APPENDIX H:

Archaeological and Historical Resources

Doris Leaper Spruce Creek Preserve
Florida Master Site File Listed Cultural Sites (State-owned lands)

Site Name	FMSF ID	Site Type
Brick Pile	8VO5340	Bldg. remains, homestead
Corduroy Causeway	8VO5339	Artifact scatter, low density, historic wharf, road
Crushed Coquina Causeway	8VO5342	Historic road segment
Doris Leaper Preserve Midden	8VO7667	Land-terrestrial
Lightbulb Dump	8VO7073	Artifact scatter, historic refuse
Moore Shell Midden	8VO2851	Extractive site/prehistoric shell midden
Odyssey Midden	8VO7075	Prehistoric shell midden
Sleepy Hollow Mound	8VO7074	Prehistoric shell works, variable density
Spring Ditch	8VO7076	Historic well
Spruce Creek Midden Complex	8VO0239	Prehistoric shell midden
Spruce Creek Mound Complex	8VO99	Sand mound complex, canoe ramp
Steinbach	8VO3455	Artifact scatter, low density
Stinging Nettle Mound	8VO2579	Prehistoric mound and midden
Stone Bridge	8VO7202	Historic road segment/rice dike/dam

Note: *Nordmann's Mound* (8VO100) is located on State owned land, but the Florida Master Site File indicates it is destroyed.

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 which 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 which 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 which 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 which must be considered in land management decisions.

B. STATUTORY AUTHORITY

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

Chapter 267, Florida Statutes is the primary historic preservation authority of the state. The importance of protecting and interpreting archaeological and historic sites is recognized in 267.061(1)(a), F.S.:

> The rich and unique heritage of historic properties in this state, representing more than 10,000 years of human presence, is an important legacy to be valued and conserved for present and future generations. The destruction of these nonrenewable historic resources will engender a significant loss to the state's quality of life, economy, and cultural environment. It is therefore declared to be state policy to:
>
> 1. Provide leadership in the preservation of the state's historic resources; [and]
> 2. Administer state-owned or state-controlled historic resources in a spirit of stewardship and trusteeship;...

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

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

2. Develop a comprehensive statewide historic preservation plan.

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

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

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

6. Carry out on behalf of the state the programs of the National Historic Preservation Act of 1966, as amended, and to establish, maintain, and administer a state historic

preservation program meeting the requirements of an approved program and fulfilling the responsibilities of state historic preservation programs as provided in subsection 101(b) of that act.

7. Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture. Prior to the acquisition, preservation, interpretation, or operation of a historic property by a state agency, the Division shall be provided a reasonable opportunity to review and comment on the proposed undertaking and shall determine that there exists historic authenticity and a feasible means of providing for the preservation, interpretation and operation of such property.

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

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

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

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

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

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

4. Each state agency of the executive branch shall assume responsibility for the preservation of historic resources which 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 sites is a felony.

C. MANAGEMENT POLICY

The choice of a management policy for archaeological and historic sites within state-owned or controlled lands 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 which are state-owned or controlled, where the basis of management is to provide for land uses that are minimally destructive of resource values.

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

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

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

2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.

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

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

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

6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other

resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).

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

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

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

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

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

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

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

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

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

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

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

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

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

Division of Historical Resources staff is 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 which the land managers may report:

   A. Historic Sites

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

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

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

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

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

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

   B. Archaeological Sites

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

      (2) Cultural affiliation and period.

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

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

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

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

(7) Description of surrounding environment.

7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review by the Division early in the project planning.

8. Ground-disturbing activities may proceed elsewhere but land managers should stop disturbance in the immediate vicinity of artifact finds and notify 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 is 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) 487-2333
Suncom 277-2333
FAX (850) 922-0496

APPENDIX I:

Prescribed Burn Plan

INTRODUCTION

Fires, naturally occurring or man-induced, are an integral part of the ecology of the southern pine (*Pinus* spp.) region (Miller 1963) and have maintained fire-dependent plant communities in the southeast for countless years. Exclusion of fire reduces nutrient cycling and changes the vegetative community from an open canopy system to a closed one. The growth of dense brush shades out fire-dependent plants, including listed species, and has an adverse affect on fire-dependent wildlife such as Florida scrub-jays, and gopher tortoises. Exclusion of fires allows seral stages to increase until a climax hardwood community exists. Areas covered by dense brush lose much of their value to wildlife. For example, food and browse plants are less palatable, access is restricted and predator's ability to capture prey is hampered. Additionally, heavy fuel accumulation results in increased wildfire hazard. Prescribed burning is used extensively in forestry and wildlife management for fuel reduction, brush control, disease and insect control, site preparation and wildlife habitat improvement. It is a recommended tool for management of such game animals as white-tailed deer (*Odocoileus virginianus*), bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*) and wild turkey (*Meleagris gallopavo*) (U. S. Forest Service 1969, Stoddard 1971). The value of prescribed fire to these and other animals, such as raptors and some songbirds, are well documented (Givens 1962, Miller 1963, Stoddard 1963). Prescribed fire benefits wildlife by reducing underbrush density, thus improving access, promoting the growth of succulent vegetation and lowering browse to feeding height of deer. Additionally, it benefits aesthetic values and enhances growth and fruiting of important wildlife food plants, such as dewberries (*Rubus spp*.) and blueberries (*Vaccinium spp*.) (Halls 1977), as well as important community plants such as wiregrass (*Aristida stricta* var. *beyrichiana*).

BURN OBJECTIVES

Prescribed fire will be used on Doris Leeper Spruce Creek Preserve (DLSCP) as a habitat management tool in conjunction with other management techniques to accomplish a variety of objectives. The primary objective for using prescribed fire on the DLSCP is to restore and /or maintain fire-dependent native habitat communities. This will result in preserving native plant communities while simultaneously improving wildlife habitat. The benefits that will be derived from prescribed burning on the DLSCP include the long term preservation of native plant communities and improved wildlife habitat and numerous others as well:

Table 1. Objectives of the Doris Leeper Spruce Creek Preserve Prescribed Fire Plan, November, 2010.

1	Restore and /or maintain fire-dependent native habitat communities
2	Reduce fuel loads, to prevent or mitigate effects of wildfires.
3	(Re)introduce natural fire regime, growing season burns
4	Enhance aesthetics by controlling undesirable vegetation.
5	Promote succession of longleaf pine in flatwoods communities

6 Reduce biomass in shrub and canopy layers

7 Increase herbaceous species cover

8 Identify habitats requiring mechanical or other fire surrogate treatments prior to application of prescribed fire

9 Identify by habitat and location, appropriate fire-surrogate and other required pre-burn activities

10 Identify by habitat and location, areas where pre-treatment activities are required prior to conducting a prescribed burn

11 Control competing vegetation, forest diseases and insects

12 Improve forage for wildlife;

13 Remove dead materials and return nutrients to soils;

14 Reduce oak / xeric shrub biomass in the scrub community

15 Establish target fire return intervals for onsite communities

16 Create/ increase open patches, especially in the scrub

17 Identify areas / habitats where shrub layer is overgrown or excessive fuel loads exist

18 Introduce fire in varying seasonality, intensity and return intervals to promote pyrodiversity

19 Evaluate utilization of wildfires as a natural, controlled burn, on a case by case basis

DESCRIPTION OF AREA

DLSCP lies within three (3) local jurisdictions that include the City of Port Orange, the City of New Smyrna Beach, and unincorporated Volusia County. It generally bordered on the north by Spruce Creek and Rose Bay, on the west by public lands along Interstate 95 on the south by developed and undeveloped private residential lands, and on the east by US Hwy 1, although some parcels do occur east of US 1. Several city and county owned forested properties are contiguous to and abut the DLSCP on several of its boundaries. The Preserve consists of tracts separated by Spruce Creek, Strickland Bay, Turnbull Bay, Murray Creek and US 1. For communication purposes, these tracts are referred to by individual name as shown on the Parcel Identification Map. DLSCP is 1,921.3 acres in size and is comprised of the following habitats. Approximately 780 acres of the Preserve are proposed to be treated with prescribed fire. This number is less than the total acreage of habitat that is considered fire dependent. The reason is that are several areas that are located in an area that make fire logistically not feasible. This is discussed by habitat in this plan, and shown on the Burn Unit Map.

Rx Fire Comm.	**Acres**
Scrub	280.0
Scrubby FW	254.1
Mesic FW	281.6
Wet FW	112.8
Wet Prairie	13.6
Total Acres	942.1
Burn Unit Acress:	778.8

Natural Community Descriptions:

Mesic Hammock – Mesic hammocks are well developed hardwood and/or palm forests on rarely inundated soils. The canopy is typically closed and dominated by live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), and pignut hickory (*Carya glabra*). The mesic hammocks found at the Preserve are dominated by the canopy trees mentioned above and the canopy is closed. The understory consists of saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), yaupon holly (*Ilex vomitoria*) and wax myrtle (*Myrica cerifera*).

Mesic hammocks are not considered fire-adapted communities and there structure and composition generally exclude fire encroachment. Fire will be utilized in adjacent communities to remove high levels of fuels and prevent catastrophic fires from encroaching into the hammocks.

However, the mesic hammocks located on the Martin's Dairy tract that are located between bluffs bordering the bottomland forest / creek system and Spruce Creek may have been former xeric hammocks or scrub. These areas are within natural fire shadows and have trended towards a mesic setting in their current condition. Based on the underlying soil map unit (42, Paola fine sand) these areas would typically be more xeric in appearance and vegetational composition. Soils within these specific hammocks indicate an intermediate condition of these two communities (xeric vs. mesic). Void of natural processes such as fire, xeric hammocks drift towards mesic hammocks. As the canopy closes, large canopy oaks become resistant to fire, hardwoods like southern magnolia encroach, and the growing layer of leaf litter increase organics and cover open sand patches associated with xeric hammocks. Evidence of some hammock in these areas is visible on the 1943 aerials.

Based on these conditions, portions of the mesic hammock on the Martin's Dairy tract may be targeted for timber harvest and scrub restoration. This would be targeted only to those areas above the bluffs along either creek system and would occur along borders adjacent to scrub restoration areas. At this time, no fire interval or prescribed burning is proposed within the hammocks. As scrub restoration approaches the edges of mesic hammocks described above, portions may be targeted for restoration. These areas would be monitored during successive years to determine if scrub conditions begin to appear or if secondary successional forest begins to appear. These observations will guide whether additional active management occurs in these zones.

Scrub – The Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges.

Scrub within the Preserve is dominated by myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminata*), Chapman's oak (*Quercus chapmanii*), and rusty lyonia (*Lyonia ferruginea*) within the shrub and subcanopy strata. There are a few remnant stands of sand

pine (*Pinus clausa*) in the canopy, but these appear to be declining in abundance. The oaks form a dense cover interspersed with few patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (*Lechea* spp.), and ground lichens (*Cladonia* spp.). Saw palmetto (*Serenoa repens*) is common but not dominant within the scrub.

While scrub is a fire-maintained community, it is not easily ignited. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years (based on the habitat requirements of the Florida scrub-jay). Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. A minimum five year fire return interval appears to be the time required for re-sprouting oak stems to reach acorn-bearing height, an important food source for jays.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, which is found on the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks.

The status of the scrub is primarily not suitable for burning in its current condition. This habitat will require mechanical or other fire surrogate activities prior to re-introduction of fire. Mechanical thinning, silviculture operations to harvest merchantable woods (limited here, but rusty Lyonia does have a local market), and forestry mowing will be implemented prior to burning. Following fuel reduction through fire surrogate activities, fire will be implemented in small tracts, from 10 – 25 acres at a time. The initial fire return interval for the DLSCP scrub will be 5-7 years. Following several seasons of fire implementation, this fire interval should be re-evaluated, and likely increased. When fire is not logistically possible, fire surrogate activities will be implemented once a burn unit is more than one year beyond the desired fire return interval.

<u>*Wet Flatwoods*</u> – Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs.

The canopy of the wet flatwoods within the Preserve consists of slash pine (*Pinus elliottii*) and pond pine (*P. serotina*), with the latter being the dominant species. The subcanopy consists of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and wax myrtle. The shrub layer is dominated by gallberry (*Ilex glabra*), shiny lyonia (*Lyonia lucida*), and saw palmetto (*Serenoa repens*). This habitat has been long unburned and saw palmetto forms a dense thicket. The herbaceous species are found primarily in breaks in the shrub layer, along field roads or game trails and consists of wiregrass (*Aristida stricta*), blue maidencane (*Amphicarpum muhlenbergianum*), Carolina

redroot (*Lachnanthes carolina*), beaksedges (*Rhynchospora* spp.), and maidencane (*Panicum hemitomon*). Due to this site being fire suppressed the shrub layer is more abundant compared to the herbs.

Wet flatwoods tend to have a longer fire interval than upland pine flatwoods in the order of 5 to 7 years. If the interval is too long, 7 to 10 years, it can lead to an increase in woody species cover and a decline in grasses and forb cover (or palmetto cover, as evidenced in this habitat on DLSCP). Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, plant size or age at the time of fire, can greatly influence tree mortality and vegetation response to fire. Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods, prevent increases in shrub densities, and promote flowering of herbaceous groundcover.

This habitat will require mechanical fuel reduction through forestry mowing or similar techniques. Canopy thinning and harvest is recommended, however, due to difficulty of access, is not likely to occur. Once mechanical fuel reduction has occurred, the site will be burned repetitively in winter months to further reduce palmetto and shrub layer coverage. Once the fuel loads are deemed appropriate, growing season fire will be implemented on a 4-7 year fire return interval. When fire is not logistically possible, fire surrogate activities will be implemented once a burn unit is more than one year beyond the desired fire return interval.

Mesic Flatwoods – Mesic flatwoods are generally characterized by an open canopy of tall pines and dense ground cover including shrubs, grasses, and forbs. Historically this community's canopy was dominated by longleaf pine (*Pinus palustris*). Today the majority of mesic flatwoods found throughout central and northeastern Florida are dominated by dense stands of slash pine due to the pine silviculture industry and furthermore by prolonged periods of fire exclusion.

The canopy found within the mesic flatwoods of the Preserve is comprised primarily of slash pine, however, longleaf pine does occur throughout much of this habitat on DLSCP. The ground cover is dominated by a heavy cover of saw palmetto and gallberry. In its natural state, mesic flatwoods herbaceous cover is dominated by wiregrass, dropseeds (*Sporobolus* spp.), panicgrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.). Limited areas of wiregrass, and these other herbaceous species, are found within the mesic flatwoods of the Preserve due to fire exclusion.

Mesic flatwoods require frequent fire (2 to 4 year intervals). Longleaf pines have thick bark to protect them from fire and their seeds need the mineral soil and open sunlight that fire provides to germinate. Longleaf pine during the grass stage is fire resistant. Several species require fire to reproduce. Wiregrass requires fire to flower, along with a number of other characteristic herbs.

The need for frequent fire to control hardwoods, shrub thickets and unnaturally dense pine stands has been documented for many years. It is also well documented that fire stimulates flowering in many flatwoods herbs and that frequent fire increases species richness and

abundance. Controlled burns in mesic flatwoods also indirectly determine the fire frequency and season for all the adjacent natural communities.

Statistics from lightning caused fires suggest that most areas in Florida would naturally burn at the beginning of the lightning season. Growing season fires (April to mid-August) are known to be necessary for flowering and seed set in wiregrass.

The mesic flatwoods on DLSCP will initially receive fire surrogate treatments to reduce fuel loads in the shrub layer. Following this fuel reduction, burning will be implemented where and when feasible. The Preserve is surrounded by numerous smoke sensitive areas, so fire surrogate activities will continue to be used when fire has not been able to be prescribed within the range of recommended fire return intervals. The fire return interval for the DLSCP mesic flatwoods is 2-4 years.

Scrubby Flatwoods – Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. Scrubby flatwoods differ from the aforementioned scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes. Structurally it differs from scrub in its lack of a continuous cover of scrubby oaks.

The scrubby flatwoods at the Preserve have a canopy of longleaf pine, slash pine, and sand pine (*Pinus clausa*). The understory consists of a closed cover of sand live oak, myrtle oak, Chapman's oak, saw palmetto, gallberry, rusty Lyonia and fetterbush. Some instances of grasses were found which include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*). The majority of the scrubby flatwoods found within the Preserve has a closed canopy of scrub oaks in the 3 to 4 meter range in height due to the lack of fire.

Scrubby flatwoods are often associated with scrub and/or mesic flatwoods. Therefore many of the rare species associated with the aforementioned scrub are also likely to inhabit scrubby flatwoods.

Scrubby flatwoods have a more continuous ground cover and more pine needle leaf litter than scrub, therefore historically have burned more readily than scrub. But due to less ground cover grasses, scrubby flatwoods tend to burn less readily than mesic flatwoods. Therefore scrubby flatwoods historically have burned at a frequency intermediate of the two, most likely in the 5 to 15 year range. Light ground fires in the surrounding mesic flatwoods tend to enter scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays. Therefore variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within this community.

The scrubby flatwoods on the Preserve will be treated similar to the mesic flatwoods, in terms of introduction of fire surrogates prior to initiation of fires. Upon initiation of fire

implementation, scrubby flatwoods will be incorporated into mesic flatwoods burn units, thereby producing the typical patchiness described above. That is, fires will be started in the mesic flatwoods and allowed to carry into or burn out in the scrubby flatwoods. The target return interval will be 5 to 15 years. If a section of scrubby flatwoods within a larger unit has not burned for more than 10 years, fires will be deliberately set within that community during the next burn rotation.

