Dicerandra Scrub Sanctuary Management Plan

Titusville, Florida

Brevard County
Environmentally Endangered
Lands Program

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I. EXECUTIVE SUMMARY

The Dicerandra Scrub Sanctuary is part of the sanctuary network established by the Environmentally Endangered Lands (EEL) Program in Brevard County. The intent of the Program is to acquire environmentally sensitive lands as a first step "towards long-term protection of essential natural resources, open space, green space, wildlife corridors and maintenance of natural ecosystems functions" (Brevard County EEL Program, Sanctuary Management Manual, 1997). The network of public lands also provides passive recreation and environmental education programs to Brevard County residents and visitors.

The Dicerandra Scrub Sanctuary encompasses approximately 44 acres, located just south of State Road 50, on Apollo Road (also known as Boyd Road), adjacent to the Carousel Roller Skating Rink. The Dicerandra Scrub Sanctuary is located within the North Regional Management Area. The Dicerandra Scrub Sanctuary, along with the other EEL properties in the North Regional Management Area will be served by the EEL Management & Education Center at the Enchanted Forest Sanctuary, which is located just south of the Dicerandra Scrub Sanctuary on State Road 405. As described in the Sanctuary Management Manual, the Dicerandra Scrub Sanctuary is a Category 3, or primary conservation and research site meaning that the site will have minimal or no improvements due to the vulnerability of resources and/or the need for intensive management or restoration. Category 3 Sites will provide opportunities for public access within limited areas of the site.

The property consists of scrubby flatwoods and a large depression marsh. Its location, adjacent to the Titusville Wellfield conservation property and the Florida Power & Light (FPL) easement enhances the site and extends the protection area for the Titusville Wellfield. Prior studies of the site and surrounding lands noted the presence, or potential presence, of several listed plant and animal species. Protected plant and wildlife species documented on site during recent or past studies include Florida scrub-jay, eastern indigo snake, gopher tortoise and *Dicerandra thinicola*, a rare scrub mint known only to occur in the northern region of Brevard County.

The primary goals of the site include the conservation and restoration of ecosystem function, natural communities and native species' habitat. The collection and documentation of natural and cultural resource data are also important management goals. Other management goals include the provision of public access and environmental education.

The Dicerandra Scrub Sanctuary will provide outstanding opportunities for field research. Due to the sensitive nature of the resources, access will be limited to passive recreation activities such as a hiking trail, nature study, and environmental education. Onsite facilities will be limited to a hiking trail, informational kiosks and minimal trail signage.

One hiking trail is proposed for the site. The trail will traverse through the scrubby flatwoods to an observation platform that looks over the depression marsh, and then loop

back through the scrubby flatwoods to the trailhead. The trail will be unimproved with minimal interpretive signage and a kiosk. The current trail is included in Figure 11.

The proposed recreation and educational opportunities will serve both Brevard County residents and visitors. An emphasis will be placed on providing educational opportunities to Brevard County Schools to promote the understanding and appreciation of the unique and valuable resources available in Brevard County and thereby promote the long-term preservation of the natural areas.

Western boundary of Dicerandra Scrub Sanctuary

II. INTRODUCTION

The following section is a brief introduction to the EEL Program, as well as a description of the structure of the management plan.

In a 1990 referendum, Brevard County voters approved the Environmentally Endangered Lands (EEL) Program. The Program's Vision Statement is as follows:

> "The Environmentally Endangered Lands (EEL) Program acquires, protects and maintains environmentally endangered lands guided by scientific principles for conservation and the best available practices for resource stewardship and ecosystem management. The EEL Program protects the rich biological diversity of Brevard County for future generations. The EEL Program provides passive recreation and environmental education opportunities to Brevard's citizens and visitors without detracting from primary conservation goals of the program. The EEL Program encourages active citizen participation and community involvement."

The Program established a conceptual framework and funding mechanism to implement an EEL sanctuary network in Brevard County. The EEL sanctuary network represents a collection of protected natural areas that form a regional conservation effort focused upon protection of biological diversity. Within the county-wide EEL sanctuary network, four management areas are geographically defined within Brevard County. For each management area, a specific site is identified as a Center for Regional Management. The sites that will function as centers for regional management for the EEL Program are:

I. The Enchanted Forest Sanctuary (Regional Management Center for North Mainland)
II. Pine Island Conservation Area (Regional Management Center for Central Mainland)
III. Malabar Scrub Sanctuary (Regional Management Center for South Mainland)
IV. Barrier Island Ecosystem Center (Regional Management Center for South Beaches)

These Centers provide strategically located hubs for implementing the countywide conservation, passive recreation, and environmental education goals of the EEL Program.

Other EEL sanctuaries within the North Regional Management Area include Buck Lake Conservation Area with the addition of North Buck Lake Scrub Sanctuary (formerly Continental Acreage), Enchanted Forest Sanctuary with the addition of two Sterling Forest properties, South Lake Conservation Area, Grissom Road Scrub Complex, North Indian River Lagoon Properties, and Tico Scrub Sanctuary.

The EEL *Sanctuary Management Manual* (SMM) guides conservation and land stewardship decisions implemented by the Brevard County EEL Program. The SMM details principles and directives for conservation, public access and environmental education within the EEL sanctuary network. The SMM also outlines the EEL Selection & Management Committee's role in advising staff and the Brevard County Board of County Commissioners on acquisition and management related issues (Chapter 2, Section 4.3.4).

As outlined in the SMM, the EEL Program will adopt and implement an ecosystem approach to environmental management. Ecosystem management is defined as an integrative, flexible approach to the management of natural resources. Key themes of ecosystem management include the following:

1. Adaptive Management – Natural areas must be managed in the context of the landscape in which they exist and based on scientific knowledge. Resource managers must adapt to continuing advances in the scientific understanding of ecosystems and changing environmental and human influences on the resources.

2. Partnerships – Interagency and private sector partnerships are essential to manage and protect ecosystems. Natural resource management is complex and requires multi-disciplinary skills and experiences.

3. Holistic Approach – Ecosystem management includes the maintenance, protection, and improvement of both natural and human communities. This system approach to management considers the "big picture" of natural resource protection, community economic stability and quality of life.

Land management issues, such as fire management, protection and restoration of natural hydrologic cycles, threatened and endangered species, and removal of invasive exotics must be integrated with issues such as provisions for public access and levels of human use. The integration of ecosystem protection and human needs combine to form the foundation of an effective ecosystem management strategy.

The Environmentally Endangered Lands Program SMM establishes a general framework for management of specific sites and establishes ten Principles of Conservation summarized, to achieve the following:

1. Maintain all sites in a natural state and/or restore sites to enhance natural resource values.
2. Protect natural resource values by maintaining biological diversity and using conservation as a primary goal for decision making.
3. Balance human use with the protection of natural resources.
4. Apply the most accurate scientific principles to strategies for conservation.
5. Collect and use the most accurate data available for developing site management plans.

6. Consider the interests and values of all citizens by using scientific information to guide management policy making.
7. Promote effective communication that is interactive, reciprocal, and continuous with the public.
8. Promote the value of natural areas to Brevard County residents and visitors through the maintenance of the quality of resource values, public services, and visitor experiences.
9. Promote the integration of natural resource conservation into discussions of economic development and quality of life in Brevard County.
10. Provide a responsible financial strategy to implement actions to achieve long-term conservation and stewardship goals.

In addition to the conservation principles, this management plan will provide specific goals, strategies, and actions to guide management of the sanctuary in terms of the objectives of the Environmentally Endangered Lands Program. The plan is divided into the following 10 sections:

I. *Executive Summary* identifies the location, size, general natural resource features and primary management goals for the site.

II. *Introduction* provides a brief introduction to the EEL Program and the site and describes the structure of the management plan.

III. *Site Description and Location* provides a detailed site location and description.

IV. *Natural Resource Descriptions* includes physical resources (climate, geology, topography, soils, and hydrology), biological resources (ecosystem function, flora, fauna, species of special concern, and biological diversity), and cultural (archaeological, historical, land-use history, and public interest).

V. *Factors Influencing Management* includes natural trends, human-induced trends, external influences legal obligations and constraints, management constraints, and public access and passive recreation.

VI. *Management Action Plans* include specific goals, strategies and actions.

VII. *Projected Timetable for implementation* prioritizes activities and provides a timeframe for management plan implementation.

VIII. *Financial Considerations* discusses funding mechanisms and projected management costs.

IX. *Bibliography* cites original research and publications used to develop the Management Plan.

X. *Appendices* includes supplemental information.

III. SITE DESCRIPTION AND LOCATION

The Dicerandra Scrub Sanctuary is a 44 acre site, located south of State Road (SR) 50, on Apollo Road, adjacent to the Carousel Roller Skating Rink (Township 22, Range 35, Section 27, Block 4, Lots 1-26) as shown in Figure 1. Apollo Road, located off SR 50, provides vehicular access to the site. A secondary vehicle access location is at the Melissa Drive cul-de-sac.

The eastern and southern boundaries of the property are adjacent to the Imperial Estates residential community. The western boundary borders the Florida Power & Light power line right-of-way easement, which is next to the Titusville wellfield. These two properties, the right-of-way easement and the Titusville wellfield, provide a high level of protection from incompatible uses to the west of the Dicerandra Scrub Sanctuary. The northern boundary is adjacent to a single-family residence and an apartment complex.

The areas to the north, east, and south of the site are built out while the area to the west, although a platted subdivision, is undeveloped. This undeveloped land is predominately owned by the City of Titusville and is the location of their south wellfield area for potable water.

The property is composed of scrubby flatwoods and a depression marsh with a small area of disturbed wetlands on the eastern boundary. Most of the site is scrubby flatwoods with a canopy of longleaf pine (*Pinus palustris*) and a shrub layer of myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminata*), Chapman oak (*Quercus chapmanii*), staggerbush (*Lyonia fruticosa*), fetterbush (*Lyonia lucida*), saw palmetto (*Serenoa repens)*, wiregrass (*Aristida beyrichiana*), and *Andropogon* spp. A small open canopy of sand pine (*Pinus clausa*) appears in the southwest quadrant of the property. Along the edge of the depression marsh, slash pine (*Pinus elliottii*) replaces longleaf pine and saw palmetto is more abundant; scattered pond pine (*Pinus serotina*) also occurs.

The property also supports a population of the scrub mint *Dicerandra thinicola*. This particular scrub mint is rare and only known to occur in northern Brevard County, including on this property, on the adjacent Titusville well field property, and on private lands in the city of Mims (Bradley et al 2003).

An aerial map of the Sanctuary and adjacent properties is included (Figure 2).

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Figure 1

Dicerandra Scrub Sanctuary
General Location Map

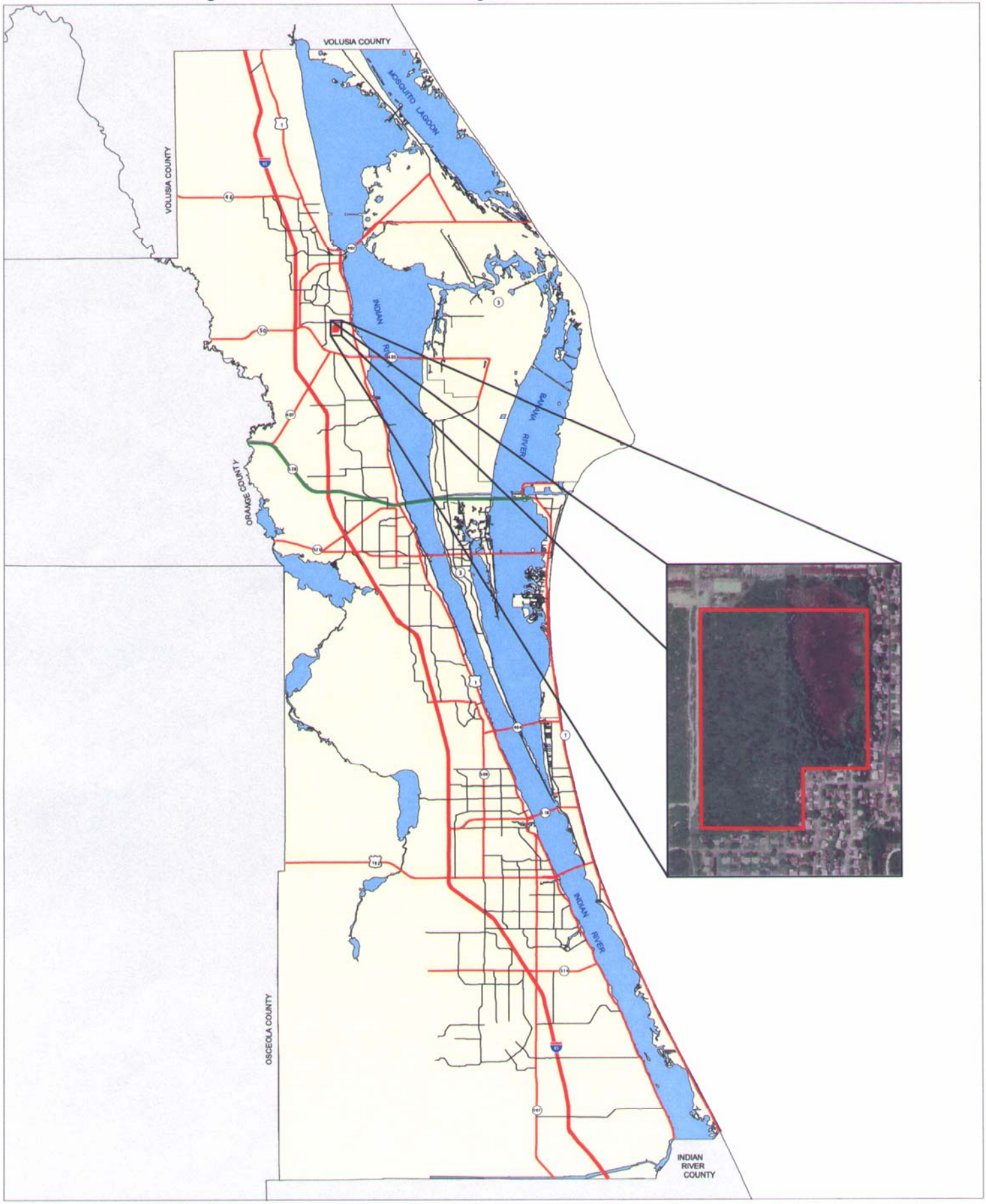

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Figure 2

Dicerandra Scrub Sanctuary
Aerial Map With Adjacent Land Uses

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IV. NATURAL RESOURCE DESCRIPTIONS

This section provides descriptions of natural resources, including physical resources (climate, geology, topography, soils, and hydrology), biological resources (ecosystem function, flora, fauna, species of special concern and biological diversity) and cultural resource information (archeological, historical, land-use history and public interest).

A. Physical Resources

a. Climate

The Dicerandra Scrub Sanctuary is located in east Central Florida, an isothermal area at the junction of the temperate and sub-tropical climatic zones. Temperature data from representative locations in Brevard County indicate an average annual temperature of approximately 74 °F. August is typically the warmest month, averaging 82°F, whereas January is the coolest month, averaging about 62°F (Schmocker, et al., 1990). Summer temperatures are moderated by frequent afternoon thunderstorms. Periods of extreme cold weather are infrequent due to the site's latitude and proximity to the Atlantic Ocean. The most recent "hard" freeze occurred in the winter of 1989. Long-term rainfall data for the area indicate an average of 54 inches per year in north Brevard County (Schmocker, et al., 1990). Wet and dry seasons are typically well-defined, with the wet season occurring between May and October, and the dry season occurring between November and April. Annual and seasonal rainfall is subject to large variation in both amount and distribution.

During summer, Central Florida has some of the highest frequencies of thunderstorms in the world. Cloud to ground lightning strikes occur frequently during summer storms. This is an important source of natural fire ignition, which determined the historic natural fire regime.

Prevailing winds are generally from north to northeast during the dry season (November to April), and from the east during the wet season (May to October) (ESMC, 1989). Climatic change, seasonal variability, and disturbance contribute to species distribution and community composition.

b. Geology

The Dicerandra Scrub Sanctuary is located on the Atlantic Coastal Ridge. The Atlantic Coastal Ridge extends along the east coast of Florida and is a major feature of the mainland of Brevard County, made of both single and multiple relict beach ridges. These ridges appear to have formed along an erosional rather than prograding shoreline, and in most places contain little carbonates. Formation of the Atlantic Coastal Ridge is associated with Pamlico time (ca. 140,000 – 120,000 years before present) when sea level was about 30 feet higher than present (Schmalzer et al,1999). In short, the property is part of a relic beach and dune system, an important geological feature that influences the biological diversity of Brevard County.

c. Topography

The Dicerandra Scrub Sanctuary has variable topography, with elevations ranging from 30' to 45'± National Geodetic Vertical Datum (NGVD) in the depression marsh and 50'± along the primary sand ridge in the western portion of the property, based upon the USGS Topographic Quadrangle map (Figure 3). It appears that the general surface drainage pattern is divided by the aforementioned ridge that runs generally north to south through the western portion of the site. It seems that the primary surface drainage pattern is toward the east. This natural drainage has been altered due to the urban development surrounding three sides of the Sanctuary.

d. Soils

The soil types within the Dicerandra Scrub Sanctuary, defined by the Natural Resource Conservation Service (formerly the Soil Conservation Service), (Figure 4), are as follows:

Myakka sand (Mk)
Myakka sand, ponded (Mp)
Pomello sand (Ps)*
Paola fine sand, 0 to 5 percent slopes (PfB)*
Paola fine sand, 5 to 12 percent slopes (PfD)*
Orsino fine sand (Or)*
(Source: Soil Survey of Brevard County, Florida, 1974)
Note: * denotes a soil with aquifer recharge characteristics

Myakka sand (Mk) This is a nearly level, poorly drained sandy soil in broad areas in flatwoods and in areas between sand ridges and sloughs and ponds. It has the profile described as representative of the series. In most years the water table is within a depth of 10 inches for 1 to 4 months and between 10 and 40 inches for more than 6 months. In dry seasons it is below a depth of 40 inches. The soil is flooded for 2 to 7 days once in 1 to 5 years. Natural vegetation is primarily pine flatwoods (slash and long-leaf), saw palmetto, gallberry, and wiregrass.

