

Malabar Scrub Sanctuary Management Plan

Approved by the
Brevard County
Board of County Commissioners
3-24-2009



Management Lease #4263

Management Plan Compliance Checklist - Natural Resource Lands

| Requirements | | Page Numbers |
|--|--|--------------|
| 18-2.021 Acquisitions and Restoration Council. | | |
| 1. Executive Summary (Example #1) This should be included in the packet and should be the first page. | | 1 |
| Management Plans. Plans submitted to the division for ARC review under the requirements of Section 253.034 F.S. should be in a form and manner prescribed by rule by the board and in accordance with the provisions of S. 259.032 and should contain where applicable to the management of resources the following: | | |
| 2. The common name of the property. | | 1 |
| 3. A map showing the location and boundaries of the property plus any structures or improvements to the property. (Example #2) | | 7 |
| 4. The legal description and acreage of the property. | | 5 |
| 5. The degree of title interest held by the Board, including reservations and encumbrances such as leases. | | 1 |
| 6. The land acquisition program, if any, under which the property was acquired. | | 1 |
| 7. The designated single use or multiple use management for the property, including other managing agencies. | | 1 |
| 8. Proximity of property to other significant State/local/federal land or water resources. (Example #3) May be included in the map in item #2. | | 8 |
| 9. A statement as to whether the property is within an Aquatic Preserve or a designated Area of Critical State Concern or an area under study for such designation. If yes, make sure appropriate managing agencies are notified of the plan. | | NA |
| 10. The location and description of known and reasonably identifiable renewable and non-renewable resources of the property including, but not limited to, the following: | | |
| A. Brief description of soil types, using U. S. D. A. maps when available; | | 10-12, 14 |
| B. Archaeological and historical resources*; | | 28 |
| C. Water resources including the water quality classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Waters; | | NA |
| D. Fish and wildlife and their habitat; | | 16-26 |
| E. State and federally listed endangered or threatened species and their habitat; | | 24-26 |
| F. Beaches and dunes; | | NA |
| G. Swamps, marshes and other wetlands; | | 19, 23 |
| H. Mineral resources, such as oil, gas and phosphate; | | NA |
| I. Unique natural features, such as coral reefs, natural springs, caverns, large sinkholes, virgin timber stands, scenic vistas, and natural rivers and streams; and | | 15 |
| J. Outstanding native landscapes containing relatively unaltered flora, fauna, and geological conditions. | | 17-23 |
| 11. A description of actions the agency plans, to locate and identify unknown resources such as surveys of unknown archeological and historical resources. | | 26 |
| 12. The identification of resources on the property that are listed in the Florida Natural Areas Inventory. <i>Include letter from FNAI or consultant, where appropriate.</i> | | App F |
| 13. A description of past uses, including any unauthorized uses of the property. (Example #4) | | 28-31 |
| 14. A detailed description of existing and planned use(s) of the property. (Example #5) | | 33-38, 42 |
| 15. A description of alternative or multiple uses of the property considered by the managing agency and an explanation of why such uses were not adopted. | | 32,38 |
| 16. A detailed assessment of the impact of planned uses on the renewable and non-renewable resources of the property and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to mitigate damage caused by such uses. | | 38,42 |
| 17. A description of management needs and problems for the property. | | 19725.00 |
| 18. Identification of adjacent land uses that conflict with the planned use of the property, if any. | | 32-33 |
| 19. A description of legislative or executive directives that constrain the use of such property. | | 33-35 |
| 20. A finding regarding whether each planned use complies with the State Lands Management Plan adopted by the Trustees on March 17, 1981, and incorporated herein by reference, particularly whether such uses represent "balanced public utilization", specific agency statutory authority, and other legislative or executive requirements. | | 33-35, 38-42 |
| 21. An assessment as to whether the property, or any portion, should be declared surplus. | | 32-33 |
| 22. Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. Clearly defined map of parcels can be used. | | 8 |
| 23. A description of the management responsibilities of each agency and how such responsibilities will be coordinated, including a provision that requires that the managing agency consult with the Division of Archives, History and Records Management before taking actions that may adversely affect archaeological or historic resources. (Example #6) | | 28 |
| 24. A statement concerning the extent of public involvement and local government participation in the development of the plan, if any, including a summary of comments and concerns expressed. (Example #7) | | App J |

Additional Requirements—Per Trustees

Management Plan Compliance Checklist - Natural Resource Lands

| Requirements | Page Numbers |
|--|--------------|
| 25. Letter of Compliance of the management plan with the Local Government Comprehensive Plan. Letter from local government saying that the plan is in compliance with local government's comprehensive plan. | |
| 253.034 State-Owned Lands; Uses. —Each entity managing conservation lands shall submit to the Division of State Lands a land management plan at least every 10 years in a form and manner prescribed by rule by the Board. | |
| 26. All management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing entity plans to identify, locate, protect and preserve, or otherwise use fragile nonrenewable resources, such as archaeological and historic sites, as well as other fragile resources, including endangered plant and animal species. | 28 |
| 27. The management plan shall provide for the conservation of soil and water resources and for the control and prevention of soil erosion. | 30-31 |
| 28. Land management plans submitted by an entity shall include reference to appropriate statutory authority for such use or uses and shall conform to the appropriate policies and guidelines of the state land management plan. | 33-35 |
| 29. All land management plans for parcels larger than 1,000 acres shall contain an analysis of the multiple-use potential of the parcel, which analysis shall include the potential of the parcel to generate revenues to enhance the management of the parcel. | 39-40 |
| 30. Additionally, the land management plan shall contain an analysis of the potential use of private managers to facilitate the restoration or management of these lands. | 51-52 |
| 31. A physical description of the land. | 5-45 |
| 32. A desired outcome | 13-47 |
| 33. A quantitative data description of the land which includes an inventory of forest and other natural resources; exotic and invasive plants; hydrological features; infrastructure, including recreational facilities; and other significant land, cultural, or historical features. | Oct-47 |
| 34. A detailed description of each short-term and long-term land management goal, the associated measurable objectives, and the related activities that are to be performed to meet the land management objectives. Each land management objective must be addressed by the land management plan, and where practicable, no land management objective shall be performed to the detriment of the other land management activities. | 48-56 |
| 35. A schedule of land management activities which contains short-term and long-term land management goals and the related measurable objectives and activities. The schedule shall include for each activity a timeline for completion, quantitative measures, and detailed expense and manpower budgets. The schedule shall provide a management tool that facilitates development of performance measures. | 53-56 |
| 36. A summary budget for the scheduled land management activities of the land management plan. For state lands containing or anticipated to contain imperiled species habitat, the summary budget shall include any fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitats, which fees shall be used solely to restore, manage, enhance, repopulate, or acquire imperiled species habitat. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3). | 57-58 |
| Each management plan shall describe both short-term and long-term management goals, and include measurable objectives to achieve those goals. <i>Short-term and long-term management goals shall include measurable objectives for the following, as appropriate:</i> | |
| (A) <i>Habitat restoration and improvement;</i> | 25-27, 31-34 |
| (B) <i>Public access and recreational opportunities;</i> | 40-47 |
| (C) <i>Hydrological preservation and restoration;</i> | 13-14 |
| (D) <i>Sustainable forest management;</i> | App K |
| (E) <i>Exotic and invasive species maintenance and control;</i> | 39 |
| (F) <i>Capital facilities and infrastructure;</i> | 45-47 |
| (G) <i>Cultural and historical resources;</i> | 28-29 |
| (H) <i>Imperiled species habitat maintenance, enhancement, restoration, or population restoration</i> | 25-27, 31-34 |
| 253.036 Forest Management. — | |
| 31. For all land management plans for parcels larger than 1,000 acres, the lead agency shall prepare the analysis, which shall contain a component or section prepared by a qualified professional forester which assesses the feasibility of managing timber resources on the parcel for resource conservation and revenue generation purposes through a stewardship ethic that embraces sustainable forest management practices if the lead management agency determines that the timber resource management is not in conflict with the primary management objectives of the parcel. (Example #8) | App K |

Management Plan Compliance Checklist - Natural Resource Lands

| Requirements | | Page Numbers |
|--|--|------------------|
| 259.032 Conservation And Recreation Lands Trust Fund; Purpose. — | | |
| (10)(a) State, regional or local governmental agencies or private entities designated to manage lands under this section shall develop and adopt, with the approval of the Board of Trustees, an individual management plan for each project designed to conserve and protect such lands and their associated natural resources. Private sector involvement in management plan development may be used to expedite the planning process. | | |
| 32. Individual management plans required by s. 253.034(5), for parcels over 160 acres, shall be developed with input from an advisory group - Management plan should list advisory group members and affiliations. | | App J |
| 33. The advisory group shall conduct at least one public hearing in each county in which the parcel or project is located. Managing agency should provide DSL/OES with documentation showing date and location of public hearing. | | App J |
| 34. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. Managing agency should provide DSL/OES with copy of notice. | | App J |
| 35. The management prospectus required pursuant to 259.032 (9)(d) shall be available to the public for a period of 30 days prior to the public hearing. | | Completed |
| 36. Summary of Advisory Group Meeting should be provided to DSL/OES. | | App J |
| 37. Individual management plans shall conform to the appropriate policies and guidelines of the state land management plan and shall include, but not be limited to: | | |
| A. A statement of the purpose for which the lands were acquired, the projected use or uses as defined in s. 253.034, and the statutory authority for such use or | | 1-2 |
| B. Key management activities necessary to achieve the desired outcomes, including, but not limited to, providing public access , preserving and protecting natural resources, protecting cultural and historical resources , restoring habitat, protecting threatened and endangered species , controlling the spread of nonnative plants and animals, performing prescribed fire activities, and other appropriate resource management activities. | | 3, 31, 32, 35-37 |
| C. A specific description of how the managing agency plans to identify, locate, protect, and preserve, or otherwise use fragile, nonrenewable natural and cultural resources. | | 17-26 |
| D. A priority schedule for conducting management activities, based on the purposes for which the lands were acquired. (Example #10) The schedule must include a goal, an objective, and a time frame for completion. | | 42-51 |
| E. A cost estimate for conducting priority management activities, to include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement.</i> | | 51-52 |
| F. A cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired. The cost estimate shall include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement.</i> (Example #10) Include approximate monetary cost and cost effective methods. Can be placed in the appendix. | | 51-52 |
| 38. A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired. | | 38, 42 |
| 259.036 Management Review Teams.— | | |
| 39. The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. Can be addressed in the body of the plan or addressed in an appendix. If not in agreement, the managing agency should reply in a statement in the appendix. | | |
| Other Requirements | | |
| 40. This checklist table at front of plan (pursuant to request of ARC and consensus agreement of managing agencies.) | | X |
| 41. Accomplishments (implementation) from last plan (format variable by agency) | | |
| 42. FNAI-based natural community maps (may differ from FNAI in some cases) | | App F |
| 43. Fire management plans (either by inclusion or reference)(259.032) | | App G |
| 44. A statement regarding incompatible uses [ref. Ch. 253.034 (9)] | | 38, 42 |
| 45. Cultural resources, including maps of all sites <i>except</i> Native American sites* | | App H and I |
| 46. Arthropod control plan | | App M |

