Warmouth	<i>Lepomis gulosus</i>	51
Sunfish	<i>Lepomis spp.</i>	51
Largemouth bass	<i>Micropterus salmoides</i>	51
Black crappie	<i>Pomoxis nigromaculatus</i>	51
	AMPHIBIANS	
Eastern spadefoot	<i>Scaphiopus holbrooki</i>	25,30,35,41
Oak toad	<i>Bufo quercicus</i>	14,20
Southern toad	<i>Bufo terrestris</i>	All
Southern cricket frog	<i>Acris gryllus gryllus</i>	25,29,30,51,53
Green treefrog	<i>Hyla cinerea</i>	25,30,35,41,51,53
Pine woods treefrog	<i>Hyla femoralis</i>	29,41
Barking treefrog	<i>Hyla gratiosa</i>	29,30,41
Squirrel treefrog	<i>Hyla squirella</i>	29,30,41
Southern spring peeper	<i>Pseudacris crucifer bartramiana</i>	29,30,41
Little grass frog	<i>Pseudacris ocularis</i>	25,29,30,51
Bullfrog	<i>Rana catesbeiana</i>	25,30,51,53
Pig frog	<i>Rana grylio</i>	25,30,51,53
Eastern lesser siren	<i>Siren intermedia intermedia</i>	29,51,53
Greater siren	<i>Siren lacertina</i>	29,51,53
	REPTILES	
Green anole	<i>Anolis c. carolinensis</i>	20, 35,81
Brown anole *	<i>Anolis sagrei sagrei</i>	20,35,81
Southern fence lizard	<i>Sceloporus undulatus undulatus</i>	41
Florida scrub lizard	<i>Sceloporus woodi</i>	82
Peninsula mole skink	<i>Eumeces egregius onocrepis</i>	14
Five-lined skink	<i>Eumeces fasciatus</i>	35
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>	81

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
Sand skink	<i>Neoseps reynoldsi</i>	14
Ground skink	<i>Scincella laterale</i>	20,35,41
Six-lined racerunner	<i>Cnemidophorus sexlineatus sexlineatus</i>	14,81
Florida worm lizard	<i>Rhineura floridana</i>	14,81
Eastern slender glass lizard	<i>Ophisaurus attenuatus longicaudus</i>	81
Eastern glass lizard	<i>Ophisaurus ventralis</i>	20,41
Southern black racer	<i>Coluber constrictor priapus</i>	20,25,30,35,41,81
Southern ringneck snake	<i>Diadophis punctatus punctatus</i>	25,30,35,41
Eastern indigo snake	<i>Drymarchon corais couperi</i>	20
Corn snake	<i>Elaphe guttata guttata</i>	20,25,30,35,41,81
Yellow rat snake	<i>Elaphe obsoleta</i>	20,81
Yellow rat snake	<i>Elaphe obsoleta quadrivittata</i>	20,81
Eastern mud snake	<i>Farancia abacura abacura</i>	25,26,30,53
Eastern hognose snake	<i>Heterodon platyrhinos</i>	14,81
Scarlet kingsnake	<i>Lampropeltis triangulum elapsoides</i>	25,30,41
Eastern coachwhip	<i>Masticophis flagellum flagellum</i>	14
Florida water snake	<i>Nerodia fasciata pictiventris</i>	51,53
Florida green water snake	<i>Nerodia floridana</i>	51,53
Rough green snake	<i>Opheodrys aestivus</i>	20,25,30,35,41
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	81
Peninsula crowned snake	<i>Tantilla relicta relicta</i>	20,81
Peninsula ribbon snake	<i>Thamnophis sauritus sackeni</i>	25,30
Eastern garter snake	<i>Thamnophis sirtalis sirtalis</i>	20,25,30,35,41
Eastern coral snake	<i>Micrurus fulvius fulvius</i>	20,35,41
Florida cottonmouth	<i>Agkistrodon piscivorus conantii</i>	35, 41
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	41,81
Dusky pigmy rattlesnake	<i>Sistrurus miliarius barbouri</i>	14,41
Striped mud turtle	<i>Kinosternon bauri</i>	25,30
Florida softshell	<i>Apalone ferox</i>	53
Florida cooter	<i>Pseudemys floridana floridana</i>	25,26,29,30,49,50,51, 53
Florida redbelly turtle	<i>Pseudemys nelsoni</i>	51,53
Florida box turtle	<i>Terrapene carolina bauri</i>	35
Gopher tortoise	<i>Gopherus polyphemus</i>	14,81

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
	BIRDS	
Common Loon	<i>Gavia immer</i>	51
Pied-billed Grebe	<i>Podilymbus podiceps</i>	51
Brown Pelican	<i>Pelecanus occidentalis</i>	Flyover
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	51
Anhinga	<i>Anhinga anhinga</i>	51
American Bittern	<i>Botaurus lentiginosus</i>	51,53
Great Blue Heron	<i>Ardea herodias</i>	51,53
Great Egret	<i>Ardea alba</i>	51,53
Snowy Egret	<i>Egretta thula</i>	51,53
Little Blue Heron	<i>Egretta caerulea</i>	51,53
Cattle Egret	<i>Bubulcus ibis</i>	81
Green Heron	<i>Butorides virescens</i>	51,53
White Ibis	<i>Eudocimus albus</i>	51,53
Wood Stork	<i>Mycteria americana</i>	25,30
Black Vulture	<i>Coragyps atratus</i>	All
Turkey Vulture	<i>Cathartes aura</i>	All
Canada Goose	<i>Branta canadensis</i>	51
Wood Duck	<i>Aix sponsa</i>	51
Hooded Merganser	<i>Lophodytes cucullatus</i>	51
Osprey	<i>Pandion haliaetus</i>	51
Swallow-tailed Kite	<i>Elanoides forficatus</i>	25,30
Bald Eagle	<i>Haliaeetus leucocephalus</i>	51
Northern Harrier	<i>Circus cyaneus</i>	81
Sharp-shinned Hawk	<i>Accipiter striatus</i>	41
Cooper's Hawk	<i>Accipiter cooperii</i>	41
Red-shouldered Hawk	<i>Buteo lineatus</i>	41,81
Short-tailed Hawk	<i>Buteo brachyurus</i>	41,81
Red-tailed Hawk	<i>Buteo jamaicensis</i>	41,81
American Kestrel	<i>Falco sparverius</i>	81
Southeastern American Kestrel	<i>Falco sparverius paulus</i>	81
Peregrine Falcon	<i>Falco peregrinus</i>	81
Wild Turkey	<i>Meleagris gallopavo</i>	41,81
Northern Bobwhite	<i>Colinus virginianus</i>	41,81
King Rail	<i>Rallus elegans</i>	25,30
Limpkin	<i>Aramus guarauna</i>	51,53
Sandhill Crane	<i>Grus canadensis</i>	25,30,81
Florida Sandhill Crane	<i>Grus canadensis pratensis</i>	25,30,81
Killdeer	<i>Charadrius vociferus</i>	81
Bonaparte's Gull	<i>Larus philadelphia</i>	51