Myakka sand, ponded (Mp) This is a nearly level, poorly drained, sandy soil in shallow depressions in the flatwoods. This soil is similar to Myakka sand, but it is in low places where water accumulates. In most years it is flooded 6 to 12 months. They are important feeding grounds for many kinds of wading birds and other wetland wildlife. Natural vegetation on this soil type consists of maidencane, St. Johnswort, water tolerant trees, and water lilies.

Pomello sand (Ps) This is a nearly level, moderately well drained sandy soil on broad low ridges and low knolls. The water table is 30 to 40 inches below the surface for 2 to 4 months in most years and between 40 and 60 inches for more than 6 months. During dry periods it is below 60 inches for short periods. Natural vegetation characteristic of these

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Figure 3

Dicerandra Scrub Sanctuary
Topography Map

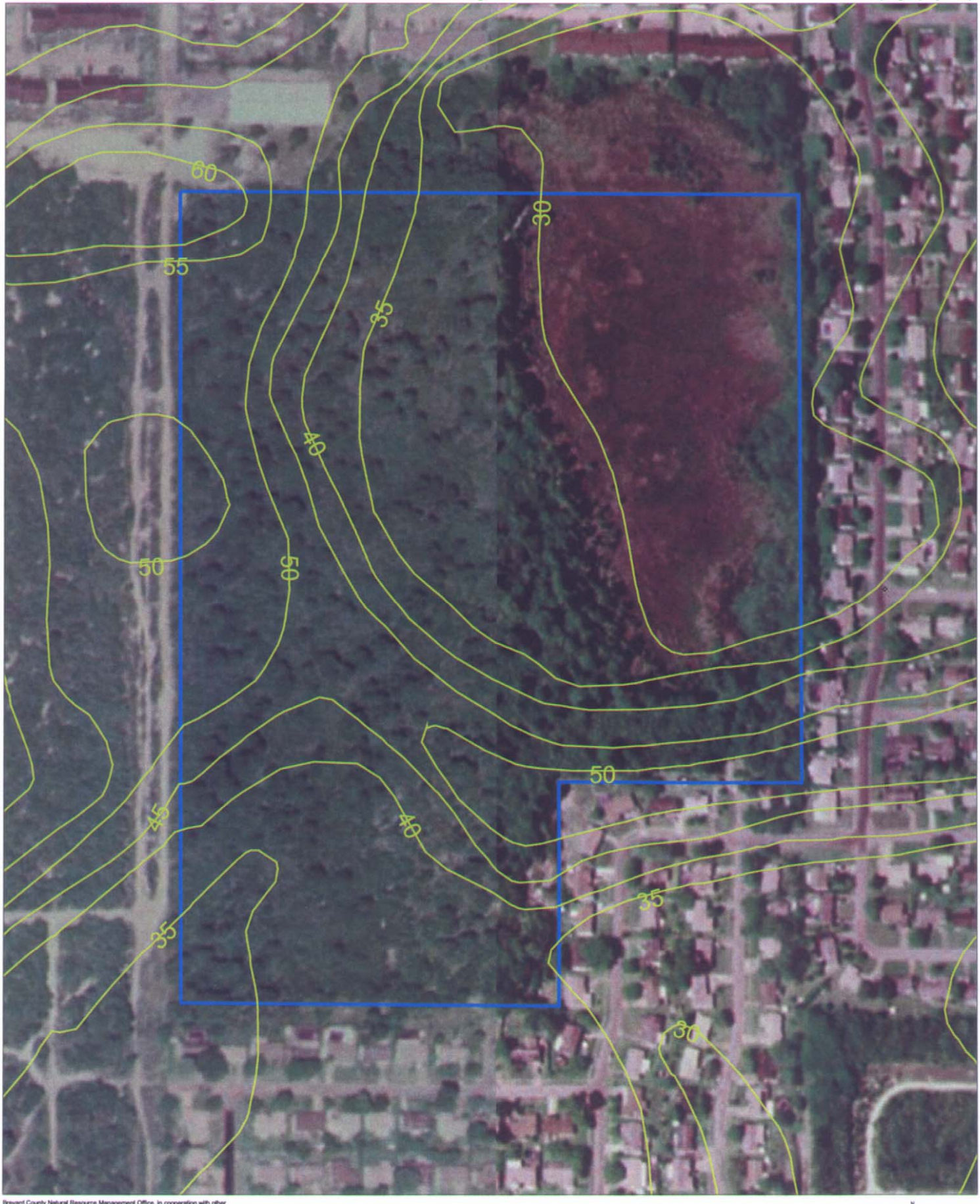

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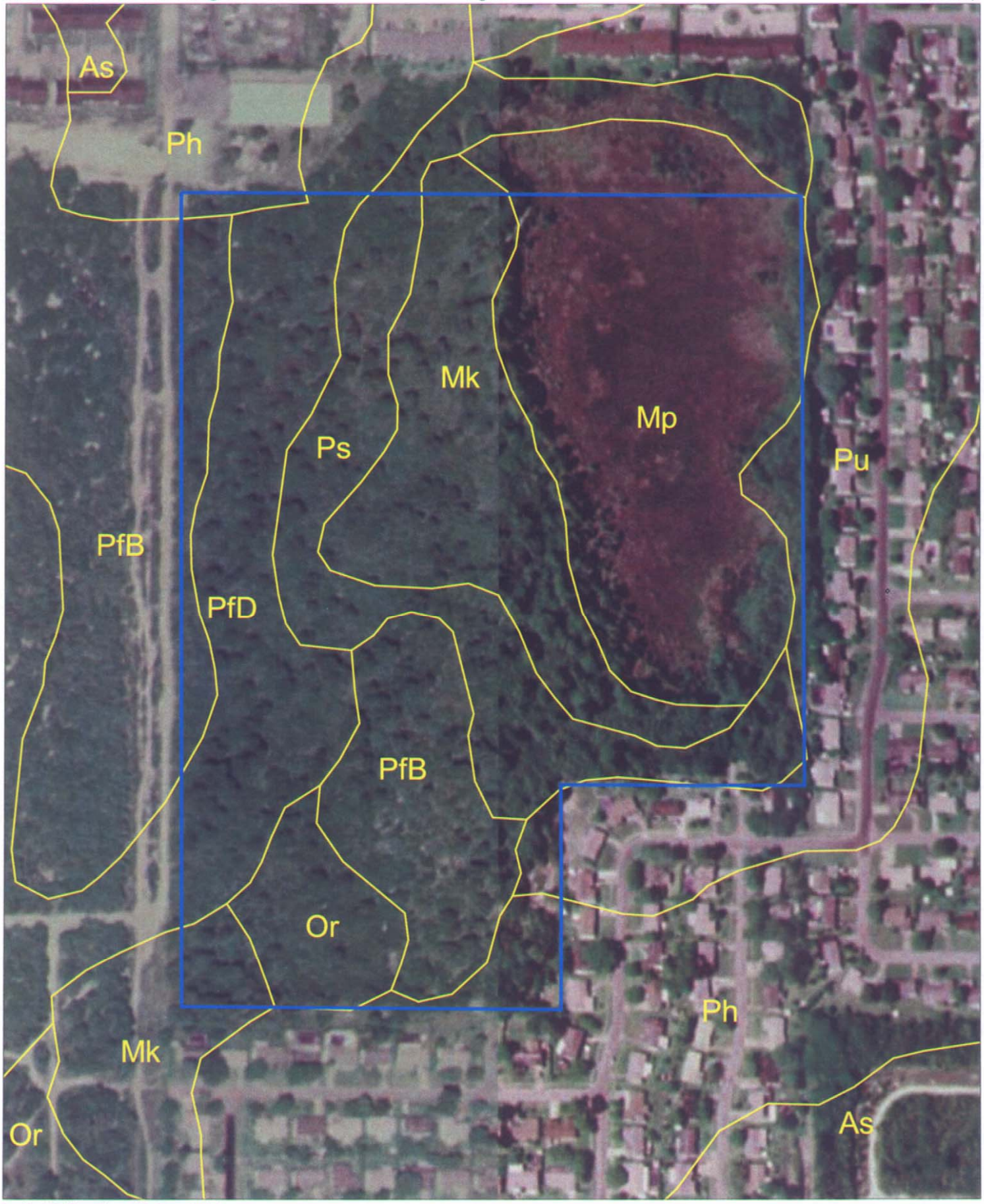
Figure 4

Dicerandra Scrub Sanctuary
Soil Map



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soils consists of longleaf pine with undergrowth of live oak, saw palmetto, and grasses. Pomello sand is an aquifer recharge soil.

Paola fine sand, 0 to 5 percent slopes (PfB) This is an excessively drained soil on ridges. It has the profile described as representative of the series. The water table is below a depth of 10 feet. Natural vegetation is primarily sand pine scrub with an understory of scattered palmetto, rosemary, and cactus. Paola fine sand, 0 to 5 percent slopes is an aquifer recharge soil.

Paola fine sand, 5 to 12 percent slopes (PfD) This is an excessively drained sandy soil on the sides of high ridges. The water table is at a depth of more than 10 feet. Natural vegetation is primarily sand pine scrub with an understory of scattered palmetto, rosemary, and cactus. Paola fine sand, 5 to 12 percent slopes is an aquifer recharge soil.

Orsino fine sand (Or) This is a nearly level, moderately well drained sandy soil on moderately low ridges and between high ridges and poorly drained areas. In most years the water table is at a depth of 40 to 60 inches for 6 months or more. During prolonged dry periods it is below a depth of 60 inches, and during wet periods it is between 20 to 40 inches for 7 days to 1 month. Natural vegetation typically consists of sand pine with turkey oak, and blackjack oak. The understory consists of palmetto, rosemary, and a variety of grasses. Orsino fine sand is an aquifer recharge soil.

Pomello-Urban land complex (Pu) This complex is about 45 to 60 percent Pomello sand, 20 percent Pomello sand that has been altered for use as building sites, and about 20 to 45 percent Urban land or areas covered by houses, streets, driveways, buildings, parking lots, and other related uses. In most years the water table is at a depth of 30 to 40 inches for 2 to 4 months and between 40 and 60 inches for more than 6 months. In dry seasons it is below 60 inches for short periods.

e. Hydrology

The Dicerandra Scrub Sanctuary lies within Community Panel Numbers 190 & 195, of the FEMA maps dated April 1989. The FEMA map shows an isolated flood zone A. This zone is located over the depression marsh. Flood zone A means that no base elevation has been determined.

The hydrologic regime of the Sanctuary is expected to have been altered as a result of surrounding development to the north, south and east of the property. The primary hydrologic feature on the site is the depression marsh located on the northeast portion of the property. This depression marsh is a shallow freshwater system that is vegetated with native herbaceous plants. The depression marsh appears to exhibit seasonal fluctuations in water quality and quantity, although no formal studies have evaluated the system. Surface water runoff from the property would drain from the scrub ridge east into this depression marsh. The vegetative community of the depression marsh appears to be undisturbed.

The depth of the water table is between 10 to 15 feet. Ground infiltration of precipitation is the primary mechanism for recharge of the superficial aquifer.

B. Biological Resources

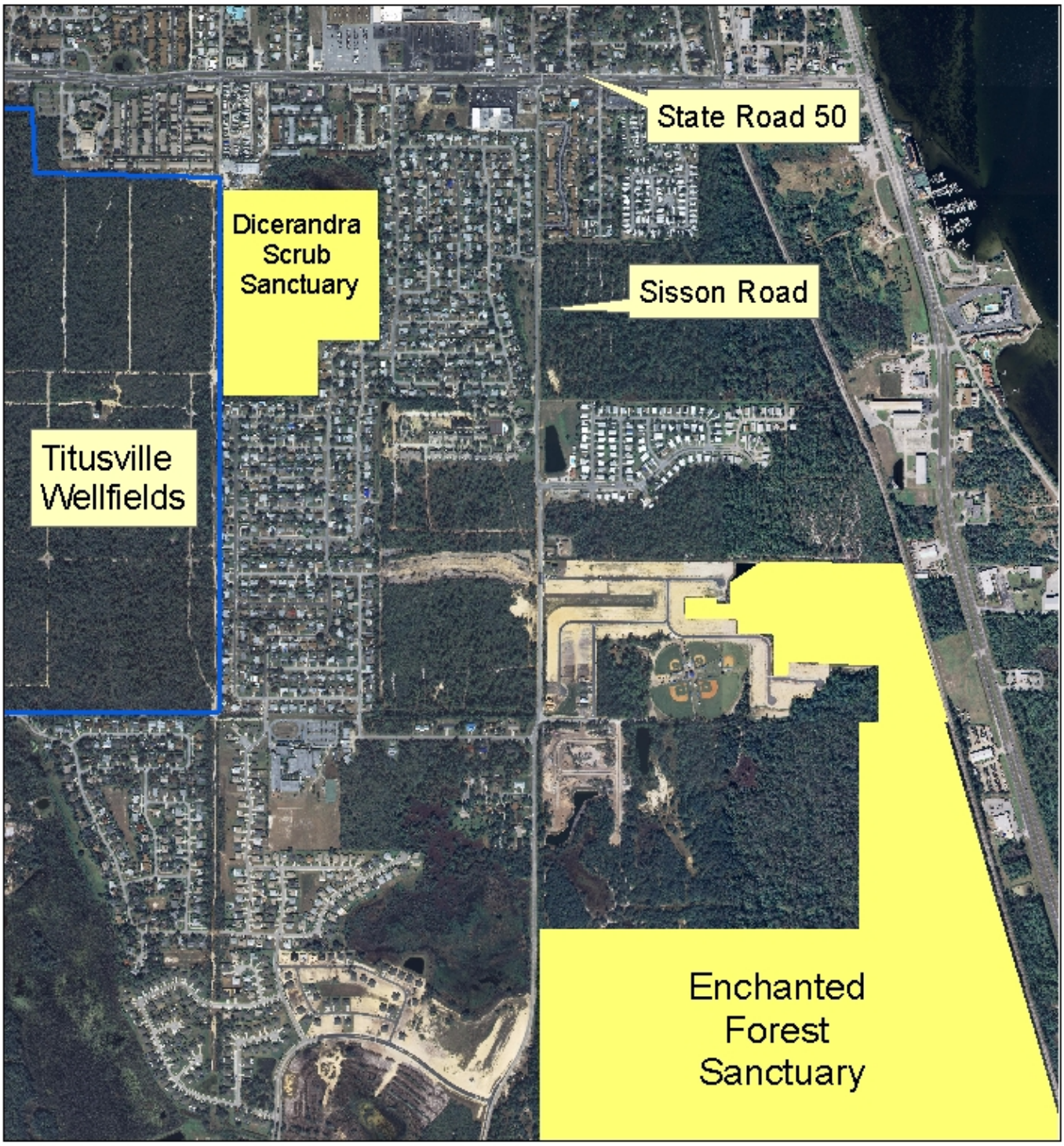
a. Ecosystem Function

Protection of the natural resources and biological diversity that is characteristic of the Dicerandra Scrub Sanctuary is dependent upon the maintenance of the functional attributes of the upland and wetland natural communities. Species viability is ultimately dependent upon the protection and restoration of elements that influence ecosystem function. At the Dicerandra Scrub Sanctuary, management actions include restoration of the natural communities, primarily enhancement of the habitat for *Dicerandra thinicola* and Florida Scrub-jay (*Aphelocoma coerulescens)* and removal of invasive exotic species.

The Dicerandra Scrub Sanctuary is approximately two miles north of the Enchanted Forest Sanctuary, a 428 $\pm$ acre conservation area purchased by the EEL Program. These properties along with the Titusville wellfield help to form a conservation corridor within the urban areas of the City of Titusville. An aerial photo, with the property boundaries of the Enchanted Forest Sanctuary, Dicerandra Scrub Sanctuary, and the Titusville wellfield delineated is provided as Figure 5. This figure shows the proximity of these properties to one another.

The Dicerandra Scrub Sanctuary consists of scrubby flatwoods, an isolated depression marsh and a disturbed wetland. The site has had minimal impacts over the last fifty years. According to the historical aerial photographs, the Dicerandra Scrub Sanctuary

Figure 5: Titusville Wellfield and EEL Sanctuaries



appeared to be undisturbed. Development adjacent to the Sanctuary occurred in the 1960's. Most of the impacts have occurred on the edges of the property boundary due to encroachment from development. The Sanctuary, along with adjacent parcels of scrub habitat is important as a superficial aquifer recharge area. Recharge occurs when water seeps through the soil down to the aquifer layer to be stored.

b. Flora

This section describes the plant communities identified within the Dicerandra Scrub Sanctuary. The vegetative communities are described using the Florida Natural Areas Inventory's *Guide to the Natural Communities of Florida* (1990) (Figure 6). A complete floristic inventory has not been conducted for this Sanctuary. EEL staff & Office of Natural Resources staff conducted a preliminary plant survey in 2000. This list reflects the representative species and is not a complete floristic inventory. A total of 90 plant species were identified. Of these 90 plant species, 16 plant species are exotic. A list of the exotic plant species found on site is listed below in the Management Constraints section of this management plan. A second plant survey was conducted in 2003 by Dynamac Corporation. This inventory includes 92 listed species. The results of the two plant inventories are included in Appendix C. To complete the plant survey a year-long floristic survey needs to be conducted.

Aside from being a valuable upland community and aquifer recharge area, this site is important in the preservation of designated plant and animal species. The site provides a significant area, free from development, for *Dicerandra thinicola,* an endemic native plant cited only in North Brevard (Miller 1993). This native plant should be considered to be of high conservation importance. Other species of *Dicerandra* are not reported from Brevard County (Wunderlin, 1982; Muller et al.1988; Christman and Judd 1990; FNAI 1990). Four scrubby or suffrutescent species of *Dicerandra* are known from Florida (*D. christmanii, D. cornuttissima, D. frutescens,* and *D. immaculata*). These four species are listed as endangered by the state of Florida and the U.S. Fish and Wildlife Service and as G1/S1 (critically imperiled globally/critically imperiled in the state by the Florida Natural Areas Inventory) (FNAI 1990). *Dicerandra thinicola* is listed as Endangered by the State of Florida and has no federal protection. *Lechea divaricata* (pineland pinweed) has been found along the northern edge of the Sanctuary (Schmalzer and Foster 2003, 2005). This species is listed as Endangered by the State of Florida.