Maritime Hammock – Maritime hammock is predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore.

The maritime hammocks found within the Preserve have a closed canopy dominated by live oak, cabbage palm, southern magnolia, and pignut hickory. The subcanopy is dominated by red cedar (*Juniperus virginiana*), yaupon holly *(Ilex vomitoria*), saw palmetto, Brazilian pepper, red bay (*Persea borbonia*), wild coffee (*Psychotria nervosa*), wax myrtle, and wild orange (*Citrus* spp.). The invasive exotic Australian pine (*Casuarina equisetifolia*) was also noted within the maritime hammock communities of the Preserve, although it is limited in occurrence.

As with mesic hammocks, fire is naturally rare in this community and is not proposed within this habitat. Where fire hazards exist near maritime hammocks, fuel reduction will be implemented. Due to location, this will occur in areas where adjacent habitats are in areas where fire is not likely feasible, thus, fire surrogates will be implemented to control adjacent habitat fuel loads.

Wet Prairie – Wet prairie is an herbaceous community found on continuously wet, occasionally inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and within slightly higher wet or mesic flatwoods, or dry prairies.

The wet prairies found within the Preserve are small depressions within wet flatwoods and mesic flatwoods. The groundcover consists primarily of yellow eyed grass (*Xyris* spp.), St. John's wort (*Hypericum fasciculatum*), maidencane, panic and witch grasses (*Panicum* spp, and *Dichanthelium* spp.), beaksedges, and Carolina redroot.

Natural fires likely entered wet prairies from surrounding pine flatwoods and burned through them when they were dry enough to carry fire. It is estimated that wet prairies found adjacent to pine flatwooods historically had a fire interval of 2 to 4 years. In absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. Further evidence of fire interval is the necessity of many of the dominant grasses that require fire to stimulate flowering. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting by human disturbance or hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.

Wet Prairie in the Preserve can undergo extreme water fluctuations annually as well as within a given year. Despite fire exclusion, this community generally resembles historic

conditions. Increased fire return intervals would reduce the prevalence of encroaching woody vegetation that commonly occurs in the higher elevation areas on the edge of the prairies.

No fire surrogate activities are necessary prior to fire introduction in this habitat. The wet prairies will be burned in conjunction with the surrounding land type (primarily wet flatwoods) and included within adjacent burn units. The potential of a muck fire exists when allowing fire to encroach into a wet prairie lacking proper soil moisture. Soil moisture will be evaluated prior to inclusion of the wet prairie into the adjacent burn unit. Fire breaks will be utilized when the potential for a muck fire exists. Fire return intervals will be based on adjacent habitats and soil moisture at the time of burning adjacent habitats. No fire surrogate activities are recommended at this time. However, should hardwood encroachment exceed 10% of a prairie, herbicide application to reduce hardwoods may be implemented.

Coastal Hydric Hammock – Coastal hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The coastal hydric hammock found within the Preserve has a canopy which is 100% cabbage palm. The subcanopy consists of swamp bay, wax myrtle, and saw palmetto. The herbaceous cover is dominated by Virginia chain fern (*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamonea*), and royal fern (*Osmunda regalis* var. *spectabilis*).

Fire is not considered an important component of coastal hydric hammock dynamics; however they do burn occasionally. Due to this coastal hydric hammock being dominated by old growth cabbage palm fire most likely occurred historically. Cabbage palms are fire tolerant and intense fires favor the species.

No fire surrogate activities or direct fires are proposed for this habitat. Due to size and location, wildfire is unlikely in this habitat.

Bottomland Forest – Bottomland forest is a deciduous, or mixed deciduous/evergreen closed-canopy forest within riverine floodplains and in shallow depressions.

The dominant canopy species found within this community at the Preserve include laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), cabbage palm, swamp tupelo (*Nyssa sylvatica* var. *biflora*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), and red maple (*Acer rubrum*). The understory consists of swamp dogwood (*Cornus foemina*), dahoon holly (*Ilex cassine*), swamp bay, shiny lyonia (*Lyonia lucida*), buttonbush (*Cephalanthus occidentalis*) and wax myrtle.

Bottomland forests are not considered fire-adapted communities. The bottomland forests will be treated in a manner similar to the mesic hammocks described above. Note that most of the bottomland forest is bordered by mesic hammock, making this a feasible implementation.

Salt Marsh – Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary.

In the case of the Preserve the salt marshes are protected from wave activity by barrier islands. The dominant species are smooth cordgrass (*Spartina alterniflora*) and needle rush (*Juncus roemerianus*). The landward edge of the marsh consists of sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), marsh elder (*Iva frutescens*), sea oxeye daisy (*Borrichia frutescens)*, and christmasberry (*Lycium carolinianum*). The salt marshes within the Preserve also have sporadic black mangroves (*Avicennia germinans*).

Fire is known to occur in salt marshes, although sporadically, either by spreading from adjacent uplands or from lightning strikes in the marsh itself.

The salt marsh on DLSCP will be utilized as a natural fire break for adjacent habitat burn zone units, when the water depths are sufficient to allow fire to encroach without threat of muck fires.

Mangrove Swamp – Mangrove swamps are dense forests occurring along relatively flat, low wave energy, marine and estuarine shorelines. Four species of mangroves occur in Florida consisting of red mangrove (*Rhizophora mangle*), black mangrove, white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The four species can occur either in mixed stands or often in differentiated, monospecific zones that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves often dominate the lowest (deep water) zone, followed by black mangroves, then white, and finally buttonwoods which are normally found within the transition zone between the upland and wetland limits.

The mangrove swamps on DLSCP are primarily dominated by black mangroves, although both red and white mangroves occur as well. Many of the mangrove systems are bordered by salt marsh on the waterward edge. Some areas, typically near US Hwy 1, continue to be invaded by Brazilian pepper, a topic addressed in later sections of this Plan.

No fire or fire surrogate activities will occur within the mangrove swamps.

Blackwater Stream, Clearing and Impoundment - No fire activities are related to these communities.

Improved pasture – A small portion of improved pasture is included within the Preserve. This area consists of actively maintained bahiagrass (*Paspalum notatum*). It is currently used for parking equestrian trailers used by visitors of the Preserve. Gopher tortoises actively use this area for forage and a few burrows were also identified.

This habitat will be utilized as a fire break in conjunction with the surrounding habitats.

Successional Hardwood Forest – Successional hardwood forests are best described as closed-canopied forest dominated by fast growing hardwoods. These forests are either invaded natural habitat due to lengthy fire-suppression or old fields that have succeeded to forest. The subcanopy and shrub layers of these forests are often dense and dominated by smaller individuals of the canopy species.

This habitat is found along a canal which was historically draglined through a wetland hardwood forest. The existing vegetation consists of a canopy of laurel oak, slash and longleaf pine, cabbage palm, sugarberry, and southern magnolia. This community is expected to reach a climax community similar to the mesic hammocks described above, through natural succession.

No fire activity is to occur within this habitat. Should a wildfire occur, the area will be re-evaluated to determine if fire should be re-introduced.

PRESCRIBED BURNING PROGRAM

Restoration of a pre-Columbian landscape is impractical and probably impossible on DLSCP because of the area's location nearby several smoke-sensitive areas. Accounts of pre-settlement communities are vague and based largely on general inferences from post-settlement communities, thus, precluding replication. Some former plant community attributes, however, can be restored by applying a variety of fire regimes. There is no single fire regime that can be applied across communities to achieve ecological restoration and maintain community heterogeneity. Therefore, fire frequency, intensity, pattern of spread, and regularity must be varied among and within burn units. The DLSCP Burn Plan has been divided into multiple burn units based on existing fire breaks and habitat boundaries. Where a fire-dependent community exists, but is not shown as a burn unit, it is due to logistics precluding fire a feasible management tool and fire surrogates will be used to achieve the Management Plan goals.

The following parameters will be defined within each burn prescription submitted to Department of Forestry (DOF) for approval.

- Fireline
- Size and Arrangement of Burns
- Type of Burn
- Season and Time of Day
- Optimal Weather Conditions

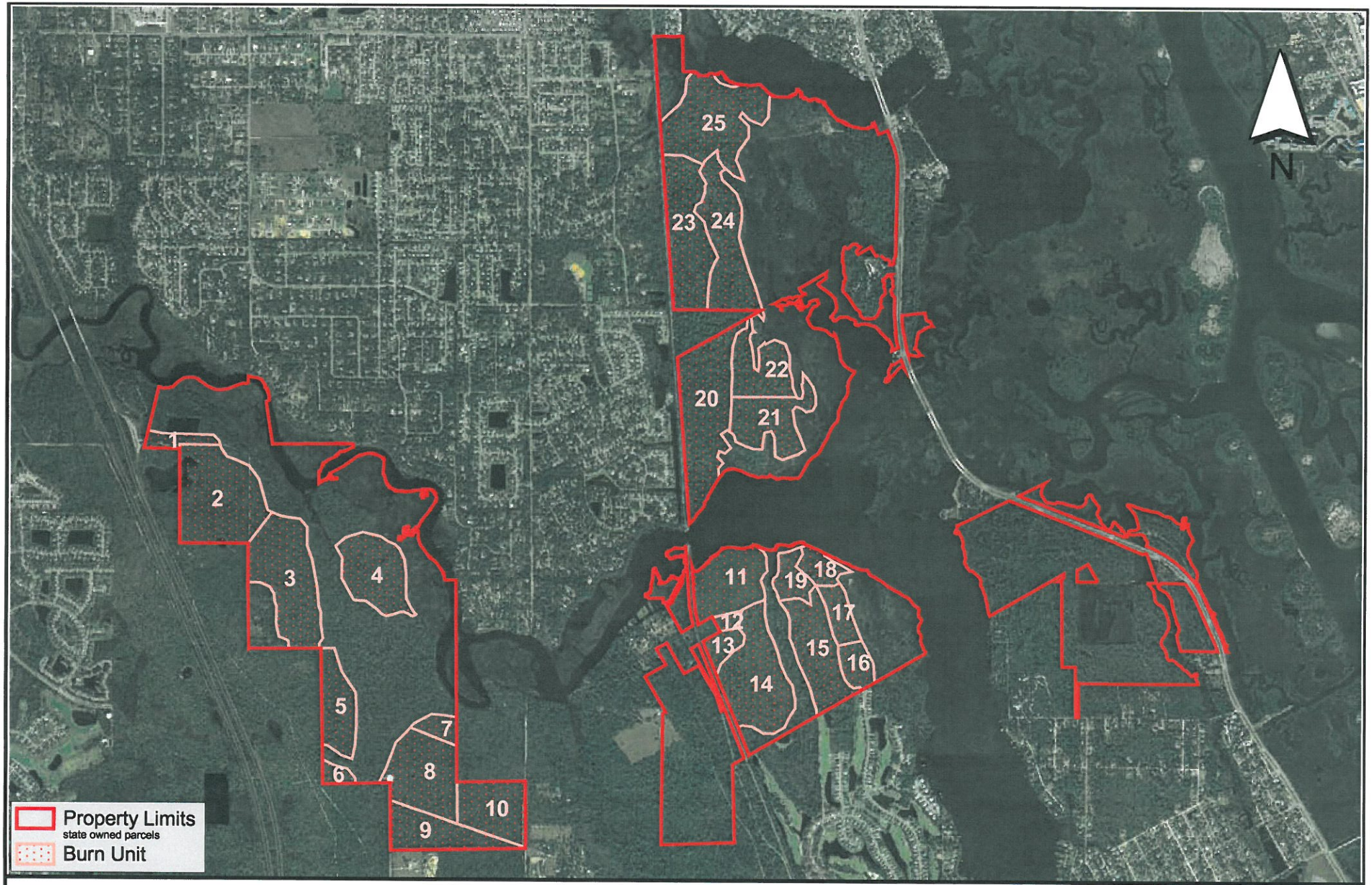
- Smoke Management
- Personnel
- Equipment
- Notification and Emergency Contact Information
- Evaluation of Burn

Special Considerations

Attention will be given to the safety of neighboring private properties. The firebreaks along these properties will be reinforced; a pumper unit and/or fire-plow will be stationed nearby to expedite response time, if required. Gopher tortoises (*Gopherus polyphemus*) seem somewhat dependent on vegetation responses to fire, and research has shown no adverse effects on this species from prescribed burning (Means and Campbell 1981). Although individual tortoises may be destroyed by fire on rare occasions, prescribed burning provides better habitat for tortoise populations than unburned areas (J. Diemer, FGFWFC, pers. commun.). Growing season burning may affect various wildlife species that are highly active during this period. Moreover, growing season burns may also adversely impact other breeding patterns of reptiles, birds and mammals, particularly by fast-moving headfires. Consideration for summer burning will be given to areas having desirable burning conditions.

Growing Season Burning Procedure

Growing season prescribed burning is generally performed for site preparation and hardwood brush control. High air temperatures reduce the amount of heat needed to raise plant temperatures to lethal levels. Actively growing plants are more easily killed by fire than dormant plants, which results in better hardwood brush control than winter fires (Mobley et al. 1973, G. Evans, Tall Timbers Research Station, pers. commun.). In addition, growing season burns promote an increase in herbaceous vegetation growth, promote species diversity, release planted longleaf pine seedlings from vegetative competition, help control brown-spot disease and mimic naturally occurring summer lightning fires. Therefore, prescribed burning in the summer will be the preferred method on DLSCP with special attention given to wildlife and weather conditions. Growing season burns will be conducted during *April-September* with desired wind speed and relative humidity as appropriate. Fires in these areas will be used in conjunction with other land management practices.



Source : 2006 Volusia County True Color Aerials

Date : 08/16/10
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BURN UNIT MAP
DORIS LEEPER SPRUCE CREEK PRESERVE
VOLUSIA COUNTY, FLORIDA

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APPENDIX J:

Timber Assessment / Timber Plan

Doris Leeper Spruce Creek Preserve

Timber Assessment & Plan

Conducted and Written By:
Zev Cohen & Associates and Volusia County

Purpose

This document is intended to fulfill the forestry assessment requirement for the Doris Leeper Spruce Creek Preserve (DLSCP). The goal of this assessment is to evaluate the potential and feasibility of utilizing silviculture techniques to assist managers in achieving objectives at this facility.

General Information

Seventeen (17) ecological communities exist within the boundary of this property. These communities range from Scrub uplands to Blackwater Stream and various wetland and upland habitats in between. Some communities have been altered due to past land use.

To better understand timber management methods, knowledge of a few silviculture terms is useful. The cross sectional area (in square feet) of an individual tree measured four and one-half feet above the ground is its Basal Area (BA). Basal Area per acre is the sum of the Basal Area of every tree within a stand divided by the number of acres in the stand. It is used as a measure of a forested area's tree stocking and density. The diameter of an individual tree taken at this height (four and one-half feet above the ground) is referred to as its diameter breast height or DBH. This measurement is used in calculating the Basal Area and combined with height can determine volume of each tree. When the term Basal Area is used as a stand alone term, it is referring to the Basal Area per acre of a stand.

Slash pine exhibits very fast height growth averaging 3 feet annually until about age 9, after this age growth begins to stall due to competition within the stand. More than half of the annual height growth (52%) is completed by April of each growing season. Diameter growth is affected by stand density about 5 years after seeding. Mean annual diameter growth for the first 20 years is about ½ inch for a density of 194 trees per acre. Between the ages of 5 and 9 tree diameter growth drops about 56 % with this density (Bennett, Frank 1963).

Restoration of longleaf pine within its former range is advocated by a number of public and private associations and by governmental agencies, and is advocated by Volusia County where mesic and xeric flatwoods occur. Some land managers desire to employ lower intensity management, particularly longer rotation ages, for which longleaf pine is well suited (Boyer 1990). Very little growth and yield modeling has been accomplished with longleaf pine plantations. The only existing model is restricted to unthinned stands (Lohrey and Bailey 1977). There is however a large volume of data on growth and yield for naturally occurring and naturally regenerated longleaf pine (Goelz and Leduc) (Somers and Farrar 1991).

Fully stocked pine stands have enough trees per acre of a size large enough to utilize the growing space without causing over-crowding. Pine stands with 70 to 100 sq. ft. BA are considered fully stocked, although lower BA's are typically used in managing for natural pine flatwood stands (refer to County's Desired Future Conditions). It requires more, smaller diameter trees than it does larger diameter trees to equal one square foot of basal area. (For example: It takes 357 evenly spaced, six-inch diameter breast height trees per acre to equal 70 sq. ft. BA. Whereas, only 89 twelve-inch DBH trees per acre equals the same 70 sq. ft. BA.).

Pine plantations should be thinned when live crowns in the majority of the dominant and co-dominant trees have been reduced to approximately 1/3 of their total height. Simply, these stands should be thinned to 60 – 70 sq. ft. BA per acre each time they reach 100 sq. ft. BA per acre or more. This will help ensure a stand of vigorous healthy trees. An added benefit of opening up the canopy is that more sunlight will reach the forest floor increasing forage production for wildlife. Once the stand has reached maturity, it may be harvested, then planted or naturally regenerated. If prescribed fire is used prior to any thinning, it is recommended a winter burn be used to condition the stand and lower the chance of high mortality.

A variety of thinning methods can be utilized. Thinning options to consider are: normal thinning with relatively even spacing, group selection, group seed tree, or a combination of all three. Once the plantation becomes mature enough to produce seed, natural regeneration should become established without much difficulty.