**MALABAR SCRUB SANCTUARY
MANAGEMENT PLAN**

TABLE OF CONTENTS

| | PAGE |
|---|-------------|
| I. Executive Summary..... | 1 |
| II. Introduction..... | 2 |
| III. Site Description and Location..... | 5 |
| IV. Natural Resource Descriptions..... | 6 |
| A. Physical Resources | 6 |
| a. Climate | 6 |
| b. Geology..... | 10 |
| c. Topography..... | 10 |
| d. Soils..... | 11 |
| e. Hydrology..... | 13 |
| B. Biological Resources | 14 |
| a. Ecosystem Function | 14 |
| b. Vegetation..... | 15 |
| c. Fauna..... | 21 |
| d. Designated Species | 21 |
| e. Biological Diversity | 27 |
| C. Cultural..... | 28 |
| a. Archaeological..... | 28 |
| b. Historical | 29 |
| c. Land-Use History..... | 29 |
| d. Public Interest | 31 |
| V. Factors Influencing Management | 31 |
| A. Natural Trends..... | 31 |
| B. Human-Induced Trends..... | 32 |
| C. External Influences | 34 |

TABLE OF CONTENTS (Continued)

| | PAGE |
|---|-------------|
| D. Legal Obligations and Constraints | 35 |
| a. Permitting | 35 |
| b. Other Legal Obligations | 37 |
| E. Management Constraints..... | 38 |
| a. Fire | 38 |
| b. Exotic Control..... | 39 |
| c. Habitat Restoration | 39 |
| F. Public Access and Passive Recreation..... | 40 |
| VI. Management Action Plans | 48 |
| A. Goals | 48 |
| B. Strategies and Actions..... | 48 |
| VII. Projected Timetable for Implementation | 53 |
| VIII. Financial Considerations..... | 56 |
| IX. References..... | 59 |
| X. Appendices..... | 61 |

LIST OF FIGURES

| | |
|---|----|
| 1. Malabar Scrub Sanctuary Location | 7 |
| 2. Malabar Scrub Sanctuary Boundaries | 8 |
| 3. Malabar Scrub Sanctuary Possible Expansion | 9 |
| 4. Malabar Scrub Sanctuary Topography | 16 |
| 5. Malabar Scrub Sanctuary Soils | 17 |
| 6. Malabar Scrub Sanctuary Natural Communities..... | 22 |
| 7. Malabar Scrub Sanctuary Historical Aerials..... | 23 |
| 8. Malabar Scrub Sanctuary Historical Aerials..... | 24 |
| 9. Malabar Scrub Sanctuary Florida Scrub-jay Territories..... | 30 |
| 10. Malabar Scrub Sanctuary Fire Units | 42 |
| 11. Malabar Scrub Sanctuary Fire History | 43 |
| 12. Malabar Scrub Sanctuary Recreation Plan..... | 44 |
| 13. Malabar Scrub Sanctuary Proposed Facility Site..... | 46 |

APPENDICES

- A. Malabar Scrub Sanctuary Plant Species
- B. Malabar Scrub Sanctuary Avian Species
- C. Malabar Scrub Sanctuary Herptile Species
- D. Malabar Scrub Sanctuary Mammal Species
- E. Malabar Scrub Sanctuary Legal Description
- F. Malabar Natural Areas Inventory Element Occurrences Map
- G. Malabar Scrub Sanctuary Fire Management Plan
- H. Florida Master Site File
- I. Division of Historical Resources Documentation Review.
- J. Public Comments
- K. Timber Assessment
- L. Acquisition History and Board of County Commissioners Actions
- M. Arthropod Control Plan

I. EXECUTIVE SUMMARY

The Malabar Scrub Sanctuary (MSS) 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 ecosystem functions” (Brevard County, 1995). The program also establishes a network of public land to provide passive recreation and environmental education programs to Brevard County residents and visitors.

The MSS has been identified as a Center for Regional Management within the South Regional Management Area. The Center for Regional Management serves as a management area hub for implementing the conservation, education and recreation goals of the EEL Program. The regional approach to the EEL Program streamlines facility operations and resource management activities, enhances ecosystem management and decreases staff resource needs.

Acquired by the EEL Program in 1993, 1994 (Tract 1) and 2003 (WGML and National Heritage properties, which constitute (Tract 2), an additional purchase of seven acres was acquired from the Brook Hollow Home Owners Association in 2006. The MSS consists of 577 acres comprising two tracts within the Town of Malabar. This sanctuary preserves a fine example of the upland and wetland communities that once covered larger areas of the southern portion of the County. It also preserves high quality oak and sand pine communities in a contiguous form. The scrub ridge is home to several endemic plant and animal species. Protected wildlife species noted on site during recent or past studies include the gopher frog (*Rana capito*), the Florida Scrub-jay (*Apheloma coerulescens*), and the gopher tortoise (*Gopherus polyphemus*). No cultural resources have been recorded in the MSS.

The State reimbursed the County for approximately 50% of the purchase price in 2001 (Tract 1), and 50% for the WGML portion of Tract 2 in 2004. The State has reimbursed the County 50% of the purchase price for the National Heritage portion of Tract 2 in 2005. This MSS is titled to the state and Brevard County is the designated land management agency. Brevard County has yet to be reimbursed for the 2006 acquisition and the title remains with Brevard County.

For further information on acquisition please refer to Appendix L

The primary management goals for the MSS 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, environmental education and opportunities for multiple uses, such as stormwater control and water recharge.

The MSS will provide outstanding opportunities for nature-based outdoor recreation, environmental education, field research and guided or self-guided interpretive tours featuring Central Florida's ecological diversity. Due to the sensitive nature of the resources, access will be limited to passive recreation. Facilities proposed for the MSS include a trail system available for hiking, bicycling, horseback riding, a Management and Education Center, and parking. MSS plans to provide a high level of ADA accessibility at the sanctuary. The nature trails will feature signs to interpret the MSS's natural resources, and to provide information about resource management activities. This Center and associated environmental programs will be universally accessible. All proposed facilities would meet any applicable local, state and federal regulations.

The proposed recreation and education facilities will serve local and regional residents as well as tourists to Brevard County. The Management and Education Center and surrounding Sanctuaries in the EEL Sanctuary network are targeted as potential facilities to support nature-based tourism activities. Public access to the MSS will encourage awareness of the County's natural and cultural assets, foster a greater understanding of the balance between access and non-consumptive use of the sites' resources, and promote environmental stewardship, benefiting both the local community and the EEL Program. Emphasis will be placed on providing educational opportunities to the Brevard County school system to promote the understanding and appreciation of the unique and valuable resources available in Brevard County and thereby promote long-term preservation.

II. INTRODUCTION

In a 1990 referendum, Brevard County voters approved the Environmentally Endangered Lands (EEL) Program. The Program 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 through acquisition and management. The EEL Program provides passive recreation and environmental education opportunities to Brevard's citizens and visitors without detracting from the 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 Program sanctuary network represents a collection of protected natural areas that form a regional conservation effort focused upon protection of biological diversity. Within the countywide 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:

- Barrier Island Ecosystem Center
Regional Management Center for South Beaches

- Enchanted Forest Sanctuary
Regional Management Center for North Mainland
- Pine Island Conservation Area
Regional Management Center for Central Mainland
- Malabar Scrub Sanctuary
Regional Management Center for South Mainland

These centers provide strategically located hubs for implementing the countywide conservation, passive recreation and environmental education goals of the EEL Program. These sites are proposed for varied public access and development of environmental education/land management centers.

The MSS Tract 1 was chosen as a Category 1 Site (Regional Management Center) for its accessibility, suitability for environmental learning center development, proximity to residential areas of the County and marketability for capital program campaigns to secure financial support from the private sector, foundations and outside grants. Tract 2 is designated as an EEL Program Category 2 Site meaning that this area will have minimal capital development.

Public facilities in the MSS will be designed in accordance with the Americans with Disabilities Act (ADA). Educational and recreational opportunities include nature trails with interpretive signs, environmental education programs and extensive volunteer programs. The MSS will be staffed by a full-time sanctuary manager, who will coordinate all management, education and volunteer efforts on-site as well as all EEL Sanctuaries within the designated regional management areas. Other EEL Sanctuaries in the South Regional Management Area include Jordan Scrub Sanctuary, Valkaria Scrub Sanctuary, Micco Scrub Sanctuary and the Grant Flatwoods Sanctuary.

As outlined in the Sanctuary Management Manual (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 systems 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 *Sanctuary Management Manual* of the EEL Program 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 provides specific goals, strategies and actions to guide management of the Malabar Scrub Sanctuary in terms of the objectives of the EEL 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 as well as a description of 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, special concern species, and biological diversity), and cultural (archeological, historical, land-use history, 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* include supplemental information.

III. SITE DESCRIPTION AND LOCATION

The MSS consists of 577 acres, and is located within the Town of Malabar, north of Malabar Road (Sections 34 and 35, Township 28S and Range 37E) as shown in Figure 1. The tax parcel IDs are 28-37-35-00-00500.0-0000.00, 28-37-35-00-00015.0-0000.00, 28-37-35-00-00015.0-0000.00, 28-37-35-00-00006.0-0000.00, 28-37-35-00-00007.0-0000.00, 28-37-36-00-00002.0-0000.00, 28-37-36-00-00008.0-0000.00, 28-37-36-00-00500.0-0000.00, 28-37-36-00-00001.0-0000.00, 28-37-36-00-00250.0-0000.00, 28-37-36-00-00253.0-0000.00, 28-37-36-00-00754.0-0000.00 and 28-37-36-00-00006.0-0000.00. The legal descriptions are attached as Appendix E. Vehicular access to Tract 2 will be provided from Malabar Road, and for Tract 1, gated access is available from Malabar Road, Marie Street and the north boundary canal easement (Figure 2). Tract 1

had been approved for residential development, and initial site work with the construction of a concrete road was completed before the residential project was abandoned. Adjacent uses include the Malabar Town Park, located next to the southwest corner of the MSS, and residential development.

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, special concern species and biological diversity) and cultural resource information (archeological, historical, land-use history and public interest).

A. Physical Resources

a. Climate

The MSS 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. There are reliable rainfall records from Titusville that span approximately 100 years, and average 53.8 inches. Wet and dry seasons are typically well defined, with the wet season occurring between May and October. Annual and seasonal rainfall is subject to large variation in both amount and distribution. During spring and summer, Brevard County experiences numerous thunderstorms often coupled with frequent lightning strikes. Historical alteration in climate in association with intermediate disturbance events such as hurricanes and lightning-induced wildfires directly and indirectly affect the composition and distribution of species and natural communities in Florida, and Brevard County is no exception.

Prevailing winds are generally from the north to northeast during the dry season (November-April) and from the east-southeast during the wet season (May-October) (ESMC, 1989). Weather patterns such as cold fronts and thunderstorms will affect local wind direction depending upon the time of year.