Historical aerial photographs were reviewed to determine changes to vegetative community type and structure, as well as man-induced changes in the past fifty (50) years. Aerial photographs from 1943, 1951, 1959, 1963, 1967, 1975, 1983, and 1996 were inspected. Historical aerial photographs from 1943, 1951 and 1963 are provided as figures 7, 8 and 9 respectively. Most of the development in the area start in the early 1960's and was completed by 1968.

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Figure 6

Dicerandra Scrub Santuary
Natural Communities

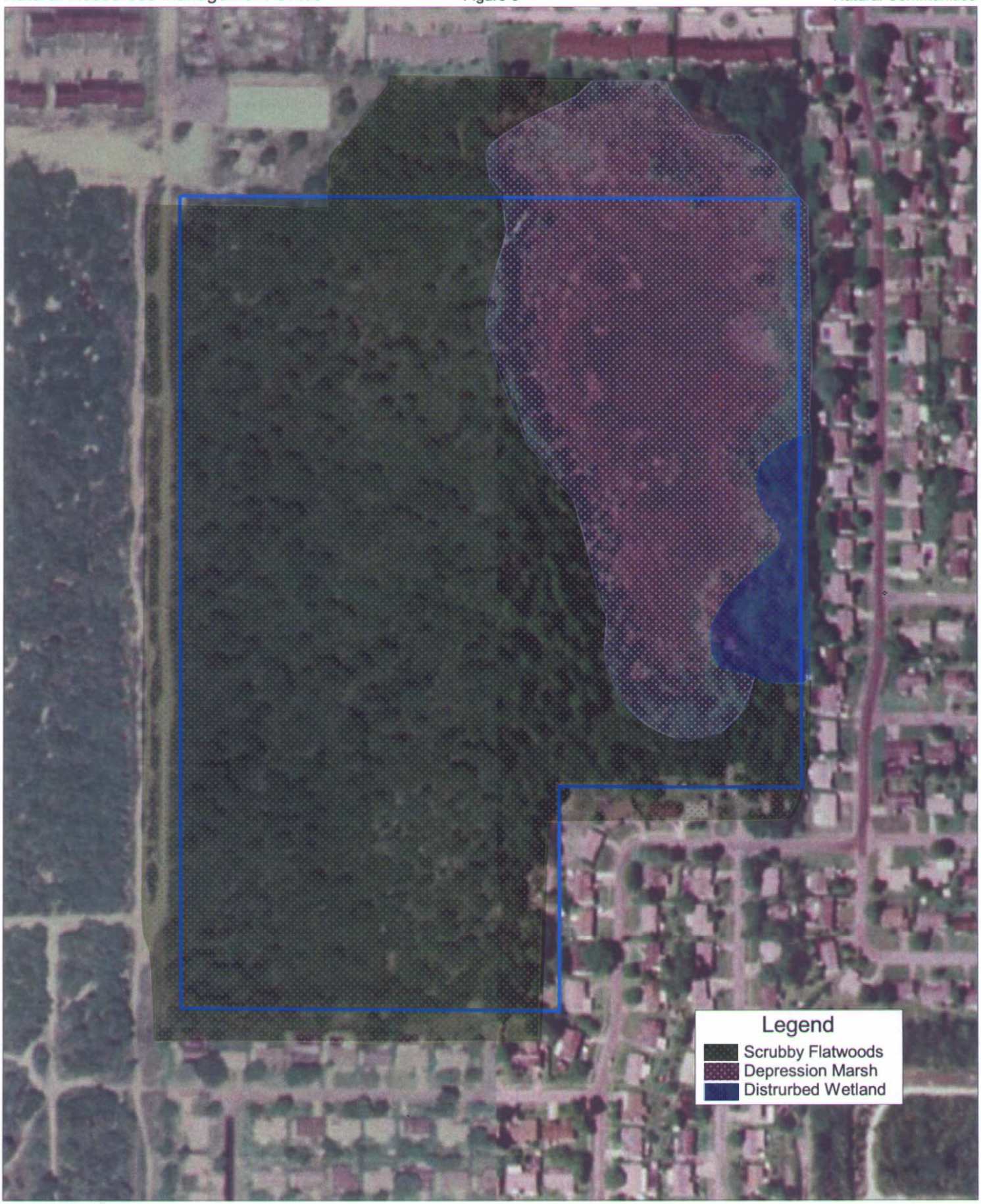

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Figure 7: Brevard County Map Reproduction - Aerial - 1943

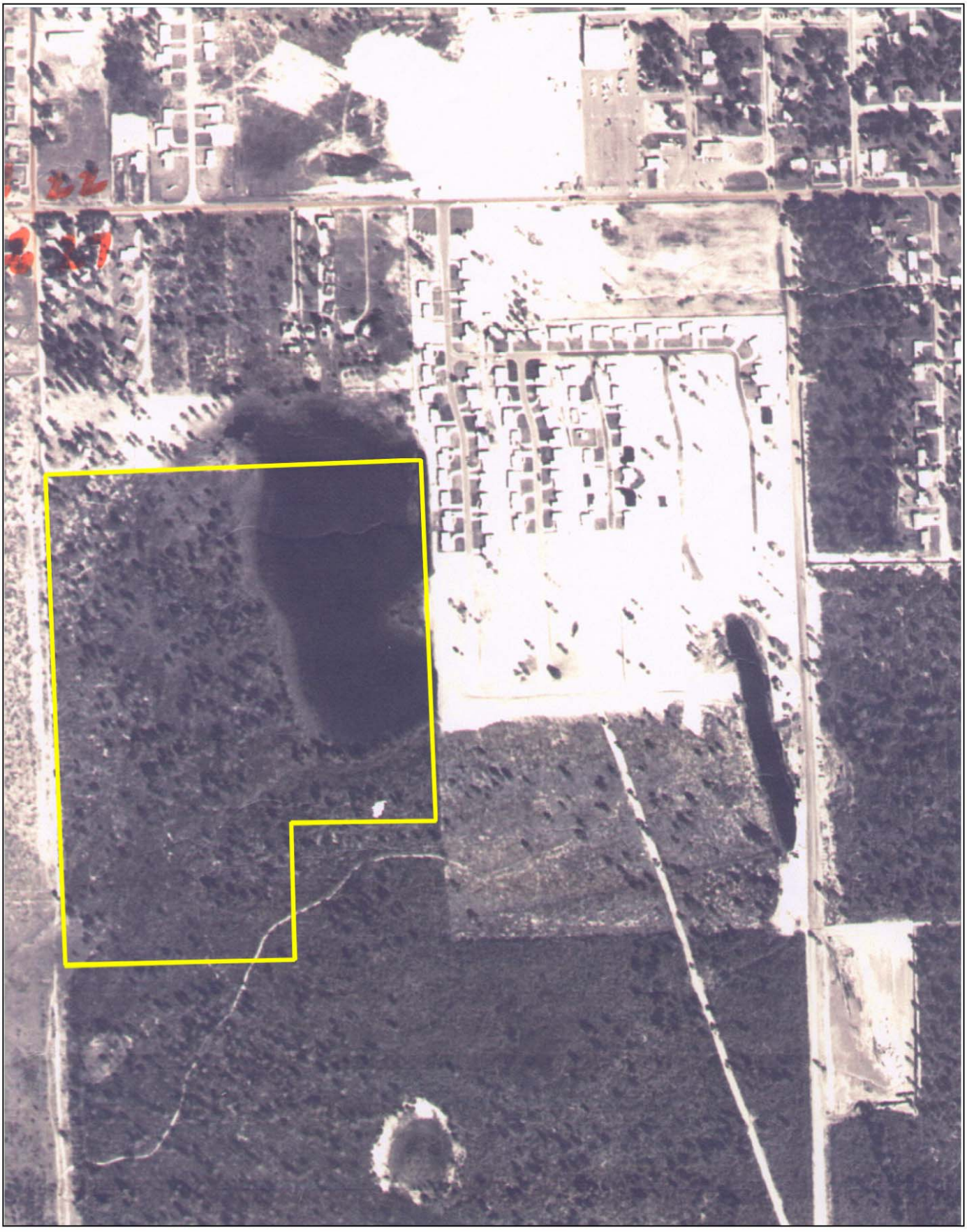
Present Dicerandra Scrub Sanctuary Boundary

Figure 8: Brevard County Map Reproduction - Aerial - 1951

Present Dicerandra Scrub Sanctuary Boundary

Figure 9: Brevard County Map Reproduction - Aerial - 1963

Present Dicerandra Scrub Sanctuary Boundary



Upland Communities

Scrubby Flatwoods - This community type makes up the majority of the site. The percent of scrubby flatwoods present is approximately 75%. An open canopy of longleaf and slash pines dominates the scrubby flatwoods community. In the southwest quadrant of the property there is an open canopy of sand pine. The understory is fetterbush, rusty lyonia, myrtle oak, Chapman oak, scrub live oak, and saw palmetto. The ground cover consists of wiregrass, *Andropogon* spp., partridge pea, and other herbs.

The presence of sand pine in the scrubby flatwoods when the property was purchased was an indication that fire had been absent for quit some time. To prepare the site for prescribed fire, EEL Program staff contracted to roller chop vegetation around the perimeter of the property boundary. This is done as a safety precaution when conducting a prescribed fire in an urban area. The EEL Program partnered with the Nature Conservancy to conduct the first prescribed burn on the Sanctuary in 2003.

Wetland Community

Depression Marsh – The depression marsh occurs on the eastern portion and makes up approximately 25% of the property. Plant species that occur within the depression marsh include dahoon holly (*Ilex cassine*), sand cordgrass (*Spartina bakeri*), St. John's wort (*Hypercum fasciculatum*), spikerush (*Eleocharis melanocarpa*), yellow-eyed grasses (*Xyris* spp.), Carolina willow (*Salix caroliniana*), maidencane (*Panicum* sp.), and wax myrtle (*Myrica cerifera*). During higher water levels bladderworts (*Utricularia* sp.), big floating heart (*Nymphoides aquatica*) and pickerelweed (*Pontederia cordata.*) are evident.

Disturbed Wetlands – The disturbed wetland occurs between the southeastern edge of the depression marsh and the eastern property boundary. Plant species that occur within the disturbed wetland include many exotics, such as, Brazilian pepper (*Schinus terebinthifolius)*, air potato vine (*Dioscorea bulbifera)*, and Chinese tallow tree (*Sapium sebiferum*). These exotics occur in the Sanctuary as a result of human impacts associated with the urbanization around the Sanctuary. The native vegetation within the disturbed wetlands includes wax myrtle, Carolina willow (*Salix caroliniana)*, groundsel tree (*Baccharis halimifolia*) and various herbaceous plants. The exotic vegetation within the disturbed wetland covers approximately 70%.

The Florida Natural Areas Inventory (FNAI) global and state rankings of the natural community elements identified on the Dicerandra Scrub Sanctuary are:

Scrubby flatwoods	G3/S3
Depression Marsh	G4/S3

Key: Florida Natural Areas Inventory (FNAI) natural community designations assigns two ranks for each natural community (element): G = global element rank, S = state element rank. Numbers represent: 1 = critically imperiled because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of vulnerability to extinction; 2 = imperiled because of rarity (6-20 occurrences or less than 3,000 individuals) or because of vulnerability to extinction; 3 = either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction because of other factors; 4 = apparently secure (may be rare in parts of range); 5 = demonstrably secure; #? Tentative rank; G?/S? not yet ranked (temporary).

c. Fire History

Prior to 2003, the presence of sand pine in the scrubby flatwoods was an indication that fire had been absent from the landscape for quite some time. To prepare the site for a prescribed burn, the EEL Program staff contracted to roller chop vegetation around the perimeter of the property boundary to create firebreaks. This is done as a safety precaution when conducting a prescribed fire in an urban area. A prescribed burn was conducted in March of 2003 across the 28 ± acres of flatwoods west of the marsh in partnership with the Nature Conservancy.

d. Fauna

Although no comprehensive faunal surveys have been initiated for the Dicerandra Scrub Sanctuary, the natural community heterogeneity characterizing the site provides suitable habitat conditions for use by a broad range of animal species. Species readily visible on the Sanctuary include: raccoons (*Procyon lotar*), Florida scrub-jays (*Alphelocoma coerulescens),* gopher tortoise (*Gopherus polyphemus),* and a variety of wading birds, migratory and neotropical migrant bird species. There are unconfirmed reports of bobcats (*Lynx rufus)* using the site.

David Breininger and Mike Legare of Dynamac Corp. have conducted demographic studies of Florida scrub- jays on this site as part of research on Florida scrub-jay populations in Brevard and Indian River Counties. Data from their findings can be found in the reports, *Biological Criteria for the Recovery of Florida Scrub-Jay Populations on Public Lands in Brevard County and Indian River County,* 2001 and 2003 Annual surveys by EEL Program staff, under the supervision of David Breininger, occur each year in March/April. A preliminary bird survey is attached as Appendix D.

A herptofauna survey may be conducted around the depression marsh area. A graduate intern student, EEL staff, or an EEL volunteer would perform this survey. The goal of this sampling will be to determine species richness and the relative species diversity of the site. Drift fences, cover boards, funnel traps, pit fall traps, and hand captures will be used to conduct the survey.

The Bailey Wildlife Foundation and US Fish and Wildlife Service (USFWS) are sponsoring a tracking study of Eastern Indigo snakes. The purpose of the study is to develop a relationship between home range and habitat use and apply that information to population viability analysis. Mike Legare with Dynamac Corporation has captured

indigo snakes, surgically implanted the tracking devices and released the snakes at the capture sites. The snakes are tracked and the movements recorded.

e. Designated Species

The Dicerandra Scrub Sanctuary will be managed to protect and enhance natural community functions that support the rich biological diversity exhibited on the site. A primary goal of this management plan is to develop and implement strategies to enhance conservation of threatened, endangered, or endemic species on the Sanctuary. The following is information on existing listed species or species that may occur on the Dicerandra Scrub Sanctuary.

Plants

From the preliminary plant surveys that were conducted in March 2000 and in 2003, four plant species endemic to Florida occur on the Sanctuary. These endemic species are Brownhair snoutbean (*Rhyncosia cineria*), Scrub hickory (*Carya floridana*), Spreading pinweed, (*Lechea divaricata*) and the Titusville balm (*Dicerandra thinicola*).

Scrub Hickory (Carya floridana)

The USFWS and the State of Florida under the auspices of the Florida Department of Agriculture and Consumer Services (FDACS) compile lists of protected plant species. The USFWS classifies protected plants as either endangered or threatened. The FDACS lists plant species that are considered State Endangered/Threatened and/or Commercially Exploited.

Additional plant surveys are needed to determine species present on the site, to map their locations and to photograph the areas detailing the extent of coverage of any designated species. A monitoring program will also be established for the designated species that are present on site. Once the baseline has been established, additional management activities can be addressed. Continued efforts to remove invasive exotics plants and the use of prescribed fire will allow for the natural progression of native species. The location of designated species has been considered during the creation of public access trails and during other management efforts including exotic plant removal and prescribed fires.

The only listed plant species recorded during site reviews was *Dicerandra thinicola*. The *Dicerandra thinicola* is found along the western boundary of the property in disturbed areas.

In 2000, Ramona Smith, graduate student at Florida Institute of Technology, investigated the seedling recruitment and life history of *Dicerandra thinicola*. The research project documented eighteen 1 square meter quadrants within the area where *Dicerandra thinicola* is located. Several main experiments were conducted: biomass, light and canopy openness, flower production, seed production, seed viability, seedling recruitment and leaf litter depth. Findings included:

- while plants are capable of living in a relatively wide range of openness, they prefer a higher amount of exposure for increased growth and reproduction
- the vast majority of seed pods collected contained no mature seeds
- germination rates in the field were less than 2%
- germination rates from laboratory studies ranged from 2-5%
- depth of leaf litter may affect seedling growth.

No statistical analyses were performed to reach these findings. Future studies should include similar experiments to verify these findings.

Currently, Eric Menges with Archbold Biological Station and Suzanne Kennedy with the non-profit Floravista, Inc. are conducting research into the demography and effects of fire on seedling recruitment of *Dicerandra thinicola*. Approximately 600 – 700 seeds collected in the adjacent Titusville wellfields were planted in plots in the Sanctuary. The goal is to attempt to recruit *Dicerandra thinicola* onto the managed area within the Sanctuary.

Dicerandra thinicola

Animals

The USFWS and the State of Florida under the auspices of the Florida Fish and Wildlife Conservation Commission (FWC) also compiles lists of protected wildlife species considered to be under possible threat of extinction. These species are categorized as either Endangered or Threatened. The FWC utilizes an additional category "Species of Special Concern" (SSC) for several animal species which may ultimately be listed as Endangered or Threatened. This classification provides the SSC listed animal with a particular level of protection that varies from species to species.

Florida scrub-jay (*Alphelocoma coerulescens*)

Florida Scrub-jay

The Florida scrub-jay is listed as a Threatened species by the USFWS and FWC. The history of the Florida scrub-jay on the Dicerandra Scrub Sanctuary is unknown. A review of the 1943 and 1959 aerials revealed a habitat that most likely was suitable for Florida scrub-jays (Breininger pers. Comm.). Jeffrey A. Cox, GFC Wildlife Biologist, also documented scrub-jays present on the site in 1982 (Status and Distribution of the Florida Scrub-jay, Florida Ornithological Society Special Publication No. 3, 1987). Dave Breininger with Dynamac continues to conduct annual surveys at Dicerandra Scrub Sanctuary and the adjacent Titusville wellfield to compile demographic information for the scrub-jays. In 2000 seven scrub-jays were observed to be using the Sanctuary. Six of the seven birds were banded. In 2001, two families of scrub-jays were observed in the wellfield adjacent to the Sanctuary. Breininger states that the habitat has the potential to support ten times that number, but that the scrub is suboptimal due to historic fire suppression.