One advantage of thinning is that the understory will regenerate the vegetation necessary to allow carry prescribed fire more safely and eliminate the potential for canopy fires. However, immediately after any kind of ground disturbance the area may be susceptible to invasion by exotic/invasive plant species. This is something to be especially concerned with in this part of Florida, and it is recommended that a plan be in place to address this potential problem prior to any harvest activities.

Tracts

Bolt Property: **Description**

The Bolt tract is a 230 acre tract consisting of coastal hydric hammock, mangrove swamp, maritime hammock, mesic flatwoods, salt marsh, and scrub. Only the scrub and mesic flatwoods are suggested for potential thinning. These areas are somewhat restricted in size on the site and only the mesic flatwoods, which is quite restricted, has sufficient BA for harvest consideration.

Recommendation:

The site has moderately difficult access, primarily off of Art Center Avenue on the south boundary of the tract, which may have weight restrictions and is located adjacent to a residential subdivision, making transport to and from the site problematic. No thinning or harvesting of pine is recommended at this time.

Ground level clearing within the scrub and mesic flatwoods, through mechanical thinning is recommended. Following this thinning, the site should be evaluated for winter burns, and following these events, re-evaluated for potential silviculture activities.

Martin's Dairy: **Description**
The Martin's Dairy tract is approximately 665 acres in size and is comprised of several habitats including salt marsh, black water stream, impoundment, wet prairie, bottomland forest, mesic hammock, scrubby flatwoods, scrub, and improved pasture. The flatwoods and scrub habitats are areas with potential to utilize silviculture activities, and these habitats are abundant onsite. The pine stand density and BA are low overall, especially in the scrub community. The scrub has some remnant mature sand pine, but is primarily converting to an oak and Lyonia dominated scrub with little pine regeneration. The flatwoods communities contain several species of pines with large DBH, but low densities.

Recommendation:
For the scrub habitat, mechanical thinning of the shrub / subcanopy layer is recommended, followed by prescribed fire. As part of the thinning process, it is recommended to determine the viability of oak and Lyonia harvesting to assist in associated costs. There are several known Lyonia harvesting operations located in Volusia County. The likelihood of obtaining revenue from oak harvesting is low.

For the flatwoods habitats located west of the slough / creek that separates this parcel, it is recommended that the County commence coordination with Florida DOT to determine if access via the abandoned rest stop on I-95. Once access is obtained, it is recommended to conduct two winter burns prior to any growing season burn. For harvesting, commence harvest of non-longleaf pines to promote longleaf as the dominant pine in these habitats.

Rose Bay: **Description**
The Rose Bay tract is approximately 642 acres in size and is comprised of several habitats including maritime hammock, mesic flatwoods, salt marsh, scrubby flatwoods, wet flatwoods, and wet prairie.

Recommendation:
This is the only site in DLSCP with a sufficient BA to warrant pine harvest / thinning. However, it is not readily accessible by the equipment necessary to conduct the operation. The only access is from US Highway 1, and across a salt marsh. As the stand matures, it may become valuable enough to allow the necessary modifications to reach the timber stand. At this time, the stand is of sufficient BA, but individual trees are not large enough in DBH to warrant high enough value to overcome accessibility issues. This parcel should be re-evaluated if timber prices undergo any dramatic increase in price, or once the individual pines are of significant DBH (e.g., >24").

Sleepy Hollow: **Description**
This stand is about 20 acres of maritime hammock. Typical species are present throughout this tract and little timber management is necessary for optimal conditions.

Recommendation:
Management in this area will be limited to removal of exotic species encroachment. No burning or silviculture activities are recommended for this tract.

Turnbull: **Description**
The Turnbull tract is approximately 392 acres in size and is comprised of several habitats including salt marsh, mangrove swamp, maritime hammock, mesic flatwoods, scrubby flatwoods, scrub, and successional hardwood forest. The scrub and flatwoods communities east of the FEC Railroad do not currently have sufficient density or BA for harvest or thinning. Some areas of the flatwoods west of the FEC, including flatwoods extending onto publicly managed lands that are not under state ownership, do have sufficient BA for pine thinning.

Recommendation:
The scrub and flatwoods east of the FEC should be mechanically thinned, and burned when possible. The stand should be re-evaluated in five to ten years to determine if sufficient BA exists at that time to warrant silviculture operations. For areas west of the FEC, mechanical thinning of the understory/ groundcover, and repeated winter burns prior to any growing season burns are recommended. Thinning of extant pine stands are warranted here.

Prescribed Fire

Prescribed fire is an important tool for ecosystem management in Florida. Before European settlement, natural fires occurred at regular intervals on an average of two to five years. These fires reduced the fuel load, produced a seedbed for pine regeneration and released nutrients back into the soil. Prescribed fire, coupled with a well-planned timber harvest, is often the most economical and responsible method for conducting ecosystem management, and restoring areas back to natural conditions.

The major objective when prescribed burning in timber and overgrowth in natural areas should be minimal mortality of the trees. Historic natural fires caused very little tree mortality except in small seedlings because they burn mostly on the finer fuels of wiregrass and pine straw. For fire- suppressed ecosystems, a major regional conservation goal has been ecological restoration, primarily through the reinitiating of historic fire regimes. Unfortunately, fire reintroduction in long unburned stands can have novel, undesirable effects. When burning, even in mature timber, it must be kept in mind that not all fire is good. A hot fire may not initially kill trees, but will stress them enough to dramatically increase their susceptibility to insect and disease attack. This is especially true when combined with other stresses, such as drought or flood.

Many of the stands in DLSCP are long unburned stands. Therefore, mechanical clearing and winter burning are necessary in several areas prior to re-introduction of natural, growing season, fire regimes.

Economics

Timber sales are common practice in this region, and several pine silviculture plantations exist in the vicinity, west of New Smyrna Beach and Port Orange. With such readily available timber and large acreage available nearby, combined with the identified access difficulties noted above, revenue from timber sales is expected to be inconsequential. The best available opportunity at this time is the potential sale of Lyonia (known as dragonwood in the floral market) from Martin's Dairy.

Access

DLSCP maintains access gates providing entry point for each tract. Access to Martin's Dairy tract is from a County-maintained road and this tract has the best access. The west side of Turnbull also has readily available access. The east side of Turnbull and Bolt tracts only have access through a residential subdivision, which limits the load capacity of the trucks and the likelihood of successful large harvest operations. Rose Bay is only accessible across an existing, at-grade field road through a salt marsh. Access here would require roll out mats or aerial access. Each severely limits the viability of conducting silviculture on the tract.

Summary

DLSCP currently has limited acreage of timber stands in which silviculture treatments may prove beneficial to achieving the stated habitat restoration and management goals. It is possible to manage this area in such a manner to provide a more natural appearance, meet local objectives and produce limited revenue through timber harvests in the future. The revenue producing potential of the area is low. The most practical application of silviculture on this property is a tool in achieving forestry objectives and for reducing wildfire hazards.

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APPENDIX K:

Recreation Plan

1.0 INTRODUCTION

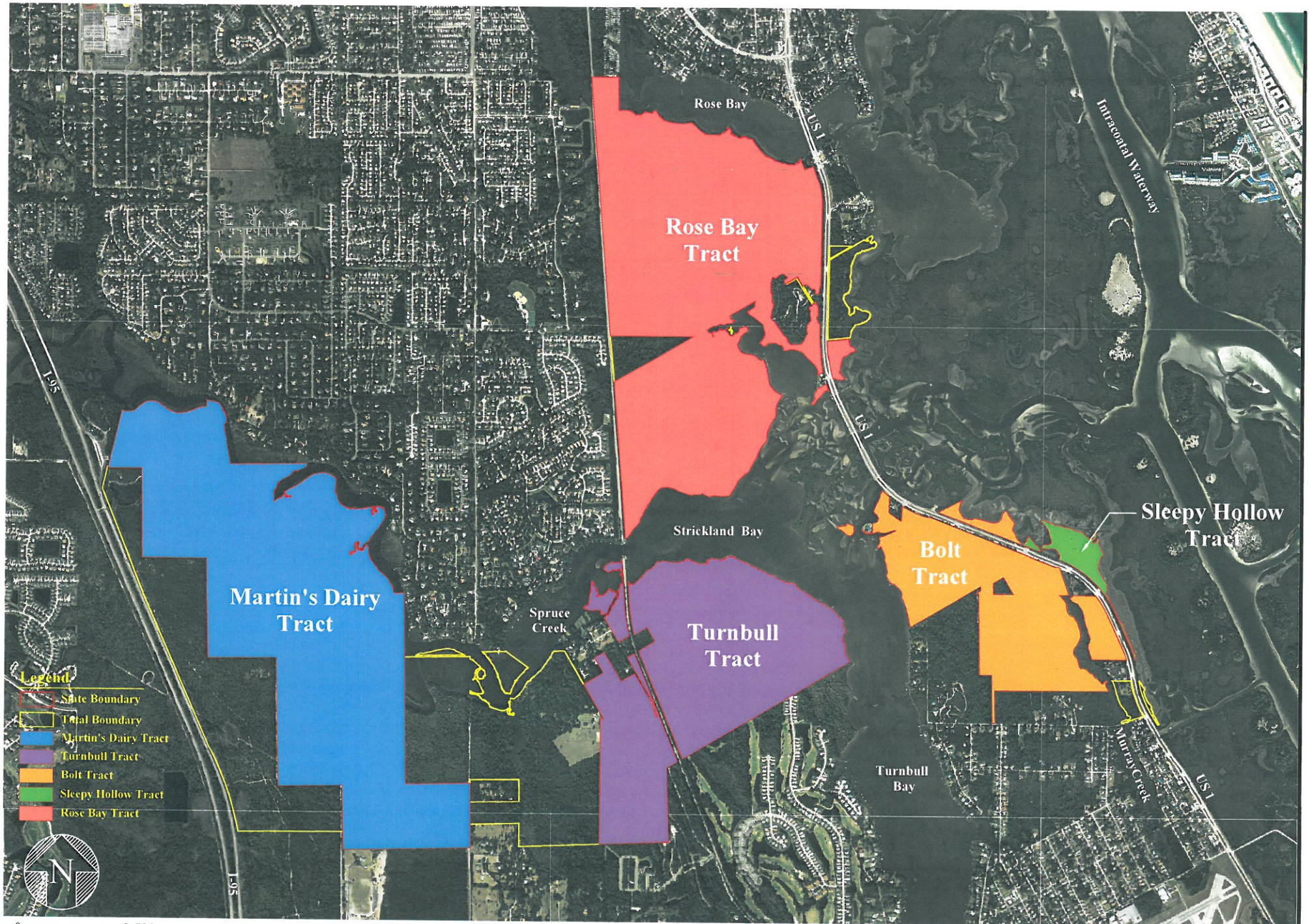
Doris Leeper Spruce Creek Preserve (DLSCP, Preserve) is a nearly 2,500 acre multi-habitat preserve managed by Volusia County. The Preserve provides public access and outdoor, resource-based recreational and educational opportunities to the public.

DLSCP consists of numerous parcels owned by various public entities. The total size of the Preserve under public ownership is 2,477 acres. Due to reasons outlined in the following section, the focus of this Recreation Plan is aimed at lands that are owned in full or part by the State of Florida (Board of Trustees of the Internal Improvement Trust Fund, or simply BOT). For the purpose of management, the County considers the entire Preserve as one complete managed area; however, regulations exist that require analysis of specifically owned parcels.

Thus, two levels of identification exist: The Preserve in its entirety (2,477 acres) and the state-owned lands portion of the Preserve (1,921 acres). Throughout this document, both levels will be discussed. The focus of this Plan is on those particular state-owned parcels, and unless otherwise noted, references are to the state-owned parcels. The exception is use of the word "Preserve" which will refer to the entire Preserve, regardless of ownership.

DLSCP is located in eastern Volusia County, approximately 8 miles southeast of Daytona Beach and 43 miles northeast of Orlando. The property lies within three (3) local jurisdictions: the City of Port Orange, the City of New Smyrna Beach, and Volusia County. DLSCP is generally bordered on the north by Spruce Creek and Rose Bay, on the west by Interstate 95, on the south by developed and undeveloped private residential lands, and on the east by US Hwy 1, although some parcels do occur east of US 1.

The Preserve consists of tracts separated by Spruce Creek, Strickland Bay, Turnbull Bay, Murray Creek, the FEC railroad and US 1. These features result in tracts that are somewhat disjunct in terms of connectivity and management. As such, the individual tracts are referred to by name and evaluated individually. Only state-owned lands are labeled and identified by tract; non-state owned lands are simply shown to occur within the overall boundary.



Recreation Master Plan

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Planning • Environmental Services • Transportation

2.0 PURPOSE AND SCOPE

This Recreation Plan is developed as a supplement to the overall unit Management Plan, which was governed by requirements of the Florida Statutes, Florida Administrative Code, and guidelines in the State Lands Management Plan. The particular regulations mandate that public lands held in title by the BOT, in full or in conjunction with other entities, must be evaluated to determine that the lands are being managed for the purpose of acquisition.

This document is intended to provide information on public access and outdoor recreation on the Doris Leeper Spruce Creek Preserve (DLSCP) as it relates to the two primary goals of acquisition; a) the conservation and protection of natural and historical resources and b) resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands.

This Recreation Plan includes establishing the goals and objectives that will direct land managers, an inventory of current recreational uses and facilities, planned future uses and a priority schedule for implementation. Facilities and capital improvements, whether existing or planned, are considered when discussing uses, as they are necessary to support the evaluated uses. All uses discussed within this Recreation Plan were evaluated in the overall unit Management Plan and are considered to be in concert with the stated objectives of the Management Plan, although some require specific conditions. For this assessment of all uses evaluated, please refer the Management Plan, Section III.

All planned infrastructure facilities or outlined in this document are subject to the granting of appropriate permits, easements, licenses, and other required legal instruments.

3.0 GOALS AND OBJECTIVES

The goals listed below are related to public access and outdoor resource-based recreation and education where compatible with the conservation and protection of the extant natural and cultural resources. Note that facilities and infrastructure are included, as these are necessary to support the public use element.

The public has been included in development of the specific goals and objectives for the Preserve. Public involvement has included a Public Hearing held at the Atlantic Center for the Arts (adjacent to the Bolt Tract) in New Smyrna Beach. The purpose of the hearing was to receive feedback on the overall unit Management Plan. This hearing was followed by a Management Plan Advisory Group (MPAG) meeting that reviewed the public input provided at the hearing and provided final recommendations for inclusion into the unit Management Plan and this Recreation Plan.

Goal 1: Facilities and Infrastructure

- *Develop and Maintain/Improve the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.*

The facilities and infrastructure are numerous and are supported by additional resources located on adjacent County-managed lands within the Preserve. For the purpose of DLSCP facility and infrastructure management, the County considers the entire managed area, regardless of ownership, as one complete unit. Overall, the facilities and infrastructure currently available and in operation are sufficient to meet the stated goal.

Specific Objectives RE Facilities and Infrastructure:

- Continue to monitor, maintain and relocate as necessary a system of multi-use trails
- Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands
- Construct, maintain and update signage, public parking areas, and kiosks
- Maintain gates at appropriate locations to regulate traffic and visitation
- Monitor existing facilities for illegal activities and vandalism
- Consider the development of additional facilities/infrastructure for security purposes
- Acquire additional land within the Optimal Boundary as funding allows

Goal 2: Public Access, Recreational and Educational Opportunities

- *Provide public access, recreational and educational opportunities.*

The Preserve provides recreational activities including mountain biking, equestrian access, hiking, birding, boardwalks, canoeing, fishing, pavilions and picnic areas, overlook towers, and restrooms. Additional resources, including canoe and kayak launches and/or landings, fishing piers, and overlook platforms are planned as funding becomes available but are not critical to meet the goals established here.

Objectives:

- Implement a Recreation Plan to include but not limited to:
  - Manage user groups / user impacts
  - Identify existing abuse
  - Provide enforcement (incl. methods)
  - Establish approved trail system / uses / locations
  - Provide for primitive camping
  - Provide canoe launch / landing
  - Erect educational and regulatory signage
  - Assess use mix / conflicts and mitigative measures
  - Assess potential resource (cultural and natural) impacts
  - Coordinate with partners / local jurisdictions
- Cooperate with other agencies, cities, stakeholders, to provide educational and recreational opportunities
- Educate the public on the presence of protected resources and the importance of preservation
- Monitor and maintain a system of multi-use trails
- Exclude off-road vehicle (ORV) use
- Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)
- Continue to support the Legacy Program

- Provide additional recreational and educational facilities as funding allows

4.0 EXISTING USES AND FACILITIES

In its current state, the Preserve provides numerous opportunities for public access and outdoor recreation and education. This includes trails for hiking, biking and equestrian use, expansive forests for observing natural ecosystems, native flora and fauna, access to waterways for fishing, kayaking and canoeing, and unique opportunities to observe historical features. The facilities are inventoried below, and are discussed and shown by tract in the Master Recreation Plan by Tract section.

The Preserve contains several miles of trails that traverse throughout the five state owned tracts and in some locations are interconnected to one another, or provided access via the adjacent, non-stated owned parcels. Access to multiple habitats, some of which are considered imperiled (such as the Florida scrub), topographic changes unique to the area, and scenic vistas are unlike any other in the region.