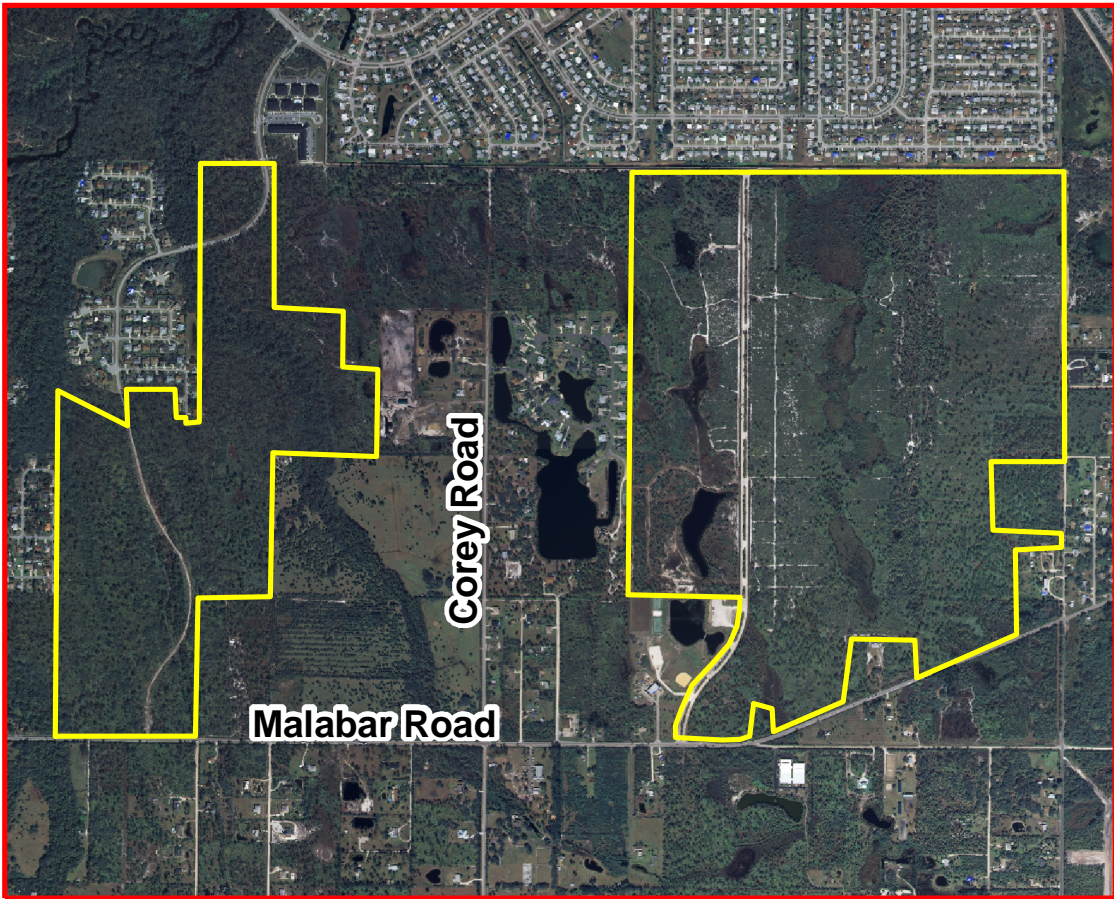
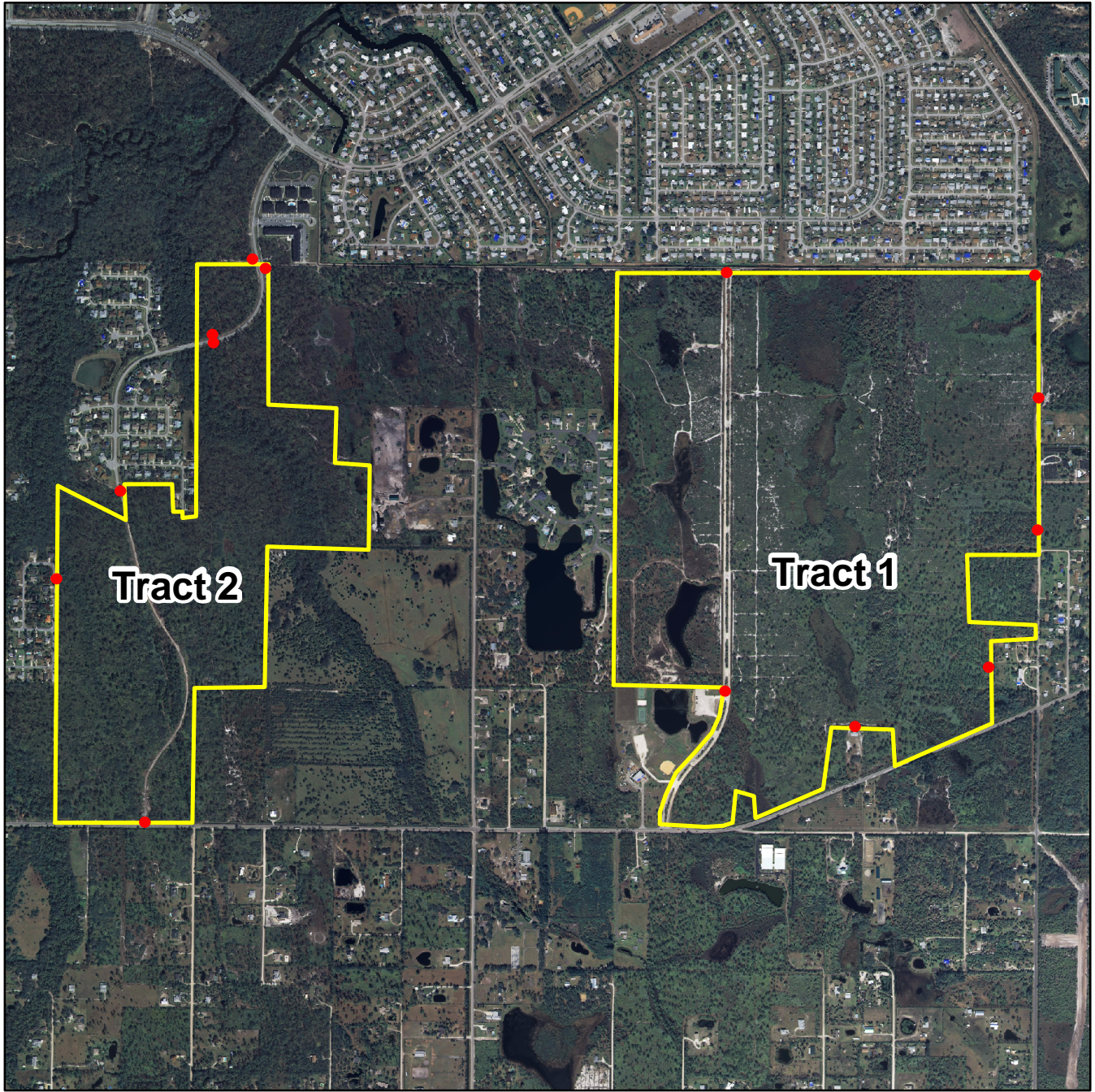


Figure 1: Malabar Scrub Sanctuary Location



0 875 1,750 3,500 Feet



- Gates
- Sanctuary Boundary

Figure 2: Malabar Scrub Sanctuary
Tract 1 and Tract 2 Boundaries

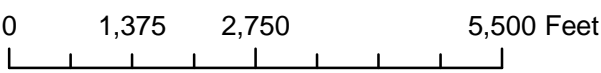
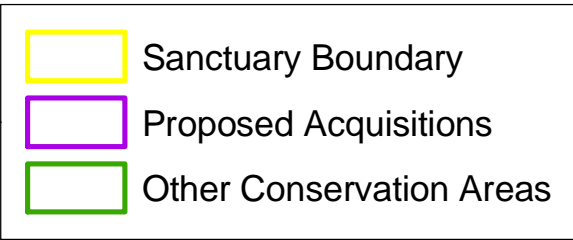
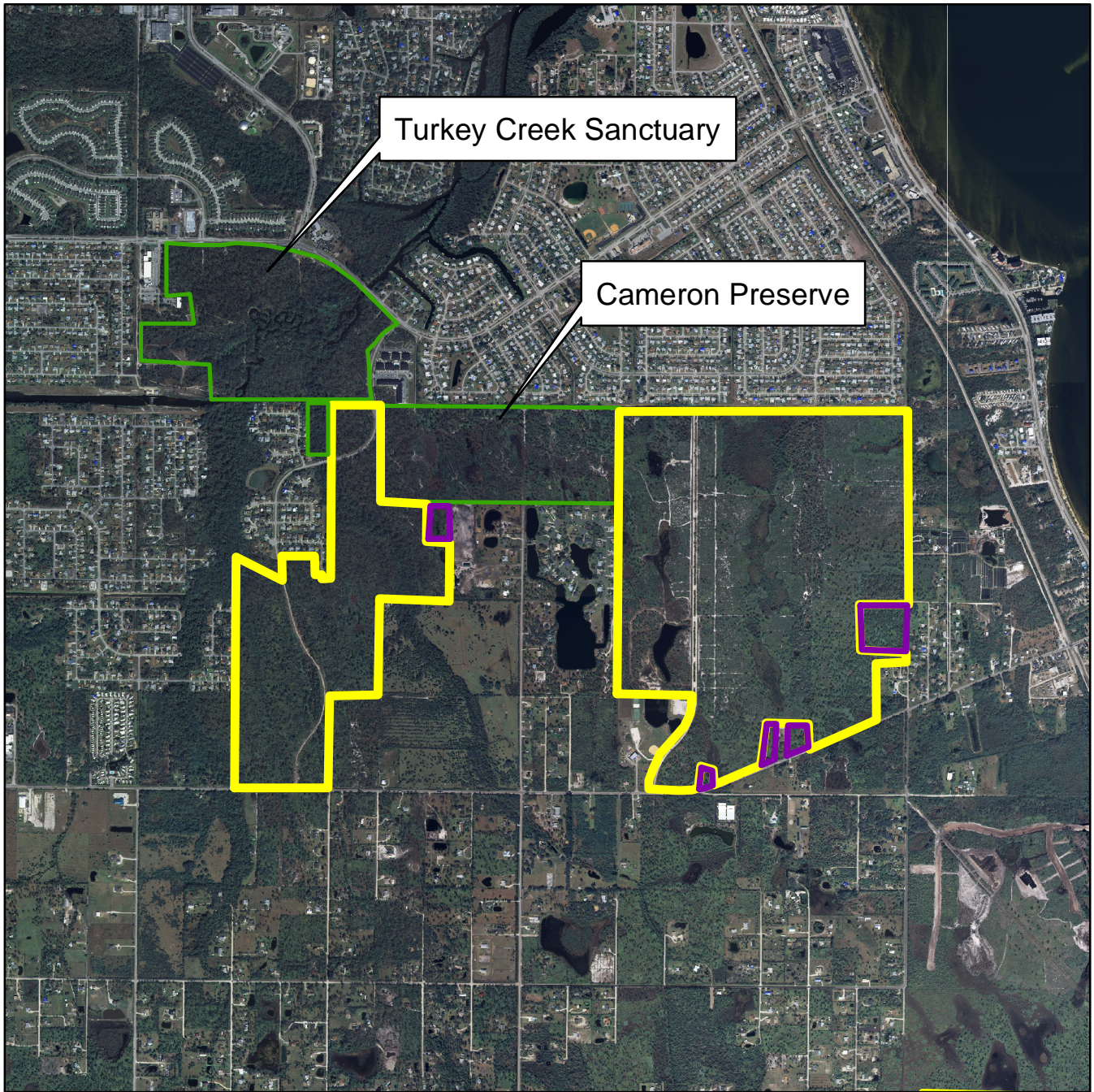


Figure 3: Malabar Scrub Sanctuary Proposed Acquisitions and Adjacent Conservation Areas

b. Geology

Since the late Oligocene, Florida has been a continuous peninsula, comprised of numerous ecosystems. The most ancient terrestrial systems are probably the mesic forests and the xeric oak/scrubby ecosystems. Scrub ridges that are present throughout Florida and Brevard County remained high and dry during historical water level fluctuations that dramatically shaped the composition of the state's rich scrub biota (Myers, 1990) The MSS is located on the Atlantic Coastal Ridge, a geological shoreline feature estimated to have formed up to 140,000 years ago when the sea level was as much as 30 feet above the present level. The site is part of a relic beach and dune system, an important geological feature that influences the biological diversity of Brevard County. Paul A. Schmalzer wrote the following description concerning the historical development of the Atlantic Coastal Ridge in Brevard County (Swain, et. al. 1995):

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.