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
Forster's Tern	<i>Sterna forsteri</i>	51
Least Tern	<i>Sterna antillarum</i>	51
Eurasian Collared-Dove *	<i>Streptopelia decaocto</i>	82
Mourning Dove	<i>Zenaida macroura</i>	81
Common Ground-Dove	<i>Columbina passerina</i>	14,81
Scarlet Macaw *	<i>Ara macao</i>	82
Great Horned Owl	<i>Bubo virginianus</i>	25,30,41,81
Barred Owl	<i>Strix varia</i>	25,30,41
Common Nighthawk	<i>Chordeiles minor</i>	All
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	25,81
Chimney Swift	<i>Chaetura pelagica</i>	All
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	81
Belted Kingfisher	<i>Ceryle alcyon</i>	51,53
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	All
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	81
Downy Woodpecker	<i>Picoides pubescens</i>	81
Hairy Woodpecker	<i>Picoides villosus</i>	81
Northern Flicker	<i>Colaptes auratus</i>	81
Pileated Woodpecker	<i>Dryocopus pileatus</i>	All
Eastern Phoebe	<i>Sayornis phoebe</i>	20,35
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	20,35,41,81
Loggerhead Shrike	<i>Lanius ludovicianus</i>	14,81
White-eyed Vireo	<i>Vireo griseus</i>	20,35
Yellow-throated Vireo	<i>Vireo flavifrons</i>	20,35
Blue-headed Vireo	<i>Vireo solitarius</i>	20,35
Red-eyed Vireo	<i>Vireo olivaceus</i>	8,20,35
Blue Jay	<i>Cyanocitta cristata</i>	All
American Crow	<i>Corvus brachyrhynchos</i>	MTC
Fish Crow	<i>Corvus ossifragus</i>	51
Tree Swallow	<i>Tachycineta bicolor</i>	81
Barn Swallow	<i>Hirundo rustica</i>	81
Carolina Chickadee	<i>Poecile carolinensis</i>	20,35,41
Tufted Titmouse	<i>Baeolophus bicolor</i>	20,35,41
Carolina Wren	<i>Thryothorus ludovicianus</i>	20,35,41
House Wren	<i>Troglodytes aedon</i>	20,35,41
Sedge Wren	<i>Cistothorus platensis</i>	8
Marsh Wren	<i>Cistothorus palustris</i>	24,29,32
Ruby-crowned Kinglet	<i>Regulus calendula</i>	20,35
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	20,35,41
Hermit Thrush	<i>Catharus guttatus</i>	20,35
American Robin	<i>Turdus migratorius</i>	All

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
Gray Catbird	<i>Dumetella carolinensis</i>	20,25,81
Northern Mockingbird	<i>Mimus polyglottos</i>	81
Brown Thrasher	<i>Toxostoma rufum</i>	20,35,81
Cedar Waxwing	<i>Bombycilla cedrorum</i>	81
Orange-crowned Warbler	<i>Vermivora celata</i>	20,25,30,35,41
Northern Parula	<i>Parula americana</i>	20,25,30,35,41
Yellow-rumped Warbler	<i>Dendroica coronata</i>	20,35
Yellow-throated Warbler	<i>Dendroica dominica</i>	20,35
Pine Warbler	<i>Dendroica pinus</i>	41
Prairie Warbler	<i>Dendroica discolor</i>	8
Palm Warbler	<i>Dendroica palmarum</i>	35
Black-and-white Warbler	<i>Mniotilta varia</i>	20,35
American Redstart	<i>Setophaga ruticilla</i>	20,35
Prothonotary Warbler	<i>Protonotaria citrea</i>	20,35
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	20,35
Common Yellowthroat	<i>Geothlypis trichas</i>	25,29,30,41
Summer Tanager	<i>Piranga rubra</i>	8,41
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	14,20,35,41
Bachman's Sparrow	<i>Aimophila aestivalis</i>	8,81
Chipping Sparrow	<i>Spizella passerina</i>	81
Field Sparrow	<i>Spizella pusilla</i>	81, 2
Vesper Sparrow	<i>Pooecetes gramineus</i>	81
Savannah Sparrow	<i>Passerculus sandwichensis</i>	81, 35
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	81
Song Sparrow	<i>Melospiza melodia</i>	81
Swamp Sparrow	<i>Melospiza georgiana</i>	24,29,32
Northern Cardinal	<i>Cardinalis cardinalis</i>	20,35,41,81
Blue Grosbeak	<i>Guiraca caerulea</i>	20,35,41,81
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	25,29,30,81
Eastern Meadowlark	<i>Sturnella magna</i>	81
Common Grackle	<i>Quiscalus quiscula</i>	81
Boat-tailed Grackle	<i>Quiscalus major</i>	29,51
Brown-headed Cowbird	<i>Molothrus ater</i>	81
American Goldfinch	<i>Carduelis tristis</i>	20,35,81
House Sparrow *	<i>Passer domesticus</i>	82
	MAMMALS	
Virginia opossum	<i>Didelphis virginiana</i>	20,35,41,81
Florida black bear	<i>Ursus americanus floridanus</i>	20,35,41
Raccoon	<i>Procyon lotor</i>	25,30,41,53,81

* Non-native Species

Lake Louisa State Park

Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for all species)
River otter	<i>Lutra canadensis</i>	53
potted skunk	<i>Spilogale putorius</i>	8,41
Coyote	<i>Canis latrans</i>	20,81
Red fox *	<i>Vulpes vulpes</i>	35,41,81
Gray fox	<i>Urocyon cinereoargenteus</i>	20,35,41,81
Bobcat	<i>Felis rufus</i>	14,20,25,35,41,81
Gray squirrel	<i>Sciurus carolinensis</i>	20,35,81
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	35,41,81
Southern flying squirrel	<i>Glaucomys volans</i>	20,35
Southeastern pocket gopher	<i>Geomys pinetis</i>	81
Oldfield mouse	<i>Peromyscus polionotus</i>	14,81
Cotton mouse	<i>Peromyscus gossypinus</i> <i>gossypinus</i>	14,20,41
Florida mouse	<i>Peromyscus floridanus</i>	14
Hispid cotton rat	<i>Sigmodon hispidus</i>	41,81
House mouse *	<i>Mus musculus</i>	81
Eastern cottontail	<i>Sylvilagus floridanus</i>	20,35,41,81
Wild pig *	<i>Sus scrofa</i>	81
White-tailed deer	<i>Odocoileus virginianus</i>	25,30,35,41,81
Nine-banded armadillo *	<i>Dasypus novemcinctus</i>	81

* Non-native Species

Habitat Codes

TERRESTRIAL

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

PALUSTRINE

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

LACUSTRINE

43. Clastic Upland Lake
44. Coastal Dune Lake
45. Coastal Rockland Lake
46. Flatwood/Prairie Lake
47. Marsh Lake

LACUSTRINE—Continued

48. River Floodplain Lake
49. Sandhill Upland Lake
50. Sinkhole Lake
51. Swamp Lake

RIVERINE

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

ESTUARINE

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

MARINE

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

SUBTERRANEAN

79. Aquatic Cave
80. Terrestrial Cave

MISCELLANEOUS

81. Ruderal
82. Developed

MTC Many Types Of Communities

OF Overflying

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)

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

LEGAL STATUS

- N = Not currently listed,nor currently being considered for listing,by state or federal agencies.
FEDERAL **(Listed by the U. S. Fish and Wildlife Service - USFWS)**
- LE = Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species 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.