The waters within and surrounding the Preserve are popular for canoeing, kayaking, recreational boating and fishing. These waters also provide nature enthusiasts an alternative viewpoint for observing wildlife that utilizes the estuarine shorelines and aquatic habitats. Spruce Creek has been recognized as State paddling trail by DEP's Office of Greenways and Trails (the Spruce Creek Paddling Trail brochure is attached). Spruce Creek is also listed by the State as an Outstanding Florida Water (OFW) and has a designated Riparian Habitat Protection Zone, both of which provide for greater protection from runoff pollutants from upstream sources and development along the river.

Hunting is prohibited on the Preserve at this time. The County plans to coordinate with the Florida Fish and Wildlife Conservation Commission on this topic. Any changes to the current program will be considered based on their analysis and recommendations.

Another opportunity for resource-based recreation is presented by the ability to observe a site on the Martin's Dairy tract which is listed the National Historic Register - the Spruce Creek Mound. Additional program information is to be developed and utilized for this resource as an interpretive site for the cultural resources in the area. In general, and in conformance with state regulations, the locations of the archaeological resources are not provided to the public in order to protect the resource. The Spruce Creek Mound is the primary resource that is made available for educational use.

Revenue is not generated via access, recreational or educational opportunities. The County does obtain nominal revenue for group camping on the adjacent Spruce Creek Park.

Below is a summary of uses and related facilities and capital improvements that exist on DLSCP.

Table 1. Inventory of Doris Leeper Spruce Creek Preserve Public recreational and access facilities, February, 2011.

Current Use / Infrastructure	Tract				
	Martin's Dairy	Turnbull	Bolt	Sleepy Hollow	Rose Bay
Access Point	1	1	1	1	2, 1*
Parking	1		1	1	1*
Access Gate	1	2	4	1	2, 1*
Information Kiosk	1				3*
Trails**(H,B,E)***	H B E	H B E	H B	H	H B
Pavilion	1****			1	1, 1*
Boardwalk					1
Observation Tower					1
Camp Sites (Special use – permit required)					17*
Fishing Access			2	1	1*
Canoe/Kayak Landing/ Launch					1*
Picnic Area					24*
Playground					1*
Restroom					2*
Historic Site Open to Public	1				

*Located on adjacent Spruce Creek Park for Rose Bay;
***H,B,E = Hiking, Biking, Equestrian. Vehicle trails are for staff and approved use only. Equestrian use on Turnbull is for the west portion only
****Located on adjacent public land between Turnbull and Martin's Dairy Tracts

Updates to this table in subsequent years will provide easy tracking for accomplishments achieved by the County.

5.0 CHALLENGES AFFECTING MANAGEMENT

An important focus here will be conducting public meetings with the user groups and provide more interface between the managing agency and the user groups.

This section focuses on discussion items that affect management and implementation of the Recreation Plan. The issues listed have been discussed in various places throughout the Management Plan and this Recreation Plan, and are provided here to ensure attention is paid to these details or comments that may otherwise be lost amongst the vast data provided elsewhere.

Periodic closures to the public: Notify users via signage, meetings, and/or website on area closures / trail re-routing during habitat restoration projects. Educate the public on schedule of events, reasons for restoration, estimated re-opening dates and follow up information on the results of the restoration.

Protected and/or rare species: The presence of listed species provides environmental education opportunities for the general public. However, user group management is an important component of these species continued existence or restoration efforts. Identification of the protected species and notification that they are protected by law, and an important part of the ecosystem should be a major point of education as it relates to these species. This education can be accomplished through kiosks, brochures, and/ or internet resources made available to user groups. Warnings against the taking of these or any wildlife species should be included in such educational materials. An example would be a kiosk display about scrub-jays that would display the importance of the habitat restoration practices that require occasional area closures to restore habitat for this federally endangered species. This should include what the current scrub habitat looks like and what it is intended to look like in the managed condition.

Archaeological and cultural resources: To protect archeological and cultural resources, the County does not provide the general public with information regarding location of these sites, with the exception of Spruce Creek Mound, where an interpretive kiosk is planned. Protection of these identified cultural resources is a key management objective for the Preserve. Interpretation of this resource along with the other lesser mounds and shell middens scattered through the surrounding areas is a key component to the educational programs proposed for the Preserve.

Erosion control and resource impact issues: During the planning of recreational activities slope is a more important concern than actual elevations with regards to minimizing ecological impacts. On the project site, the steepest slopes are associated with bluff areas in the western portion of the project site (primarily the Martin's Dairy tract). Multi-use trails, especially equestrian and bike trails, proposed in proximity to these areas should be field verified to avoid excessively sloped areas. This will minimize sedimentation and erosion problems in the future and protect surface water quality. Existing trails are used by these groups, but the appropriateness of the trail locations have not been evaluated by the County. The most commonly used trails, especially on Martin's Dairy, were largely created by user groups.

6.0 PRIORITY SCHEDULE FOR IMPLEMENTATION

The short and long term goals established in the unit Management Plan, along with their designated priority levels were used to develop a Priority Schedule. The schedule is divided into three chronological sections; 1-2 years, 2-5 years, and 6-10 years. The schedule will be used to prioritize expenditures related to capital facility improvements. Objectives may occur prior to the schedule as funding or other opportunities arise.

Schedule of Events Years 1 -2:

Goal / Objectives		Parameter(s)
1	**Facilities and Infrastructure**	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring, ongoing task
	Monitor existing facilities for illegal activities and vandalism	Recurring, ongoing task
2	**Public Access, Recreational and Educational Opportunities**	
	Educate the public on the presence of protected resources and the importance of preservation	Kiosk and website information
	Exclude off-road vehicle (ORV) use	Recurring, ongoing task
	Continue to support the Legacy Program	Recurring, ongoing task

Note that construction of new facilities or improvements is not proposed for the first two years on State owned land. Public access and recreation is currently adequate to meet the objectives of the Management Plan and habitat restoration is deemed the most critical item for expenditures at this time.

Schedule of Events Years 3-5:

Goal / Objectives		Parameter(s)
1	**Facilities and Infrastructure**	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task
	Construct, maintain and update signage, public parking areas, and kiosks	Provided on an as-needed basis
	Maintain gates at appropriate locations to regulate traffic and visitation	Provided on an as-needed basis
	Monitor existing facilities for illegal activities and vandalism	Recurring task
2	**Public Access, Recreational and Educational Opportunities**	
	Cooperate with other agencies, cities, stakeholders, to assist with the development of educational and recreational opportunities	Host public meeting
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Kiosk, website information
	Continue to support the Legacy Program	Recurring task

The primary task within the 3-5 year time period, besides ongoing tasks, is to conduct another public meeting (note a Public Hearing was previously conducted to review the Draft Management Plan). The purpose of this meeting will focus on gathering information from the user groups of the Preserve regarding specific details. This will include such items as final location of approved trails, uses allowed on trails and/or tracts, general comments/ input of the user groups and input on the order and location of proposed new facilities in the following 5 years.

Schedule of Events Years 6-10:

Goal / Objectives		Parameter(s)
1	**Facilities and Infrastructure**	
	Continue to monitor, maintain and relocate as necessary a system of multi-use trails	Recurring task
	Continue to use existing facilities on adjacent County managed lands for support of DLSCP state-owned lands	Recurring task
	Construct, maintain and update signage, public parking areas, and kiosks	Install remaining kiosks; signage
	Maintain gates at appropriate locations to regulate traffic and visitation	Recurring task
	Monitor existing facilities for illegal activities and vandalism	Recurring task
	Consider the development of additional facilities/infrastructure for security purposes	TBD
	Evaluate the potential for-additional land acquisition within the Optimal Boundary as funding allows	As funding allows
2	**Public Access, Recreational and Educational Opportunities**	
	Implement a Recreation and Land Use Concept Plan	Update inventory; determine priority for development / implementation; develop at least 1 water landing / access
	Cooperate with other agencies, cities, stakeholders, to assist with the development of educational and recreational opportunities	Conduct 1 public meeting – status update
	Monitor and maintain a system of multi-use trails	Recurring task
	Exclude off-road vehicle (ORV) use	Recurring task
	Provide and enhance interpretive/education programs (i.e., website, kiosk, guides website)	Update as necessary
	Continue to support the Legacy Program	Recurring task
	Provide additional recreational facilities as funding allows	Develop at least 1 water landing, as funding allows

New construction of facilities is considered to be a long term, low priority for the State owned lands of the Preserve. This is due to a number of factors including the immediate need to undertake habitat restoration activities, the limited funds available for management of the Preserve vs. the relatively high cost of habitat restoration and ongoing management, and the fact that access and recreation is considered sufficient at this time.

It is anticipated that the intensity of restoration efforts will be less in the 6-10 year range, than in the first 5 years following the development of the Management Plan. Thus, within this longer timeframe, the County plans to install at least one new facility, targeting a water landing / access point. Additional items beyond regularly recurring events include completion of any remaining kiosks and another public meeting to evaluate existing uses and desires at the time. The meeting should include an evaluation of how items have been implemented since the last meeting conducted (in the 3-5 year timeframe).

7.0 MASTER RECREATION PLAN BY TRACT

Following the direction of the objectives identified above, a Conceptual Recreation Plan has been developed. The Plan is depicted on aerial photographs and shows the overall Preserve and then provides details regarding each tract. The information was color coded to distinguish between existing site features and uses (in white text) and future, planned uses and features (orange text).

Tract Name: Martin's Dairy:

Description: The Martin's Dairy tract is approximately 665 acres in size fronting Spruce Creek it features the largest topographic change within the Preserve. It is comprised of several habitats provides access to scenic vistas and bluffs that overlook Spruce Creek. The diversity of habitats, from water to scrub, presents conditions favorable to view diverse flora and fauna with limited time or effort. This site also contains Spruce Creek Mound which is listed on the National Register of Historic Places; an interpretive kiosk is planned for this location. Educational information is provided at the kiosk located at the Martin's Dairy Road entrance.

Acreage: 665

Location: Southwest of Spruce Creek

Access: Vehicular via Martin Dairy Road
Connector trails from adjacent public lands

Current Hours of Operation: Sunrise to sunset – parking area not gated.

Existing Recreational Uses: Hiking, biking, and equestrian use.

Planned Additional Recreational Uses: Group camping, bluff viewing platform, water landing / access point

Parking: Yes – north end of Martin Dairy Road

Habitats: salt marsh, blackwater stream, bottomland forest, wet prairie, impoundment, mesic hammock, pasture, scrubby flatwoods, scrub

Potential impacts / mitigative measures:

- Erosion on bluffs / trail relocations and closures, develop overlook and/or landing
- Resource impacts / monitor trails and use, finalize trail locations and uses associated with each, develop primitive campsite that includes waste containers and signage, require permits
- Illegal dumping activities – gated access and monitoring by staff
- Spread of invasive species – monitoring by staff, early detection rapid response, evaluate further restrictions should introduction(s) be attributable to specific uses

Comments: The natural features, in combination with the extensive trail system, make this tract one of the most used on a daily basis. This area will face closures during habitat restoration efforts and may require significant public notice and involvement.

Martin's Dairy Tract

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Tract Name: Turnbull:

Description: The Turnbull tract is approximately 392 acres in size fronting on Strickland Bay. This tract is really divided into two separate tracts, east and west of the FEC railroad. The eastern tract is only open via special events or coordination with County. The western tract is open daily and provides vehicular access, parking and connection to adjacent public lands.

Acreage: 392

Location: South of Strickland Bay, north of Turnbull Bay Country Club.

Access: East tract: Limited vehicular via Turnbull Estates Drive (inside Turnbull Bay Country Club). Can be accessed by water, but no approved landing exists.
West tract: vehicular via Creekshore Trail and connector trails from adjacent public lands.

Current Hours of Operation: East side: Only by prior arrangement,
West side: (via Creek Shore Trail) 8 AM to sunset.

Existing Recreational Uses: East Side: none
West Side: Parking, (vehicular and equestrian),

Planned Additional Recreational Uses: A potential water landing, located at the northern end of the east tract. Will include canoeing, kayaking, hiking and primitive camping.

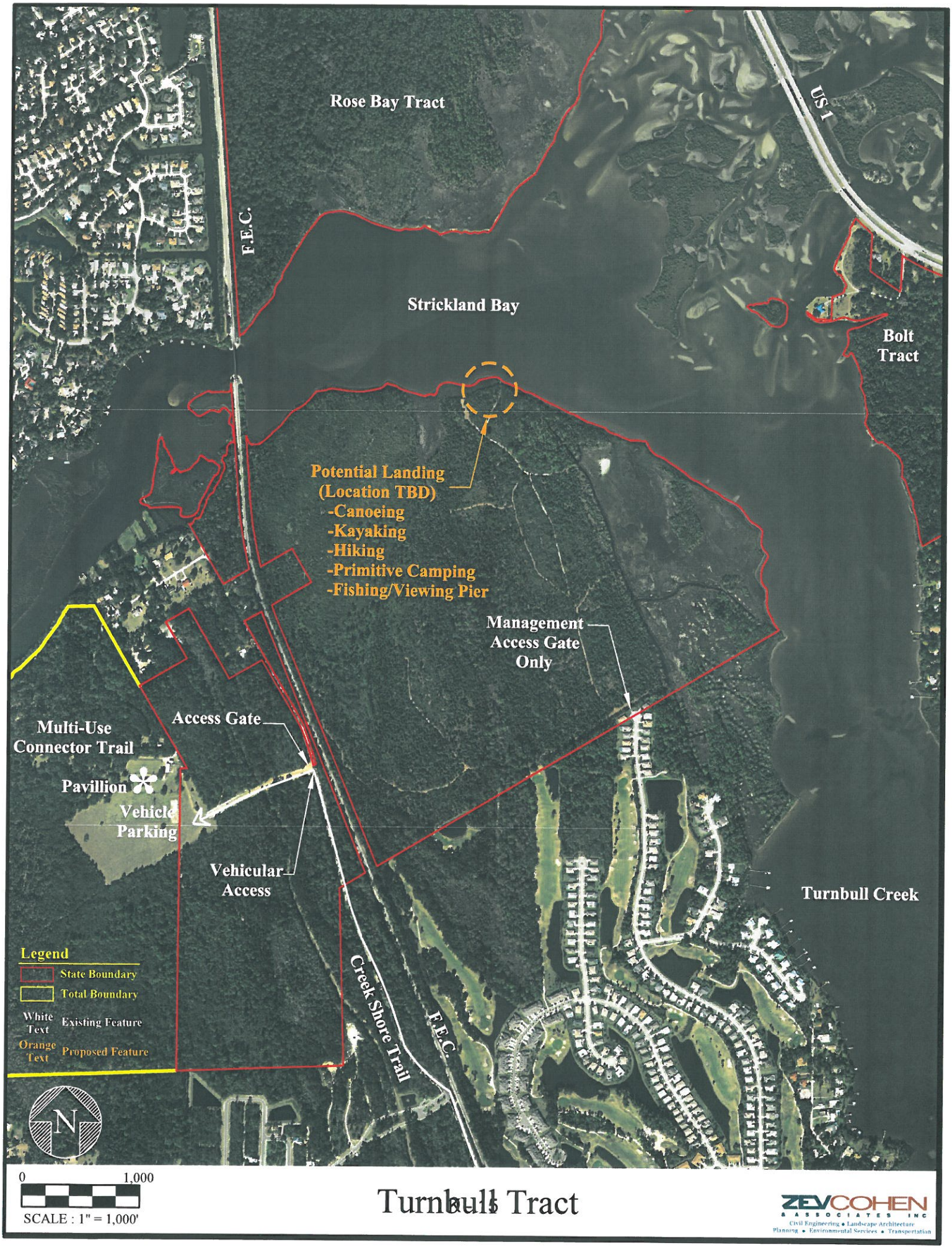
Parking: Gated: The most southwesterly portion of the site (west of the FEC) provides opportunity for vehicular and equestrian trailer parking

Habitats: salt marsh, mangrove swamp, bottomland forest, successional hardwood forest, improved pasture, mesic hammock, mesic flatwoods, scrubby flatwoods and scrub

Potential impacts / mitigative measures:

- Erosion on shoreline / develop canoe landing
- Resource impacts / limited access, develop primitive campsite that includes waste containers and signage, require permits
- Illegal dumping & ORV use / limited access
- Illegal activities – gated access and monitoring by staff

Comments: Tract is split by FEC railroad, East has no access. Water access to east tract is planned for long term implementation. West is contiguous with non-state owned lands and is used for parking, equestrian use and hiking.



Turnbull Tract

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Tract Name: Bolt Property:

Description: The Bolt tract is a 230 acre tract adjacent to US 1, Turnbull Bay and Murray Creek. The northern portion of the site, on the south side of US 1 is heavily used. A single family residence is located in this location as well, adjacent to the west side of this recreation area, adjacent to the water. The site contains an impoundment which has converted naturally to a salt marsh system, and has enough deep sections to allow access by canoe/ kayak.

Acreage: 230

Location: South and east of Turnbull Bay, primarily west of US 1, split by Murray Creek.

Access: Vehicular: via US 1

Current Hours of Operation: via the north end gate – open 8 AM closes 4:30 PM.

Existing Recreational Uses: Picnic, parking, fishing, canoeing

Planned Additional Recreational Uses: None beyond existing

Parking: Available at north end, access from US 1

Habitats: salt marsh (includes impoundment), mangrove swamp, coastal hydric hammock, maritime hammock, mesic flatwoods, scrub and developed

Potential impacts / mitigative measures:

- Erosion on shoreline / hardened shore exists
- Resource impacts / limited access
- Illegal dumping & ORV use / limited access
- Illegal activities – gated access and monitoring by staff

Comments: Residentially developed portion on the north end and an important water access.