Most of Florida's major lakes, bayheads and swamps are newly formed since the Wisconsin glacial stage (Webb, 1990). This implies that these wetland systems have been repopulated during the last several thousand years in a manner comparable to island colonization (Webb, 1990).

c. Topography

The MSS is described as gently rolling terrain, with alternating low ridges and shallow swales. Elevations range from approximately 15' National Geodetic Vertical Datum (NGVD) in the primary slough that runs through the center of the site, to 25' to 30'+/- NGVD along the ridge immediately east of the concrete boulevard, based upon the USGS Topographic Survey Map (Figure 4). It appears that the general surface drainage pattern is toward the north and east via sheet flow to reach the aforementioned slough. The slough empties into a drainage canal that forms the northern boundary of the property, which eventually outfalls to the Indian River Lagoon.

d. Soils

The soil types within the MSS, defined by the Natural Resource Conservation Service (formally the Soil Conservation Service), are as follows (Figure 5):

Anclote Sand (An)
Basinger Sand (Ba)
EauGallie Sand (Eg)
Immokalee Sand (Im)
Myakka Sand (Mk)
Myakka Sand, ponded (Mp)
Paola Fine Sand, 0 to 5 % slopes (PfB)
Pomello Sand (Ps)
Satellite Sand (Sa)
St. Lucie Fine Sand, 0 to 5% slopes (SfB)
Tomoka Muck (Tw)

Note: Descriptions of vegetation associated with soil series from the Brevard County Soil Survey are generic and not specific to Malabar Scrub Sanctuary.

Anclote Sand (An)

This is a nearly level poorly drained sandy soil with a dark colored surface layer. These soils occur in broad areas on flood plains, in marshy depressions in the flatwoods, and in poorly defined drainageways. They formed in sandy marine sediments. In most years the water table is within a depth of 10 inches for more that 6 months. In dry seasons it is deeper, but is seldom below a depth of 40 inches. During periods of high rainfall, the soil is covered by slowly moving water for periods of about 7 days to one month. Typical vegetation on this soil type may include herbaceous communities (primarily grasses).

Basinger Sand (Ba)

These soils are nearly level, poorly drained sandy soil typically found in sloughs and depressions in flatwoods. The typical natural community found on Basinger sand is saw palmetto, wiregrass and widely spaced pines. Low areas are covered with maidencane and St. Johns wort.

EauGallie Sand (Eg)

These soils are nearly level, very poorly drained sandy soil in broad areas in the flatwoods, on low ridges between sloughs, and in low, narrow areas between sand ridges, lakes and ponds. These soils are mainly on broad, low ridges. In most years, the water table is within a depth of 12 inches of the surface for 1 to 4 months. In other months, the water table is below 12 inches. Rarely is it above the surface. This soil is flooded for 2 to 7 days once in 1 to 5 years. Typical vegetation on this soil type may include saw palmetto, gallberry, second growth longleaf pine, slash pine and wiregrass.

Immokalee Sand (Im)

These soils consist of nearly level, poorly drained sandy soils in broad areas in the flatwoods, on low ridges between sloughs, and in low narrow areas between sand ridges and lakes and ponds. These soils formed in beds of marine sands. In normal years, the seasonal high water table is within 12 inches of the surface for 1 to 4 months. In other months, the water table is below 12 inches. Rarely is it above the surface. Typical vegetation on this soil type may include saw palmetto, gallberry, slash pine and wiregrass.

Micco Mucky Peat (Mc)

This is a nearly level, poor draining peat underlain by mineral soils. The water table lies with 10 inches 9 to 12 months out of the year. Rarely is the water table more than 30 inches below the surface. Common vegetation includes maiden cane, sawgrass, cattail and flags.

Myakka Sand (Mk)

These soils consist of nearly level, poorly drained soils in broad areas in the flatwoods, and in areas between sand ridges and ponds and sloughs. These soils formed in beds of marine sands. In normal years, the seasonal high water table is within 12 inches of the surface for 1 to 4 months. In other months, the water table is below 12 inches. Rarely is it above the surface. Typical vegetation on this soil type may include second growth slash pine with an understory of saw palmetto, runner oak, native grasses and gallberry.

Myakka Sand, ponded (Mp)

This is a nearly level, poorly drained sandy soil, and is characteristic of depressions in flatwoods. Natural vegetation is primarily maidencane or St. Johns wort, although water-tolerant trees are found in some areas, and water lilies and flags are found in deeper standing water.

Paola Fine Sand, 0 to 5 % slopes (PfB)

The Paola series consists of nearly level to strongly sloping soils. These soils formed in thick beds of eolian sands. Permeability is very rapid, and the available water content is very low. Organic matter content and natural fertility are low. The 0 to 5% slope series is an excessively drained sandy soil found on ridges. The water table is below a depth of ten feet. Many areas are in woods of sand pine and an understory of scattered palmetto, rosemary and cactus.

Satellite Sand (Sa)

Satellite sand is found in thick beds of sandy marine sediment. These nearly level soils are on low knolls and ridges in the flatwoods. The water table is at a depth of 18-40 inches for 2-6 months and at a depth of 40- 72 inches for 6 months or more in most years.

St. Lucie Fine Sand, 0-5% slopes (SfB)

This is a deep, nearly level to steeply loped, excessively drained sandy soil found on high, dune-like ridges and isolated knolls. Most areas are vegetated by sand pine with a sparse understory of saw palmetto, rosemary and prickly pear cactus. St. Lucie fine sand is an aquifer recharge soil.

Tomoka Muck (Tw)

This is a nearly level, very poorly drained muck soil in broad flat marshes, small depressions and swamps. Sandy and loamy layers are at a depth of 16 to 40 inches. The water table is within a depth of 10 inches for 9 to 12 months in most years, and water is frequently above the surface. In dry periods it is between 10 and 30 inches. Typical vegetation on this soil type include maidencane, sawgrass, cattails, and scattered thickets of buttonbush. A few areas are wooded with maple, bay and other wetland hardwoods.

e. Hydrology

There are several different hydrologic features with MSS. Tract 1 has a series of connected basin marshes that tend to sheet flow to the north. Some alterations to the marshes occurred during the failed development project. Tract 2 has several black water streams that vary in size flowing water to the north into Turkey Creek. Only one of these creeks remains wet year round. The hydrology of the streams is altered due to development within the historic drainage area for the streams.

There is a swale west of the “Boulevard”(a paved road that bisects the western side of Tract 1) (Fig. 3) was installed by the EEL Program to help drain the south portion of the paved road. There was a flooding problem that was occurring during heavy rain events, it was decided that the EEL Program would assist by modifying the existing swale to help drain the southern portion of the paved road. This swale will be maintained on an “as needed” basis.

East of the “Boulevard,” the hydrology is dominated by a series of marshes that drain generally northward towards a drainage canal along the north property boundary. In 2007 a water control structure was installed as part of a mitigation project associated with the construction of the North Boundary Trail. Historic aerial photographs indicate that the drainage canal that forms the northern boundary of the MSS was excavated in the late 1950’s – early 1960’s.

A small area along the southern boundary and east of the entry road holds water during the wet season due to slightly lower topography and restriction of natural flow patterns. The EEL Program will work with the Town of Malabar and Florida Department of Transportation regarding flooding concerns along Malabar Road.

During site visits in December 1998, a substantial amount of standing water was observed on the “Boulevard.” Based upon visual observations, it appears that much of this road is considerably lower than Malabar Road, which makes it impossible for the Malabar Road stormwater system to function as a positive outfall for this project. The MSS also receives water from the south side of Malabar Road. Three culverts under

Malabar road help bring water to both tracts of the sanctuary. This existing condition will need to be remedied in conjunction with the development of the environmental learning center to meet the stormwater treatment and storage requirements identified by the Town of Malabar and the St. Johns River Water Management District.

During the planning and construction of the paved trail adjacent to Marie Street, consideration will be given regarding the flooding issues observed during Tropical Storm Fay (2008) on Marie Street. The EEL Program will work with the Town of Malabar to address concerns about flooding during the design of the paved trail.

The major hydrological features within Tract 2 consist of blackwater stream systems that flow through the upland communities, very similar to the mix of ecosystems within the Turkey Creek Sanctuary.

Over time within both Tract 1 and 2 there have been alternations to the hydrology of these sites; as more information is gathered additional hydrological restoration may need to take place. These projects will be coordinated with the water management district to insure no adverse effects occur during restoration.

B. Biological Resources

Protection of the resources depends upon five key items: Reintroduction of a fire regime, restoration of historical hydrological processes that have altered plant communities, removal of exotics, limiting recreational impacts and monitoring all of the above items.

Protection of the natural resources and biological diversity is dependent upon the maintenance and functionality of the upland-wetland transitions of the natural communities. Restoration of the natural community features and native species is a management action priority for Malabar Scrub Sanctuary.

Proper management of the MSS is essential for the protection of the Florida Scrub-jay population in the south area of Brevard County. The MSS contains a diverse assemblage of natural communities and associated species. This association of habitats on site represents a natural mosaic typical of coastal Florida.

a. Ecosystem Function

Both tracts of the MSS preserve a fine example of the upland and wetland communities that once covered larger areas of the southern portion of the County. It also preserves high quality scrub communities in a contiguous form, thus increasing the value of the site in terms of ecosystem function. The blackwater stream habitat in Tract 2 is an important ecosystem that offers species a wetland habitat that meanders through the drier scrub. The scrub ridge is home to several endemic plant and animal species, which rely upon specific adaptations to this harsh environment for their continued survival. There is a well-documented gopher tortoise population as well as one family of Florida Scrub-jays within Tract 1.