Eastern Indigo Snake

Eastern indigo snakes (*Drymarchon corais couperi*) have been observed on the property. The USFWS and FWC list the Indigo snake as a Threatened species. It is uncertain whether there is a stable breeding population of indigo snakes in the area. Indigo snakes require large home ranges (370 to 2,500 acres) in order to maintain a stable population (Tennant, 1997). Impacts from dogs, humans and roads cause habitat fragmentation and reduce indigo snake populations. Their ability to utilize natural lands interspersed with urban areas is unknown. The Dicerandra Scrub Sanctuary and adjacent conservation lands do not provide the acreage required for a stable indigo snake population.

Indigo snake (*Drymarchon corais couperi*)

Gopher Tortoise

Gopher tortoises (*Gopherus polyphemus*) have been noted on the site. In June of 2006, the Florida Fish and Wildlife Conservation Commission changed the status of the gopher tortoise from Species of Special Concern to Threatened. This change will take effect in 2007. A formal survey will be conducted to determine if the population is stable and in good health. Managing the scrub habitat and reintroducing prescribed fire to the habitat will enhance the habitat by opening up the understory thereby increasing the amount of habitat open to foraging and colonization.

f. Biological Diversity

Gopher tortoises (*Gopherus polyphemus*)

No documented work has been conducted to assess the Sanctuary's biological diversity. Previously collected data were designed to qualitatively catalog species. Additional data will need to be collected in order to assess the biological diversity (both richness and evenness) so that changes in diversity can be tracked over time. Richness refers to the number of species found within a particular community, while evenness refers to the distribution of individuals among species. Methodologies will need to be established for all of the relevant taxonomic groups and researchers and staff identified to address this particular need.

C. Cultural

a. Archaeological

A thorough review of the Dicerandra Scrub Sanctuary to determine the presence of archaeologically significant sites has not been conducted. One management strategy will be to have an archaeology study performed on the site. The EEL Program staff will write a letter to the Division of Historical Resources asking for their assistance in performing an archeological survey of the Sanctuary.

b. Historical

The history of the area ranges from the Indian burial sites several miles to the west at Windover, dating from 6,000 BC to the events associated with the development of the space industry at Cape Canaveral during the 1950's, 1960's, and 1970's. In 1982, The Windover Development found one of the best preserved aboriginal burial sites to be discovered, with skeletons approximately 8,000 years old. The Ais Indians later occupied the region around Titusville (Historical Society of North Brevard, 1998).

There are no historic events associated with the Dicerandra Scrub Sanctuary. The following paragraphs provides some history of the area from 1000 BC to the 1920's.

Ais Indians (1000BC – 1500 AD)

The first people to inhabit Florida arrived about 12,000 years ago, from central and southern areas of the North American continent, at the end of the last ice age. At this time much of the North American continent was still covered by glaciers. Sea level was 200 feet below its current level and much of the earth's water was stored in glaciers (Brown, 1994).

At the time of European contact in the 16th century, the Ais (pronounced "Eyes") Indians were known to inhabit Brevard County. The Ais Indians did not exhibit the nomadic existence of other Native Americans, as the semi-tropical climate provided for their needs without requiring them to travel great distances.

Turn of the Century to Present

During the late 1800's and early 1900's, naturalists were some of the primary visitors to Brevard County. Notable scientists came to this species-rich, semi-tropical region to collect specimens for natural history museums. These specimens included rare bird life such as the Carolina parakeet (*Conuopsis carolinensis*), which is now extinct.

In the early 1900's, people came to Brevard County from around the country via the Florida East Coast Railway. There was an increase in settlement and development of towns brought about by the creation of railroads and canals. The increase in population was also the result of the 1916 Drainage Acts of Florida and the establishment of

Mosquito Control measures beginning in 1927. The Drainage Acts rerouted drainage patterns which permanently lowered water tables in areas where standing water naturally existed for six or more months each year. Mosquito control (pesticide spraying and mosquito control ditches) lowered the mosquito population to acceptable levels (Barille, 1988; Woodward-Clyde consultants, 1994).

In the 1920s, improved roads such as the Dixie Highway (U.S.1) brought more cars and people to Brevard County. In 1921, a bridge was built over the Indian River Lagoon and hotels and casinos were established. Later, air conditioning was introduced, and Florida became known as the residential and tourist destination it remains today.

c. Land-Acquisition History

In October 1993, the County acquired 44 acres from Bert & Lorene Solomon and Kenneth & Kathleen Jackson for $400,619.00. At the time of acquisition the property was zoned General Use. In 2002, the property was annexed into the City of Titusville and currently zoned Open Space and Recreational. The Dicerandra Scrub Sanctuary was acquired using public funds from the Brevard County EEL Program. The primary goal for acquisition of this Sanctuary is conservation of the natural resources and to protect the scrub mint *Dicerandra thinicola* population existing on the site.

The Dicerandra Scrub Sanctuary was acquired as part of Brevard Coastal Scrub Ecosystem (BCSE) Florida Forever project. The Sanctuary was acquired when the BCSE project was called the Scrub-jay Refugia Conservation and Recreation Lands (CARL) project. CARL was a conservation land acquisition program under the State's Department of Environmental Protection. It received funds through the Preservation 2000 (P-2000) legislation. P-2000, which was initiated in 1990, sunset in the year 2000 and was succeeded by the Florida Forever legislation, which is also a 10-year land acquisition and conservation program. Under Florida Forever, the DEP's CARL program was revised and titled the Florida Forever program, the same as the legislation. According to Multiparty Acquisition Agreement between the State and the County, the County was entitled to receive up to 50% of its land acquisition costs associated with this Sanctuary. In August 2000 the State reimbursed the County $199,655.50.

d. Public Interest

Public interest for the EEL Program as a whole has been enthusiastic and supportive. A public meeting held on May 20, 1998, which introduced the Master Site Plan for the Enchanted Forest Management and Education Center was very well received. Other potential partners include Brevard County Schools, the City of Titusville, Brevard Community College, local universities and specific non-profit groups. The Enchanted Forest Sanctuary provides a management and education center in close proximity to the Dicerandra Scrub Sanctuary. All management activities associated with the Dicerandra Scrub Sanctuary will be administered at the Enchanted Forest Center by the North Region Land Manager.

V. FACTORS INFLUENCING MANAGEMENT

Part V includes information regarding natural and human-induced trends, external influences, legal obligations, and constraints, management constraints, and public access and passive recreational activities.

A. Natural Trends

Past and future natural trends that influence resource values or management strategies are associated with regional climate and storm events that can influence the biological resources and natural characteristics of the site. Global trends, like sea level rise and global warming cause potential threats that are difficult or impossible to assess. In each case appropriate management strategies that protect natural ecosystem functions and biological diversity enables the site to respond to most, if not all, natural stochastic events.

The primary variable that influences the formation and succession of Florida's vegetative communities is fire. Florida's major upland community (e.g., pine flatwoods) experience fire naturally on a three to five year cycle. If natural fires are not present, or are suppressed by man, less-fire-adapted species can invade and alter the natural successional path of the community. Changes in species composition do occur with fire suppression in flatwoods. In scrubby flatwoods, structural changes (height growth, density) occur more rapidly than changes in species composition.

In systems such as scrub communities, lack of fire can profoundly affect the value and usability of the community for endemic as well as listed plant and animal species. Fires in scrub communities are typically less frequent than in flatwoods. To occur naturally, scrub fires require drier and hotter conditions than do the flatwoods (Myers and Ewel, 1990). Land management practices developed for the Dicerandra Scrub Sanctuary must consider the re-introduction of a "natural" fire regime through the use of prescribed fire. Using prescribed fire as a management tool ensures that the natural ecological processes are restored and protected.

Another factor affecting the communities within the Dicerandra Scrub Sanctuary is hydroperiod, particularly in the depression marsh area of the site. Changes in hydroperiod have the potential to significantly alter community structure. A decrease in hydroperiod could allow the invasion of nuisance or non-native species, while an increase in hydroperiod could surpass the inundation tolerances of the species present.

The natural hydrologic regime and periodicity of the Dicerandra Scrub Sanctuary is expected to have been altered by the residential area that surrounds it on the north, south, and east boundaries of the property. Investigation into the natural hydroperiod as well as the existing hydroperiod should be undertaken to better understand and enhance the natural ecological processes.

Land management practices for Dicerandra Scrub Sanctuary will include re-establishment of natural hydroperiods and re-introduction of a natural fire regime through prescribed burning. This will be dependent on the needs and ability to introduce these practices.

B. Human-Induced Trends

Humans have altered the surrounding landscape through activities such as development, the introduction of exotic plants and animals, and recreational activities. Other factors influencing the site include natural fire suppression, localized disruption or damage of vegetation by foot trails, disruption of vegetation by dirt bikes/ATV's, and dumping of garbage.

The management goals set forth in the Section VI - Management Action Plan provide strategies and actions for reduction of human-induced impacts and restoration and enhancement of natural resources. As part of the management plan implementation, methodologies for assessing carrying capacity of the natural resources on the site will be developed. In addition, strategies for visitor impacts analysis that consider species-level, natural community-level and ecosystem-level human influences will be developed and implemented.

C. External Influences

On the east and south side of the property boundary some encroachment from the residential homeowners occurred prior to the installation of boundary fencing. There was evidence that adjacent property owners had mowed vegetation within the Sanctuary boundary and dumped some debris within the Sanctuary. A wooden play structure located on the northern boundary of the site was removed.

Boundary Fence and Firebreak

The Sanctuary boundary has been fenced and posted, with public access limited to three walk-throughs at gates. EEL staff and interns, County staff and volunteers removed trash during several workdays. Letters were sent to neighboring residents notifying them of the presence and purpose of the Sanctuary in their community and alerting them to planned management activities. Volunteer workdays will continue to be scheduled for exotic species removal and trail maintenance.

D. Legal Obligations and Constraints

The following is a list of possible legal constraints to management and public access on site.

St. John's River Water Management District

The St. Johns Water Management District (SJRWMD) regulates impacts to wetlands pursuant to Part IV, Chapter 373 of the Florida Statutes (F.S.) and in accordance with Chapters 40C-4, 40C-40, 40C-41, and 40C-400 of the Florida Administrative Code (F.A.C.). The 1995 Florida Wetlands Delineation Manual defines jurisdictional wetlands. The SJRWMD typically requires an Environmental Resource Permit (ERP) to impact wetlands. Mitigation is required for impacts greater than 0.5 acres in size. In considering wetland impacts, SJRWMD considers not only direct impact to wetlands, but secondary impacts that may affect wetland dependent wildlife. To minimize secondary wetland impacts, SJRWMD generally requires that applicants preserve a buffer of undisturbed upland habitat with a 15' minimum width and 25' average width around preserved wetlands [Sec. 12.2.7(a)].

Prior to submitting an application for dredging or filling within Waters of the state, it is recommended that the areas proposed for impact be delineated in accordance with the Unified Wetland Delineation Methodology for the State of Florida dated 1 July 1994, and then reviewed and confirmed by representatives of the SJRWMD.

U.S. Army Corps of Engineers

Any associated impacts to wetlands will require an additional permit through the U.S. Army Corps of Engineers (USACE). USACE regulates wetlands connected to "Waters of the State" and isolated wetlands pursuant to Section 404 of the Clean Water Act. Mitigation may not be required if impacts are minimal or to degraded systems.

Division of Forestry

The Florida Division of Forestry (DOF) issues permits for prescribed burns for land management to land managers with certified burn numbers. Certification is provided by DOF.

E. Management Constraints

Potential management constraints and challenges are associated with site security, limited on-site presence and proximity of residential homes. The following is a description of the major management issues and constraints associated with the Sanctuary.

Titusville Wellfield

The wellfield owned by the City of Titusville is adjacent to the western boundary of the Sanctuary. The wellfield is located on a quality scrub habitat that supports scrub-jays, indigo snakes, gopher tortoises and *Dicerandra thinicola*. The area also serves as a primary aquifer recharge. The EEL Program staff recognizes the conservation value of the wellfield and intends to pursue a partnership with the city of Titusville in order to manage the two sites as one ecosystem.

Fire

Natural communities within the Dicerandra Scrub Sanctuary will be evaluated to determine any constraints upon the use of prescribed burning posed by natural site conditions and adjacent land uses. The EEL Selection & Management Committee and the EEL staff have already established the need for fire within the scrubby flatwoods community. Within the first year after adoption of this management plan by the Brevard County Board of County Commissioners, a site-specific fire management plan will need to be developed for the entire Sanctuary. The fire management plan will include the habitat maintenance and restoration goals of the EEL Program, and provide a detailed approach to conducting prescribed burns. The development of this plan should involve local and state experts on prescribed burning, including the Florida Division of Forestry, The Nature Conservancy, U.S. Fish and Wildlife Service, the County's Public Safety Department, City Fire Departments, and Volunteer Fire Departments.

Exotic Species

Exotic, non-indigenous, non-native, and alien species are all terms used to describe plants and animals that are of foreign origin, yet may persist, thrive, harm or displace native species and alter native ecosystem function. Well-known and widespread non-indigenous plant species include Australian pine, Brazilian pepper, potato vine, Chinese tallow tree and cogon grass.

Plants

The plant survey conducted in March 2000 identified 17 exotic plant species present on the Sanctuary. A list of these exotic species is provided in Table 1. Brazilian pepper (*Schinus terebinthifolius)* is the dominant nuisance plant noted within the Dicerandra Scrub Sanctuary. Air potato (*Dioscorea bulbifera*) and Chinese tallow tree (*Sapium sebiferum*) are also cause for concern within the Sanctuary boundaries. It should also be noted that a detailed inventory of exotic/invasive/nuisance plants has not been conducted, and other exotic species are likely to exist on-site.

Table 1. Exotic Plants Species List – Dicerandra Scrub Sanctuary - 2000

Scientific Name	**Common Name**	
Asparagus sp.	Asparagus fern	**Florida Exotic Pest Plant Council Category I***
Dioscorea bulbifera	Air potato	
Melaleuca quinquenervia	Melaleuca	
Sapium sebiferum	Chinese tallow tree	
Schinus terebinthifolius	Brazilian pepper	
Cinnamomum camphora	Camphortree	
Citrus sp.	Wild citrus	
Enterolobium contortisiliquum	Earpod tree	
Kalanchoe sp.	Kalanchoe	
Koelreuteria elegans	Golden rain tree	
Monstera deliciosa	Monstera	
Oxalis debilis	Pink woodsorrel	
Philodendron selloum	Philodendron	
Philodendron sp.	Philodendron	
Sansevieria hyacinthoides	Mother-in-law's tongue	
Tecoma capensis	Cape Honeysuckle	
Yucca aloifolia	Spanish bayonett	
*****Category I*** *– Invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives.*		

The EEL Program staff along with volunteer groups will prepare an inventory of the exotic and/or invasive plant species found within the Dicerandra Scrub Sanctuary, and develop strategies to remove the species, or to control their coverage. The EEL Program staff is currently developing a comprehensive treatment and monitoring program to ensure the long-term removal of these species from the Dicerandra Scrub Sanctuary and other EEL managed properties. EEL staff and volunteers have begun removal of air potato, Brazilian pepper and melaleuca from the Sanctuary.

Air potato (Dioscorea bulbifera)

Animals

Exotic and non-indigenous animal species also have the potential to adversely affect ecosystem function and to significantly alter population levels of native animals through predation or displacement. The fire ant (*Solenopsis invicta*) has become present in Central Florida, as has the nine-banded armadillo (*Dasypus novemcinctus).* Wild forms of domesticated animals such as the feral hog are also widespread and can cause significant harm to the vegetation and soils due to their rooting. Currently there is no evidence of feral pigs utilizing the Sanctuary.

Due to the nature and location of this Sanctuary, feral cats and feral dogs could be present and could pose a significant threat to the wildlife. No established feral cat colonies are found on the Sanctuary. Any feral cats and dogs found on the property will be trapped and taken to the local animal shelter.

A list of non-indigenous animal species has not been collected. An investigation into the levels and impacts of these species needs to be conducted prior to the establishment of a control strategy.

F. PUBLIC ACCESS AND PASSIVE RECREATION

The EEL Program staff is committed to provide a range of public use opportunities that are consistent with the conservation and protection goals of the voter approved referendum. It has been determined that passive recreational activities best support the EEL Program goals. The EEL Program *Sanctuary Management Manual* defines passive recreation as follows:

> "A recreational type use, level of use and combination of use that do not, individually or collectively, degrade the resource values, biological diversity, and aesthetic or environmental qualities of a site."

The Dicerandra Scrub Sanctuary is a Category 3 site meaning that there are minimal or no improvements made to the Sanctuary due to vulnerability of resources, and/or need for intensive management and/or restoration. Category 3 Sites will provide opportunities for public access within limited areas of the site. Public access areas will be controlled through the use of site design decisions and capital improvements, such as, limited trail networks, scenic overlooks, and elevated boardwalks. The size, location, habitats and SMM category ranking of the Dicerandra Scrub Sanctuary will dictate the types of activities that will be compatible with the primary conservation mandate.

The original conceptual plan for the Sanctuary is included in Figure 10. The current hiking trail is included in Figure 11. A trailhead with educational kiosk was placed at the end of Melissa Dr. in early 2005. The EEL Program Recreation and Education Committee (REAC) approved the Dicerandra Scrub Sanctuary recreation assessment in December of 2005. The Dicerandra Scrub Sanctuary currently accommodates limited hiking and nature watching as well as scientific studies and research. No facilities are proposed for this site. Whenever possible, research and restoration conducted on site will be used to guide educational programs.

The current hiking trail is the only trail proposed for the site. The trail traverses through the scrubby flatwoods, past the depression marsh and then loops back through the scrubby flatwoods past the *Dicerandra thinicola* and back to the trailhead. A proposed overlooked will be added along the trail running adjacent to the depression marsh. The trail is unimproved with minimal interpretive signage and a kiosk. A Sanctuary brochure and a Self-guided Hike Brochure will be created for the Sanctuary. Points of interest along the trail will may include scrub-jays, gopher tortoises, scrub hickory and wading birds during times of high water.