Tract Name: Sleepy Hollow:

Description: This tract is about 20 acres of maritime hammock fronting US 1 and ICW tributaries. The site includes a paved strip of old US 1, parking and a pavilion.

Acreage: +/- 20

Location: South of Spruce Creek, East of US 1

Access: Gated, vehicular via US 1,

Current Hours of Operation: 8 AM to 4:30 PM (Gated)

Existing Recreational Uses: Fishing, covered pavilion for picnicking, parking

Planned Additional Recreational Uses: Water access launch, trail

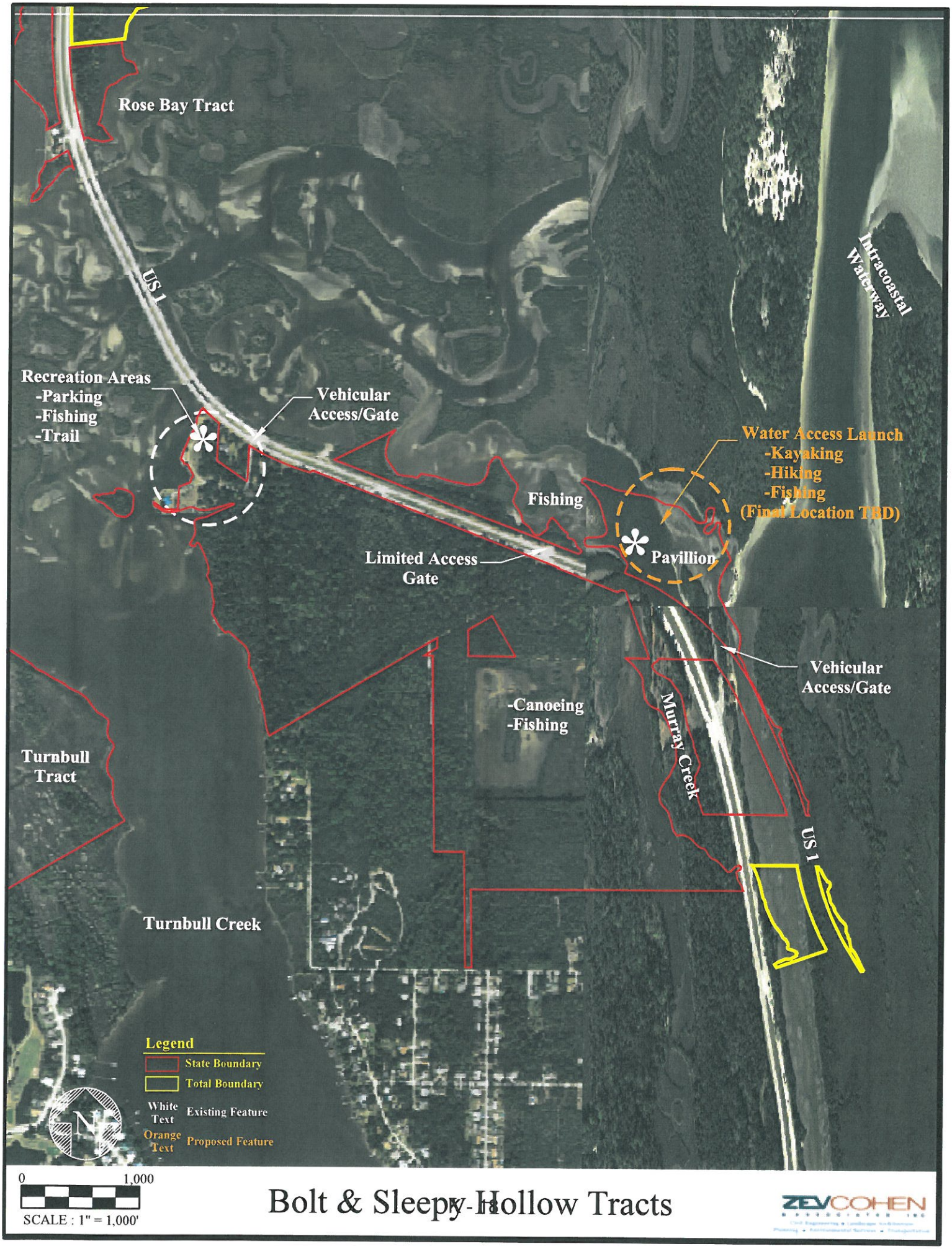
Parking: Yes

Habitats: Maritime hammock, mangrove swamp

Potential impacts / mitigative measures:

Erosion on shoreline / develop launch or landing facility
Resource impacts / control access via trail management and signage
Illegal activities – gated access and monitoring by staff

Comments: Contains portion of old US 1, paved entrance, grass parking. This will be a prime location for a water access/ canoe launch as it is easily accessible to the public.


Rose Bay Tract
US 1
Intracoastal Waterway
Recreation Areas
-Parking
-Fishing
-Trail
Vehicular Access/Gate
Water Access Launch
-Kayaking
-Hiking
-Fishing
(Final Location TBD)
Fishing
Limited Access Gate
Pavillion
Vehicular Access/Gate
-Canoeing
-Fishing
Murray Creek
Turnbull Tract
US 1
Turnbull Creek
Legend
State Boundary
Total Boundary
White Text Existing Feature
Orange Text Proposed Feature
N
0
1,000
SCALE : 1" = 1,000'
Bolt & Sleepy Hollow Tracts
ZEVCOHEN

Tract Name: Rose Bay:

Description: The Rose Bay tract is a 642 acres tract adjacent to Rose Bay (to the north) and Strickland Bay (to the south). The portion east of the salt marsh has approved trails and multiple uses. This site is well supported by the adjacent Spruce Creek Park.

Acreage: 642

Location: South of Rose Bay, North of Strickland Bay

Access: Vehicular from US 1 via adjacent Spruce Creek Park.

Current Hours of Operation: 7:00 AM and closes at sunset.

Existing Recreational Uses: Canoeing/kayaking (launch is provided from Spruce Creek Park), fishing, boardwalks, lookout observation tower, pavilion and multi-use trails.

Planned Additional Recreational Uses: Provide final approved trail in western forested area.

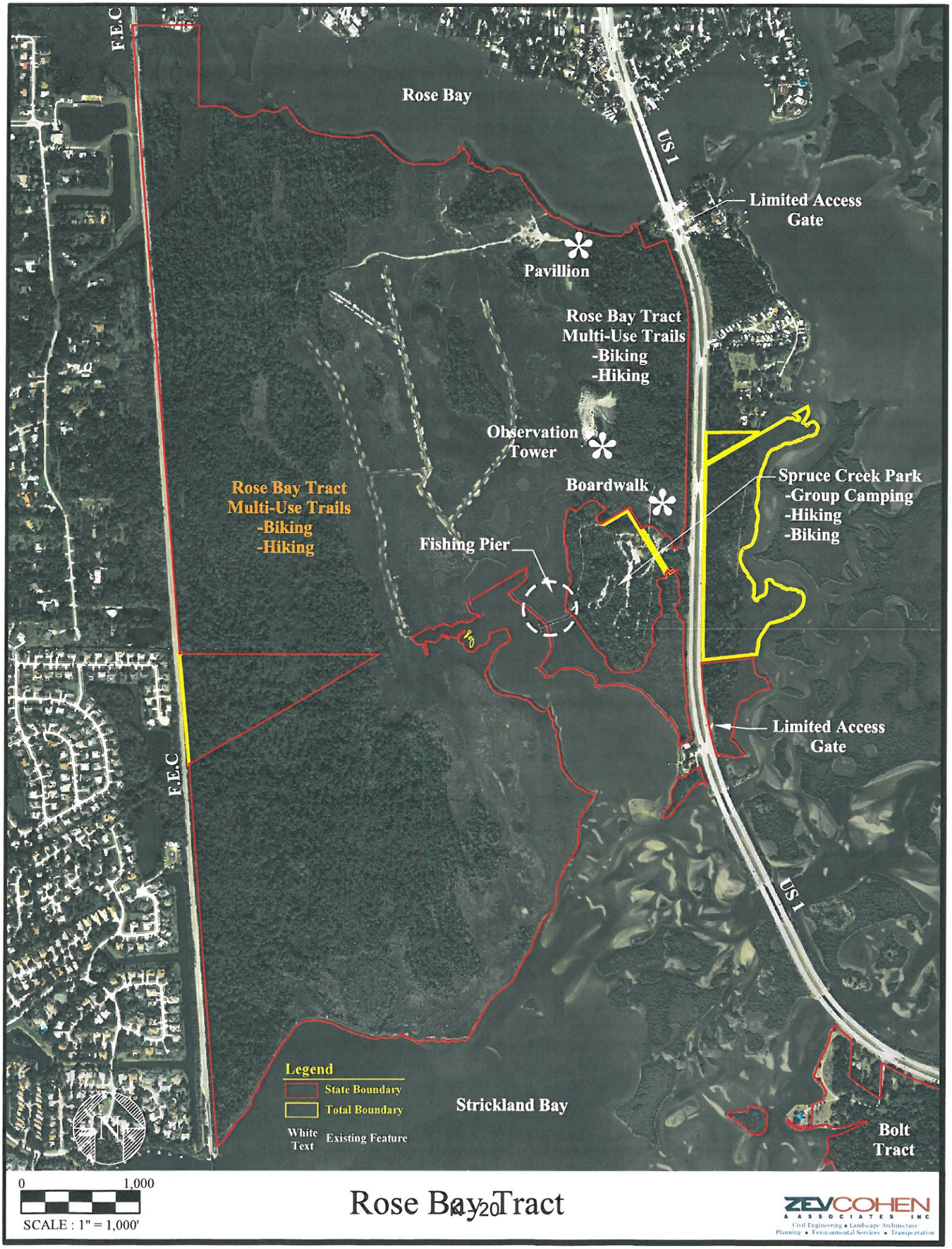
Parking: Offsite at Spruce Creek Park

Habitats: Salt marsh, mangrove swamp, wet prairie, wet flatwoods, mesic flatwoods, scrubby flatwoods, mesic hammock, clearing (proposed wetland restoration area).

Potential impacts / mitigative measures:

- Erosion on shoreline from canoe launch or landing / a specific access point is provided on Spruce Creek Park
- Resource impacts / establish final trail locations and signage
- Illegal dumping activities – gated access and monitoring by staff

Comments: Flatwoods west of salt marsh has infrequent visitors/use. A management access field road crosses the salt marsh into the western flatwoods. This is occasionally utilized by hikers, but is not a currently approved trail.



Rose Bay Tract

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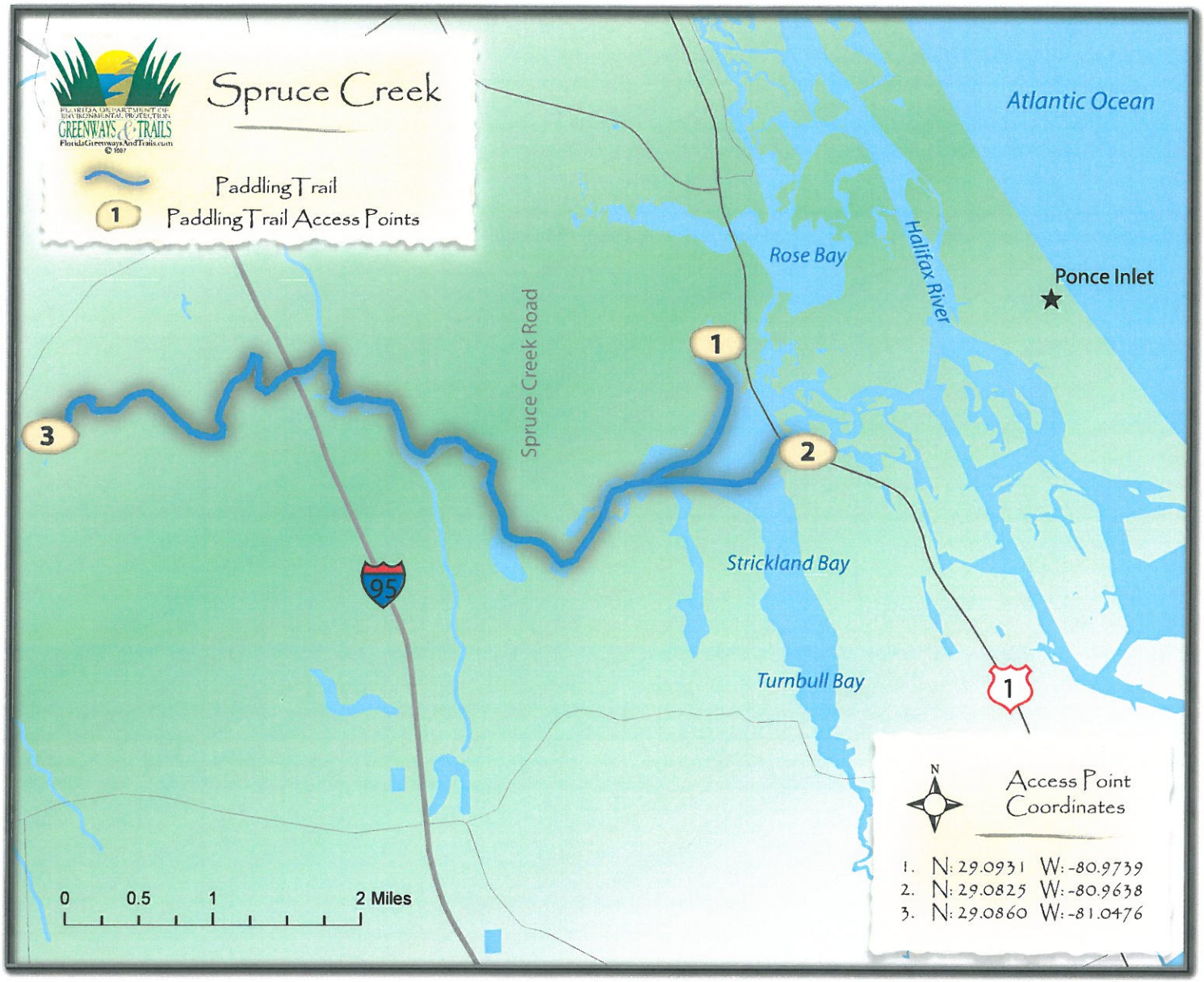
Spruce Creek Paddling Trail



Spruce Creek Trip Planning

County: Volusia **Nearest towns:** New Smyrna Beach, Daytona Beach

Trip length: 16 miles round trip **Difficulty:** Easy

Skill level: Beginner

**The provided mileage data is approximate (rounded to the nearest 0.5 mi) and shouldn't be relied upon for navigation.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION GREENWAYS & TRAILS FloridaGreenwaysAndTrails.com

-Continue-

(Access Point 1) Put-in: Launch from Spruce Creek Park only at high tide. Because of deep mud, the ramp is unusable at low tide. Strickland Bay Bridge or Spruce Creek Outfitters can be accessed at any tide. The trip is the same distance, regardless of access choice.

Nearest town to put-in: New Smyrna **Miles from put-in:** 5

Directions to put-in at Spruce Creek Park: Take Dunlawton Avenue (SR421) east from I-95 interchange. Turn south on Nova Road (Hwy 5A) then south on US 1 for about one mile to Spruce Creek Park

(Access Point 2) Directions to put-in at Strickland Bay bridge: From the intersection of SR 44 and US 1 in New Smyrna travel north on US 1 4.8 miles. Look for a small, sandy beach on the east side of US 1, at the south end of the bridge.

(Access Point 3) Turn around point of round-trip

Take-out: Same as Access Points 1 and 2

Directions to take-out: Same as Access Points 1 and 2

Topo maps (USGS quads): Samsula, New Smryna Beach

Gazeteer page: 75

Outfitters within 5 miles of trail:

Spruce Creek Outfitters
6296 U.S. Hwy. 1
Port Orange, FL 32127
(386)-763-9417

Shuttle service offered: No

USGS link (water level info):
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=02248053&PARAmeter_cd=00065,00060

Tide info:
http://tbone.biol.sc.edu/tide/tideshow.cgi?site=Ponce+de+Leon+Inlet+%28inside%29%2C+Florida

Break / Lunch areas: None

Camping options: Spruce Creek Park has campsites but there is no camping along the river

Other lodging: There are numerous hotels in the Daytona Beach/New Smyrna area

Food/Beverage restrictions: None

What to expect on the river:

Tidal influence: Yes, check tide conditions prior to picking launch site

Pull-overs: None

Low branches: None

Narrow water: None

Shallow water: Numerous oyster bars at low tide near Strickland Bay

Strong currents: Possible with tides

Rocks: None

Houses: Numerous

Shoals: Oyster bars

Tight turns: None

Open water: Strickland Bay crossing to Spruce Creek

Springs: None

Potable water sources: Spruce Creek Park and Spruce Creek Outfitters

Wildlife: Numerous birds

Natural communities: Floodplain swamp, hydric hammock, freshwater marsh, salt marsh, mangroves

Portages: None

Swimming: At your own risk

Motorboats: May be heavy on weekends and holidays

Expect at parking Spruce Creek Park:

- **Parking fee:** No
- **Bathrooms:** Yes
- **Hours of operation** (gates close): Sunrise to Sunset
- **Camping:** Yes , visit: http://echotourism.com/parks/camp.htm
- **Camping fees:** Yes, contact (386)-322-5133
- **Crowds:** Varies with holidays, weekends
- **Boat Ramp:** No
- **Potable water source:** Yes
- **Canoe/kayak launch:** Yes

Expect at parking Strickland Bay Bridge

- Unimproved sandy boat launch in parking area at east side of the bridge, no amenities

Cultural and historical features along the trail:

Historically, a large indigenous Native American habitation was nestled around the Spruce Creek basin. A large prehistoric earthen works, the Spruce Creek Mound, is located on the creek. The site functioned as

a major ceremonial and political center for the Timucua Indians. Lesser mounds are scattered throughout surrounding areas.