The preservation of ecotones (transition areas between community types) also increases the intrinsic biological value of the site. Both tracts exhibit examples of such transition areas. These ecotones are important due to the high diversity of plant species found in these areas, and the wide variety of animal species, which depend upon these areas for significant life function requirements.

The wetlands on-site range from small marshes, larger areas of basin marsh, marsh lakes and blackwater streams. This variety of community types translates into a high diversity of habitat, and provides several wetland-dependent species (such as the gopher frog) with necessary breeding areas. These wetland areas, particularly the slough and the marsh lake, can serve as corridors and waypoints for species along migratory routes or species moving through the south portion of the County.

The MSS is also situated in close proximity to the Indian River Lagoon. The close proximity of these resources provides feeding areas for some of the larger animals that may nest or breed within the boundaries of the MSS. The flowways within the MSS and the canal that form a portion of the northern boundary serve as a corridor between the site and the Indian River Lagoon.

Due the absence of a natural fire regime within MSS the sand pine has taken over some of the scrub and sandhill communities. To maximize management efforts the sand pine will have be reduced significantly to allow a more natural community function.

b. Vegetation

This section describes the plant communities identified within the MSS. The identified vegetative communities (Figure 6) are described using the Florida Natural Areas Inventory's Guide to the Natural Communities of Florida (1990). A list of plant species encountered was recorded for the study site. This list reflects the representative species and is not a complete floristic inventory. A plant species table generated through the compilation of data collected by Mr. David Simpson of Audubon Society, Nancy Coile from the Florida Department of Agriculture and Consumer Services, students from the Florida Institute of Technology (FIT), and members of the EEL Selection & Management Committee is included in Appendix A.

Historic aerial photographs were reviewed to determine changes to vegetative community type and structure, as well as man-induced changes, in the past fifty years. Photographs from 1943, 1951, 1958, 1963, 1967, 1969, 1975, 1980 and 1983 were inspected and observations of significant changes were noted. In general, the flatwoods and scrub vegetation have both increased in density as a result of lower fire frequency. Sand pines from the sand pine scrub ecosystem have invaded surrounding sandhill and flatwoods ecosystems as the fire frequency has abated, resulting in the potential for higher intensity wildfires and prescribed fires due to the fire behavior of the sand pine. Selections of historic aerials are included in Figures 7-8.

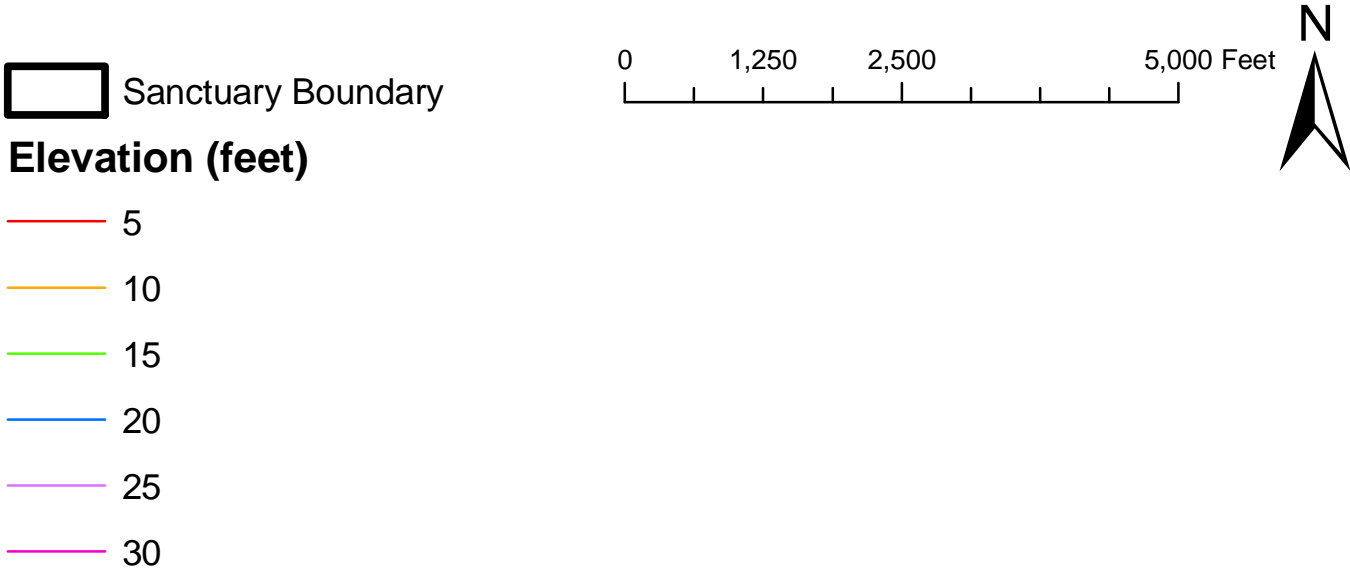
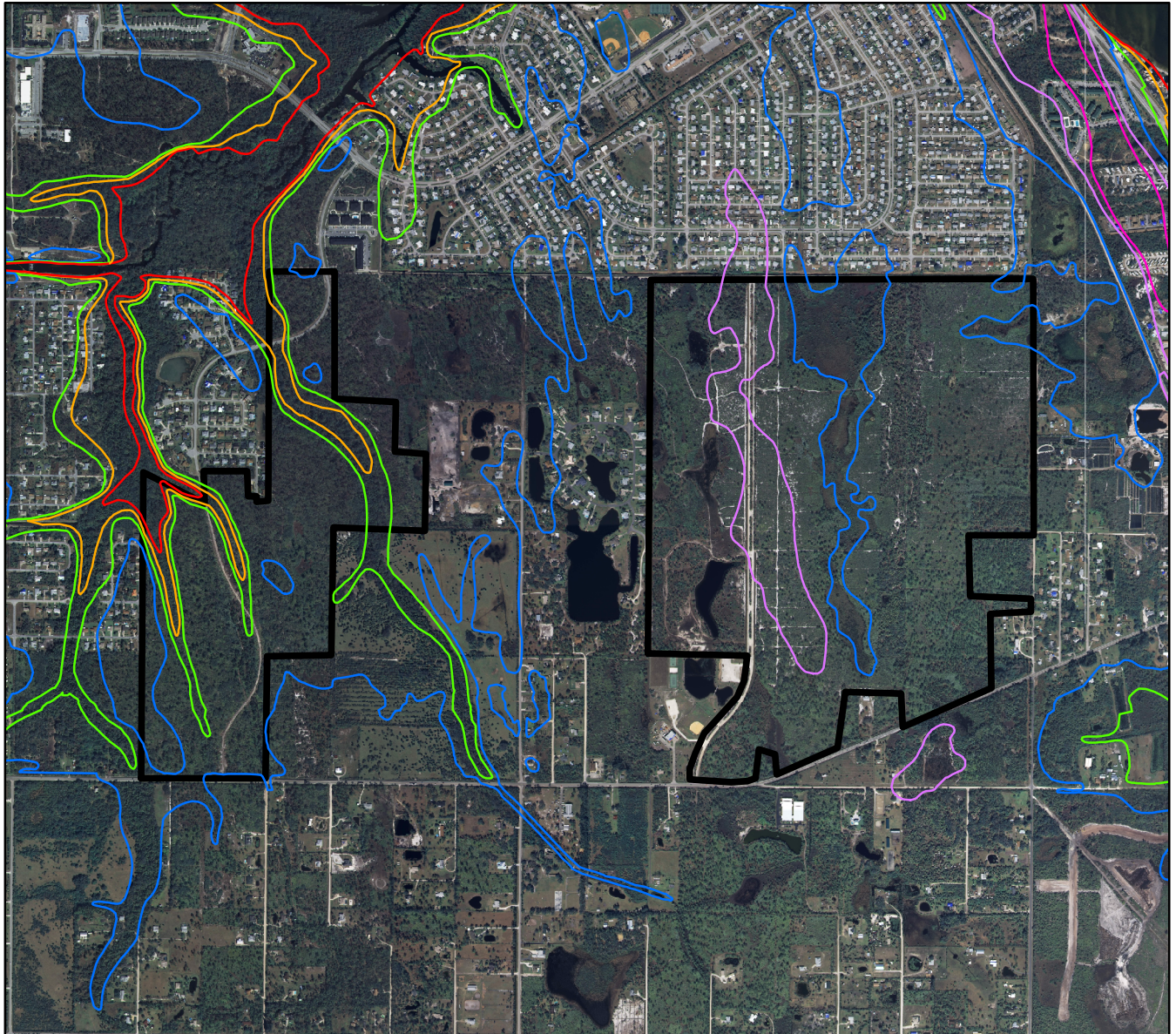
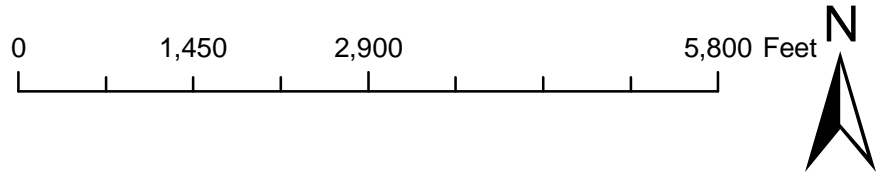
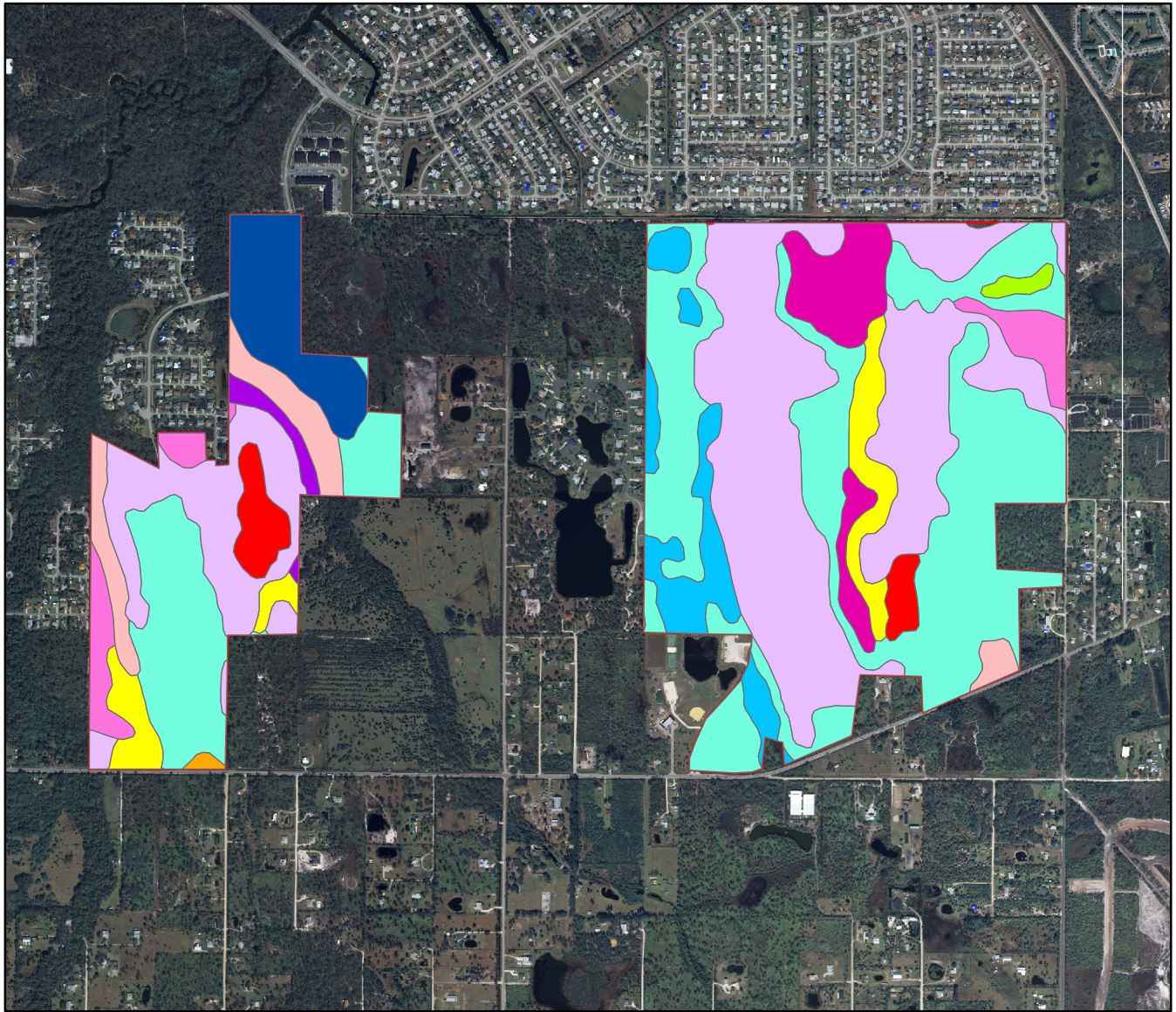