Due to environmental and public health & safety issues, dogs and other pets are not permitted in the Dicerandra Scrub Sanctuary, except for service animals needed for the disabled.

Figure 10: Conceptual Plan

Dicerandra Scrub Sanctuary

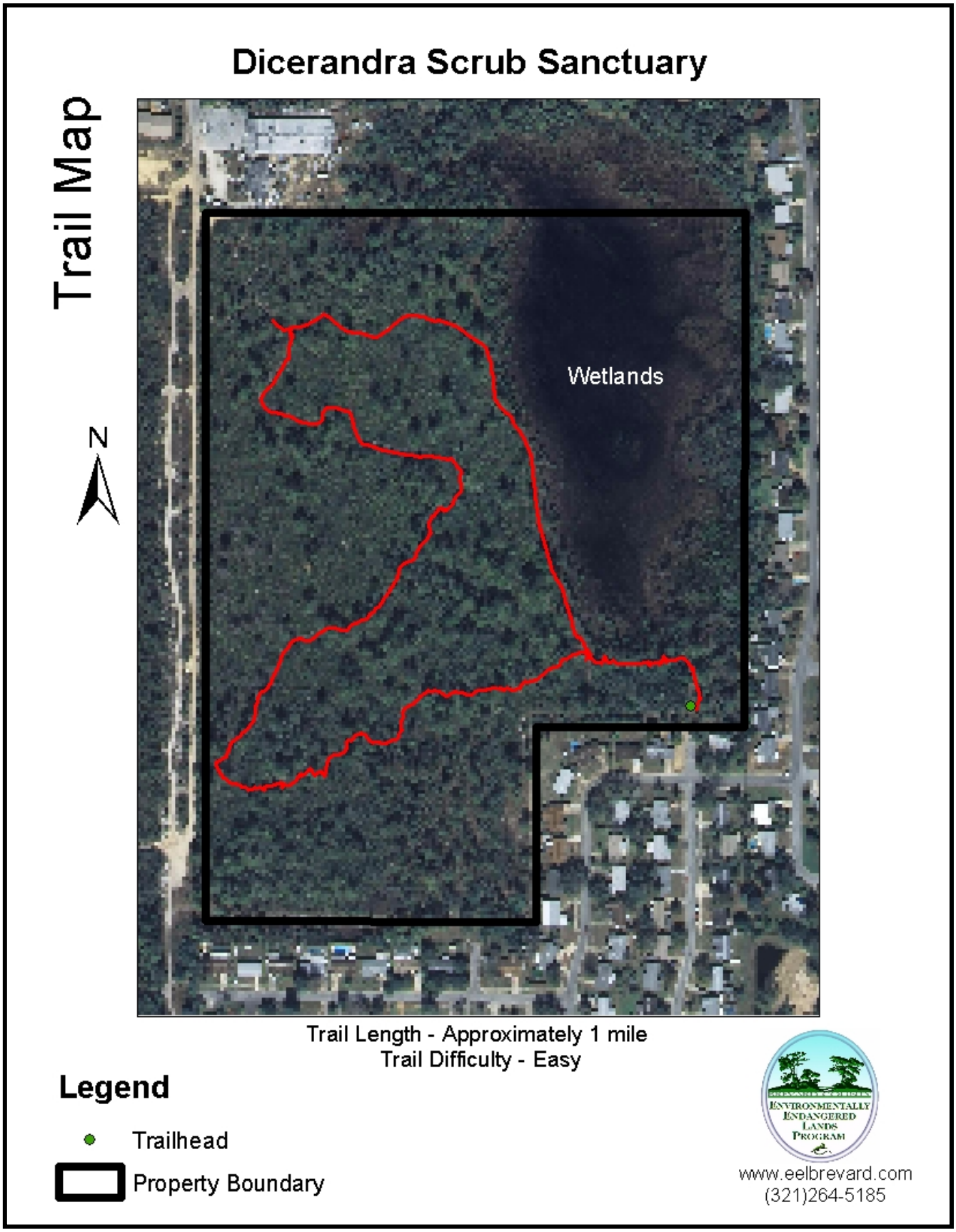


Figure 11. Current Dicerandra Scrub Sanctuary trail map.

VI. MANAGEMENT ACTION PLANS

The following is a comprehensive outline of the goals, strategies, and actions necessary to manage the Dicerandra Scrub Sanctuary.

A. Goals

The *Sanctuary Management Manual* of the EEL Program provides the following management goals for the Dicerandra Scrub Sanctuary.

- Documentation of historic public use
- Conservation of ecosystem function
- Conservation of natural (native) communities
- Conservation of species (including endemic, rare, threatened and endangered species)
- Documentation of significant archeological and historic sites
- Provision of public access and responsible public use
- Assessment of carrying capacity of natural resources with public use
- Provision of environmental education programs
- Opportunities for multiple uses and compatibility
- General upkeep and security of the property

B. Strategies and Actions

The following is an outline of the specific management strategies and actions that are needed to meet the management goals for the Dicerandra Scrub Sanctuary.

GOAL: DOCUMENTATION OF HISTORIC PUBLIC USE

Strategy 1: Document historic public use

Actions:
- Collect historic information regarding the types of activities that have occurred on-site;
- Evaluate how historic public use impacted the site's natural resources;
- Consider historic public use patterns in planning future public uses.

GOAL: CONSERVATION OF ECOSYSTEM FUNCTION

Strategy 2: Protect, maintain, and restore native diversity, ecological patterns, and the processes that maintain diversity.

Actions:
- Research and monitor baseline conditions of natural systems;
- Research the connection of on-site natural resources with adjacent resources;

- Research hydrologic patterns on and off-site;
- Focus natural community restoration efforts on enhancing native diversity;
- Investigate the historic hydroperiod.

Strategy 3: Ensure that natural upland-wetland interfaces are protected and enhanced.

Actions:
- Collect data to analyze the public access on the natural resources;
- Protect communities from deleterious impacts deriving from external influences;
- Restore/enhance natural communities.

GOAL: CONSERVATION OF NATURAL (NATIVE) COMMUNITIES

Strategy 4: Restore degraded, disturbed, or altered wetlands within the Dicerandra Scrub Sanctuary.

Actions:
- Establish baseline conditions within wetlands;
- Use native plants for restoration efforts (if needed);
- Assess possible impacts of proposed restoration on adjacent communities and offsite properties;
- Implement the selected restoration activities (i.e. remove exotic species, restore natural hydrologic flood, etc.);
- Monitor the effects of the restoration activities, evaluate the success of the restoration projects, and revise the restoration plan, as necessary.

Strategy 5: Restore degraded, disturbed, or altered uplands within the Dicerandra Scrub Sanctuary.

Actions:
- Establish baseline conditions within the upland communities;
- Consult local experts and current literature regarding best scientific methods for upland restoration;
- Prioritize the upland communities in need of restoration based upon ease of accomplishment, expected habitat value yield, or financial considerations;
- Use native plants for restoration efforts (if needed);
- Assess possible impacts of proposed restoration on adjacent communities and offsite properties;
- Implement the selected restoration activities (i.e. remove exotic species, restore natural disturbance regime, replant native species, etc.);
- Monitor the effects of the restoration activities, evaluate the success of the restoration projects, and revise the restoration plan, as necessary.

Strategy 6: Design and implement a "natural" fire management program.

Actions:

- Identify natural communities that require prescribed fire management;
- Identify and evaluate individual proposed burn management units;
- Identify the goal of the application of fire to each proposed burn unit;
- Document listed species within each burn unit;
- Identify and plan perimeter and internal fire breaks;
- Develop and implement public education campaign including programs and literature regarding the need for periodic controlled burns;
- Secure the necessary permits from the State Division of Forestry and other agencies;
- Secure the service of properly trained staff or consultants to implement the prescribed burns;
- Begin prescribed fire management program;
- Monitor the effects of the fire management activities, evaluate the success of the program, and revise the program strategies as needed.

GOAL: CONSERVATION OF SPECIES (INCLUDING ENDEMIC, RARE, THREATENED AND ENDANGERED)

Strategy 7: Protect on-site populations of endemic, rare, threatened and endangered species through the utilization of existing habitat management and species recovery plans.

Actions:

- Develop a methodology and work plan to accomplish the identification of designated plant and animal species;
- Survey for, and identify listed/protected plant and animal species;
- Plot the location of identified designated species within and/or adjacent to the sanctuary for use in the implementation, or re-distribution, of amenities or site improvements;
- Periodically update these baseline survey data to determine possible changes in designated species distribution or density;
- Review management plans for consistency with USFWS and FGFWFC guidance concerning listed species;
- Implement habitat restoration activities for listed species (i.e. removal of exotic/nuisance species, restoration of ecosystem function);
- Establish periodic monitoring of habitat suitability (where indices are available for a given species), species population levels, diversity levels, and exotic/nuisance species, as a means of evaluating the success of management strategies.

GOAL: DOCUMENTATION OF SIGNIFICANT ARCHAEOLOGICAL AND HISTORIC SITES

Strategy 8: Survey for archaeological and historic sites within the Dicerandra Scrub Sanctuary.

Actions:
- Contact the State Division of Historic Resources to conduct a Phase I survey of the site;
- Review available maps and historic records for indications of past usage of the site;
- Map all archaeological and historic sites for future reference.

GOAL: PROVISION FOR PUBLIC ACCESS AND RESPONSIBLE PUBLIC USE

Strategy 9: Establish and enforce specific policies and management techniques for public access and responsible public use.

Actions:
- Plan appropriate public facilities by examining the site's natural and cultural resources and reviewing public input;
- Evaluate design and proposed public facilities for consistency with ADA guidelines;
- Establish social and environmental carrying capacities for proposed public facilities;
- Use daily or seasonal quotas, restricted access or limited parking to enforce established carrying capacities;
- Coordinate recreational use with the ecological burning strategies of the EEL Program;
- Minimize unauthorized trail expansion by establishing sufficient trails, constructing handrails, and the development of written guidelines;
- Construct hiking trails in accordance with the USDA Forest Service "Standard Specifications for the Construction of Trails";
- Construct terraces for erosion control.

GOAL: ASSESSMENT OF CARRYING CAPACITY OF NATURAL RESOURCES WITH PUBLIC USE

Strategy 10: Establish a monitoring program to assess effects of public usage on natural resources.

Actions:
- Establish baseline vegetation monitoring transects to provide data regarding existing conditions prior to development;
- Establish a methodology and record keeping system to document public use;
- Conduct regular monitoring to assess impacts of public use on natural habitats;
- Conduct regular "walk-throughs" over frequently used sites to assess the need for changes in routing/user types, or user intensity;

- Re-route users from sensitive areas or popular sites on a regular or as-needed basis;
- Re-align public use to avoid areas which observations or data indicate are too sensitive for the level of use originally planned.

GOAL: PROVISION OF ENVIRONMENTAL EDUCATION PROGRAMS

Strategy 11: Develop a plan to provide on-going environmental education programs to Brevard County residents and visitors.

Actions:

- Determine target audiences and types of programming best suited to those groups;
- Design and develop indoor and outdoor exhibits, signs and printed materials;
- Include educators, friends groups and other organizations in the design, development and delivery of programs;
- Develop and coordinate a docent program to assist in program delivery;
- Develop and provide training and site specific informational materials for use by docents and other educators;
- Develop a marketing and promotions plan for educational programs;
- Develop criteria and process of evaluation for program review and refinement;
- Provide a “special collection” of books and other materials specifically related to the environmental and cultural character of the Sanctuary.

GOAL: GENERAL UPKEEP AND SECURITY OF THE PROPERTY

Strategy 12: Secure and maintain the Sanctuary to the highest degree possible using EEL staff, Parks and Recreation staff, contract employees and volunteers.

Actions:

- Contract with outside contractors or with Brevard County, Parks and Recreation for maintenance of parking areas, fire breaks, trails, boardwalks, bridges, benches etc.;
- Coordinate daily maintenance tasks using staff and volunteers.

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION

Part VII recommends a timeline for management plan implementation. The timeline has been divided into immediate, short-term and long-term time frames. Immediate time frame is defined as within one year of the adoption of this management plan, short term is 1 to 5 years, and long-term is more than 5 years. Some actions are also defined as on-going, if the activity is required for the on-going maintenance of the Sanctuary.

ACTION	**ACTIVITY TIMELINE**
Strategy 1: Document historic public use	
Collect historic information regarding the types of activities that have occurred on-site	Short-term
Evaluate how historic public use impacted the site's natural resources	Short-term
Consider historic public use patterns in planning future public uses	Short-term
Strategy 2: Protect, maintain, and restore native diversity, ecological patterns, and the processes that maintain diversity	
Research and monitor baseline conditions of natural systems	Immediate
Research the connection of on-site natural resources with adjacent resources	Immediate
Research hydrologic patterns on and off-site	Immediate
Research native species' movement patterns on and off-site	Immediate
Focus natural community restoration efforts on enhancing native diversity	Short-Term
Strategy 3: Ensure that natural upland-wetland interfaces are protected and enhanced	
Collect data to analyze the public access on the natural resources;	Short-Term
Protect communities from deleterious impacts deriving from external influences	On-going
Restore/enhance natural communities.	On-going
Strategy 4: Restore degraded, disturbed, or altered wetlands within the Dicerandra Scrub Sanctuary	
Establish baseline conditions within wetlands;	Immediate
Collect historic information regarding the prior wetland communities that may have occurred on-site;	Immediate
Consult local experts and current literature regarding best scientific methods for wetland restoration;	Immediate
Prioritize the wetland communities in need of restoration based upon ease of accomplishment, expected habitat value yield, or financial considerations;	Immediate
Assess possible impacts of proposed restoration on adjacent communities and offsite properties;	Immediate
Implement the selected restoration activities (remove exotic species, restore natural hydrologic flood, etc.);	Short-term
Monitor the effects of the restoration activities, evaluate the success of the restoration projects,	On-going

Strategy 5: Restore degraded, disturbed or altered uplands within the Dicerandra Scrub Sanctuary

Conduct monitoring to establish baseline conditions within the upland communities	Immediate
Collect historic information regarding prior wetland communities that may have occurred on-site	Immediate
Consult local experts and current literature regarding best scientific methods for upland restoration	Immediate
Prioritize the upland communities in need of restoration	Immediate
Assess possible impacts of proposed restoration on adjacent communities and off-site properties	Short-Term
Implement the selected restoration activities	Long-Term
Monitor the effects of the restoration activities, evaluate the success of the restoration projects, and revise the restoration plan as necessary	On-going

Strategy 6: Design and implement a "natural" fire management program

Identify natural communities that require prescribed fire management	Immediate
Identify and evaluate individual proposed burn management units	Immediate
Identify the goal of the application of fire to each proposed burn unit	Immediate
Document listed species within each burn unit	Immediate
Identify and plan perimeter and internal fire breaks	Short-Term
Develop and implement public education campaign including programs and literature regarding the need for periodic controlled burns	Short-Term
Secure the necessary permits from the State Division of Forestry and other agencies	Short-Term
Begin prescribed fire management program	Short-Term
Monitor the effects of the fire management activities, evaluate the success of the program, and revise the program strategies as needed	On-going

Strategy 7: Protect on-site populations of endemic, rare, threatened and endangered species through the utilization of existing habitat management and species recovery plans

Develop a methodology and work plan to accomplish the identification of designated plant and animal species	On-Going
Survey for, and identify listed/protected plant and animal species	Immediate
Plot the location of identified designated species within and/or adjacent to the sanctuary for use in the implementation, or re-distribution, of amenities or site improvements	Short-Term
Periodically update these baseline survey data to determine possible changes in designated species distribution or density	Short-Term
Review management plans for consistency with USFWS and FGFWFC guidance concerning listed species	Short-Term
Implement habitat restoration activities for listed species	On-Going
Establish periodic monitoring of habitat suitability, species population levels, diversity levels, and exotic/nuisance species, as a means of evaluating the success of management strategies	On-going

Strategy 8: Survey for archaeological and historic sites

Contact the State Division of Historic Resources to conduct a Phase I survey of the site	Immediate
Review available maps and historic records for indications of past usage of the site	Immediate
Map all archaeological and historic sites for future reference	Short-Term

Strategy 9: Establish and enforce specific policies and management techniques for public access and responsible public use

Plan appropriate public facilities by examining the site's natural and cultural resources and reviewing public input	Immediate
Evaluate design and proposed public facilities for consistency with ADA guidelines	Short-Term
Establish social and environmental carrying capacities for proposed public facilities	Short-Term
Use daily or seasonal quotas, restricted access or limited parking to enforce established carrying capacities	Short-Term
Coordinate recreational use with the ecological burning strategies of the EEL Program	Short-Term
Minimize unauthorized trail expansion by establishing sufficient trails, constructing handrails, and the development of written guidelines	Short-Term
Construct hiking trails in accordance with the USDA Forest Service "Standard Specifications for the Construction of Trails"	Short-Term
Construct terraces for erosion control	

Strategy 10: Establish a monitoring program to assess effects of public usage on natural resources

Establish baseline vegetation monitoring transects to provide data regarding existing conditions prior to development	Short-Term
Establish a methodology and record keeping system to document public use	On-Going
Conduct regular monitoring to assess impacts of public use on natural habitats	On-Going
Conduct regular walk-throughs over frequently used sites to assess the need for changes in routing/user types, or user intensity	On-Going
Re-route users from sensitive areas or popular sites on a regular or as-needed basis	On-Going
Re-align public use to avoid areas which observations or data indicate are too sensitive for the level of use originally planned	On-Going

Strategy 11: Develop a plan to provide on-going environmental education programs to Brevard County residents and visitors

Determine target audiences and types of programming best suited to those groups	Short-Term
Design and develop indoor and outdoor exhibits, signs and printed materials;	Short-Term
Include educators, friends groups and other organizations in the design, development and delivery of programs	Short-Term
Develop and coordinate a docent program to assist in program delivery	Short-Term
Develop and provide training and site specific informational materials	Short-Term

for use by docents and other educators	
Develop a marketing and promotions plan for educational programs	Short-Term
Develop criteria and process of evaluation for program review and refinement	Short-Term
Provide a “special collection” of books and other materials specifically related to the environmental and cultural character of the Sanctuary	Long-Term

Strategy 12: Secure and maintain the Sanctuary to the highest degree possible using EEL staff, EEL Interns, Parks and Recreation staff, contract employees and volunteers

Employ a land manager to oversee maintenance and security activities	Short-Term
Contract with outside contractors and/or Brevard County, Parks and Recreation for maintenance of parking areas, fire breaks, trails, boardwalks, bridges, benches, etc.	On-Going
Coordinate daily maintenance tasks using staff and volunteers	On-going

VIII. FINANCIAL CONSIDERATIONS

The Brevard County EEL Program receives land acquisition and management revenues from ad valorem revenues collected pursuant to the 1990 and 2004 voter-approved EEL Referendums. The EEL Program allocates bond funds to capital land acquisition and one-time capital expenditures. Ad valorem revenues collected during each fiscal year that are not required for bond debt services can be used for any legal purpose within the EEL Program pursuant to §200.181 and §125.013 of the Florida Statutes. The EEL Program will collect ad valorem revenues from the 1990 referendum until the Year 2011 and from the 2004 referendum until 2024, the sunset dates of the ad valorem collections respectively.