Notes:

From the sandy beach launch area at the Strickland Bay Bridge on US 1, go under the bridge and paddle west through Strickland Bay towards a railroad bridge at the entrance of Spruce Creek. Nestled under tall pines just northwest of the US 1 Bridge, Spruce Creek Park has rest rooms, picnic tables, nature trails and a camping area. There is a canoe launch next to the park's fishing pier, however boats must be dragged quite a distance and it is unusable at low tide (too much mud). It is much easier to launch from the sandy beach off of US 1.

There are many oyster bars exposed at low tide in the bay between Strickland Bridge and the railroad bridge that marks the entrance of Spruce Creek.

APPENDIX L:

Land Management Review and Manager's Response

Land Management Review of

Doris Leeper Spruce Creek Preserve

Lease No. 4195

February 20, 2007

Prepared by Division of State Lands Staff

Keith Singleton, Land Acquisition & Management Planner
Cindy Morris, Administrative Assistant

For

Doris Leeper Spruce Creek Preserve Review Team

FINAL

June 19, 2007

Land Manager:	Volusia County
Area:	1903.49
County:	Volusia
Mgmt. Plan Revised:	2/13/2001
Mgmt. Plan Due:	2/13/2011

Management Review Team Members

Agency Represented	Team member Appointed	Team member In attendance
DOF	Bill Korn	Bill Korn
DEP District	Jennifer Cotch	Jennifer Cotch
FWCC	Mike Orlando	Mike Orlando
Private Land Manager	Alan Alshouse	Alan Alshouse
Conservative Org. (NPS)	Ray Jarrett	Ray Jarrett
SWCD	Michele Moen	Michele Moen
County	Dot Moore	Dot Moore
Observer (FNAI)	Carolyn Kindell	
Observer (DHR)	Mike Wisenbaker	
Observer (FDEP)	Greg Jubinsky	
Volusia County	Julie Scofield	
Volusia County (LAM)	Mark Rizzo	
Volusia County (LAM)	Randall Sleister	
Volusia County	Tim Baylic	

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 team findings is given to the managing agency under review, the Acquisition and Restoration Council, and the Governor and Cabinet and made available by site on the web at www.dep.state.fl.us/lands/landmgt/maps/default.htm .

Review Site

The management review team for Doris Leeper Spruce Creek Preserve considered approximately 1903.49 acres in Volusia County that are managed by Volusia County. 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 management plan update is due on February 13, 2011.

Review Team Determination

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

After completing the checklist, team members were asked to answer "yes" or "no" to this question. Six team members agreed and one disagreed Doris Leeper Spruce Creek Preserve is being managed for the purpose for which it was acquired.

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

After completing the checklist, team members were asked to answer "yes" or "no" to this question. Five team members agreed Doris Leeper Spruce Creek Preserve is not in compliance with the management plan. Two team members agreed Doris Leeper Spruce Creek is in compliance with the management plan.

Commendations to the Managing Agency

1. The team commends the County for their invasive exotic plant inventory, mapping, and treatment efforts at the Spruce Creek Preserve that has achieved maintenance condition. (VOTE 5+, 0-)

2. The team commends the County for their continued proactive acquisition of outparcels, inholdings and adjacent lands to the preserve. (VOTE: 5+, 0-)

3. The team commends the County and local school board for the extensive educational outreach programs at the preserve. (VOTE 5+, 0-)

4. The team recognizes that the cultural resources at this site are of national significance. The team commends the County for its ongoing inventory and protective efforts for the highly significant cultural resources at the preserve. (VOTE 5+, 0-)

Exceptional Management Actions

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

Exceptional management actions:

- Management of the mesic hammock, tidal marsh/mangrove, floodplain forest, upland mixed forest and mangrove communities.
- Control of invasive animals and plants.
- Maintenance of roads and culverts, ditches, hydro-period alteration and water-level alteration.
- Monitoring of the surface water and boundary survey and equipment.

Recommendations and Checklist Findings

The management plan must include responses to the recommendations and checklist items that are identified below.

Recommendations

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

1. The team recommends that the County establish systematic annual monitoring of all known archaeological sites on the property, including photographic documentation and GIS mapping. (VOTE: 5+, 0-)

Manager's Response: There are 33 known archaeological sites (all documented in the Florida Master Site Files) located within the boundaries of the preserve. Those sites with more frequent visitor access are frequently monitored for natural and man-made impacts. (To protect these resources, it is our policy not to provide the general public with information regarding location of these sites, with the exception of the Spruce Creek Mound Complex, where an interpretive kiosk is planned.) The more remote sites are routinely monitored and documented.

The management review team specifically commended the County for its stewardship of the significant cultural resources found on the Preserve.

2. The team recommends that the County treat protection of environmentally sensitive and archaeological sites as the main priority in determining public recreational use of the property. (VOTE: 5+, 0-)

Manager's Response: Situated amid an urban/suburban area experiencing significant growth pressures, there presently exists a significant demand for access and use by the public to the Preserve. As the adjacent region continues to grow, it is anticipated that the demand by the public for access to the Preserve will dramatically increase.

Addressing this demand in a responsible manner that ensures proper stewardship of the Preserves' environmental and archaeological resources will be a continuing challenge.

The protection and preservation of the sensitive environmental and cultural resources (archaeological sites) of the Preserve will remain the fundamental goal guiding management of the Preserve. The Preserve is regularly monitored to identify adverse impacts associated with public use, and where necessary, formulate and implement mitigating or corrective measures.

For example, particular effort has been focused on the Spruce Creek Mound Complex (8VO099) which is listed on the National Register of Historic Places. ***Prior*** *to Volusia County's management, the Spruce Creek Mound Complex was seriously impacted. Early 20th century archaeologists actually excavated here, preceded and followed by pot hunters through the years. In modern times,* ***prior*** *to public ownership/management, it was used "unofficially" as a bike "ramp." Under Volusia County management this site has been successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. There has been no discernable impact to this site since the fencing was installed, and this site is regularly monitored. A plan is in place to stabilize the site by introducing sterile fill on top of a barrier cloth, and remove damaged trees. This plan has been discussed in the field with Bureau of Archaeological Research (BAR) staff who concur with this strategy.*

There are 33 known archaeological sites located within the boundaries of the preserve. The vast majority of these sites were documented in the Florida Master Site Files as new sites by registered public archaeologists retained by local governments with field investigations and reports completed in 1986, 1989, 1990, 1996, 1997, 1999 and 2006. These studies have systematically addressed areas of most probable resources. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including frequent pedestrian traffic. Our general policy is not to provide the location of these sites to the public. This is a legitimate and effective tool to protect the sites in the more remote areas of the preserve from looting. We have also permitted the surrounding vegetation to camouflage these sites, making it more difficult for potential looters to locate the sites.

The Volusia County Historic Preservation Officer is a member of the management team, best management practices are applied, and we are in regular communication with staff at the Bureau of Archaeological Research (BAR), Division of Historical Resources (DHR) and Florida Public Archaeology Network (FPAN).

It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. However, these activities are to be offered in a way that is compatible with and furthers the over-arching strategy of providing proper protection of the Preserves' significant and sensitive environmental and archaeological resources.

3. The team recommends that the County develop a timber management assessment of the property. (VOTE: 5+, 0-)

Manager's Response: Although most of the acreage associated with Doris Leeper Spruce Preserve is not appropriate for timber harvesting, a timber management assessment for the remaining acreage will be developed and included as an appendix to the Management Plan Update.

4. The team recommends that the County establish an on-site county law enforcement presence on the Martin Dairy portion of the Preserve to improve protection of the site from illegal encroachments and vandalism. (VOTE: 5+, 0-)

Manager's Response: Volusia County Leisure Services maintains a residential caretaker lease agreement with a Volusia County Sheriff's Deputy. The duties of this individual, who resides within the Preserve, include patrolling Preserve grounds and to act a deterrent to vandalism. The County has expended approximately $50,000 to maintain the residence and surrounding grounds as part of this commitment to protecting the resources and users of the Preserve.

5. The team recommends that the County establish a county-appointed advisory group for this tract, made up of community and professional members, to provide advice and support for management decisions. (VOTE: 5+, 0-)

Manager's Response: Volusia Forever Advisory Board was created in 2001 to provide guidance for the acquisition and management of conservation lands county-wide. In order to provide the expertise of historic and cultural aspects to the site, the Historic Preservation Board will provide input to the Volusia Forever Advisory Board.

6. The management responsibilities for this site are divided across several County Divisions. The team recommends that the County evaluate the management responsibilities across Divisions to consolidate organizational functions and to ensure accountability for program accomplishments. (VOTE: 5+, 0-)

Manager's Response: The Department of Growth and Resource Management is the department with the oversight for Doris Leeper Spruce Creek Preserve. Within the Department, Leisure Services as well as Land Acquisition and Management provides staff to implement the management plan.

7. The team recommends that the County develop a scrub jay monitoring and habitat restoration plan for the Preserve. (VOTE: 5+, 0-)

Manager's Response: Scrub jay monitoring has occurred in the area of Martin's Dairy Road. in 2003 and 2005. At that time it was estimated that two families existed in the area. In 2005, 4 birds were banded. Monitoring, using staff or qualified consultants, will continue on the property as long suitable habitat conditions are present. A habitat restoration plan will be developed and incorporated into the timber assessment plan.

8. The team recommends that the County include in the next plan update a revised natural communities map, using FNAI categories, and natural community descriptions including desired future conditions. (VOTE: 5+, 0-)

Manager's Response: The next update will have vegetative communities and desired future conditions mapped in accordance with FNAI guidelines.

9. The team finds the lack of any prescribed fire since acquisition of this property to be less than acceptable, given concerns for ecological values and mitigation of hazard to adjacent developments. The team recommends that the County develop a comprehensive prescribed fire plan for this site and make implementation to restore and manage the pyrogenic natural communities a top priority at this site. (VOTE: 5+, 0-)

Manager's Response: A prescribed fire plan is in its early draft stages and will be implemented subsequent to final approval. Due to smoke sensitive areas, such as Interstate 95, US Hwy 1, New Smyrna Beach Airport and surrounding residential communities, the plan will address challenges such as the substantial difficulty in sustaining a sufficient fire frequency to maintain healthy ecosystems and the protection of archaeological resources, and possible solutions such as mechanical alternatives to prescribed fire. The prescribed fire plan will be incorporated in the update of the management plan.

Checklist findings

The following items received low scores on the review team checklist (see Attachment 1), which indicates that management actions, in the field, were insufficient (f) or that the issue was not sufficiently addressed in the management plan (p). These items need to be further addressed in the management plan update.

1. **Discussion in the management plan to address the management issues related to the sandhill, scrub, scrubby flatwoods and shell mound communities. (f)**

   Manager's Response: The mosaic of natural communities within the Preserve is comprised of a wide variety of habitats, including several that are rare. These communities are of varying quality and stages of maturity/succession.

   Several of the communities also present challenging management opportunities, especially given the location of the Preserve. For example, several communities are dependent upon a comparably frequent fire interval. As noted in response to Item #4 below, the use of prescribed fire within the Preserve is fraught with practical difficulties.

We are aware of these concerns and will strive to continually seek creative and alternative means to properly manage the natural communities to ensure long-term viability/health.

Specific management strategies for the above identified, and other natural communities, of the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

2. Discussion in the management plan of the listed species including the bald eagle (p,f), scrub jay, gopher tortoise and plant inventory (f).

Manager's Response: The diversity of the Preserve provides habitats that may accommodate numerous wildlife and plant species. The management plan presently identifies over one hundred listed species (plant and animal) observed and potentially occurring on the Preserve. This inventory, which includes the species itemized above, and the accompanying Florida Natural Areas data clearly point to the richness and value of the Preserve.

The set of resource management strategies of the existing management plan includes a general discussion of activities addressing listed species, such as surveying and other strategies.

Specific management strategies and future activities for the above identified and other listed species on the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

3. Discussion in the management plan of the protection and preservation of the cultural resources. (f)

Manager's Response: As noted in the Manager's Response to Recommendation #1, numerous archaeological sites have been documented across the Preserve. This richness represents a core value of the Preserve. A high priority is placed upon the identification and protection of these resources. The Volusia County Historic Preservation Officer is a member of the management team. Best Management Practices are applied as a matter of routine management and we are in regular communication with staff at the BAR, DHR and FPAN.

The vast majority of the sites identified on the Preserve were documented in the Florida Master Site Files as new sites by registered public archaeologists retained by local governments with field investigations and reports completed in 1986, 1989, 1990, 1996, 1997, 1999 and 2006. These studies have systematically addressed areas of most probable resources. For management purposes, the entire preserve is considered to be archaeologically sensitive and investigation is undertaken prior to any site disturbance or recreational uses with potential for ground disturbance, including frequent pedestrian traffic. Our general policy is not to provide the location of these sites to the public. This is a legitimate and effective tool to protect the sites in the more remote areas of the preserve from looting. We have also permitted the surrounding vegetation to camouflage these sites, making it more difficult for potential looters to locate the sites.

Particular effort has been focused on the Spruce Creek Mound Complex (8Vo099) which is listed on the National Register of Historic Places. ***Prior*** *to Volusia County's management, the Spruce Creek Mound Complex was seriously impacted. Early 20th century archaeologists actually excavated here, preceded and followed by pot hunters through the years. In modern times,* ***prior*** *to public ownership/management, it was used "unofficially" as a bike "ramp." Under Volusia County management this site has been successfully secured with fencing and alternative trail routes that do not impact cultural resources have been provided. There has been no discernable impact to this site since the fencing was installed, and this site is regularly monitored. A plan is in place to stabilize the site by introducing sterile fill on top of a barrier cloth, and remove damaged trees. This plan has been discussed in the field with BAR staff who concur with this strategy.*

The management review team specifically commended the County for its stewardship of these significant resources.

Additionally, it our policy not to provide the general public with information regarding location of these sites, with the exception of the Spruce Creek Mound Complex, where an interpretive kiosk is planned.

Specific management strategies and future activities related to the management and protection of archaeological resources will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan. The protection and preservation of cultural resources will remain a high priority of emphasis in the update of the management plan.

4. Discussion in the management plan of the area, frequency and quality the desired of prescribed fire. (f)

Manager's Response: As noted in the response to Item #1 above, several communities found in the Preserve are dependent upon a comparably frequent fire interval. However, it is unlikely that the frequency of fire required for sustaining these communities can be met.

The use of prescribed fire within the Preserve, whether for purposes of community health or fuel reduction, is fraught with practical difficulties.

The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. While pockets of residential use have existed for years adjacent to the Preserve, residential development at the periphery of the Preserve has significantly increased in recent years in response to the heightened demand associated with the regions population growth. This activity has generally occurred since development of the management plan.

Aside from adjacent residential land use, the Preserve is also bounded or traversed by the regional thoroughfares of Interstate 95 and U.S. 1. The Preserve is also traversed by a primary railroad line. Also, the New Smyrna Beach airport is located a short distance from the Preserve.

In addition to being adjacent to the aforementioned "smoke-sensitive areas", the wind pattern of this region also complicates the use of prescribed fire. The prevailing wind pattern in this portion of the county is an easterly/westerly direction. However, the narrow smoke corridor that may be acceptable for prescribed burning is oriented in a north to south direction.

Regardless of these concerns, it is noted that the County, like public agency land managers across the state, has experienced conditions that have been significantly hindered our efforts to undertake a consistent program of prescribed burning.

The use of prescribed fire will be further evaluated, including the possibility of alternatives, and comprehensively addressed as part of the forthcoming update of the management plan. As noted in the response to Recommendation #9 above, a prescribed fire plan is in the early stages of preparation. This plan will be incorporated in the forthcoming update of the management plan for the Preserve.

5. Discussion in the management plan of the efforts to restore the pastures, Australian pine, and the mosquito ditch.(p,f)

Manager's Response: The control of exotics and invasive species is a central activity in the overall management of the Preserve. The management review team specifically commended the County for exotic plant inventory, mapping and treatment efforts.

The only known stand of Australian pine has been removed. As part of the overall effort to control invasive and exotic species, this site is routinely monitored for re-generation and, if necessary, is re-treated. If new growth of this species is found, here or elsewhere, it will be treated.

A small area of pasture that was established as part of a now abandoned adjacent agricultural enterprise found in the western portion of the Preserve next to Martins Dairy Road, is gradually reverting to a natural condition. Pioneering species are becoming established on the site. Another area of pasture is found in the middle portion of the Preserve.

The overall restoration effort within the Preserve includes identification and evaluation of the existing mosquito control system. It is presently anticipated that restoration of the aforementioned ditch will begin in the next few months after final permitting.

The current management plan generally addresses the stewardship activities of exotic control and restoration. The management plan provides that highly disturbed areas will serve as access points and locations for facilities in order to minimize potential impacts associated with public use of the Preserve. These resource management efforts (restoration and potential sites for use by the public) should be evaluated and approached in a comprehensive and balanced manner. These topics will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

6. **Discussion in the management plan of the non-native invasive and problem species. (p)**

Manager's Response: The management review team specifically commended the County for exotic plant inventory, mapping and treatment efforts.