Figure 4: Malabar Scrub Sanctuary Topography















- | | |
|--|--|
|  Anclothe sand |  Myakka sand- depressional |
|  Basinger sand |  Paola fine sand- 0 to 5 percent slopes |
|  EauGallie sand |  Pomello sand |
|  Immokalee sand |  Satellite sand |
|  Micco mucky peat- frequently flooded |  St. Lucie fine sand- 0 to 5 percent slopes |
|  Myakka sand |  Tomoka muck- undrained |

Figure 5: Malabar Scrub Sanctuary Soils

The dominant natural community within both tracts is flatwoods, both scrubby and mesic. Slash pine (*Pinus elliottii*), sand pine (*Pinus clausa*) and longleaf pine (*Pinus palustris*) are the dominant tree species comprising the canopy layer. Saw palmetto (*Serenoa repens*), gallberry (*Illex glabra*) and various oaks are most prevalent in the shrub layer. In the herbaceous layer, soil type and water availability influences composition.

Several floral surveys within both tracts have been conducted and are listed in Appendix A. Further surveys will be performed in order to detect changes in plant diversity and to monitor invasive exotic vegetation. Exotic plant species within MSS are concentrated along the disturbed areas created by the initial phases of the Malabar Woods development, and the north-south road that splits the southern section of Tract 2. The primary invasive exotics on-site are the Brazilian pepper (*Shinus terebinthifolius*), cogon grass (*Imperata cylindrical*), downy rose myrtle (*Rhidimyrthus tomentosa*), Japanese climbing fern (*Lygodium japonicum*) and melaleuca (*Melaleuca quinquenervia*). Treatment of the pepper with the chemical Garlon and the cogon grass with Roundup have slowed the spread of these exotics into the MSS. Routine eradication activities coupled with monitoring are ongoing to all exotic plants within MSS.

The following natural communities (listed by their FNAI classification) have been documented within both Tracts:

Mesic flatwoods

This plant community is found on the eastern side of the property south of the sand pine scrub community along a low ridge system that runs north to south through the MSS. Pine density and type varies, with some areas containing only longleaf pine), others only slash pine and still others a combination. Mesic flatwoods are characterized as an open canopy forest of widely spaced pine trees with little or no understory and a dense ground cover of herbs and shrubs. Typical understory vegetation consists of saw palmetto, gallberry, fetterbush (*Lyonia lucida*), and grasses. A portion of this habitat has been altered due to historic grazing or the interruption of historic fire frequencies. A return to a more natural fire regime is necessary for all of the mesic flatwoods on property.

Fetterbush and or gallberry are often dominant shrubs in this ecosystem, but in many stages of mesic flatwoods saw palmetto can be dominant. Height of shrub layer accurately reflects period since last fire event. Occasional pawpaw (*Asimina reticulata*), tar flower (*Befaria racemosa*) and redbay (*Persea borbonia*) are present. Ground cover contains yellow-star grass (*Hypoxis juncea*), pennyroyal (*Piloblephis rigida*) and big yellow milkwort (*Polygala rugelii*).

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

Thus, many plants are under the stress of water saturation during the wet seasons, and under the stress of dehydration during the dry seasons.

Finally, mesic flatwoods are fire dependent ecosystems. Fires likely occurred in these communities every 1 to 8 years during the pre-Columbian times. Nearly all plants and animals inhabiting mesic flatwoods are adapted to periodic fires; several species actually depend on fire for their continued existence. In the absence of frequent fire there are structural changes. Pine densities increase, shrub layer height increases, shrub cover increases, and herbaceous cover decreases. These changes are detrimental to the native fauna of flatwoods and to many plant species, particularly herbs that require open conditions. Structural changes occur well before successional changes (i.e., replacement of flatwoods by hardwood forests). For central Florida, the extent or rate of successional change of flatwoods to hardwood forest is not well established. Mesic flatwoods often grade into wet flatwoods, dry prairie, or scrubby flatwoods, depending upon elevation.

Scrub

This community type occurs in the center of the site, straddling the concrete boulevard, though the majority of the habitat occurs to the east of the boulevard. The dominant species include sand live oak (*Quercus geminata*), Chapman oak (*Quercus chapmanii*), myrtle oak (*Quercus myrtifolia*), rusty lyonia (*Lyonia ferruginea*), rosemary (*Ceratiola ericoides*), hog plum (*Ximenia americana*), tarflower and saw palmetto. The ground cover is composed of deer tongue (*Carphephorus*), sand spikemoss (*Selaginella arenicola*), deer moss (*Cladina*), wiregrass (*Aristida stricta*), bracken fern (*Pteridium aquilinum*), and pennyroyal.

Sandhill

Sandhill community is characterized as a forest with widely spaced pine trees with sparse understory of turkey oaks and dense ground cover of grasses and herbs. This community has well drained soils that act as aquifer recharge soils. The soils appear yellow in color and are relatively sterile. The dominant plant species in sandhill community are wiregrass, long leaf pine, turkey oak (*Quercus laevis*), and winged sumac (*Rhus copallinum*). Most of these community characteristics are observable in the northern part of Tract 2 of the MSS (Figure 6). However this sandhill community in its present state has a very high density of sand pines which results in lower than expected coverage by the typical sandhill plant species and a much less open habitat. The increase in sand pine density over time can be observed on historical aerials and is a result of the alteration of fire regime.

Removal of sand pine and the application of prescribed fires are necessary in order to restore this rare community type and maximize habitat functionality.

Ruderal/Disturbed

This land use description describes the status of portions of the west side of Tract 1, immediately adjacent to the concrete boulevard. This area was historically xeric oak scrub, but was impacted by the installation of the Boulevard, concomitant changes in the localized drainage pattern, and subsequent usage of the area by recreational vehicles.

Remnant scrub vegetation including sand live oak and Chapman oak are clumped around areas of bare sand. Herbaceous species include grass-leafed aster, sand spikemoss and bracken fern. The area has been invaded by more mesic species including wax myrtle (*Myrica cerifera*) and gallberry.

Along the northern boundary of the site, a portion of the wetland system that runs north to south through the MSS shows signs of historic disturbance. The area is vegetated by a thick mat of muscadine grape (*Vitis rotundifolia*). The source of disturbance is not readily apparent, but may be related to surface water management efforts on and/or adjacent to the MSS.

Scrubby Flatwoods

Scrubby flatwoods occur on higher soil elevations than more mesic flatwoods, and consist of various oaks, palmettos and scattered pines. Fire is an important component of this habitats' overall health, and should be introduced in a rotational pattern to impose a mosaic formation within the community to insure long-term Scrub-jay survivability. Myrtle oak is the dominant oak species with a shrub layer of saw palmetto, fetterbush and rusty lyonia present. Wiregrass, shiny blueberry (*Vaccinium myrsinites*), dwarf huckleberry (*Gaylussacia dumosa*), lupine (*Lupinus diffusus*) and ground lichens are present.

Basin Marsh

This wetland system is interspersed with shrub marshes to the east of the sand ridge. The dominant species include sawgrass (*Cladium jamaicense*), pickerelweed (*Pontederia cordata*), duck potato (*Sagittaria latifolia*), milkworts, maidencane, royal fern (*Osmunda regalis*), marsh fern (*Thelypteris palustris*), swamp fern (*Blechnum serrulatum*), hatpins (*Syngonanthus flavidulus*) and redroot (*Lachnanthes caroliniana*). According to the historic aerial photographs, the basin marsh wetlands appear to have been primarily herbaceous, and shrub species began to populate these areas in about same time period as the Malabar Woods development.

Depression Marsh

Depression marshes are the seasonally wet ponds scattered throughout the mesic flatwoods. These wetlands are essential for the conservation of many of the site's amphibians and provide breeding grounds for sandhill cranes. These are in excellent shape in the MSS, and are relatively undisturbed. They are ringed by dense saw palmetto with sandweed (*Hypericum fasciculatum*) as the dominant species. This represents a natural community fast disappearing to development Brevard County.

Hydric Hammock

This system is characterized as a low-lying, closed-canopy forest of tall, straight trees with sparse understory and little or no ground cover, or an open understory and ground cover of ferns, herbs and grasses. These forests can border streams with distinct banks, such that water periodically overflows the channel. Typical plants include water oak (*Quercus nigra*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*) and cabbage palm (*Sabal palmetto*).

Seepage Stream

Seepage streams are characterized as perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but their presence is often reduced because of typically steep banks and considerable fluctuation in water level. Seepage streams have sandy bottoms overlain by organics and frequently underlain by limestone, and have high steep banks alternating with bottomland forest.

c. Fauna

The diversity of natural communities found within both tracts of the MSS support a high number of animal species. Only Tract 1 has had an initial survey for animal species, and Tract 2 still needs to be surveyed.

Birds

EEL staff and volunteers have conducted several bird surveys (Appendix B). Regular bird surveys will be established to obtain a more accurate measure of bird diversity and abundance.