Lake Louisa State Park

Designated Species

Plants

Common Name/ <i>Scientific Name</i>	Designated Species Status		
	FDA	USFWS	FNAI
Curtiss' milkweed <i>Asclepias curtissii</i>	E		S3
Florida lady's nightcap <i>Bonamia grandiflora</i>	E	T	S3
Florida butterfly orchid <i>Encyclia tampensis</i>	CE		
Longleaf wild buckwheat (Introduced to Park) <i>Eriogonum floridanum</i>	E	T	S3
Snowy orchid <i>Habenaria nivea</i>	T		
Catesby's lily; Pine lily <i>Lilium catesbaei</i>	T		
Florida beargrass (Introduced to Park) <i>Nolina atopocarpa</i>	T		S3
Erect pricklypear <i>Opuntia stricta</i>	T		
Cinnamon fern <i>Osmunda cinnamomea</i>	CE		
Royal fern <i>Osmunda regalis var. spectabilis</i>	CE		
Cutthroatgrass <i>Panicum abscissum</i>	E		S2
Blueflower butterwort <i>Pinguicula caerulea</i>	T		
Yellow butterwort <i>Pinguicula lutea</i>	T		
Rose pogonia; Snakemouth orchid <i>Pogonia ophioglossoides</i>	T		
Hooded pitcherplant <i>Sarracenia minor</i>	T		
Cardinal airplant <i>Tillandsia fasciculata</i>	E		

Lake Louisa State Park

Designated Species

Plants

**Common Name/
*Scientific Name***

FDA

Designated Species Status

USFWS

FNAI

Lake Louisa State Park

Designated Species

Animals

Common Name/ <i>Scientific Name</i>	Designated Species Status		
	FFWCC	USFWS	FNAI
REPTILES			
Florida scrub lizard <i>Sceloporus woodi</i>			S3
Sand skink <i>Neoseps reynoldsi</i>	T	T	S2
Eastern indigo snake <i>Drymarchon corais couperi</i>	T	T	S3
Florida pine snake <i>Pituophis melanoleucus mugitus</i>	SSC		S3
Eastern diamondback rattlesnake <i>Crotalus adamanteus</i>			S3
Gopher tortoise <i>Gopherus polyphemus</i>	SSC		S3
BIRDS			
Brown Pelican <i>Pelecanus occidentalis</i>	SSC		S3
Snowy Egret <i>Egretta thula</i>	SSC		S3
Little Blue Heron <i>Egretta caerulea</i>	SSC		S4
White Ibis <i>Eudocimus albus</i>	SSC		S4
Wood Stork <i>Mycteria americana</i>	E	E	S2
Osprey <i>Pandion haliaetus</i>			S3S4
Swallow-tailed Kite <i>Elanoides forficatus</i>			S2
Bald Eagle <i>Haliaeetus leucocephalus</i>	T	T	S3
Cooper's Hawk <i>Accipiter cooperii</i>			S3
Short-tailed Hawk <i>Buteo brachyurus</i>			S1
Southeastern American Kestrel <i>Falco sparverius paulus</i>	T		S3
Limpkin <i>Aramus guarauna</i>	SSC		S3
Florida Sandhill Crane <i>Grus canadensis pratensis</i>	T		S2S3

Lake Louisa State Park

Designated Species

Animals

Common Name/ <i>Scientific Name</i>	<u>Designated Species Status</u>		
	FFWCC	USFWS	FNAI
Least Tern <i>Sterna antillarum</i>	T		S3
Hairy Woodpecker <i>Picoides villosus</i>			S3
American Redstart <i>Setophaga ruticilla</i>			S2
Worm-eating Warbler <i>Helmitheros vermivorus</i>			S1
Bachman's Sparrow <i>Aimophila aestivalis</i>			S3

MAMMALS

Florida black bear <i>Ursus americanus floridanus</i>	T		S2
Sherman's fox squirrel <i>Sciurus niger shermani</i>	SSC		S3
Florida mouse <i>Podomys floridanus</i>	SSC		S3

Addendum 6—Timber Management Analysis

Lake Louisa State Park Timber Management Analysis

The timber assessment required by Chapters 253 and 259, Florida Statutes, was conducted by Mike Penn, Senior Forester, Florida Division of Forestry. The complete assessment is on file at the District 3 Office of the Division of Recreation and Parks. The assessment provided 3 alternatives – a timber management emphasis, a wildlife management emphasis, and a restoration emphasis. At Lake Louisa State Park the restoration emphasis is being followed. Accordingly, that emphasis is detailed in Addendum 6 and incorporated into the Resource Management Component.

I. GENERAL INFORMATION

Lake Louisa State Park (LLSP) is currently being managed by the Department of Environmental Protection, Division of Recreation and Parks. It is located in southern Lake County approximately 8 miles south of Clermont and 30 miles west of Orlando.

II. PURPOSE

The purpose of the Timber Assessment portion of this document is to evaluate the potential and feasibility of utilizing silvicultural techniques to assist managers in achieving restoration objectives at LLSP. The Timber Assessment section addresses only areas of the park where overstory timber species presently exist.

The purpose of the Reforestation portion is to develop methods, timeframes and rough cost estimates for reestablishing pine trees on abandoned citrus grove and pasture land as the first step in the ecosystem restoration process.

III. TIMBER ASSESSMENT

A. Current Ecological Conditions

Much of Lake Louisa State Park (46%) is in an unnatural condition due to past use of the land. Prior to purchase by the state, the area was used primarily for citrus production and cattle grazing. Approximately 958 acres of old grove and 279 acres of old pasture remain. In addition there are approximately 207 acres of planted pine (206 acres of slash pine and 98 acres of sand pine). The pine stands are approximately 14 years old (2005) and appear healthy. Cattle grazing has been excluded from the area and all but 166 acres of the citrus groves have been abandoned due to frost kill. The bahia grass pastures and remnant citrus groves persist today with mostly non-native plant species. Several of these are invasive/exotic species, most notably, chinaberry and rosary pea. The 166 acres of citrus not abandoned is being leased to an individual who is trying to restore the productivity of the grove.

Natural plant communities found within the boundaries of Lake Louisa State Park are wet flatwoods with various longleaf and slash pine stocking levels (157 acres), late successional scrub (63 acres), depression marsh (106 acres), baygall (143 acres), dome/basin swamp (950 acres), swamp lakes (700 acres), mesic hammock (8 acres), hydric hammock (22 acres), sinkhole lakes (19 acres) and 11 acres of developed areas. Of these communities only the wet flatwoods will be discussed in this document.

Lake Louisa State Park Timber Management Analysis

B. Current Management Objectives at Lake Louisa State Park as Related to Timber Management

In the management of Lake Louisa State Park, a balance is sought between the goals of preserving natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. (Lake Louisa Unit Management Plan 1997).

The natural resources of Lake Louisa State Park require a substantial amount of restoration. Much of the property has been under intensive agricultural operations until recent times. The former orange groves and pasture areas need to be restored to sandhills and pine flatwoods, respectively. There are several pervasive, aggressive exotic plants which require removal as part of this uplands restoration effort. The prescribed burning program needs to continue and be expanded to accommodate the more recently acquired property. (Lake Louisa Unit Management Plan 1997).

C. Current Timber Resources and Management Options

The following description of the timber resource on the Lake Louisa State Park has been generalized due to time and manpower constraints. All acreage figures are estimates using aerial photos and GIS software. Density estimates are based on a very small number of sample points and are not adequate for statistical analysis. A more intensive survey is needed to more accurately portray the timber resource for long range planning purposes.