Based on financial projections, the EEL Program shall annually appropriate a portion of the EEL Program ad valorem millage not required for bond debt services to fund annual EEL Program capital and non-capital expenditures. Specific appropriations for the Dicerandra Scrub Sanctuary property will be made each fiscal year as part of this overall annual budget process. The EEL Program budget will be reviewed and adopted annually as part of the Brevard County budget process and as authorized by the Board of County Commissioners. After 2024, the Board of County Commissioners will consider other funding options and financial resources to address the long-term management responsibilities of the EEL Program.

The following is a breakdown of the general costs estimated for annual management operations of the Dicerandra Scrub Sanctuary:

Annual Management

Staff Salaries/ Benefits* (Staff also responsible for other North Region sites.)

Land Manager (f.t)	$5,008 (incl. benefits)
Assistant Land Manager (f.t.)	$2,978 (incl. benefits)
Management Activities	$15,000

(Exotic treatment, fire management, trail environmental education, boundary maintenance, etc.)

Total	**$22,986**

*Staff salaries/benefits for the Dicerandra Scrub Sanctuary reflect approximately one-twelfth of the North Region Land Manager and Assistant Land Manager salaries/benefits. It is estimated that management of the Enchanted Forest Management and Education Center will require three-quarters of their time, and their remaining time will be divided among the other sites in the North Region.

A Land Manager has been hired to oversee maintenance, security and resource management for the Dicerandra Scrub Sanctuary and other properties within the North Region Management Area. An Assistant Land Manager will assist the Land Manager with maintenance, security, and resource management for all properties in the north

region. The cost estimate for personnel assumes that volunteers will be utilized to assist with maintenance and research. The maintenance and operations cost includes estimates for travel activities, office supplies, repair and maintenance services, printing and training. The cost estimate for resource management includes activities such as research and monitoring contracts, developing and implementing the prescribed burn program, environmental education programs and exotic species removal.

In addition to the on-going maintenance and operation costs estimate, EEL Staff had the following capital start-up costs for the Dicerandra Scrub Sanctuary, for the completed projects which are outlined below.

Capital Improvement

Boundary Fencing and Firebreak Installation	$26,916.75
Rollerchopping	$2,715.00
Boundary Signs (20 @ $8 each)	$160.00

IX. BIBLIOGRAPHY

Part IX provides the following citations for original research or publications used to develop the Management Plan.

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X. APPENDICES

Appendix A: State of Florida Lease

Appendix B: Florida Natural Areas Inventory

Appendix C: Preliminary and Secondary Plant Surveys

Appendix D: Preliminary Bird Survey

Appendix A: State of Florida Lease

ATL1
44.21 Acres DICERANDRA (SOLOMON/JACKSON)

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT

TRUST FUND OF THE STATE OF FLORIDA

AMENDMENT NUMBER 1 TO LEASE NUMBER 4263

BREVARD COASTAL SCRUB

THIS LEASE AMENDMENT is entered into this 4TH day of SEPTEMBER, 2001, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and BREVARD COUNTY, FLORIDA, hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds title to certain lands and property for the use and benefit of the State of Florida; and

WHEREAS, on June 27, 2001, LESSOR and LESSEE entered into Lease Number 4263 ; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the leased property.

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of Lease Number 4263 is hereby amended to include the real property described in Exhibit "A," attached hereto, and by reference made a part hereof.

2. It is understood and agreed by LESSOR and LESSEE that in each and every respect the terms of Lease 4263, except as amended, shall remain unchanged and in full force and effect and the same are hereby ratified, approved and confirmed by LESSOR and LESSEE.

IN WITNESS WHEREOF, the parties have caused this Lease Amendment to be executed on the day and year first above written.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA

Witness

Print/Type Witness Name

Witness

Print/Type Witness Name

By: _____ (SEAL)
GLORIA NELSON, OMC MANAGER
BUREAU OF PUBLIC LAND ADMINISTRATION, DIVISION OF STATE LANDS, DEPARTMENT OF ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 4th day of September, 20 01, by Gloria C. Nelson, as Operations and Management Consultant Manager, Bureau of Public Land Administration, Division of State Lands, Florida Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. She is personally known to me.

Notary Public, State of Florida

Print/Type Notary Name

Commission Number:

Commission Expires:

CHERYL J. KING
MY COMMISSION # CC 852921
EXPIRES: November 7, 2003
Bonded Thru Notary Public Underwriters

Approved as to Form and Legality

By: _____
DEP Attorney

BREVARD COUNTY, FLORIDA, by its
Board of County Commissioners

Witness

By: _____ (SEAL)

Bernadette Talbert
Print/Type Witness Name

SUSAN CARLSON, CHAIR
Print/Type Name

Witness

Title: _____

Tammy Etheridge
Print/Type Witness Name

(OFFICIAL SEAL)

ATTEST: _____

AS APPROVED BY THE BOARD ON:

August 14, 2001
DATE

Scott Ellis, Clerk
Print/Type Name

Title: County Administrator and
Ex-Officio Clerk of the
Board of County Commissioner
of Brevard County, Florida

"LESSEE"

STATE OF FLORIDA
COUNTY OF BREVARD

The foregoing instrument was acknowledged before me this 14th day of August, 2001, by Susan Carlson and Scott Ellis, as Chairman and Clerk, respectively, on behalf of the Board of County Commissioners of Brevard County, Florida. They are personally known to me.

Notary Public, State of Florida

Print/Type Notary Name

Commission Number:

Commission Expires:

BERNADETTE S. TALBERT
MY COMMISSION # CC 936140
EXPIRES: May 14, 2004
Bonded Thru Notary Public Underwriters

This Instrument Prepared By and

Please Return To:
Ms. Lisa Kruse
Space Coast Title Company
308 Pine Street
Titusville, Fl. 32796

COUNTY DEED

(STATUTORY FORM - SECTION 125.411, F.S.)

THIS INDENTURE, made this 25 day of July, A.D. 2000 between the BOARD OF COUNTY COMMISSIONERS, BREVARD COUNTY, FLORIDA, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA, of the County of Brevard in the State of Florida, party of the first part, whose post office address is 2725 Judge Fran Jamieson Way, Building B, Viera, Florida 32940 and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, party of the second part,

(Wherever used herein the terms "party of the first part" and "party of the second part" include all the parties to this instrument and their heirs, legal representatives, successors and assigns. "Party of the first part" and "party of the second part" are used for singular and plural, as the context requires and the use of any gender shall include all genders.)

WITNESSETH: That the said party of the first part, for and in consideration of the sum of Ten Dollars, to it in hand paid by the party of the second part, receipt whereof is hereby acknowledged, has granted, bargained and sold to the party of the second part, and its successors and assigns forever, the following described land situate, lying and being in Brevard, County, Florida, to-wit:

See Exhibit "A" attached hereto and by reference made a part hereof, together with all riparian and littoral rights appertaining thereto.

Property Appraiser's Parcel Identification Number: 22-35-27-BC-4-21
22-35-27-BC-4-1

IN WITNESS WHEREOF the said party of the first part has caused these presents to be executed in its name by its Board of County Commissioners acting by the Chair or Vice Chair of said board, the day and year aforesaid.

BOARD OF COUNTY COMMISSIONERS,
BREVARD COUNTY, FLORIDA
a political subdivision of the State of Florida

BY: Nancy Higgs
Nancy Higgs, Chair
Brevard County Board of County Commissioners

Approved for Closing
By: A Stockwell
DEP Attorney
Date: 8-3-00

As Approved by the Board on May 24, 1999

Attest: Sandy Crawford
Sandy Crawford, Clerk
(Official Seal)

No. 4263-1
Exhibit A
Page 4 of 5

Exhibit "A"

Lots 1 though 26, inclusive, Block 4, Indian River Heights, except the East 500 feet of Lots 2, 4, and 6, and the Southerly 96 feet of the East 500 feet of Lot 8, of said Block 4, according to the plat thereof as recorded in Plat Book O, Page 23 of the Public Records of Brevard County, Florida.

BSM [illegible]
By RS Date 7.28.9

BCSE, SJR, Digerandis, Solomon-Jackson

Page 1 of 1

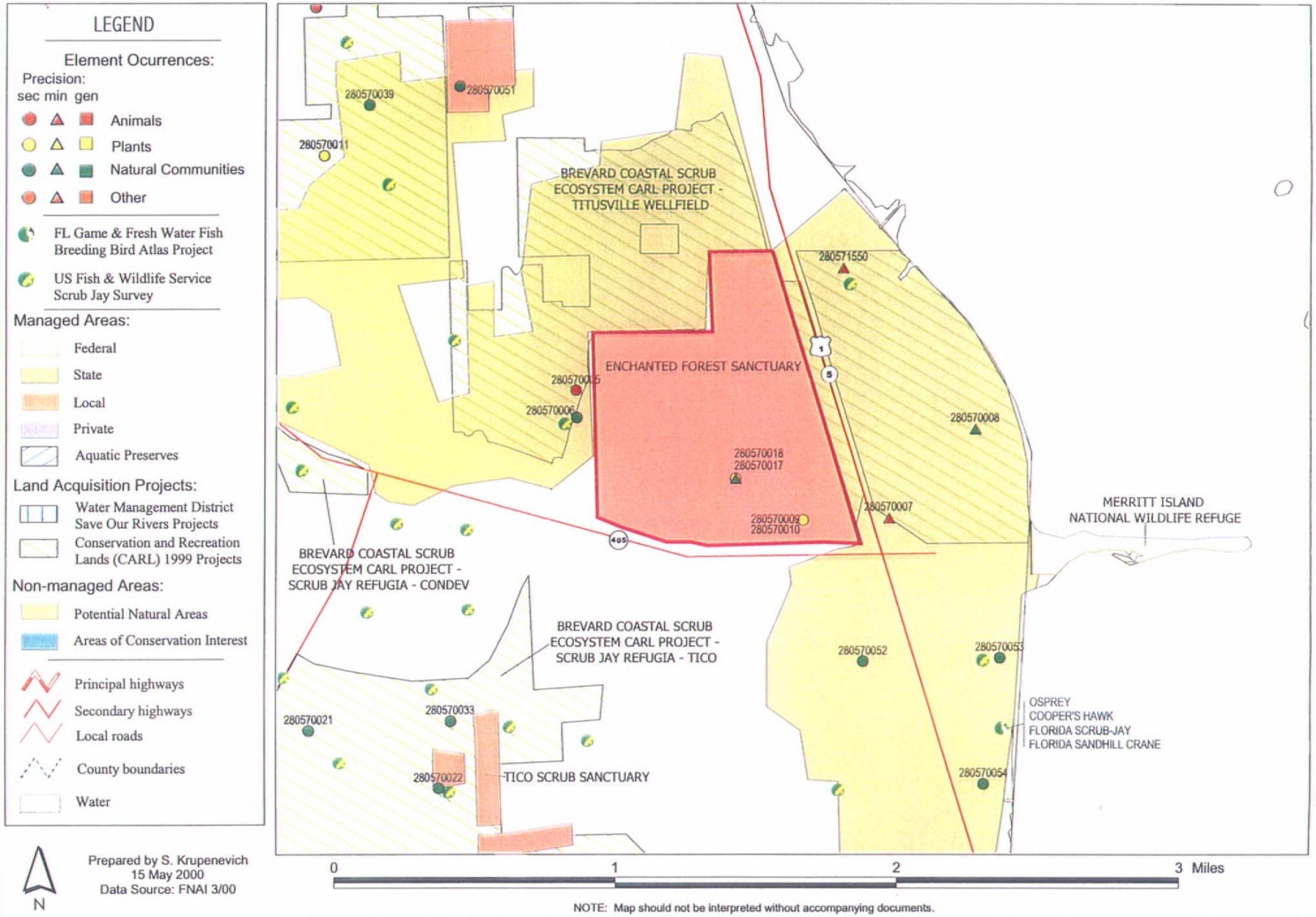
No. 4263-1
Exhibit A
Page 5 of 5

Appendix B: Florida Natural Areas Inventory

Florida Natural Areas Inventory

FNAI
1018 Thomasville Road, Suite 200-C
Tallahassee, FL 32303
(850) 224-8207

Township 22S, Range 35E, Sections 34 and 35, Brevard County



Prepared by S. Krupenevich
15 May 2000
Data Source: FNAI 3/00

NOTE: Map should not be interpreted without accompanying documents.

FLORIDA NATURAL AREAS INVENTORY

1018 Thomasville Road, Suite 200-C · Tallahassee, Florida 32303 · (850) 224-8207 · FAX (850) 681-9364 · www.fnai.org

May 15, 2000

Tami Robinson
Brevard County
Parks and Recreation Department
2725 Judge Fran Jamieson Way, Bldg. B
Suite 203
Viera, FL. 32940

Dear Ms. Robinson:

Thank you for your request for information from the Florida Natural Areas Inventory (FNAI). Your data request, received on May 03, 2000, specified an area located in Township 22S, Range 35E, Sections 34 and 35, in Brevard County.

A search of our maps and database indicates that currently we have several Element Occurrence Records mapped within one mile of the study area (see enclosed map and table). The map legend indicates the precision of the element occurrence location, defined as second (within about 300 feet), minute (within about one mile), or general (within about 5 miles). Also note the locations of breeding colony sites identified by the Florida Game and Fresh Water Fish Commission Breeding Bird Atlas Project, and scrub jay locations identified by the U.S. Fish & Wildlife Service Scrub Jay Survey.

Several of the species and natural communities tracked by the Florida Natural Areas Inventory are considered data sensitive. Occurrence records for these elements contain information which we consider sensitive due to collection pressures, extreme rarity, or at the request of the source of the information. The Element Occurrence Record has been marked "Data Sensitive." We request that you please not publish or release specific locational data about these species or communities without consent from the Inventory. If you have any questions concerning this please do not hesitate to call.

The Inventory always recommends that a site specific survey be conducted to determine the current presence or absence of rare, threatened, or endangered species. Surveys should be conducted by individuals familiar with Florida's flora and fauna. For your convenience, a summary of the elements recorded for Brevard County is enclosed.

The database maintained by the Florida Natural Areas Inventory is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

Information provided by this database may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. FNAI data may not be resold for profit.

Thank you for your use of FNAI services. If I can be of further assistance, please give me a call at (850) 224-8207.

Sincerely,

Jonathan Oetting
Information Coordinator

JO:stk

encl

FNAI ELEMENT OCCURRENCE RECORDS ON OR NEAR SITE

GIS ID	SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	DATE OBSERVED	DESCRIPTION	COMMENTS
280570005	APHELOCOMA COERULESCENS	FLORIDA SCRUB-JAY	G3	S3	LT	LT	1991-04-26	OAK ^SCRUB^.	1981-07-25: 2 SCRUB JAYS (U81COX01). 1991-04-26: 1 ADULT SCRUB JAY REPORTED (U91SNO01); SNODGRASS ET AL. ESTIMATED RECORDS 2, 4, 32, 33, AND 36 TO CONSTITUTE A LARGE POPULATION OF >30 FAMILY GROUPS DURING A 1991 INVENTORY.
280570006	SCRUB		G2	S2	N	N	1991	OAK ^SCRUB^.	OCCURRENCE AT SITE.
280570007	APHELOCOMA COERULESCENS	FLORIDA SCRUB-JAY	G3	S3	LT	LT	1991-08-06	OAK ^SCRUB^ AND SANDPINE SCRUB WITH SCATTERED SNAGS & SLASH PINE.	1981-07-26: 4 SCRUB JAYS. 1989-11-15: 3 ADULTS; 1989-12-19: 1 SCRUB JAY; 1991-01-07: 1 SCRUB JAY; 1991-08-06: 2 ADULTS; 1991-08-06: 2 ADULTS (U91SNO01); SNODGRASS ET AL. ESTIMATED THESE RECORDS TO CONSTITUTE A MEDIUM POPULATION OF 6-30 FAMILY GROUPS DURI
280570008	SCRUB		G2	S2	N	N	1991	OAK ^SCRUB^ WITH SCATTERED SNAGS & SLASH PINE.	1981-07-26: OCCURRENCE AT SITE WITH SCATTERED SNAGS & SLASH PINE. 1991: EO PRESENT ON SITE.
280570009	MARITIME HAMMOCK		G4	S2	N	N	1985-11-30	MARSHY OPENINGS ON PARTS OF SITE - ON DRIER PARTS IS TEMPERATE LIVE OAK HAMMOCK AND HARDWOOD SWAMP EXTENDING TO R.R.	CANOPY LAYER: QUERCUS VIRGINIANA, SABAL PALMETTO - SOME LIVE OAKS OF LARGE SIZE. UNDERSTORY SHRUBS: RAPENEA PUNCTATA, NECTANDRA CORIACEA, PSYCHOTRIA NERVOSA AND MYRCIANTHES FRAGRANS
280570010	DATA SENSITIVE		G4	S2	N	LE	1985-11-30		
280570011	CONRADINA GRANDIFLORA	LARGE-FLOWERED ROSEMARY	G3	S3	N	LE	1987-	SAND PINE SCRUB (SITE OF PRESUMPTIVE NEW SP. OF DICERANDRA).	