Reptiles and Amphibians

The reptiles and amphibians noted within the MSS are listed in Appendix C. There is a need for more extensive species surveys, especially of the blackwater stream system in Tract 2, which most likely supports a wide variety of frogs and other amphibians.

Mammals

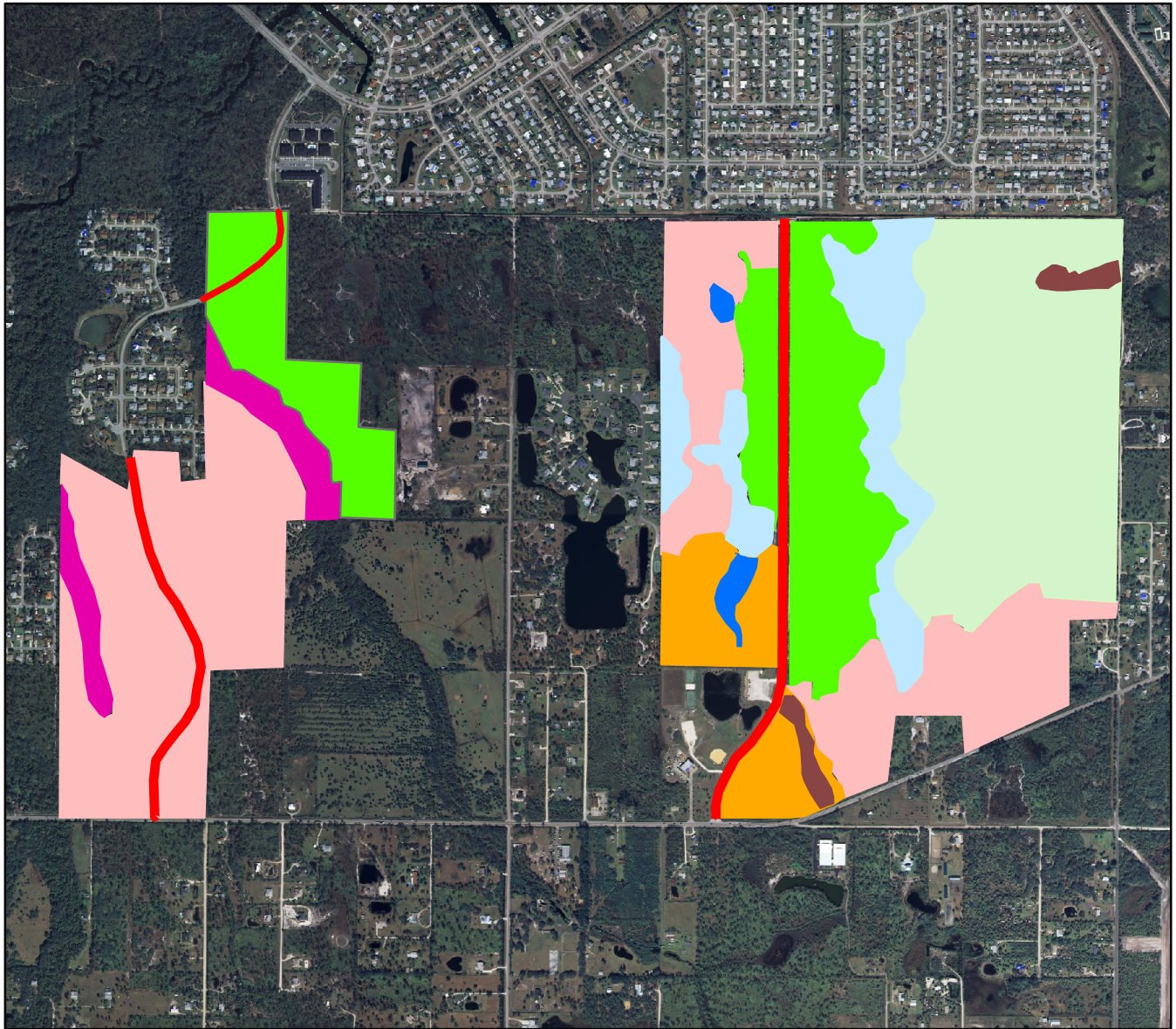
The mammals recorded on-site are listed in Appendix D. There is a need for more extensive small mammal surveys.

d. Designated Species

Plants

The US Fish and Wildlife Service (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 plant species as either endangered or threatened. The FDACS lists plants that are considered State Endangered/Threatened and/or Commercially Exploited.

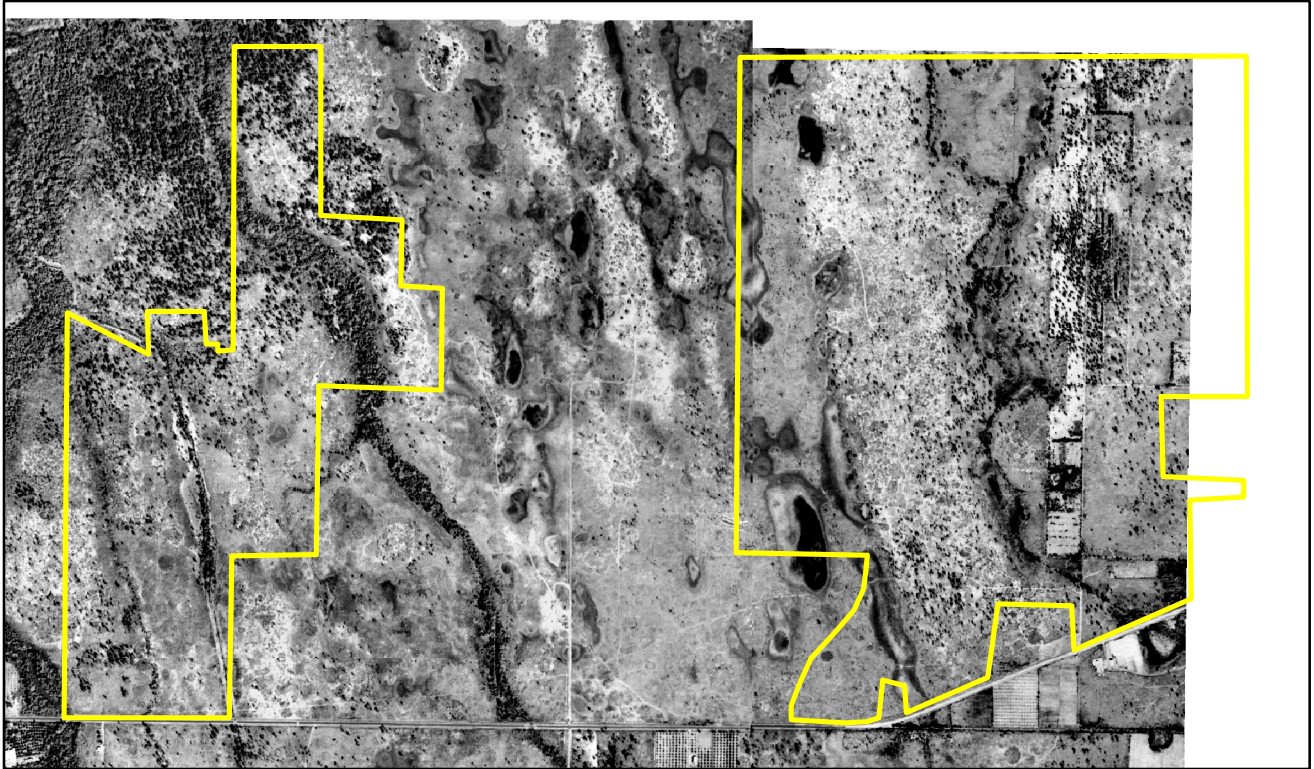
Garberia heterophylla (Florida, Threatened) as well as nodding clubmoss (*Lycopodium cernuum*), royal fern (*Osmunda regalis*) and cinnamon fern (*Osmunda cinnamomea*), species listed by the FDACS as commercially exploited, were noted on-site during field investigations associated with the preparation of this document. In addition, *Lechea cernua* (Florida, Threatened), *Lechea divaricata* (Florida, Endangered), *Nolina atopocarpa* (Florida, Threatened) and *Pteroglossaspis ecristata* (Florida, Threatened) were documented on Tract 1. Finally, *Conradina grandiflora* (Florida, Threatened) was documented on Tract 2. (Schmalzer and Foster, 2005)