This timber assessment does not include discussion concerning the management of cypress, bay, and hardwood swamp ecosystems, and does not address the hardwood hammock forest type. The emphasis of this assessment will be on the pine flatwoods composed of both natural and planted longleaf and slash pine trees and the 98 acres of sand hill planted with sand pine. The abandoned old grove and pasture at Lake Louisa have potential for growing timber but will be discussed in the Reforestation portion of this document.

The complete analysis on file discusses a range of alternatives by which the planted and natural pine stands may be managed. It is known that some options, especially the timber management emphasis, may be inconsistent with the objectives found in the Lake Louisa State Park UMP. Therefore, they are not included here since the park has chosen the restoration option. It is not expected or recommended that any of the pine communities be managed in a manner that compromises the objective of restoring natural plant and animal communities. In most instances, revenue from timber will be a residual benefit in managing for restoration purposes. This document does not address the specifics of ground cover restoration. Ground cover issues are only mentioned to describe how the restoration process will relate to overstory establishment.

1) Planted Slash Pine Stands

There are currently 207 acres of planted slash pine in four stands growing on Lake Louisa State Park. They are approximately 14 years old (2005) and have

Lake Louisa State Park Timber Management Analysis

not achieved merchantable size. The average diameter at breast height (DBH) is 4 inches and the average total height is 15 ft. These stands appear healthy but will eventually be in need of thinning. These stands were planted in old citrus groves. The remnant citrus trees have since sprouted and are now growing in the understory. Florida Park Service personnel intend to eliminate the remnant citrus through basal bark and cut-stump herbicide applications.

Restoration Emphasis: The goal of this method will be to eventually restore these planted slash pine stands into naturally functioning ecosystems. Since it is thought longleaf pine was the dominant tree species growing in the Lake Louisa area prior to cultivation, it would be logical to convert these even-aged slash pine stands to uneven-aged longleaf pine stands. It must be noted, even though timber revenue may not be the overriding goal for managing these stands, revenue from timber can be derived while still meeting restoration objectives.

The easiest and most economical way to achieve species conversion is to simply wait until the trees reach merchantable size, clear-cut and replant to longleaf pine. This approach, however, may be distasteful to the general public for aesthetic reasons. For this reason, the recommendation of this assessment is to gradually convert over time. This process involves thinning as well as creating openings in the stand large enough to allow sunlight to reach the ground. Pine seedlings are intolerant to shade and must have direct sunlight to regenerate and grow vigorously. There may still be some concern over aesthetics, but this type of harvest is not as visibly apparent as in clearcuts. For converting slash pine to longleaf pine, the openings must be planted. The process can then be repeated until the slash pine is eventually removed and the existing stand will exhibit an uneven-aged character. Native ground cover can also be reestablished in these areas in much the same way and in conjunction with the overstory restoration. Seed from native species can be scattered soon after harvesting activities when bare mineral soil is exposed, aiding in germination.

2) Planted Sand Pine Stands

There are currently 98 acres of planted sand pine in two stands on Lake Louisa State Park. These stands are approximately 14 years old (2005) and average 15 feet in total height. These stands were planted in old groves and the ground cover consists almost entirely of non-native vegetation. The reason the previous owners chose to plant sand pine are unknown. There is strong evidence that these sites are suitable for either longleaf or slash pine. Both are more valuable timber species.

Management alternatives discussed in the previous section, Planted Slash Pine Stands, will work equally well in the sand pine plantations. Another alternative that would not be unreasonable in this situation would be to let the stand of trees grow to a merchantable size then clearcut and replant. Again, aesthetics may be a concern, so, the Restoration Emphasis may be more desirable for species conversion.

Lake Louisa State Park Timber Management Analysis

3) Natural Pine Stands

Approximately 157 acres of Lake Louisa State Park currently exhibits characteristics of a natural flatwoods ecosystem. These stands are highly diverse and play an important role in the ecosystem health of Lake Louisa State Park. Both longleaf and slash pine grow naturally on these sites with the slash pine becoming more abundant as the ground grades into the swamps. Stocking levels and stand densities are extremely diverse ranging from areas with no stocking, to areas with abundant regeneration, to areas of mature trees with basal areas reaching 120 sq. ft. acre.

Restoration Emphasis: Acreage where it may be advantageous to conduct tree plantings are those areas currently under-stocked or non-stocked and have no available natural seed source. Either longleaf or slash pine can be used. Longleaf will be preferred on mesic sites as it is more tolerant to fire in its early years, has a longer life span, and appears to be indigenous to the area. Slash pine will be preferred on hydric sites. Prior to planting, each individual site needs to be evaluated to determine which species to plant.

Site preparation can be accomplished a variety of different ways but due to the abundance of undergrowth, a tandem rollerchop and burn will be the most successful method to reduce competition and ensure a successful planting.

Planting methods are discussed under the Reforestation Plan contained within this document and can be applied here as well. Once stands are established, they can gradually be converted to a more natural, uneven-aged condition by following the guidelines under Planted Pine Stands (Restoration Emphasis). A method not mentioned in the reforestation plan which may prove effective under these conditions is direct seeding. Bare mineral soil must be exposed for the seed to germinate and the seed must be chemically treated so rodents and birds do not eat them. The major reason this method is not often used is it is difficult to control stocking rates and access is more restricted, limiting other future management activities.

IV. REFORESTATION PLAN

It has become apparent that there is a need to begin reforesting the abandoned pastureland and old citrus groves on LLSP as the first step in restoring natural vegetation to these areas. These areas have been disturbed by agricultural activities and it is the goal of the Florida Park Service to eventually restore the area to a naturally functioning ecosystem.

Reforesting LLSP will be beneficial for a variety of reasons: 1) It will aid in the long term control of the exotic/invasive plant species by shading them out and providing competition, thus reducing the chances of reestablishment after initial control. 2) It will be a step towards moving the area towards a natural functioning ecosystem. 3) It will increase both the aesthetic quality of the area as well as the wildlife potential. 4) Future

Lake Louisa State Park Timber Management Analysis

revenue can be derived from thinnings and harvests associated with the management of these forests.

A. Methods

Approximately 1,237 acres have been tentatively targeted for reforestation on LLSP. To accomplish this goal, it has been decided to span this effort over at least 5 years, planting approximately 250 acres per year. This acreage will vary from year to year, as planting units will be dictated by the size of the burn units (it is logical to use the same boundaries for both planting units and burn units). Reasons for not planting the entire acreage in one season are threefold. One, it will allow for adaptive management. If one method is not working well, strategies can be adjusted. Two, it will reduce the risk if unforeseen factors come into play (e.g. severe drought). Three, it will provide more options for the resource manager as these stands grow.

Site preparation methods to be utilized on LLSP will vary depending on the existing ground conditions. These methods will serve to prepare the ground for planting seedlings. Old grove areas will employ a combination of methods including root raking to eliminate sprouting citrus trees, burning and possibly scalping. The loose nature of the soils may result in trees being planted too deep. Bahia grass pastures will be burned and possibly scalped. These methods may be modified as deemed necessary.

Longleaf pine will be the primary tree species planted on LLSP. It is anticipated that the great majority of LLSP can be planted mechanically although there may be areas that may have to be planted by hand. Where feasible, trees will not be planted in straight rows but rather in curves or in a meandering fashion following the contour lines. This will increase the aesthetics of the stand by reducing the appearance of a plantation. Trees will be planted on a 12' by 5' spacing which translates into 726 trees per acre. This density was chosen to ensure adequate stocking levels and the spacing was chosen so equipment can operate between the rows if necessary for exotic control and ground cover restoration. Some areas may be planted in a random manner.