The set of resource management strategies of the existing management plan includes a section generally discussing the control of exotic plants. Since preparation of the management plan, specific activities have been conducted and/or coordinated to identify and control the presence of exotic and other problematic species. These on-going efforts have resulted in the control of Brazilian Pepper and other species.

Specific management strategies and future activities for the control of exotic and other problem species will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

7. **Discussion in the management plan relating to the resource protection including the gates and fencing, signage and law enforcement presence. (f)**

Manager's Response: The location of the Preserve amid an urban/suburban area, in combination with the configuration and length of the Preserve boundary (which includes extensive frontage upon navigable waterways and several roads/highways), represents a challenging environment in which to ensure proper resource protection.

We are consistently striving to properly address this issue. Concerns addressed on a routine basis include public access at inappropriate locales, transients and other unauthorized users, trash dumping, and vandalism. Steps undertaken to address this issue include the installation of gates and fencing. Maintenance of these items is also a common activity, as they are regularly subjected to destruction or damage by the public. As noted in the response to Recommendation #4 above, the County maintains a residential caretaker lease agreement with a Volusia County Sheriff's Deputy. The duties of this individual, who resides within the Preserve, include patrolling the Preserve and to act a deterrent to vandalism. In-house professional staff frequents the Preserve to ensure the protection of archaeological and historically sensitive areas.

Appropriate signage, including kiosks, has and will continue to be established at locales such as at recreational sites and other points of public access. Signage within the Preserve is intended to educate, guide, or inform the user. The signage, where appropriate, also addresses regulatory matters. An effort to develop a uniform sign design for the Preserve (e.g. to be used along major roads, at access points, etc) has been discussed.

The portions of the Preserve presently open for public use (e.g. the trails system on Martins Dairy Road) are extensively signed. As other locales are opened, the appropriate signage will be installed. An opportunity also exists to place appropriate signage along U.S. 1 to inform the travelling public as they enter/exit the Preserve.

Resource protection strategies, including access control and enforcement, will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

8. Discussion in the management plan of the adjacent property concerns including expanding development. (p,f)

Manager's Response: One of the attributes of the Preserve, and also one of the challenges presented to management, is its location. The Preserve is situated amid an urban/suburban area that is experiencing significant growth pressures. This population growth has heightened the demand for residential uses. As a result, residential development at the periphery of the Preserve has increased in recent years. Much of this activity has occurred since development of the management plan. This development and growth has, and will continue to, present a range of challenges related to stewardship of the Preserve. These issues include the ability to perform certain resource management activities and increased user demand/expectations.

Adding to this complexity is the configuration of the Preserve boundaries (increased edge) and that the lands adjoining the Preserve are within three different jurisdictions – County of Volusia (unincorporated) and the municipalities of Port Orange and New Smyrna Beach. Decisions regarding use(s) of lands adjoining the Preserve reside with the appropriate jurisdiction.

We are very much aware of these concerns and constantly strive to appropriately address the issues associated with this dynamic environment.

Most notably, the County, since 2000, has acquired title to four separate ownerships comprising approximately 218 acres of in-holdings and additions. The costs associated with theses acquisitions collectively total approximately $5.5 million, including the contributions of our agency partners. These acquisitions facilitate comprehensive management of the Preserve and have eliminated the potential for adverse impacts that may have otherwise be associated with development of the affected properties had each remained in private ownership. The management review team specifically commended the County on these efforts.

In addition to these completed acquisitions, the County has also recently obtained a signed contract from another property owner within the Preserve. The successful completion of this acquisition (seven acres with a purchase price of $1.9 million dollars) will protect archaeological resources listed on the National Register of Historic Places.
We have also sought to protect the valuable resources encompassed by the Preserve from the potential impacts associated with development of adjacent properties by successfully amending the boundaries to encompass additional area. Subsequently, we have actively sought to acquire the properties within this expanded area. A potential partner this effort has been the Division of State Lands.

We also strive to regularly address concerns associated with adjacent land uses on a more routine level. For example, we have worked with a resident to assure that

public demand for access to the shoreline adjacent to his residence is provided in a balanced, responsible, manner.

The relationship between management of the Preserve and adjacent land uses (existing and future) will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

9. Discussion in the management plan of the public access and education including parking, canoe access (p), management of visitor impacts and environmental education/outreach (f).

Manager's Response: Situated amid an urban/suburban area experiencing significant growth pressures, there presently exists a significant demand for access and use by the public. As the adjacent region continues to grow, it is anticipated that the demand by the public for access to the Preserve will dramatically increase.

A variety of outdoor recreational opportunities, both water and land oriented, for use and enjoyment by the public exist and are planned (on both State and County-owned lands) within the Preserve. These opportunities include day use areas (i.e. picnic shelter, parking, playground, shoreline fishing, etc.), trails, and canoe access. The County has sought to further public availability by completing activities such as;

- *upgrading roadways and providing entrances,*
- *upgrading and establishing parking areas,*
- *erecting picnic pavilions and wildlife observation platform, and*
- *providing and correcting/upgrading trails.*

Collectively, these efforts have resulted in the expenditure of nearly $400,000 since the year 2000. This expenditure does not include all personnel costs. In addition, approximately $3,000 has been expended on special projects for site clean-up and debris removal.

The range of outdoor experience offered to the public includes educational activities. At present, the Preserve is being used by the Volusia School District as part of a county-wide educational program. The staff of County's Division of Land Acquisition and Management also includes a Naturalist who conducts educational programs at the Preserve.

Field classes are conducted by County's Historic Preservation Officer and Naturalist to educate members of the public about the archaeological (in particular the mound complex) and natural resources of the Preserve. The management review team specifically commended the County for its extensive outreach programs undertaken at the Preserve.

It is our intent to continue to provide the public with appropriate opportunities to use and enjoy the Preserve. These opportunities will be provided in a manner that is complimentary and compatible with the Preserves' other resources. As with all management efforts, these activities will also be tempered by factors such as the future availability of funding and other demands.

Public access and educational opportunities will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

10. Discussion in management plan of the infrastructure including the need for additional staff. (f)

Manager's Response: As outlined in the response to item #9 above, a mixture of public access and recreational uses are planned for the Preserve. Each of these uses necessitates the construction and maintenance of the appropriate facilities and supporting infrastructure. These improvements represent significant financial and personnel investments.

The Preserve is overseen by the collaborative efforts of staff from the Divisions of (a) Leisure Services and (b) Land Acquisition and Management of the County's Department of Growth and Resource Management. The Division of Land Acquisition and Management was formed subsequent to preparation of the existing management plan. The focus of this Division within the Preserve is generally upon natural resource matters. The Division of Leisure Services, the larger of the two Divisions, is generally directed toward public use and archaeological resources. Through this Division, the County maintains a presence seven days per week within the Preserve. This Division has one half-time staff member solely dedicated to performing operational and maintenance activities within the Preserve and two full-time staff members assigned to the County's Spruce Creek Park. Aside from working within the Park, these individuals also provide operational and maintenance support to other areas within Preserve. In-house professional staff frequents the Preserve to ensure the protection of archaeological and historically sensitive areas.

While every effort possible is made to assure proper stewardship of the Preserve, both of these Divisions operate / manage properties across the county. For example, the Division of Land Acquisition and Management, with a field staff of seven (7) individuals, presently manages over 28,000 acres of conservation lands county-wide, inclusive of the Preserve. The staff of the respective Divisions must constantly weigh the needs and demands of other properties with that of the Preserve and vice-versa. Aside from these challenges, the abilities and efforts of both Divisions are also tempered by budgetary considerations.

Staffing opportunities and constraints will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

11. Discussion in the management plan of the uses proposed in the management plan including the need for paved multi-use trails. (p)

Manager's Response: As discussed by the management plan, the conceptual mixture of recreational uses envisioned for the Preserve includes a brief statement regarding the possible provision of paved, multi-use, trails. These trails are proposed for establishment in the southeastern portion of the Preserve. The actual location and alignment is to be determined in the future after consultation with user groups.

Segments of paved trails are typically constructed by the County when the segment is part of a planned or existing system that extends for significant distances spanning broad portions of the county. These systems are conceptually depicted by the County's trails plan, a separate document. This document depicts the Old Kings Highway (which traverses a portion of the Preserve) as a "showcase multi-use trail corridor".

The opportunity(ies) for paved, multi-use, trails on the Preserve will be further evaluated and comprehensively addressed as part of the forthcoming update of the management plan.

Team Member's Comments

Natural Communities: protection and maintenance: (I.A)

- Neither the management plan, nor the managers could provide information on the acreages for any of the natural communities. Neither has the plan used the accepted Florida Natural Areas Inventory community descriptions, which makes assessment difficult. The flatwoods are in desperate need of fire, with heavy fuel build-up due to the lack of any prescribed fire since acquired by the county. Scrub conditions are well past burning and will require mechanical treatment. The sand pine appeared to be of merchantable size, so that logging may be an option. There is some considerable concern for public access and trail use adjacent to and over shell mound, one of which is on the national register. The shell mounds need to be provided a wider protection area where trail construction is prohibited. In summary regarding the scrub, an overall scrub and scrubby flatwoods restoration plan is strongly suggested. This plan should also address monitoring for scrub jays.
- Cumulative user abuse must be addressed and solved. Burns are needed for some communities. No information is provided on water quality and quantity. No acreage information is provided on different communities. Restoration of the scrub is needed. Maintenance is needed on a more regular basis.
- Some user impacts and potential. Need additional staff, resources or out sourcing to meet goals.
- Needs fire in the uplands and acreage identified. Users must not dictate your management.
- The fire dependent communities appear fire suppressed. The tidal marsh and mangrove communities are healthy, little or no invasive plant species. Some soil erosion on multi use trails in the mesic hammock near Martin Dairy Road and Spruce Creek Bluff.
- The erosion has been caused by user groups. There is a need for prescribed burning in the sand hill and scrub areas.

Listed Species: protection and preservation (I.B1, I.B.2)

- It is not clear what current population of scrub jays is. No monitoring is occurring and the habitat conditions are poor. More monitoring is needed for gopher

tortoises. The team observed on the upland site where vandals had dug up 3 or 4 burrows to hunt and destroy adult tortoises.

- Wildlife monitoring is needed. Very little knowledge of wildlife. Plant survey needs to be done. The plant communities are not managed.
- A second Bald Eagle nest is known to occur within the preserve in the southeast area just west of US1 along Murray Creek just south of Sleepy Hollow; nest #Vo088.A survey for threatened and endangered plants is needed. A survey for Rugel's pawpaw may be needed for Martin Dairy and Spruce Creek Bluff areas where the flatwoods occur.
- Prescribed burning is necessary for the scrub jay habitat revival.

Cultural Resources: (II.A; II.B)

- No interpretation of cultural sites is provided to visitors. No photo monitoring, as prescribed in the plan, has yet been initiated. There are over 30 cultural archeological sites listed with the Division of Historical Resources. The plan has called for a level 1 archeological survey. This has not been completed; however several measures are planned to improve protection of old village site.
- A more complete survey is needed. User abuse must be solved. An educational center and signage is needed.
- Photographic monitoring needs to be done and more education.
- Much more additional surveys are required around known sites and to identify unknown sites, particularly in high potential areas.

Prescribed Fire (Natural Community Maintenance): (III.A)

- A comprehensive fire management plan for this site has still not been completed. No prescribed fire has been done on this property since acquisition from the state. Much of this property is using restoration fire strategies.
- The burns are insufficient.
- Need to develop a comprehensive burn plan. The urban interface is a challenge for the burn program.
- Needs fire zones, mechanical and to protect longleaf sensitive areas.
- Most fire dependent communities are in need of prescribed burning.
- The 1998 wildfires cleared areas naturally.

Restoration of Disturbed Natural Communities: (III.B)

- The removal of Australian pine and planted native herbaceous plants.

Non-native Invasive and Problem Species: (III.D)

- The management plan needs to provide more specific information on non-native exotic plant populations and eradication measures. During the review, no major problems were observed. Evidence was seen of Australian pine and Brazilian

pepper populations. Exotics seem to be in maintenance condition. Florida Natural Areas Inventory is scheduled to conduct an invasive, non-native plant survey.

- There are no animal problems. The Brazilian pepper and Australian pine problem is being addressed. The St Augustine grass needs attention.
- Trapping feral hogs. Brazilian pepper, Air potatoes, lantana, Australian pine, have been treating.
- Other exotic invasives that were sighted are, Air potato (Droscorea Bulbifera). The coyote, feral pigs are possible non-native animals on site.
- The feral pigs are being trapped and removed.

Hydrologic/Geologic Function (III.E)

- Has access to the data, but not supplied to the reviewers. Does not review available information.
- Have adequate monitoring program.

Resource Protection: (III.F)

- Fencing and gates are lacking in certain areas allowing motorized vehicles to easily access the Martin Dairy property and the Bolt Tract. The old survey and boundary marking needs to be better maintained.
- No boundary map is available. The signage is insufficient. Vandals are a problem and law enforcement in inadequate.
- Need to have a resident deputy and off duty deputies. Need to propose future residences.
- Don't dismiss the moving of the gate back to the parking lot on the 7th time.
- More law enforcement is needed to stop vandalism and ATV on and off road vehicle use.

Adjacent Property Concerns: (III.G)

- A new plan should address clustering to create larger buffers requirement for previous surfaces. Low impact development. Retention ponds – damage to preserve. Rain gardens, edge effect study needed. Requirement for native plants and keeping of native plants.
- Need to address edge effect of future development.

Public Access and Education: (IV.1; IV.2; IV.3; IV.4)

- Most of the recreational components in the plan have not been pursued as proposed in the 2000 plan. Public access (legal) is lacking on general parcels. More official signage is needed at the entrance points. It is not clear who owns the property and who the manager is. More efforts are needed to coordinate management responsibilities and priorities amongst, not only recreation user groups, but other archeological and conservation interests. Use of a 10-12

member, county appointed advisory group would be helpful in educating the public and develop understanding and support for management decisions.
- There is a classroom facility at the park but no general public educational facility as recommended in the plan.

Management Resources: (V.2. V.3; V.4)

- A staff person needs to be assigned to this tract for management decisions and supervision of the overall program to improve accountability for accomplishment of all program objectives.
- There are no bathrooms, could use compositing toilets.
- Seriously understaffed. Need funding for more employees, wildlife monitoring, burns and an educational center.
- Equipment can be mobilized to the sites.
- Currently there are 7 staff county wide for land management; 3 for leisure service. Funds are available for outsourcing.
- Much more staff and funding is needed to manage fire prescriptions, property management and species survey, etc.

Managed Area Uses: (VI.A, VI.B)

- There is a real concern for allowing two intensive level of public access and recreation use.
- Erosion is a real concern with proposed canoe access sites along Spruce Creek Bluff areas. This can already be seen at one site on the property. Such a streamside improvement might also impact archeological sites.

Review Team Determination

Purpose for acquisition

- This is a preserve. Surrounding land use, both existing and planned has and will greatly lessen the value of this land as a preserve. Also, law enforcement is needed. User abuse is rampant.
- Overall yes, some improvements are needed.
- The management plan for the preserve looks to be a great initial proposal, but more staff may be needed for future management, including prescribed burning and threatened and endangered surveys.

Management plan compliance

- The property needs a new management plan that reflects current priorities and sensitivity to cultural and natural resource needs. No burning has been done other than bike and equestrian trails on one parcel, several of which threaten significant archeological sites. There has been minimal implementation of public use and interpretive facilities as proposed in the management plan. Most of the

fire dependent communities are far out of maintenance condition due to lack of fire. The problem continues to persist, which will now require more intensive restoration measures, possibly including mechanical treatments.

- Public access is fairly good. (Need signs) They need better education for the general public. Prescribed fire and mechanical community's treatments are needed. Signage and security needs improvement.
- Need more land management. (fire, users)
- On the way, but not all in.

Exceptional Management Actions

- The management plan does a fairly good job of identifying current species composition in most of the natural community types. Good job of cleaning up the old US 1 highway site from extensive dumping and abuse. Good work to monitor and remove invasive exotic plants.
- Staff is very concerned over historical sites and damage caused to the preserve by abusive users and vandals. They are doing the best they can considering they are under staffed.
- Exotic and invasive control and continued acquisition of out parcels and adjacent property.
- Exceptional management actions include exotics in control and education.

Areas of insufficient management

- For the natural communities, it is recommended that you contract with Florida Natural Areas Inventory, or others, to survey the property and prepare historical and current natural community maps with guidance on resource management needs. Areas for each community, especially pre-dependent habitats, need to be researched and documented. The management plan should describe the desired condition or maintenance condition for each major community type.
- No wildlife monitoring. (Gopher tortoise habitat vandalized) No knowledge of water quality. No interest in addressing the impacts from bordering urban. No plant survey done. Need more Staff!
- The area of insufficient management is User Abuse.

Recommendations for Improving Management of this Site:

- It seems appropriate for county staff to review the way staff is organized here. Three different divisions play different roles, but not with overall responsibility.
- Funding for more staff and an educational facility. There needs to be an edge effects study. Research low impact development for undeveloped lands in Port Orange and Samsula which crash into the preserve. Port Orange plan high density development of hundreds of acres which will crash into the preserve. The county should utilize its environment minimal standards ordinance to protect the preserve. Wildlife and water quality must be monitored as well as a survey of plant life.