FNAI ELEMENT OCCURRENCE RECORDS ON OR NEAR SITE

GIS ID	SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	DATE OBSERVED	DESCRIPTION	COMMENTS
280570017	XERIC HAMMOCK		G?	S3	N	N	1990-04-00	XERIC HAMMOCK, E OF SCRUB RIDGE. CANOPY OF QUERCUS VIRGINIANA, ULMUS AMENCOVA.	NO EO DATA GIVEN
280570018	DATA SENSITIVE		G1	S1	N	LE	1990-04-00		
280570021	SCRUB		G2	S2	N	N	1992-06-19	XERIC OAK-DOMINATED SCRUB.	THE LOW (15-20^) CANOPY IS COMPOSED OF A DENSE GROWTH OF VARIOUS SCRUB OAKS INCLUDING QUERCUS MYRTIFOLIA, Q. GEMINATA, AND Q. CHAPMANII MIXED WITH A SLIGHTLY LOWER ERICACEOUS COMPONENT. OCCASIONAL INDIVIDUALS OF PINUS ELLIOTTII AND/OR P. PALUSTRIS ARE SC
280570022	SCRUB		G2	S2	N	N	1992-06-19	XERIC OAK-DOMINATED SCRUB.	THE LOW (15-20^) CANOPY IS COMPOSED OF A DENSE GROWTH OF VARIOUS SCRUB OAKS INCLUDING QUERCUS MYRTIFOLIA, Q. GEMINATA, AND Q. CHAPMANII MIXED WITH A SLIGHTLY LOWER ERICACEOUS COMPONENT. OCCASIONAL INDIVIDUALS OF PINUS ELLIOTTII AND/OR P. PALUSTRIS ARE SC
280570033	SCRUBBY FLATWOODS		G3	S3	N	N	1992-06-19	SCRUBBY FLATWOODS IN ASSOCIATION WITH MESIC FLATWOODS AND OAK-DOMINATED SCRUB.	SPARSE CANOPY OF SLASH PINE, THICK SAW PALMETTO WITH A SIGNIFICANT PRESENCE OF SCRUB OAKS, RUSTY LYONIA AND TARFLOWER. WIREGRASS, GALLBERRY, WILD COCO, YELLOW FOXGLOVE, AND HAIRY HYSSOP ARE ALSO FOUND IN THIS COMMUNITY.

FNAI ELEMENT OCCURRENCE RECORDS ON OR NEAR SITE

GIS ID	SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	DATE OBSERVED	DESCRIPTION	COMMENTS
280570039	SCRUB		G2	S2	N	N	1991	Oak Scrub/Sand Pine Scrub.	Ca. 60% Oak Scrub and 40% Sand Pine Scrub.
280570051	SCRUBBY FLATWOODS		G3	S3	N	N	1991	Oak Scrub/Sand Pine Scrub.	EO present on site.
280570052	SCRUB		G2	S2	N	N	1991	NO GENERAL DESCRIPTION GIVEN	CA. 60% SAND PINE SCRUB AND 40% OAK SCRUB.
280570053	SCRUB		G2	S2	N	N	1991	OAK SCRUB.	EO PRESENT ON SITE.
280570054	SCRUB		G2	S2	N	N	1991	SAND PINE SCRUB.	EO PRESENT ON SITE.
280571550	SCELOPORUS WOODI	FLORIDA SCRUB LIZARD	G3	S3	N	N	1986-11-11	Coastal scrub	1986-11-11: K.E. Enge, GFC - See Enge et al (1986; Coop Unit Tech Rep No 26).

Brevard County Summary

Rare Species and Natural Communities

Occurrence Scientific Name	Common Name	Global Rank*	State Rank*	Federal Status*	State Status*	Status†
FISH						
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon	G3T?	S1	N	N	C
Bairdiella sanctaeluciae	striped croaker	G5	S2	N	N	C
Gobiomorus dormitor	bigmouth sleeper	G5	S2	N	N	C
Gobionellus pseudofasciatus	slashcheek goby	G3G5	S1	N	N	C
Microphis brachyurus	opossum pipefish	G5	S2	N	N	C
Rivulus marmoratus	mangrove rivulus	G5	S3	N	LS	C
AMPHIBIANS						
Rana capito	gopher frog	G4	S3	N	LS	C
REPTILES						
Alligator mississippiensis	American alligator	G5	S4	T(S/A)	LS	C
Caretta caretta	loggerhead	G3	S3	LT	LT	C
Chelonia mydas	green turtle	G3	S2	LE	LE	C
Crotalus adamanteus	eastern diamondback rattlesnake	G5	S3	N	N	C
Dermochelys coriacea	leatherback	G3	S2	LE	LE	C
Drymarchon corais couperi	eastern indigo snake	G4T3	S3	LT	LT	C
Gopherus polyphemus	gopher tortoise	G3	S3	N	LS	C
Lampropeltis calligaster	mole snake	G5	S2S3	N	N	C
Lepidochelys kempii	Kemp's ridley	G1	S1	LE	LE	P
Pituophis melanoleucus mugitus	Florida pine snake	G5T3?	S3	N	LS	C
Sceloporus woodi	Florida scrub lizard	G3	S3	N	N	C
BIRDS						
Accipiter cooperii	Cooper's hawk	G4	S3?	N	N	P
Aimophila aestivalis	Bachman's sparrow	G3	S3	N	N	C
Ajaia ajaja	roseate spoonbill	G5	S2S3	N	LS	C
Aphelocoma coerulescens	Florida scrub-jay	G3	S3	LT	LT	C
Aramus guarauna	limpkin	G5	S3	N	LS	P
Ardea alba	great egret	G5	S4	N	N	C
Ardea herodias occidentalis	great white heron	G5T2	S2	N	N	P
Buteo brachyurus	short-tailed hawk	G4?	S3	N	N	P
Caracara plancus	crested caracara	G5	S2	LT	LT	C
Charadrius melodus	piping plover	G3	S2	LT	LT	P
Dendroica discolor paludicola	Florida prairie warbler	G5T3	S3	N	N	P
Egretta caerulea	little blue heron	G5	S4	N	LS	C
Egretta rufescens	reddish egret	G4	S2	N	LS	C
Egretta thula	snowy egret	G5	S4	N	LS	C
Egretta tricolor	tricolored heron	G5	S4	N	LS	C
Elanoides forficatus	swallow-tailed kite	G4	S2S3	N	N	P
Eudocimus albus	white ibis	G5	S4	N	LS	C
Falco columbarius	merlin	G5	SU	N	N	P
Falco peregrinus	peregrine falcon	G4	S2	LE	LE	P
Falco sparverius paulus	southeastern American kestrel	G5T3T4	S3?	N	LT	P
Fregata magnificens	magnificent frigatebird	G5	S1	N	N	P

Brevard County Summary

Rare Species and Natural Communities

Occurrence Scientific Name	Common Name	Global Rank*	State Rank*	Federal Status*	State Status*	Status†
Grus canadensis pratensis	Florida sandhill crane	G5T2T3	S2S3	N	LT	C
Haematopus palliatus	American oystercatcher	G5	S3	N	LS	P
Haliaeetus leucocephalus	bald eagle	G4	S3	LT	LT	C
Ixobrychus exilis	least bittern	G5	S4	N	N	C
Laterallus jamaicensis	black rail	G4	S3?	N	N	C
Mycteria americana	wood stork	G4	S2	LE	LE	C
Nyctanassa violacea	yellow-crowned night-heron	G5	S3?	N	N	C
Nycticorax nycticorax	black-crowned night-heron	G5	S3?	N	N	C
Pandion haliaetus	osprey	G5	S3S4	N	LS**	C
Pelecanus occidentalis	brown pelican	G4	S3	N	LS	C
Picoides borealis	red-cockaded woodpecker	G3	S2	LE	LT	C
Picoides villosus	hairy woodpecker	G5	S3?	N	N	P
Plegadis falcinellus	glossy ibis	G5	S2	N	N	C
Rynchops niger	black skimmer	G5	S3	N	LS	C
Speotyto cunicularia floridana	Florida burrowing owl	G4T3	S3	N	LS	P
Sterna antillarum	least tern	G4	S3	N	LT	C
Sterna caspia	Caspian tern	G5	S2?	N	N	P
Sterna maxima	royal tern	G5	S3	N	N	P
Sterna sandvicensis	sandwich tern	G5	S2	N	N	P
Vireo altiloquus	black-whiskered vireo	G5	S3	N	N	P
MAMMALS						
Corynorhinus rafinesquii	Rafinesque's big-eared bat	G3	S3?	N	N	P
Eubalaena glacialis	black right whale	G1	S1	LE	LE	C
Mustela frenata peninsulae	Florida long-tailed weasel	G5T3	S3?	N	N	P
Neofiber alleni	round-tailed muskrat	G3	S3	N	N	P
Peromyscus polionotus niveiventris	southeastern beach mouse	G5T1	S1	LT	LT	C
Podomys floridanus	Florida mouse	G3	S3	N	LS	C
Sciurus niger shermani	Sherman's fox squirrel	G5T2	S2	N	LS	P
Trichechus manatus	manatee	G2?	S2?	LE	LE	C
Ursus americanus floridanus	Florida black bear	G5T2	S2	C	LT**	P
VASCULAR PLANTS						
Andropogon arctatus	pine-woods bluestem	G3	S3	N	N	C
Argusia gnaphalodes	sea lavender	G4	S3	N	LE	C
Aristida rhizomophora	Florida three-awned grass	G2	S2	N	N	C
Asclepias curtissii	Curtiss' milkweed	G3	S3	N	LE	C
Calamovilfa curtissii	Curtiss' sandgrass	G3	S3	N	LT	C
Centrosema arenicola	sand butterfly pea	G2	S2	N	N	C
Chamaesyce cumulicola	sand-dune spurge	G2	S2	N	LE	C
Cheiroglossa palmata	hand fern	G4	S2	N	LE	C
Coelorachis tuberculosa	piedmont jointgrass	G3	S3	N	N	C
Conradina grandiflora	large-flowered rosemary	G3	S3	N	LE	C
Dennstaedtia bipinnata	hay scented fern	G4	S1	N	LE	C
Glandularia maritima	coastal vervain	G3	S3	N	LE	C
Glandularia tampensis	Tampa vervain	G1	S1	N	LE	C

Brevard County Summary

Rare Species and Natural Communities

Occurrence Scientific Name	Common Name	Global Rank*	State Rank*	Federal Status*	State Status*	Status†
Halophila johnsonii	Johnson's seagrass	G2	S2	PT	N	C
Harrisia simpsonii	Simpson's prickly apple	G2Q	S2	N	LE	C
Lantana depressa var floridana	Atlantic Coast Florida lantana	G2T2	S2	N	LE	C
Lechea cernua	nodding pinweed	G3	S3	N	LT	C
Lechea divaricata	pine pinweed	G2	S2	N	LE	C
Lindera subcoriacea	bog spicebush	G2	S1	N	LE	C
Monotropsis reynoldsiae	pigmy pipes	G1Q	S1	N	LE	C
Nemastylis floridana	fall-flowering ixia	G2	S2	N	LE	C
Nolina atopocarpa	Florida beargrass	G3	S3	N	LT	C
Pavonia spinifex	yellow hibiscus	G4G5	S2S3	N	N	C
Peperomia humilis	terrestrial peperomia	G5	S2	N	LE	C
Peperomia obtusifolia	blunt-leaved peperomia	G5	S2	N	LE	C
Persea humilis	scrub bay	G3	S3	N	N	C
Pteroglossaspis ecristata	wild coco	G2G3	S2	N	LT	C
Schwalbea americana	chaffseed	G2	S1	LE	LE	C
Tephrosia angustissima var angustissima	devil's shoestring	G1TH	SH	N	LE	C
Tephrosia angustissima var curtissii	coastal hoary-pea	G1T1	S1	N	LE	C
Warea carteri	Carter's warea	G1G2	S1S2	LE	LE	C
Zephyranthes simpsonii	rain lily	G2G3	S2S3	N	LT	C
NATURAL COMMUNITIES						
Basin Swamp		G4?	S3	N	N	C
Beach Dune		G4?	S2	N	N	C
Bottomland Forest		G4	S4?	N	N	C
Coastal Grassland		G3	S2	N	N	C
Coastal Interdunal Swale		G3	S2	N	N	C
Coastal Strand		G3?	S2	N	N	C
Depression Marsh		G4?	S3	N	N	C
Dome Swamp		G4?	S3?	N	N	C
Dry Prairie		G2	S2	N	N	C
Estuarine Grass Bed		G2	S2	N	N	C
Estuarine Tidal Marsh		G4	S4	N	N	C
Estuarine Tidal Swamp		G3	S3	N	N	C
Hydric Hammock		G?	S4?	N	N	C
Maritime Hammock		G4	S2	N	N	C
Mesic Flatwoods		G?	S4	N	N	C
Scrubby Flatwoods		G3	S3	N	N	C
Scrub		G2	S2	N	N	C
Shell Mound		G3	S2	N	N	C
Wet Flatwoods		G?	S4?	N	N	C
Xeric Hammock		G?	S3	N	N	C
OTHER						
Bird rookery				N	N	C
Manatee aggregation site				N	N	C

* See attached ***FNAI Rank Explanations*** sheet for definitions of **Global and State Ranks**, and **State and Federal Status**

** See attached *FNAI Rank Explanations* sheet, ***Special Animal Listings - State and Federal Status*** section

† COUNTY OCCURRENCE STATUS

Vertebrates and Invertebrates:

C = (Confirmed) Occurrence status derived from a documented record in the FNAI data base.

P = (Potential) Occurrence status derived from a reported occurrence for the county, or the occurrence lies within the published range of the taxon.

N = (Nesting) For sea turtles only; occurrence status derived from documented nesting occurrences.

Plants, Natural Communities, and Other:

C = (Confirmed) Occurrence status derived from a documented record in the FNAI data base or from a herbarium specimen.

R = (Reported) Occurrence status derived from published reports.

RANK EXPLANATIONS

for FNAI Global Rank, FNAI State Rank, Federal Status, and State Status

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

Each element (species or natural community) tracked by the Florida Natural Area Inventory (FNAI) is assigned an FNAI Global Rank based on it worldwide status, and an FNAI State Rank based on the status of the element in Florida. Element ranks are determined by many factors, the most important ones being estimated number of element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected element occurrences, relative threat of destruction, and ecological fragility. The Nature Conservancy and the Natural Heritage Program Network assign the Global Ranks, and FNAI scientists assign the State Ranks. Both of these rankings are reviewed and updated as new information on the conservation status of a species or natural community becomes available.

The legal protection status information was obtained from the following sources:
Federal animal and plant listings: U.S. Fish and Wildlife Service, March 31, 1999, *Endangered and Threatened Wildlife and Plants*, 50 CFR 17.11 and 17.12.
State animal listings: Florida Game and Fresh Water Fish Commission, August 1, 1997, *Florida's Endangered Species and Species of Special Concern, Official Lists*
State plant listings: *Rules for the Department of Agriculture and Consumer Services, Division of Plant Industry, Chapter 5B-40, Preservation of Native Flora of Florida. Amended Oct. 5, 1998.*

FNAI GLOBAL RANK DEFINITIONS

G1	=	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2	=	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3	=	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
G4	=	apparently secure globally (may be rare in parts of range)
G5	=	demonstrably secure globally
GH	=	of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GX	=	believed to be extinct throughout range
GXC	=	extirpated from the wild but still known from captivity or cultivation
G#?	=	tentative rank (e.g., G2?)
G#G#	=	range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	=	rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
G#Q	=	rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	=	same as above, but validity as subspecies or variety is questioned.
GU	=	due to lack of information, no rank or range can be assigned (e.g., GUT2).
G?	=	not yet ranked (temporary)

FNAI STATE RANK DEFINITIONS

S1	=	Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2	=	Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3	=	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

FNAI STATE RANK DEFINITIONS (cont.)

S4 = apparently secure in Florida (may be rare in parts of range)

S5 = demonstrably secure in Florida

SH = of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)

SX = believed to be extinct throughout range

SA = accidental in Florida, i.e., not part of the established biota

SE = an exotic species established in Florida may be native elsewhere in North America

SN = regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine

SU = due to lack of information, no rank or range can be assigned (e.g., SUT2).

S? = not yet ranked (temporary)

LEGAL STATUS

N = Not currently listed, nor currently being considered for listing.

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

LE = Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.

PE = Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.

LT = Listed as Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

PT = Proposed for listing as Threatened Species.

C = Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A) = Endangered due to similarity of appearance.

T(S/A) = Threatened due to similarity of appearance.

STATE

Animals (Listed by the Florida Fish and Wildlife Conservation Commission - FFWCC, formerly known as the Florida Game and Fresh Water Fish Commission)

LE = Listed as Endangered Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

LT = Listed as Threatened Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

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

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

LE = Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

LT = Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

FLORIDA NATURAL AREAS INVENTORY

Florida Scrub-Jay Survey and Breeding Bird Atlas Data Layers

In addition to our element occurrence database of rare species and natural community locations, the Inventory has additional data layers which have been provided by state and federal agencies.

Florida Scrub-Jay Survey - U.S. Fish and Wildlife Service

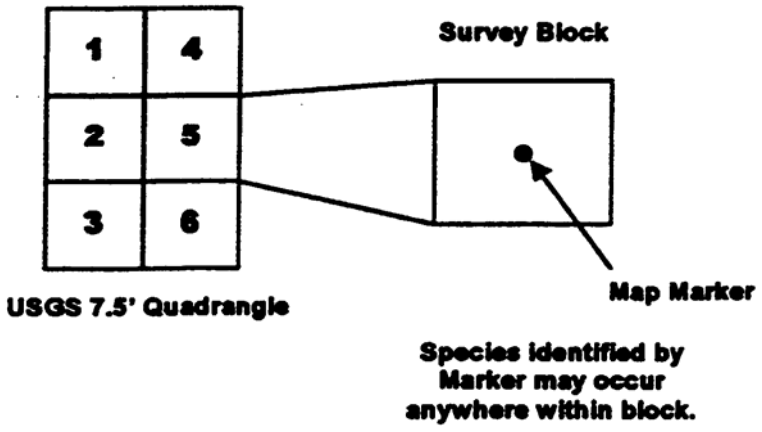
This survey was conducted by staff and associates of the Archbold Biological Station from 1992 to 1996. An attempt was made to record all scrub-jay (*Aphelocoma coerulescens*) groups, although most federal lands were not officially surveyed.