Since it is the objective of the FPS to restore native ground cover, there will be rows that are not planted with trees. Approximately 15% of the planting area within the old citrus will remain unstocked. In these areas, ground cover will be restored. There are several reasons why it was decided to leave unplanted strips. One, so the planted trees do not eventually shade out the restored native species. Two, so re-established native vegetation is not adversely affected during thinning operations, and three, so this vegetation will begin naturally reseeding and expanding its range within the area, saving restoration costs.

It is thought that the planted overstory will eventually begin to shade out non-native ground vegetation making additional reestablishment of native ground cover more successful and less costly in the future. Once the stand is in need of thinning and is harvested, additional native ground cover can be established on the disturbed ground.

Planting schemes will vary from site to site leaving a prescribed number of rows

**Lake Louisa State Park
Timber Management Analysis**

unplanted. The reason for this is so future observations can be made on the success of each method. For example, on one site the seedlings may be planted in 10 consecutive rows and leaving 2 unplanted. This will result in 15% of the area available for ground cover restoration. On another site it may be decided to plant 20 rows and leave 3 rows unplanted resulting in 12.5% of the area for ground cover restoration. Costs were based using an average of 15% unplanted for groundcover restoration.

For long term management of these stands, refer to the previous Timber Assessment portion of this document.

B. Costs (2001/2002)

The old grove and old pasture areas of LLSP have been targeted for reforestation. This section will calculate a total cost for the complete project so an average yearly cost may be calculated. The following planting and site prep costs are estimates based on past rates and may vary as these services will be put up for bid. These estimates include only the costs for site preparation, planting and the seedlings. They do not include the costs for exotic control and ground cover restoration. Seedling prices are from the Division of Forestry Andrews Nursery 2000 price list. Seedling costs include delivery. Costs were figured two ways: 1) Planting half the acreage with longleaf tubelings and half using longleaf bare root stock. 2) Planting bare root stock only.

1) Old Pasture

Description – The area consists of 279 acres of fallow bahia grass pasture.

Species to be Planted – Longleaf Pine

Trees Per Acre and Spacing – Pines - 726 T/A 12'x 5'

Site Prep Method – Scalp, burn.

a) Costs (Combination Bareroot and Containerized Seedlings)

Site Prep – Scalp	\$20.00/acre * 279 acres	\$ 5,580.00
	Burn	\$15.00/acre * 279 acres \$ 4,185.00

Planting – Machine (bareroot pine)	\$50.00/acre * 139 acres	\$ 6,950.00
Hand (tubelings pine)	\$60.00/acre * 140 acres	\$ 8,400.00

Seedlings – Bareroot LL 726 T/A * 139 acres = 101,000/seedlings	
100 * \$73.50/1000	\$7,423.50
Containerized LL 726 T/A * 140 acres = 102,000/seedlings	
102 * \$163.50	<u>\$16,677.00</u>

TOTAL \$49,215.50

b) Costs (Bareroot Seedlings Only)

Site Prep – Scalp	\$20.00/acre * 279 acres	\$ 5,580.00
	Burn	\$15.00/acre * 279 acres \$ 4,185.00

**Lake Louisa State Park
Timber Management Analysis**

Planting – Machine (pine) \$50.00/acre * 279 acres \$13,950.00

Seedlings – Bareroot LL 726 T/A * 279 acres = 203,000/seedlings
203 * \$73.50/1000 \$14,920.50

TOTAL \$38,635.50
2) Old Citrus Grove

Description – The area consists of 958 acres of abandoned citrus grove in which the citrus has sprouted. Only 815 acres will be effectively planted as 15% of the area will be left un-stocked for ground cover restoration.

Species to be Planted – Longleaf Pine

Trees Per Acre and Spacing – Pines - 726 T/A 12'x 5'

Site Prep Method – Root Rake, Burn, Scalp or Disc.

a) Costs (Combination Bareroot and Containerized Seedlings)

Site Prep – Scalp or Disc \$ 20.00/acre * 814 acres \$16,280.00
Burn \$ 15.00/acre * 958 acres \$14,370.00
Root Rake \$115.00/acre* 958 acres \$110,170.00

Planting – Machine (pine) \$50.00/acre * 407 acres \$20,350.00
Hand (pine) \$60.00/acre * 407 acres \$24,420.00

Seedlings – Bareroot LL 726 T/A * 407 acres = 296,000/seedlings
296 * \$73.50/1000 \$21,756.00

Containerized LL 726 T/A 407 acres = 296,000/seedlings
296* \$163.50 \$48,396.00

TOTAL \$255,742.00

b) Costs (Bareroot Seedlings Only)

Site Prep – Scalp \$ 20.00/acre * 814 acres \$16,280.00
Burn \$ 15.00/acre * 958 acres \$14,370.00
Root Rake \$115.00/acre * 958 acres \$110,170.00

Planting – Machine (pine) \$50.00/acre * 814 acres \$40,700.00

Seedlings – Bareroot LL 726 T/A * 814 acres = 591,000/seedlings
591 * \$73.50/1000 \$43,438.00

TOTAL \$224,958.00

3) Breakdown

a) Planting costs

Combination bareroot and tubeling (site prep, seedlings, planting)

**Lake Louisa State Park
Timber Management Analysis**

-

\$255,742.00

Bareroot seedlings only - \$224,958.00

b) Average yearly costs to reforest 1,327 acres on the LLSP are:

Combination bare root/tubeling \$255,742.00/5years = \$ 51,148.40/year

Bare Root Only \$224,958.00/5years = \$44,991.60/year

c) Total cost with inflation

The above figure does not take inflation into account so this figure can be expected to increase after the initial year (2001-2002). Assuming an average annual inflation rate of 4%, the yearly average costs will be as follows:

Combination Bare Root/Tubeling

Reforestation Costs

Year 1 \$51,148.40

Year 2 \$53,194.34

Year 3 \$55,322.11

Year 4 \$57,534.99

Year 5 \$59,836.39

Total \$277,036.23

Bare Root Only

Reforestation Costs

Year 1 \$44,991.60

Year 2 \$46,791.26

Year 3 \$48,662.91

Year 4 \$50,609.43

Year 5 \$52,633.81

Total \$243,689.01

V. SUMMARY

1. Timber Assessment

The current timber resource on the Lake Louisa State Park is limited due to the unstocked condition of old pasture and old grove areas and because the planted pine has not yet reached merchantable size. The only areas with potential for timber management at this time are the stocked portions of the wet flatwoods. These areas are generally located on the margins of the wetlands and constitute approximately 75 acres. The unstocked portion of the wet flatwoods may be regenerated naturally or can be planted to speed up the process of succession. There is no immediate need to perform any kind of thinning or harvesting operation but as time goes on, this need may develop, especially in the planted stands of timber.

LLSP has approximately 157 acres of natural pine timberland, 1,473 acres of ruderal habitat scheduled for reforestation and 206 acres of planted pine scheduled for restoration. This constitutes a significant amount of land having the potential to produce timber. Silvicultural treatments, prescribed burning or a combination of both

**Lake Louisa State Park
Timber Management Analysis**

are the most useful tools for implementing ecosystem management objectives such as habitat maintenance or restoration.