- Develop management plans for listed species, animals and plants. Develop timber management plan. Develop advisory council for pres.
- There needs to be monofilament collection stations throughout preserve to collect fishing line.
- There needs to be more security presence.

PLAN REVIEW		1	2	3	4	5	6	7	AVERAGE
Natural Communities (I.A)									
Mesic Hammock	I.A.1	1	0	1	1	1	1	1	0.86
Tidal Marsh/Mangrove	I.A.2	1	0	1	1	1	1	1	0.86
Mesic/Wet Flatwoods	I.A.3	0	0	1	1	1	1	1	0.71
Sandhill	I.A.4	0	0	1	1	1	1	1	0.71
Xeric Hammock	I.A.5	1	0	1	1	1	1	1	0.86
Floodplain Forest	I.A.6	1	0	1	1	1	1	1	0.86
Upland Mixed Forest	I.A.7		0	1	1	1	1	1	0.83
Mangrove	I.A.8		0	1	1	1	1	1	0.83
Scrub	I.A.9	0	0	1	1	1	1	1	0.71
Scrubby Flatwoods	I.A.10	0	0	1	1	1	1	1	0.71
Shell Mound	I.A.11	0	0	1	1		1	1	0.67
Listed species: Protection & Preservation (I.B)									
Animal Inventory	I.B.1	0	0	1	1	1	1	1	0.71
Scrub Jay	I.B.1.a	0	0	1	1			1	0.60
Gopher Tortoise	I.B.1.b	0	0	1	1			1	0.60
Bald Eagle	I.B.1.c	0	0	1	1				0.50
Plant Inventory	I.B.2	1			1	0	1	1	0.80
Cultural Resources (Archeological & Historic sites) (II.A,II.B)									
Cultural Res. Survey	II.A		0	1	1	1	1	1	0.83
Protection and preservation	II.B	0	0	1	1	1	1	1	0.71
Resource Management, Prescribed Fire (III.A)									
Area Being Burned (no. acres)	III.A.1	0	0	1	1	1	1	1	0.71
Frequency	III.A.2	0	0	1	1	1	1	1	0.71
Quality	III.A.3	0	0	1	1	1	1	1	0.71
Restoration of Ruderal Areas (III.B)									
Pastures	III.B.1	0	0	0	0	1	1	0	0.29
Australian Pine (Removal to Tidal Marsh)	III.B.2	0		0	0	1		1	0.40
Mosquito Ditch	III.B.3	0	0	1	1		1	1	0.67
Non-Native, Invasive & Problem Species (III.D)									
Animals	III.D.1	0	0	0	1	1	0	1	0.43
Plants	III.D.2	0	0	1	1	1	0	1	0.57
Hydrologic/Geologic function Hydro-Alteration (III.E.1)									
Roads/culverts	III.E.1.a	1		0	1	1	1		0.80
Ditches	III.E.1.b	1		0	1	1			0.75
Hydro-period Alteration	III.E.1.c	1		0	1	1			0.75

Water Level Alteration	III.E.1.d	1		0	1	1			0.75
Surface Water Monitoring (III.E.3)									
Surface water quality	III.E.3.a	1	0	1	1	1	1	1	0.86
Surface water quantity	III.E.3.b	1	0	1	1	1	1		0.83
Resource Protection (III.F)									
Boundary survey	III.F.1	1	0	1	1	1	1	1	0.86
Gates & fencing	III.F.2	0	0	1	1	1		1	0.67
Signage	III.F.3	0	0	0	1	1	1	1	0.57
Law enforcement presence	III.F.4	0	0	1	0	1	1	1	0.57
Adjacent Property Concerns (III.G)									
Land Use									
Expanding development	III.G.1a	0	0	1	1	0		1	0.50
Inholdings/additions	III.G.2	1	0	1	1			0	0.60
Public Access & Education									
Public Access-Maintenance									
Roads	IV.1a	1	0	1	1	1	1	1	0.86
Parking	IV.1b	0	0	1	0	1	1		0.50
Canoe Access	IV.1c	0	0	1	0	1			0.40
Recreational Opportunities	IV.2		0	1	1	1	1	1	0.83
Management of Visitor Impacts	IV.3	0	0	1	1	1	1	1	0.71
Interpretive facilities and signs	IV.4	0	0	1	1	1	1	1	0.71
Environmental education/outreach	IV.5	1	0	1	1	1	1	1	0.86
Managed Area Uses									
Existing Uses									
Picnicking	VI.A.1	1	1	1	1	1	1	1	1.00
Nature trails	VI.A.2	1	1	1	1	0	1	1	0.86
Fishing	VI.A.3	1	1	1	1	1	1	1	1.00
Canoeing	VI.A.4	1	1	1	1	1	1	1	1.00
Off-road bicycling	VI.A.5	1	1	1	1	1	1	1	1.00
Horseback riding	VI.A.6	1	1	1	1	1	1	1	1.00
Uses Proposed in Mgmt. Plan									
Visitor center	VI.B.1	1	0	1	1	1	1	1	0.86
Paved multi-use trails	VI.B.2	0	0	1		1	1	0	0.50
Tent Camping	VI.B.3	1		1		1	0	1	0.80

FIELD REVIEW		1	2	3	4	5	6	7	AVERAGE
Natural Communities (I.A)									
Mesic Hammock	I.A.1	4	4	4	4	4	4	4	4.00
Tidal Marsh/Mangrove	I.A.2	x	3	4	5	5	5	5	4.50
Mesic/Wet Flatwoods	I.A.3	1	3	3	3	1	4	3	2.57
Sandhill	I.A.4	1	2	2	2	1	2	3	1.86
Xeric Hammock	I.A.5	3	3	2	2	4	4	4	3.14
Floodplain Forest	I.A.6	3	3	5	4	5	x	x	4.00
Upland Mixed Forest	I.A.7	x	4	5	4	5	4	5	4.50
Mangrove	I.A.8	x	3	4	5	5	5	4	4.33
Scrub	I.A.9	1	2	3	1	1	x	3	1.83
Scrubby Flatwoods	I.A.10	2	3	3	3	1	2	3	2.43
Shell Mound	I.A.11	2	2	x	2	1	1	x	1.60
Listed species: Protection & Preservation (I.B)									
Animal Inventory	I.B.1	2	1	3	3	2	1	2	2.00
Scrub Jay	I.B.1.a	1	1	3	1	x	2	1	1.50
Gopher Tortoise	I.B.1.b	1	1	3	1	x	2	2	1.67
Bald Eagle	I.B.1.c	2	1	4	1	x	x	x	2.00
Plant Inventory	I.B.2	2	1	4	3	1	4	2	2.43
Cultural Resources (Archeological & Historic sites) (II.A,II.B)									
Cultural Res. Survey	II.A	x	3	x	1	4	x	3	2.75
Protection and preservation	II.B	x	2	x	1	2	3	3	2.20
Resource Management, Prescribed Fire (III.A)									
Area Being Burned (no. acres)	III.A1	1	1	1	1	1	1	1	1.00
Frequency	III.A.2	1	1	1	1	1	1	1	1.00
Quality	III.A.3	1	1	1	1	1	1	1	1.00
Restoration of Ruderal Areas (III.B)									
Pastures	III.B.1	1	1	1	2	1	x	1	1.17
Australian Pine (Removal to Tidal Marsh)	III.B.2	3	2	4	3	3	2	2	2.71
Mosquito Ditch	III.B.3	2	1	1	1	1	x	1	1.17
Non-Native, Invasive & Problem Species (III.D)									
Animals	III.D.1	3	x	4	4	4	x	3	3.60
Plants	III.D.2	4	4	5	5	4	x	3	4.17
Hydrologic/Geologic function Hydro-Alteration (III.E.1)									
Roads/culverts	III.E.1.a	3	3	5	5	3	x	x	3.80
Ditches	III.E.1.b	3	3	5	5	3	x	x	3.80
Hydro-period Alteration	III.E.1.c	2	3	5	5	3	x	x	3.60
Water Level Alteration	III.E.1.d	3	3	5	5	3	x	x	3.80

Surface Water Monitoring (III.E.3)									
Surface water quality	III.E.3.a	3	x	5	5	2	x	3	3.60
Surface water quantity	III.E.3.b	3	x	5	5	2	x	x	3.75
Resource Protection (III.F)									
Boundary survey	III.F.1	3	2	5	4	4	x	4	3.67
Gates & fencing	III.F.2	2	2	3	2	3	x	2	2.33
Signage	III.F.3	2	2	1	3	3	x	2	2.17
Law enforcement presence	III.F.4	2	1	x	2	2	x	2	1.80
Adjacent Property Concerns (III.G)									
Land Use									
Expanding development	III.G.1a	2	1	3	2	2	x	3	2.17
Inholdings/additions	III.G.2	4	3	4	3	4	x	2	3.33
Public Access & Education									
Public Access-Maintenance									
Roads	IV.1a	3	3	4	4	3	3	2	3.14
Parking	IV.1b	2	3	3	3	2	3	2	2.57
Canoe Access	IV.1c	2	3	4	3	5	2	x	3.17
Recreational Opportunities	IV.2	x	3	4	4	3	3	3	3.33
Management of Visitor Impacts	IV.3	2	x	3	1	2	1	2	1.83
Interpretive facilities and signs	IV.4	2	2	3	3	1	2	2	2.14
Environmental education/outreach	IV.5	4	1	5	4	5	3	2	3.43
Management Resources									
Maintenance									
Waste disposal	V.1a	3	4	5	4	4	5	3	4.00
Sanitary facilities	V.1b	3	2	4	3	4	1	2	2.71
Infrastructure									
Buildings	V.2a	3	1	4	4	3	x	2	2.83
Equipment	V.2b	4	3	4	5	3	4	2	3.57
Staff	V.3	3	1	3	4	1	2	2	2.29
Funding	V.4	3	1	4	4	2	4	2	2.86

APPENDIX M:

Letters of Compliance with Local Government Comprehensive Plan

Volusia County
FLORIDA

Growth and Resource Management Department
Planning and Development Services

September 2, 2011

Tim Baylie
Director of Parks, Recreation and Culture
202 North Florida Avenue,
DeLand, Florida 32720

Re: Comprehensive Plan Consistency Determination for the
Doris Leeper Spruce Creek Preserve Management Plan

The Volusia County Growth and Resource Management Department has reviewed the management plan for the Doris Leeper Spruce Creek Preserve for consistency with the Volusia County Comprehensive Plan. Our department finds the management plan is consistent and furthers the intent of the Volusia County Comprehensive Plan by increasing recreational opportunities for its residents, balanced with preserving and protecting natural resources.

Please contact Thomas Brooks, AICP, Planner II at 386-736-5959, Extension 12021, if you have any questions about this letter.

Sincerely,

FOR Kelli McGee,
Acting Director of Growth and Resource Management

123 West Indiana Avenue, Room 202 • DeLand, FL 32720-4604
Tel: 386-736-5959 • 386-239-7776 • 386-423-3367
Fax: 386-740-5148
www.volusia.org

CITY OF PORT ORANGE
1000 CITY CENTER CIRCLE

PORT ORANGE, FLORIDA 32129

September 26, 2011

Mr. Tim Baylie
Director of Parks, Recreation and Culture
202 North Florida Avenue
DeLand, FL 32720

RE: Comprehensive Plan Consistency Determination
Doris Leeper Spruce Creek Preserve Management Plan

Dear Mr. Baylie:

After reviewing the current management plan for the Doris Leeper Spruce Creek Preserve, Port Orange finds it consistent with our Comprehensive Plan. Management efforts within the Preserve fulfill many of the City's goals and objectives of providing recreational opportunities, preserving land, and limiting impacts to Spruce Creek and its water quality.

If you need further clarification or information, please contact me at 386-506-5501.

Sincerely,

Kent E. Donahue

Kent E. Donahue
Special Assistant to the City Manager

APPENDIX N:

Arthropod Control Plan

Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ARTHROPOD MANAGEMENT PLAN - PUBLIC LANDS

ADAM H. PUTNAM
COMMISSIONER

Section 388.4111, F.S.
Telephone: (850) 617-7997

For use in documenting an Arthropod Control Pan for lands designated by the State of Florida or any political subdivision thereof as being environmentally sensitive and biologically highly productive therein. Fill this form out if control work is necessary or planned.

Name of Designated Land:

Doris Leeper Spruce Creek Preserve

Is Control Work Necessary: ☒ **Yes** ❑ No

Location:

Multiple parcels located on or near Spruce Creek and associated tributaries.

Land Management Agency:

County of Volusia
Department of Community Services
Division of Parks, Recreation and Culture

Are Arthropod Surveillance Activities Necessary? ☒ **Yes** ❑ No
If "Yes", please explain:

Required as the primary component of an Integrated Mosquito Management (IMM) program.

Which Surveillance Techniques Are Proposed?
Please Check All That Apply:

☒ **Landing Rate Counts**	☒**Light Traps**	❑ Sentinel Chickens
☒**Citizen Complaints**	☒**Larval Dips**	☒**Other**

If "Other", please explain:

Portable "light trap" style trap baited with adult mosquito attractant i.e. carbon dioxide, octenol and/or BG Lure.

Arthropod Species for Which Control is Proposed:
Diptera:Culicidae

***Aedes* species including *Ae. albopictus, Ae. atlanticus, Ae. infirmatus, Ae. sollicitans* and *Ae. taeniorhynchus*.**

***Culex* species including *Cx. nigripalpus* and *Cx. salinarius*.**

Psorophora ferox

Proposed Larval Control:

Proposed larval monitoring procedure: **Dipping, utilizing standard dipper and methodology.**

Are post treatment counts being obtained: ☒Yes ☐ No

Biological Control of Larvae:

Might predacious fish be stocked: ☒ Yes ☐ No

VCMC has a small fish hatchery which provides the district with *Gambusia affinis*, obtained from a variety of Volusia County locations. Only *G. affinis* would be utilized.

Other biological controls that might be used:

See below Biorational agents including *Bti* and *Bs*.

Material to be Used for Larvaciding Applications:

(Please Check All That Apply:)

☒ Bti

☒ Bs

☒Methoprene

☒Non-Petroleum Surface Film

☒Other, please specify: **Spinosad**

Please specify the following for each larvacide:

Chemical or Common name: ***Bti* = VectoBac, *Bs* = VectoLex, *Bti/Bs* combination = VectoMax, methoprene = Altosid, spinosad = Natular**

☐ Ground ☐ Aerial

Rate of application:

VectoBac = 0.25-2pts/acre (liquid) or 2.5-20lbs/acre (granular), VectoLex = 5-20lbs/acre (granular), VectoMax = 5-20lbs/acre or 1 WSP (water soluble pouch = 10g)/50 sq ft.

Natular = 1.1-2.8fl oz/acre (liquid) or 3.5-9lbs/acre (granular) or 5-15lbs/acre (extended release granular).

Altosid = 0.75-1fl oz/acre (liquid) or 2.5-10lbs/acre (extended release pellets).

Method of application: **Hand, Backpack, Truck-mounted applicator and/or Helicopter.**

Proposed Adult Mosquito Control:

Aerial adulticiding	☒Yes	❑ No
Ground adulticiding	☒ **Yes**	❑ No

Please specify the following for each adulticide:

Chemical or common name:

Etofenprox, Naled, Permethrin, Prallethrin, Resmethrin, Sumithrin

Rate of application:

Etofenprox = 0.00175-0.007lb AI/acre (0.9-3.6fl oz/min at 10 mph), Naled = 0.05-0.1lb AI/acre (0.5-1fl oz/acre).

Permethrin/PBO = 0.00175-0.007lb AI/acre (0.9-3.6fl oz/min at 10mph).

Prallethrin = 0.00024-0.00072lb AI/acre, PBO = 0.0012-0.0036lb AI/acre, Sumithrin = 0.0012-0.0036lb AI/acre (all at 0.41-1.23fl oz/acre).

Resmethrin = 0.0015-0.007lb AI/acre (0.77-3.59fl oz/min at 10 mph)

Method of application:

Ultra Low Volume (ULV); Hand-held ULV, ATV-mounted ULV unit, Truck-mounted ULV unit and/or Helicopter ULV

Proposed Modifications for Public Health Emergency Control: Arthropod control agency may request special exception to this plan during a threat to public or animal health declared by State Health Officer or Commissioner of Agriculture.

Proposed Notification Procedure for Control Activities:

ULV adulticiding will occur following surveillance and include required DACS criteria. Notification will occur 24 hours in advance of an adulticiding event and will include both a phone call and email to the Park Manager as well as any other previously identified Park Personnel.

Records:

Are records being kept in accordance with Chapter 388, F.S.:

☒ **Yes** ❑No

Records Location: **VCMC, 801 South St, New Smyrna Beach, FL**

How long are records maintained: **5+ years**

Vegetation Modification: **n/a**

What trimming or altering of vegetation to conduct surveillance or treatment is proposed?

Proposed Land Modifications:

Is any land modification, i.e., rotary ditching, proposed: **If proposed in the future would consist of salt marsh dragline ditch restoration which may include limited amphibious rotary ditch utilization to reduce mosquito production habitat.**

Include proposed operational schedules for water fluctuations: **N/A**

List any periodic restrictions, as applicable, for example peak fish spawning times. **N/A**

Proposed Modification of Aquatic Vegetation: **N/A**

Land Manager Comments:

The Land Manager supports this plan.

Arthropod Control Agency Comments:

Signature of Lands Manager or Representative — Date 9/23/11

Signature of Mosquito Control Director / Manager — Date 9/29/11