Each map point represents one or more groups.

Florida Breeding Bird Atlas Project - Florida Game and Fresh Water Fish Commission (now Florida Fish and Wildlife Conservation Commission)

This study was conducted from 1986 to 1991, (final report, *An Atlas of Florida's Breeding Birds* by Kale, Pranty, Stith, and Biggs, Nongame Wildlife Program, Florida Game and Fresh Water Fish Commission). The study divided the state into "blocks", with each block representing one-sixth of a U.S. Geological Survey 7.5 minute topographic quadrangle map. Several categories of breeding activity were recorded by observers.

Each map point is located at the center of a block, and represents species listed as Possible or Probable Breeders within the surrounding block (approximately 10 square miles in area).



Appendix C: Preliminary and Secondary Plant Surveys

Preliminary Dicerandra Scrub Sanctuary Plant List

DATE: 3 March 2000

Species	Author	Common name	Status*	Family	FL endemic	Location	fertile?
Yucca aloifolia	L.	Spanish bayonett	E	AGAVACEAE	no	southern edge	
Sansevieria hyacinthoides	(L.) Druce	Mother-in-law's tongue; Bowst	E	AGAVACEAE	no	southern edge	no
Schinus terebinthifolius	Raddi	Brazilian Pepper	E	ANACARDIACEAE	no	southern edge mainly	
Monstera deliciosa			E	ARACEAE	no	southern edge	no
Philodendron sp. (williamsi)			E	ARACEAE	no	southern edge	no
Philodendron selloum			E	ARACEAE	no	southern edge	no
Tecoma capensis	(Thunb.)Lindl.	Cape honeysuckle	E	BIGNONIACEAE	no	northern edge	flws
Kalanchoe sp.	Adans.		E	CRASSULACEAE	no	southern edge	
Dioscorea bulbifera	L.	Air yam; Air potato	E	DIOSCOREACEAE	no	southwestern corner	
Enterolobium contortisiliquum	(Vell.) Morong	Earpod tree	E	FABACEAE	no	northern edge	pods present
Cinnamomum camphora	(L.) J. Presl	Camphortree	E	LAURACEAE	no	southwestern corner	
Asparagus sp. (setaceus)	(Kunth) Jessop	Common Asparagus-fern	E	LILIACEAE	no	southern edge	no
Oxalis debilis (= O. corymbosa)	Kunth	Pink woodsorrel	E	OXALIDACEAE	no	southern edge	flws
Citrus sp.	L.	Wild citrus	E	RUTACEAE	no	notrhern edge	no
Koelreuteria elegans	(Seemann) A.D. Sm.	Flamegold; Golden rain tree	E	SAPINDACEAE	no	southwestern corner	no
Acer rubrum	L.	Red maple	N	ACERACEAE	no	southwestern corner and near wetland	
Yucca filamentosa	L.	Adam's needle	N	AGAVACEAE	no	near Dicerandra	
Toxicodendron radicans	(L.) Kuntze	Eastern Poison Ivy	N	ANACARDIACEAE	no	northern edge	no
Ilex glabra	(L.) A. Gray	Gallberry; Inkberry	N	AQUIFOLIACEAE	no	southwestern corner and near wetland	no
Ilex cassine var. cassine	L.	Dahoon holly	N	AQUIFOLIACEAE	no	middle, near wetland	fruits
Sabal palmetto	(Walt.) Lodd. Ex Schultes	Cabbage palm	N	ARECACEAE	no	southwestern corner	
Serenoa repens	(Bartr) Small	Saw palmetto	N	ARECACEAE	no	throughout	
Eupatorium capillifolium	(Lam.) Small	Dog fennel	N	ASTERACEAE	no	scattered throughout	no
Pityopsis graminifolia	(Michx) Nutt.	Narrowleaf silkgrass	N	ASTERACEAE	no	near Dicerandra	no
Solidago sp.		Goldenrod	N	ASTERACEAE		near Dicerandra	
Pterocaulon pycnostachyum	(Michx.) Elliott	Blackroot	N	ASTERACEAE	no	southern edge	no
Gnaphalium sp. (obtusifolium?)	L.	Rabbit tobacco; Sweet everlasti	N	ASTERACEAE	no	southern edge	
Baccharis halimifolia	L.	Groundsel tree	N	ASTERACEAE	no	southern edge	no
Blechnum serrulatum	Rich.	Swamp fern	N	BLECHNACEAE	no	moist areas	no
Lepidium virginicum	L.	Virginia pepperweed	N	BRASSICACEAE	no	southern edge	flws
Tillandsia recurvata	(L.) L.	Ballmoss	N	BROMELIACEAE	no	throughout	

Tillandsia usneoides	(L.) L.	Spanish moss	N	BROMELIACEAE	no	throughout	
Tillansdia fasciculata var. densispi	Mez	Cardinal airplant	N	BROMELIACEAE	no	near Dicerandra	
Opuntia humifusa	(Raf.) Raf.	Prickypear	N	CACTACEAE	no	near Dicerandra	no
Licania michauxii	Prance	Gopher apple	N	CHRYSOBALANACEAE	no	near Dicerandra	no
Hypericum spp.		St. John's wort	N	CLUSIACEAE	depends on s	around wetland	yes
Commelina sp. (erecta)		Day flower	N	COMMELINACEAE		southern edge	no
Tradescantia ohiensis	Rafinesque	Spiderwort	N	COMMELINACEAE	no	southern edge	flws
Cuthbertia sp. (white-flw form)			N	COMMELINACEAE	depends on s	southern edge	flws
Tradenscantia ohiensis	Rafinesque	Ohio Spiderwort; bluejacket	N	COMMELINACEAE	no	southern edge	flws
Cladium jamaicense	Crantz	Jamaica swamp sawgrass	N	CYPERACEAE	no	southern edge of wetland	no
Ceratiola ericoides	Michx.	Florida rosemary; Sand heath	N	EMPETRACEAE	no	near Dicerandra	
Lyonia ferruginea	(Walter) Nutt.	Rusty staggerbush	N	ERICACEAE	no	near Dicerandra	no
Lyonia lucida	Nutt.	Fetterbush	N	ERICACEAE	no	near Dicerandra	no
Vaccinium myrsinites	Lam.	Shiny blueberry	N	ERICACEAE	no	saw one, southwestern corner	
Vaccinium stamineum	L.	Deerberry	N	ERICACEAE	no	near Dicerandra	senescent flws
Cnidoscolus stimulosus	(Michx.) Englem. & A. Gray	Tread softly	N	EUPHORBIACEAE	no	northern edge	flws
Chamaecrista fasciculata	(Michx.) Green	Partridge pea	N	FABACEAE	no	near Dicerandra	flws
Lupinus (diffusus?)	Nutt.	Skyblue lupine	N	FABACEAE	no	near Dicerandra	beginning flw
Rhyncosia cineria	Nash	Brownhair snoutbean	N	FABACEAE	yes	near Dicerandra	no
Dalea feayii	(Chapm) Barneby	Feay's Prairieclover	N	FABACEAE	no	assoc. with Dicerandra	no
Quercus chapmanii	Sarg.	Chapman's oak	N	FAGACEAE	no	near Dicerandra	
Quercus geminata	Small	Sand live oak	N	FAGACEAE	no	near Dicerandra	
Quercus myrtifolia	Willd.	Myrtle oak	N	FAGACEAE	no	near Dicerandra	
Carya floridana	Sarg.	Scrub hickory	N	JUGLANDACEAE	yes	near Dicerandra	yes
Dicerandra thinicola	H.A. Mill.	Titusville balm	N	LAMIACEAE	yes	western edge along sand road	senescent flws
Persea borbonia	(L.) Spreng	Red or silk bay	N	LAURACEAE	depends on v	southwestern corner	no
Magnolia virginiana	L.	Sweet bay	N	MAGNOLIACEAE	no	southwestern corner	no
Nymphoides aquatica	(J.F. Gmel.) Kuntze	Big floatingheart	N	MENYANTHACEAE	no	in wetland	no
Myrica cerifera	L.	Wax myrtle	N	MYRICACEAE	no	throughout	flws
Ximenia americana	L.	Tallow wood; Hog plum	N	OLACACEAE	no	near Dicerandra and occasionally throu	no
Osmunda regalis var. spectabilis	(Willd.) A. Gray	Royal fern	N	OSMUNDACEAE	no	northeastern edge of wetland	yes
Passiflora suberosa	L.	Corky-stem passionflower	N	PASSIFLORACEAE	no	northern edge	
Phytolacca americana	L.	Poke weed	N	PHYTOLACCACEAE	no	southern edge	
Pinus clausa	(Chapm. Ex Englm.) Vasey ex Sarg.	Sand pine	N	PINACEAE	no	near Dicerandra	yes

Pinus elliottii	Englem.	Slash pine	N	PINACEAE	no	throughout	yes
Pinus palustris	Mill.	Longleaf Pine	N	PINACEAE	no	northern edge	cones
Aristida beyrichiana (= A. stricta)	Trin. & Rupr.	Wiregrass	N	POACEAE	no	northern edge	no
Spartina bakeri	Merr.	Sand cord grass	N	POACEAE	no	northern edge	no
Andropogon virginicus var. glaucus	Hack.	Chalky blue-stemmed grass	N	POACEAE	no	northern edge	
Prunus caroliniana	(Mill.) Aiton	Carolina Laurel Cherry	N	ROSACEAE	no	southern edge	flws
Rubus sp.	L.	Blackberry or Dewberry	N	ROSACEAE	no	southwestern corner	
Zanthoxylum clava-herculis	L.	Hercules club	N	RUTACEAE		southern edge	no
Salix caroliniana	Michx.	Carolina Willow	N	SALICACACEAE	no	northern edge	
Linerea canadensis	(L.) Chaz.	Canada toadflax; Blue toadflax	N	SCROPHULARIACEAE	no	assoc. with Dicerandra	flws
Smilax glauca	Walter	Earleaf greenbrier	N	SMILACACEAE	no	occasional throughout	
Smilax (laurifolia ?)	L.	Laurel greenbrier	N	SMILACACEAE	no	occasional throughout	
Physalis walteri	Nutt.	Walter's Groundcherry	N	SOLANACEAE	no	southern edge	flws
Callicarpa americana	L.	Beautyberry	N	VERBENACEAE	no	northern edge, SW corner	no
Viola lanceolata	L.	Bog White Violet	N	VIOLACEAE	no	southern edge	flws
Phoradendron leucarpum	(Raf.) Reveal & M.C. Johnst.	Oak Mistletoe	N	VISCACEAE	no	throughout	no
Parthenocissus quinquefolia	(L.) Planch.	Virginia creeper	N	VITACEAE	no	northern edge	no
Bidens sp.	L.	Beggarticks, Spanish needles	N/E	ASTERACEAE	no	southern edge	flws
Bidens sp.		Beggarticks, Spanish needles	N/E	ASTERACEAE	depends on s	southern edge	flws
Desmodium sp.		Ticktrefoil	N/E	FABACEAE	depends on s	southern edge	pods
Galactia sp.		Milkpea		FABACEAE	no	northern edge	no

INDIVIDUALS PRESENT BUT UNCERTAIN OF GENERA

Bumelia sp.?						southern edge	
		Foxtail Grass sp.?				northern edge	
		Hawthorn					
		Buckthorn					

*Status: E = exotic; N = native; N/E = whether it is native or exotic depends on the species

FL endemic - follows Wunderlin 1998 Guide to the vascular plants of Florida.

Dalea feayi, Linaria candensis were identified by Dr. Schmalzer over phone description.

Secondary Dicerandra Scrub Sanctuary, FP&L Easement, and Titusville Wellfield Plant List.

Additions to Dicerandra Scrub Sanctuary vascular plant species list from surveys of July 8, 2003 and November 4, 2003 by Paul A. Schmalzer and Tammy E. Foster, Dynamac Corporation. * indicates collected species.

Family	Taxa
Anacardiaceae	Rhus copallina
Annonaceae	Asimina obovata
Asclepiadaceae	Asclepias tomentosa*
Aquifoliaceae	Ilex ambigua
Araceae	Colocasia esculenta
Asteraceae	Ambrosia artemisiifolia
Asteraceae	Bidens alba var. radiata
Asteraceae	Carphephorus corymbosus
Asteraceae	Chrysopsis scabrella*
Asteraceae	Erechtites hieracifolia
Asteraceae	Eupatorium mohrii
Asteraceae	Euthamia caroliniana
Asteraceae	Heterotheca subaxillaris
Asteraceae	Liatris tenuifolia var. quadriflora
Asteraceae	Palafoxia feayi
Asteraceae	Solidago odora var. chapmanii*
Bignoniaceae	Campsis radicans*
Caprifoliaceae	Sambucus canadensis
Chenopodiaceae	Chenopodium ambrosioides
Cistaceae	Lechea divaricata*
Cistaceae	Lechea minor*
Cistaceae	Lechea torreyi
Clusiaceae (Hypericaceae)	Hypericum cistifolium
Clusiaceae (Hypericaceae)	Hypericum tetrapetalum
Commelinaceae	Commelina diffusa
Convolvulaceae	Merremia dissecta*
Convolvulaceae	Stylisma patens*
Cucurbitaceae	Momordica charantia
Cyperaceae	Bulbostylis ciliatifolia
Cyperaceae	Bulbostylis stenophylla*
Cyperaceae	Cyperus retrorsus
Cyperaceae	Fuirena scirpoidea*
Cyperaceae	Rhynchospora fascicularis*
Cyperaceae	Rhynchospora megalocarpa
Cyperaceae	Scleria ciliata var. pauciflora*
Dennstaedtiaceae	Pteridium aquilinum
Euphorbiaceae	Chamaesyce hyssopifolia*
Euphorbiaceae	Chamaesyce thymifolia*
Euphorbiaceae	Croton glandulosus

Table 1 (cont.)

Family	Taxa
Euphorbiaceae	Phyllanthus abnormis
Euphorbiaceae	Stillingia sylvatica
Fabaceae	Centrosema virginianum
Fabaceae	Chamaecrista nictitans
Fabaceae	Clitoria mariana
Fabaceae	Galactia elliottii
Fabaceae	Galactia regularis*
Fabaceae	Indigofera caroliniana
Fabaceae	Indigofera hirsuta
Fabaceae	Lupinus diffusus
Gentianaceae	Sabatia grandiflora
Haemodoraceae	Lachnanthes caroliniana
Lauraceae	Persea borbonia var. humilis*
Malvaceae	Sida acuta
Malvaceae	Sida rhombifolia
Melastomataceae	Rhexia virginica*
Poaceae	Andropogon brachystachyus
Poaceae	Andropogon floridanus*
Poaceae	Andropogon glomeratus var. glaucopsis*
Poaceae	Andropogon gyrans var. stenophyllus*
Poaceae	Andropogon virginicus var. decipiens*
Poaceae	Andropogon virginicus var. glaucus*
Poaceae	Aristida condensata*
Poaceae	Aristida purpurascens var. tenuispica*
Poaceae	Aristida spiciformis
Poaceae	Cenchrus incertus
Poaceae	Cynodon dactylon
Poaceae	Dactyloctenium aegyptium
Poaceae	Dicanthelium spp.
Poaceae	Digitaria sp.
Poaceae	Eustachys petrae
Poaceae	Paspalum notatum
Poaceae	Paspalum setaceum
Poaceae	Rhynchelytrum repens
Poaceae	Saccharum giganteum
Poaceae	Schizachyrium scoparium var. scoparium*
Poaceae	Setaria corrugata*
Poaceae	Setaria parviflora*
Poaceae	Sorghastrum secundum
Polygalaceae	Polygala incarnata
Polygalaceae	Polygala rugelii
Polygonaceae	Polygonella gracilis

Family	Taxa
Portulacaceae	Portulaca amilis*
Portulacaceae	Portulaca pilosa*
Rubiaceae	Diodia teres
Rubiaceae	Richardia brasiliensis
Scrophulariaceae	Gratiola hispida*
Smilacaceae	Smilax auriculata
Verbenaceae	Lantana camara
Vitaceae	Vitis rotundifolia
Xyridaceae	Xyris caroliniana
Xyridaceae	Xyris longisepala*
Xyridaceae	Xyris sp. *

Appendix D: Preliminary Bird Survey

Report by Jim Escoffier.
A preliminary bird survey was conducted on January 30, 2000 between 8:15 a.m. and 10 a.m. by members of the Indian River Audubon Society. Conditions were foggy making visual identification difficult; most identifications were made by calls.

Yellow rumped warbler	Heard many, saw several.
Towhee	Heard several, saw none.
Downy woodpecker	Heard one.
Pine Warbler	Heard many, saw many.
Cat bird	Heard several, saw one or two.
Robin	Heard several.
Cardinal	Heard several, saw several.
Blue Jay	Heard several, saw several.
Carolina wren	Heard a few.
Blue grey gnatcatcher	Heard one.
Red bellied woodpecker	Heard several, saw several.
White eyed vireo	Heard one.
Mourning dove	Heard several, saw several.
Boat tailed grackle	Heard a few, saw a few.
Ruby crowned kinglet	Heard a few, saw a few.
Brown thrasher	Heard at least one.
Oven bird	Heard one, saw one.
Palm warbler	Heard several, saw several.
House wren	Saw one by the back boundary line.
Tree swallow	Saw a group fly over.
Fish crow	Heard several, saw several.
Phoebe	Heard one.
Starling	Heard several.
Flicker	Saw one.
Scrub-jay	Saw a family of two and heard others.
Mocking bird	Heard a few, saw a few.

A few means more than one. Several means more than five or six.