2. Reforestation Plan

The first step in restoring the unplanted ruderal areas on LLSP to naturally functioning ecosystems is to establish an overstory. Initially, 1,327 acres are being targeted for restoration with efforts taking place over five years. These areas will be planted with longleaf pine seedlings on a 12 foot by 5 foot spacing. In the old grove areas, approximately 15% of rows will be left unplanted to allow for ground cover restoration. This plan is meant to be flexible so strategies can be modified if necessary.

Total estimated costs to reforest the area is \$255,742.00 (today's dollars) if planted 50% with bare root stock and 50% with tubelings and \$224,958.60 for bare root only. When accounting for inflation this cost increases to \$277,036.23 and \$243,689.01 respectively.

This project will be beneficial in a variety of ways. First, it will begin moving the area to a more natural functioning ecosystem and in turn benefit wildlife. Second, it will increase the aesthetics of the area and make it more desirable for recreational uses.

**Lake Louisa State Park
Timber Management Analysis**

Addendum 7—Priority Schedule And Cost Estimates

Lake Louisa 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. Develop a restoration plan that identifies methods and a timeline. 0 – 1 year. **Estimated Cost: \$5,000.**
2. Replant longleaf pines on one-fifth (approximately 250 acres) of ruderal sandhill acreage (former citrus areas) every two years for 10 years. 0 – 10 years. **Estimated Cost: \$277,000.**
3. Replant 50 acres of ruderal and under-stocked flatwoods with longleaf pine. 0 – 10 years. **Estimated Cost: \$8,000.**
4. Initiate groundcover restoration on 15% (approximately 35 acres) of ruderal replanted sandhills (former citrus areas) per year. 0 – 10 years. **Estimated Cost: \$35,000/year in recurring costs.**
5. Establish seed collection agreements with suitable sandhill donor sites. 0 – 5 years. **Estimated Cost: \$2,000.**
6. Pursue a management agreement for the Schofield sandhill tract. 0 – 5 years. **Estimated Cost: \$2,000.**
7. Seek funding to establish and operate a large on-site native nursery. 0 – 5 years. **Estimated Cost: \$5,000/year in recurring costs.**
8. Prescribe burn all fire-type communities on a 2 – 5 year rotation. (Average 600 ac/year based on 4 year average rotation, \$20/acres) **Estimated Cost: \$12,000/year in recurring costs.**
9. Seek mitigation and/or grant monies to initiate hydrological restoration in former citrus areas. 0 – 10 years. **Estimated Cost: \$1,000/year in recurring costs.**
10. Apply mechanical treatments to scrub areas to remove overgrown oak component. 0 – 3 years. **Estimated Cost: \$10,000.**
11. Apply mechanical treatments where necessary to restore wet flatwoods areas. 0 – 5 years. **Estimated Cost: \$15,000.**
12. Monitor, comment, be active participant in surrounding land use changes. 0 – 10 years. **Estimated Cost: \$2,000/year in recurring costs.**
13. Seek ways to increase connectivity of park to other natural areas. 0 – 10 years. **No Estimated Cost.**
14. Transplant rare Lake Wales Ridge plants to the park. 0 – 10 years. **Estimated Cost: \$2,000/year in recurring costs.**

* Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.

Lake Louisa State Park
Priority Schedule And Cost Estimates

15. Monitor scrub morning glory (*Bonamia grandiflora*), Curtiss' milkweed (*Asclepias curtisii*), and hooded pitcher plants (*Sarracenia minor*) populations. 0 – 10 years. **Estimated Cost: \$1000/year in recurring costs.**
16. Develop hydrological restoration plan for the park. 0 – 5 years. **Estimated cost: \$5,000.**
17. Survey for sand skinks (*Neoseps reynoldsi*), Florida worm lizard (*Rhineura floridana*), and gopher tortoises (*Gopherus polyphemus*). 0 – 10 years. **Estimated Cost: \$5,000.**
18. Monitor Florida scrub-jay visits. 0 – 10 years. **No Cost.**
19. Treat exotic plants on one-fifth (approximately 250 acres) of ruderal sandhills per year. 0 – 10 years. **Estimated Cost: \$10,000/year in recurring costs.**
20. Remove exotic plants from natural areas (vs. ruderal areas) on a consistent basis. **Estimated Costs: \$3,000/year in recurring costs.**
21. Increase removal of feral hogs. 0 – 10 years. **Estimated Cost: \$5,000.**
22. Redo 1997 water quality assessments of Dixie and Hammond lakes; expand to include Bear lake. 0 – 10 years. **Estimated Cost: \$2,000.**
23. Conduct a monthly bird survey for one year. 0 – 2 years. **Estimated Cost: \$1,000.**
24. Improve park plant list. 0 – 10 years. **Estimated Cost: \$5,000.**
25. Add invertebrates to park's species list. 0 – 10 years. **Estimated Cost: \$5,000.**
26. Continue groundwater monitoring agreements with SJRWMD. 0 – 10 years. **No Estimated Cost.**
27. Develop and implement a written plan to protect and preserve the recorded archaeological sites from erosion, slumpage, animal burrowing, root damage, tree fall, and vandalism. 0 – 3 years. **Estimated Cost: \$6,000.**
28. Establish monitoring measures for recorded sites to monitor erosion, vegetation intrusion, and animal and human disturbances. 0 – 2 years. **Estimated Cost: \$1,000 plus \$500/year in recurring costs.**
29. Complete archaeological reconnaissance survey of the park utilizing GPS technology. 0 – 2 years. **Estimated Cost: \$15,000.**
30. Seek grant funding for research to document park and surrounding area history. 0 – 2 years. **Estimated Cost: \$1,000.**
31. Seek funding to establish and operate a large on-site native nursery. 0 – 5 years. **Estimated Cost: \$5,000/year in recurring costs.**

Subtotal: \$370,000 plus \$71,500 recurring

Support

32. Recruit and train volunteers to assist in land restoration program. 0 – 5 years. **Estimated Cost: \$2,000/year in recurring costs.**

Visitor Services/Recreation

33. Improve public awareness and encourage stewardship and protection of the natural and cultural resources through education, interpretation, and enforcement of rules and regulations. 0-10 years. **Estimated Cost: \$1,000 plus \$1,000/year in recurring costs.**

* Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.

Lake Louisa State Park
Priority Schedule And Cost Estimates

- 34. Develop interpretive material to explain land restoration program. 0 – 3 years. **Estimated Cost: \$5,000.**

- 35. Interpret park cultural resources in context to educate park visitors about the park and area prehistory and history. 0 – 5 years. **Estimated Cost: \$20,000 plus \$1,000/year in recurring costs.**

- 36. Meet staffing needs associated with routine maintenance, visitor services and park operations. 0-10 years. **Estimated Cost: \$72,300/year in recurring costs.**

Subtotal: \$26,000 plus \$76,300 recurring

Total Estimated Cost: \$396,000 plus \$148,000 recurring

* Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.

Lake Louisa State Park
Priority Schedule And Cost Estimates

* Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.

Lake Louisa State Park
Priority Schedule And Cost Estimates

Capital Improvements

Development Area or Facilities	Estimated Cost
Bear Lake	\$152,000.00
Cabins	\$106,600.00
Camping	\$1,085,000.00
Dixie Lake	\$628,000.00
Trails & Interpretation	\$712,320.00
Support Facilities	\$1,226,800.00

Total with contingency

\$4,692,864.00

NOTE: These preliminary cost estimates, based on Divisions standards, do not include costs for site-specific elements not evident at the conceptual level of planning. Additional costs should be investigated before finalizing budget estimates. All items fall in the new facility construction category © of the uniform cost accounting system required by ch. 259.037 F.S.

Lake Louisa State Park
Priority Schedule And Cost Estimates

NOTE: These preliminary cost estimates, based on Divisions standards, do not include costs for site-specific elements not evident at the conceptual level of planning. Additional costs should be investigated before finalizing budget estimates. All items fall in the new facility construction category © of the uniform cost accounting system required by ch. 259.037 F.S.

**Addendum 8—Additional Information
FNAI Descriptions
DHR Cultural Management Statement
And
Land Management Review Report**

Descriptions Of Natural Communities Developed By FNAI

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

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

The levels of the hierarchy are:

Natural Community Category - defined by hydrology and vegetation.

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

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

TERRESTRIAL COMMUNITIES

XERIC UPLANDS
COASTAL UPLANDS
MESIC UPLANDS
ROCKLANDS
MESIC FLATLANDS

PALUSTRINE COMMUNITIES

WET FLATLANDS
SEEPAGE WETLANDS
FLOODPLAIN WETLANDS
BASIN WETLANDS

LACUSTRINE COMMUNITIES

RIVERINE COMMUNITIES

SUBTERRANEAN COMMUNITIES

MARINE/ESTUARINE COMMUNITIES

Definitions of Terms Used in Natural Community Descriptions

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

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

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

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

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

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

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

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

Coastal Grassland - coastal flatland with sand substrate; xeric-mesic; subtropical or temperate;

Descriptions Of Natural Communities Developed By FNAI

occasional fire; grasses, herbs, and shrubs with or without slash pine and/or cabbage palm.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Descriptions Of Natural Communities Developed By FNAI

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Floodplain Swamp - floodplain with organic/alluvial substrate; usually inundated; subtropical or temperate; rare or no fire; vegetation characterized by cypress, tupelo, black gum, and/or pop ash.

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

Descriptions Of Natural Communities Developed By FNAI

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Marsh lake - generally shallow, open water area within wide expanses of freshwater marsh; still water

Descriptions Of Natural Communities Developed By FNAI

or flow-through; peat, sand or clay substrate; occurs in most physiographic regions; variable water chemistry, but characteristically highly colored, acidic, soft water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

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

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

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

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

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

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

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

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

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

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

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

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

MARINE/ESTUARINE (The distinction between the Marine and Estuarine Natural Communities is often subtle, and the natural communities types found under these two community categories have the same

Descriptions Of Natural Communities Developed By FNAI

descriptions. For these reasons they have been grouped together.) - Subtidal, intertidal and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land.

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

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

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

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

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

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

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

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

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

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

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

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

DEFINITIONS OF TERMS Terrestrial and Palustrine Natural Communities

Descriptions Of Natural Communities Developed By FNAI

Physiography

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

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

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

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

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

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

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

Hydrology

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

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

usually inundated - surface water present except during droughts

Climatic Affinity of the Flora

tropical - community generally occurs in practically frost-free areas

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

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

Fire

annual fire - burns about every 1-2 years

frequent fire - burns about every 3-7 years

occasional fire - burns about every 8-25 years

rare fire - burns about every 26-100 years

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

Descriptions Of Natural Communities Developed By FNAI

LATIN NAMES OF PLANTS MENTIONED IN NATURAL COMMUNITY DESCRIPTIONS

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

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

A. GENERAL DISCUSSION

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

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

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

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

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

B. STATUTORY AUTHORITY

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

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

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

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

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

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

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

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

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.
2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way that adversely affects the character, form, integrity, or other qualities that contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.
3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.
4. Each state agency of the executive branch shall assume responsibility for the preservation of historic

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

resources that are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.

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

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

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

C. MANAGEMENT POLICY

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

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

It should be noted that while many archaeological and historical sites are already recorded within state--owned or controlled--lands, the majority of the uplands areas and nearly all of the inundated areas have not been surveyed to locate and assess the significance of such resources. The known sites are, thus,

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

only an incomplete sample of the actual resources - i.e., the number, density, distribution, age, character and condition of archaeological and historic sites - on these tracts. Unfortunately, the lack of specific knowledge of the actual resources prevents formulation of any sort of detailed management or use plan involving decisions about the relative historic value of individual sites. For this reason, a generalized policy of conservation is recommended until the resources have been better addressed.

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

1. State land managers shall coordinate all planned activities involving known archaeological or historic sites or potential site areas closely with the Division of Historical Resources in order to prevent any kind of disturbance to significant archaeological or historic sites that may exist on the tract. Under 267.061(1)(b), F.S., the Division of Historical Resources is vested with title to archaeological and historic resources abandoned on state lands and is responsible for administration and protection of such resources. The Division will cooperate with the land manager in the management of these resources. Furthermore, provisions of 267.061(2) and 267.13, F.S., combined with those in 267.061(3) and 253.034(4), F.S., require that other managing (or permitting) agencies coordinate their plans with the Division of Historical Resources at a sufficiently early stage to preclude inadvertent damage or destruction to known or potentially occurring, presently unknown archaeological and historic sites. The provisions pertaining to human burial sites must also be followed by state land managers when such remains are known or suspected to be present (see 872.02 and 872.05, F.S., and 1A-44, F.A.C.)
2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.
3. In the case of known significant sites, which may be affected by proposed project activities, the managing agency will generally be expected to alter proposed management or development plans, as necessary, or else make special provisions to minimize or mitigate damage to such sites.
4. If in the course of management activities, or as a result of development or the permitting of dredge activities (see 403.918(2)(6)a, F.S.), it is determined that valuable historic or archaeological sites will be damaged or destroyed, the Division reserves the right, pursuant to 267.061(1)(b), F.S., to require salvage measures to mitigate the destructive impact of such activities to such sites. Such salvage measures would be accomplished before the Division would grant permission for destruction of the affected site areas. The funding needed to implement salvage measures would be the responsibility of the managing agency planning the site destructive activity. Mitigation of historic structures at a minimum involves the preparation of measured drawings and documentary photographs. Mitigation of archaeological resources involves the excavation, analysis and reporting of the project findings and must be planned to occur sufficiently in advance to avoid project construction delays. If these services are to be contracted by the state agency, the selected consultant will need to obtain an Archaeological Research Permit from the Division of Historical Resources, Bureau of Archaeological Research (see 267.12, F.S. and Rules 1A-32 and 1A-46 F.A.C.).
5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological site is discouraged. There are many endangered sites in Florida (on

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.

6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).
7. Any discovery of instances of looting or unauthorized destruction of sites must be reported to the agent for the Board of Trustees of the Internal Improvement Trust Fund and the Division so that appropriate action may be initiated. When human burial sites are involved, the provisions of 872.02 and 872.05, F. S. and Rule 1A-44, F.A.C., as applicable, must also be followed. Any state agent with law enforcement authority observing individuals or groups clearly and incontrovertibly vandalizing, looting or destroying archaeological or historic sites within state-owned or controlled lands without demonstrable permission from the Division will make arrests and detain those individuals or groups under the provisions of 267.13, 901.15, and 901.21, F.S., and related statutory authority pertaining to such illegal activities on state-owned or controlled lands. County Sheriffs' officers are urged to assist in efforts to stop and/or prevent site looting and destruction.

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

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

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

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

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

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

D. MANAGEMENT IMPLEMENTATION

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

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

A. Historic Sites

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

B. Archaeological Sites

- (1) Site location (written narrative and mapped location).
- (2) Cultural affiliation and period.
- (3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

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

E. ADMINISTERING AGENCY

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

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

Contact Person:

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

**Management Procedures For
Archaeological And Historical Sites And Properties
On State -- Owned Or Controlled Lands
(Revised August, 1995)**

Land Management Review of Lake Louisa State Park— September 21, 2000

Management Review Team Members

Agency Represented	Team member Appointed	Team member in attendance
DEP/DRP	Rosi Mulholland	
DEP	Terry Riordan	Terry Riordan
DACS/DOF	Bill Korn	Bill Korn
FWCC	Jimmy Conner	Jimmy Conner
Soil and Water Conservation	Mike Powers	Mike Powers
County Commission	John Bringard	John Bringard
Conservation Organization	Marian Ryan	Marian Ryan
Private Land Manager	Julia Faye Rodgers	Julia Faye Rodgers

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

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

Review Site

The management review of Lake Louisa State Park considered approximately 4,450 acres in Lake County that are managed by the Division of Recreation and Parks. The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management plan. The Division of Recreation and Parks revised the management plan on May 28, 1997, and the management plan update is due on May 28, 2002.

Review Team Determination

1. Is the land being managed for the purpose for which it was acquired?

Six (6) team members agreed that the Lake Louisa State Park is being managed for the purpose for which it was acquired, and one (1) team member did not agree that the park was being managed for the purposes for which it was acquired.

2. Are actual management practices, including public access, in compliance with the management plan?

Seven (7) team members agreed that actual management practices, including public access, were in compliance with the management plan for this site.

Commendations to the Managing Agency

Team commends manager for his efforts to identify and protect sensitive cultural sites

Exceptional Management Actions

The following items received high scores on the review team checklist (see Attachment 1), which indicate that management actions exceeded expectations.

- ❖ Natural Communities: Protection and Maintenance of Hydric Hammock
- ❖ Buildings
- ❖ Sanitary Facilities
- ❖ Maintenance of Waste Disposal

Recommendations and Checklist Findings

1. The team recommends that a more aggressive approach to natural resource management is necessary on CARL acquired properties at Lake Louisa State Park, including prescribed fire, and sandhill restoration.
Manager's Response: Agree. The Division is pursuing funding of restoration. Prescribed burning will be pursued through annual burn objectives.
2. The team recommends that more monitoring of listed species take place, particularly of scrub jays.
Manager's Response: Disagree. Scrub jays have not been recorded at Lake Louisa until 1 bird was observed in October 2000. There is no need to monitor for scrub jays at the park at the present time.
3. The team recommends that a baseline survey of the flora, fauna and water quality in the park be conducted.
Manager's Response: Agree. Efforts will be made to include the smaller lakes in the University of Florida's Lake Watch water sampling program. Surveys of flora and fauna will continue as part of routine resource management activities at the park.
4. The team recommends that a hydrological restoration plan be developed prior to further development of the park.
Manager's Response: Disagree. Hydrological restoration will be addressed in the revision of the unit plan.
5. The team recommends that the Division of Recreation and Parks reconsider their current plans for recreation development at this park. The proposed level of recreation improvements and facilities throughout the property, (including developments at every one of the five major lakes) appears to strike a position weighed too heavily on the side of public use/development, and could conflict with the restoration and protection of the natural resources-qualities and goals for which this property was acquired.
Manager's Response: Disagree. The current level of development in the park is included in the UMP that was approved by LAMAC. Plans for development were prepared based upon input during public meetings (workshop, advisory group, and LAMAC staff and council), internal DEP review, and DRP staff meetings. Plans and needs for the existing and new development will be considered again during the process of preparing the next updated UMP.
6. The team recommends that DRP re-asses the number of cabins and r.v. spaces allowed, to be consistent with the purpose of acquisition.

Manager's Response: Disagree. (See comments in 5. above.) The planned development of cabins and campsites is in the current UMP and this as well as other plans for development and resource restoration will be reviewed during the process of developing the next updated UMP.

7. The team recommends that central sewer be provided prior to the construction of the proposed r.v. and cabin development.

Manager's Response: Agree. Either a package plant or hookup to local services will be done during the upcoming cabin and campground development plans.

Checklist Findings

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

1. Management of sandhill. (p)

Manager's Response: Agree. This will be addressed in the next unit plan revision.

2. Inventory of animals. (p)

Manager's Response: Agree. This will be updated as part of the next unit plan revision.

3. Survey needs. (p)

Manager's Response: Agree. This will be updated as part of the next unit plan revision.

4. Description of law enforcement needs.(p)

Manager's Response: Disagree. This is not typically included in DRP unit plans unless comments are needed due to special circumstances that exist at the park.

5. Poaching problems. (p)

Manager's Response: Agree. This will be mentioned in the next unit plan revision.

6. Inholdings/Additions needs. (p)

Manager's Response: Agree. This will be included in the next unit plan revision.

7. Condition of scrub. (f)

Manager's Response: Agree. Efforts will be made to pursue the funding needed for mechanical treatments. The scrub is already included in the prescribed burn plan.

8. Condition of sandhill. (f)

Manager's Response: Agree. A basic restoration plan will be included in the unit plan revision. All of the sandhill is former citrus groves and pastures. While the park can increase the burning of these areas, the current park budget can not address the restoration needs of these ruderal sandhills. Once we have determined the most feasible way to accomplish this goal, efforts will be made to procure required funding

9. Area being burned (no. of acres). (f)

Manager's Response: Agree. The park plans to increase the number of acres being burned.

10. Frequency of burns.(f)

Manager's Response: Agree. The park plans to increase the frequency of burns.

11. Quality of burns.(f)

Manager's Response: Disagree. The quality of burning at Lake Louisa is good; the frequency

of burning has been a problem to date.

12. Restoration of ruderal sandhill. (f)

Manager's Response: Agree. A substantial increase in the park's annual budget is necessary in order to deal with the extensive restoration needs of the park's ruderal sandhills. Funding is dependent upon legislative appropriations and DEP/DRP priorities.

13. Restoration of hydrology caused by ditches.(f)

Manager's Response: Agree. The former citrus operation impacted many of the sandhill lakes. Restoration will be pursued through mitigation monies. The park's annual budget is insufficient to address these hydrological restoration needs.

14. Equipment needs.(f)

Manager's Response: Agree. Equipment needs are addressed on an annual basis through normal budgetary procedures and depend upon legislative funding and DEP/ DRP priorities.

15. Staff needs. (f)

Manager's Response: Agree. Staffing needs will be addressed accordingly as recreational use and development of the park is increases. However, no new staff can be assigned to this or any park unit unless the new positions are appropriated by the Legislature or reassigned from other units. Additional staff is needed by our parks statewide which is why we regularly seek positions, volunteers, and partners to help us overcome staff deficiencies.

16. Funding needs. (f)

Manager's Response: Agree. Funding needs of the park will be addressed through the budgetary process. Funding is determined annually by the Florida Legislature and the Governor and Cabinet and DEP/DRP priorities.