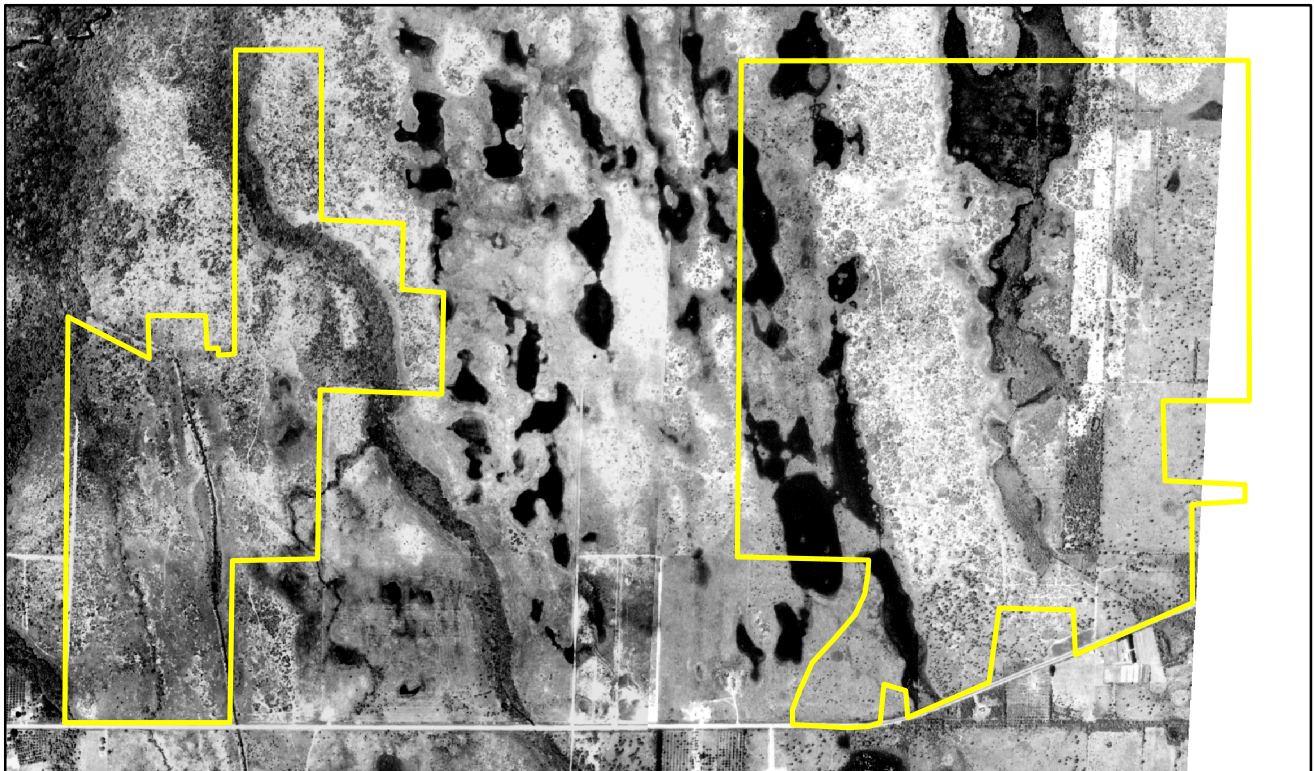
0 1,200 2,400 4,800 Feet



Figure 6: Malabar Scrub Sanctuary
Natural Communities



1943



1958

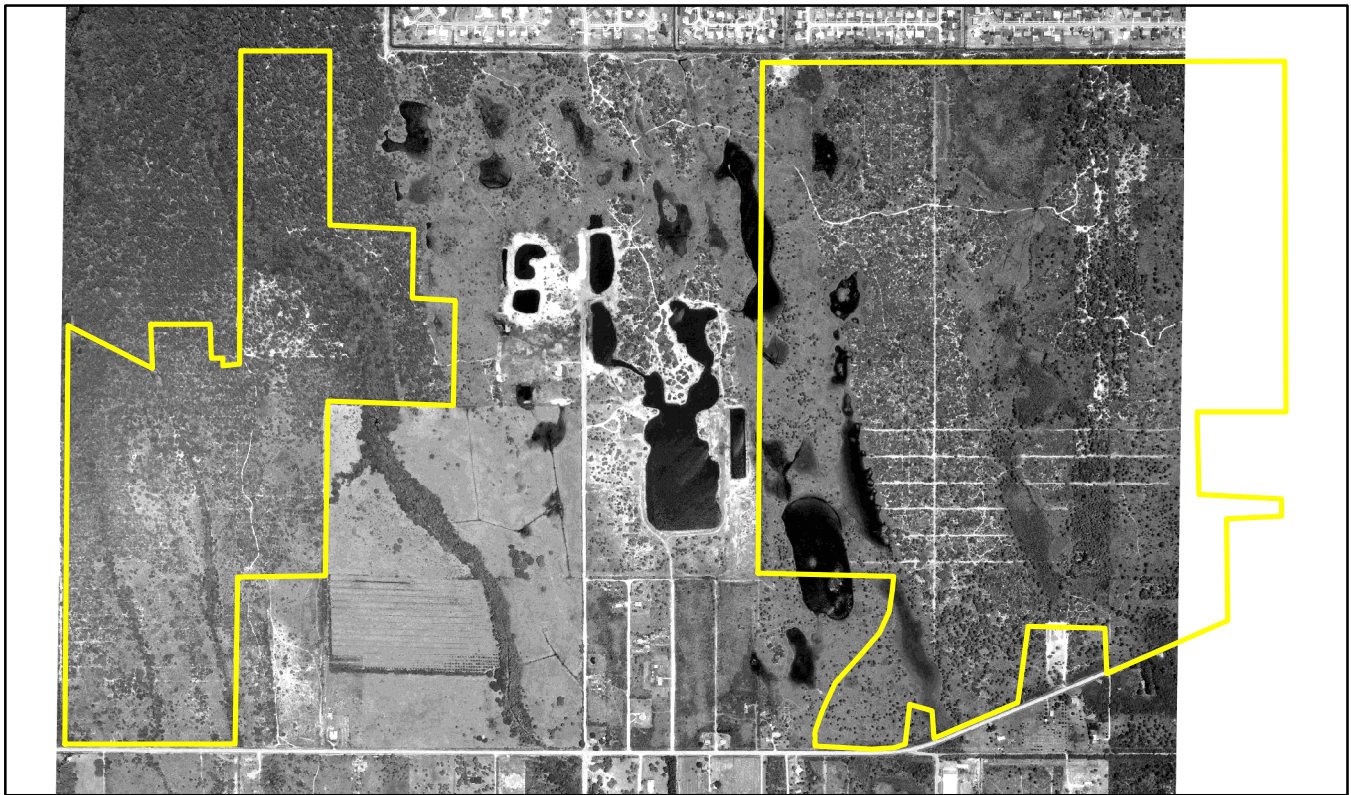
0 875 1,750 3,500 Feet



**Figure 7: Malabar Scrub Sanctuary
1943 and 1958 Historical Aerials**



1972



1983

0 900 1,800 3,600 Feet



**Figure 8: Malabar Scrub Sanctuary
1972 and 1983 Historical Aerials**

Animals

The USFWS and the State of Florida under the auspices of the Florida Fish and Wildlife Conservation Commission (FWC) also compile lists of wildlife species considered to be under the possible threat of extinction. These species are categorized as either Endangered or Threatened. The FWC utilizes an additional category, called “Species of Special Concern” (SSC), for several animal species that 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.

The Florida mouse is listed as SSC by the FWC. More in depth surveys will be conducted. Overall scrub management will benefit this species. Florida mice have been observed as part of a 2002 survey. No surveys have been conducted since.

Reptiles and Amphibians

There is a population of gopher tortoises located primarily in the xeric oak scrub, with a significant concentration on the west side of the boulevard near the north boundary of the property. The gopher tortoise is currently listed as a threatened by the FWC. The gopher tortoise population will need to be surveyed and the location of the burrows plotted on a map for use in the planning of any on-site development, such as education and management facilities.

The Florida pine snake (*Pituophis melanoleucus mugitus*), currently listed as a SSC by the FWC has been documented on site during a survey in 1993. The Florida pine snake has not been documented since. More in depth surveys are planned.

Birds

Florida Scrub-jays have been noted in the scrub habitat during site reviews. Territory maps have been provided by Dave Breininger and the U.S. Fish and Wildlife Service, and have been utilized in the planning and placement of trail systems and any proposed facilities.

The majority of the quality habitat is located immediately east and west of the Boulevard. Reduction of exotic species and the reintroduction of fire to the ecosystem are expected to maintain the quality of the prime habitat, as well as improve the habitat currently designated as marginal. The marginal habitat may also be improved for the management of Florida Scrub jays by the selective removal of the pine canopy, thereby reducing the perching opportunities for raptors, a primary predator of adult Florida Scrub jays. The options available for habitat restoration are reviewed in “Development and Implementation of a Scrub Habitat Compensation Plan for Kennedy Space Center” (Schmalzer, et. al, 1994). Specific goals of the Brevard County Scrub Conservation and Development Plan should also be referenced so as to ensure that consistency is maintained throughout the scrub refugia.

According to Breininger et al. (2000), the numbers of Florida Scrub jay territories within MSS were as high as 4 in 1997, but then declined to 2 in 1998, and consisted of 1 pair in 2004 (Figure 9). As of September 2008 2 pairs now use Tract 1. MSS is similar to other

scrubby habitat throughout Brevard County in that decades of fire suppression has led to poor quality habitat from the Florida Scrub jay's perspective. A primary cause for Florida Scrub jay decline is poor demographic success associated with reductions in fire frequency (Woolfenden and Fitzpatrick, 1984). The physical effects of fire suppression are increases in shrub height, decreases in open space, increases in tree densities and the replacement of scrub and marshes by forests (Duncan and Breininger, 1998). Dense tree layers also make it difficult for jays to spot potential predators such as the Cooper's Hawk (*Accipiter cooperi*). Habitat in poor condition is unlikely to support a population for more than a few decades (Breininger, 2001).

Declines in Florida Scrub jay with MSS have occurred since the EEL Program has acquired the parcel. This is due to the lack of habitat management prior to EEL Program acquisition. During the early years of the EEL Program there was a dispute to determine if EEL Program funds could be used for land management activities; it was determined that funds could be used for management activities. During the time MSS was privately owned and before management activities took place, the habitats within the sanctuary suffered. Due to recent management activities there has been an increase in the number Florida Scrub jays within the site.

Recommendations to enhance habitat suitability for the Florida Scrub-jay within the MSS include frequent fire (Breininger et al. 2000), the thinning of the pines within the medians of Tract 1, the mechanical reduction of scrub vegetation within several fire units. Within Tract 2, unit-specific timbering operations will need to be performed in order to reduce the thick sand pine canopy. A portion of the sand pine scrub within Tract 2 was at one time a more open sandhill habitat, and so the selective timbering coupled with more frequent prescribed fire would meet both objectives of providing for suitable Florida Scrub-jay habitat and a restored sandhill ecosystem. A perimeter firebreak has to be installed around Tract 2, and more unit-specific recommendations can be made.

Brevard County and their representatives noted bald eagles on-site during previous studies. Current eagle nest information was requested from the FWC regarding the MSS, and was informed that there are no known eagle nests within three miles of the MSS.

Several wading bird species use this site to forage and as a seasonal migrations stop over. While no specific management is planned for wading birds it is anticipated that overall habitat management will benefit these bird species.

In order to facilitate prescribed fires, mechanical reduction will also need to be performed along the edges of several fire units. Specific prescribed fire information can be found in Appendix G,. The planned burn rotation of the flatwoods components is approximately 2-5 years, with perhaps every 3-8 years for the more scrubby portions. Any of this can change based on the structural needs of the Florida Scrub jays. Trails and dirt access roads created by developers in the early 1980's serve as firebreaks to facilitate the prescribed fires, and also provide openings the Florida Scrub jays and other scrub endemics require. These will be maintained for the dual purposes.

In order to prepare Tract 2 for fire activities, firebreaks will be installed around the perimeter and individual units will be designated for safe implementation of prescribed fire. These units will be based upon existing trails.

Since MSS (and the surrounding Cameron Preserve managed by the Town of Malabar) contains a large block of contiguous scrub south of Palm Bay, it is imperative to actively manage this habitat since the MSS and surrounding land serves as a “stepping-stone” connection between the jays that are scattered north of Palm Bay and the Florida Scrub jays found in the Malabar-Valkaria-Micco corridor.

e. Biological Diversity

Although data collection has been ongoing at the MSS (primarily FIT students and private citizens), the compilation and statistical analyses have been limited. Levels of richness and evenness (the two measures of overall diversity) vary naturally among community types. Richness refers to the number of species found within a particular community, while evenness refers to the distribution of individuals among species. With this in mind, current data need to be collected to form the baseline against which future monitoring efforts will be compared. A methodology should be selected which will provide useful data but will not be too cumbersome for staff and or volunteers to implement.

A comprehensive sampling protocol (i.e. sampling each stratum of the community) is typical, but practicality and specific use dictate that the sampling should be limited to the subcanopy/scrub layer, and to the herbaceous/ground cover layer, wherein the stronger indications of change in species diversity will be noted. Sampling these layers will provide useful management data regarding the effects of use on the plant communities. Sampling for small mammals, avian species and herptiles will also be useful to the land manager in future decisions regarding trail selection and carrying capacity of the site.

Examples of sampling methodology may be found in:

Brower, J.E. and J.H. Zar. 1984. *Field and Laboratory Methods for General Ecology*, 2nd Ed. Wm. C. Brown Publishers, Dubuque, Iowa.

Campbell, H.W. and S. P. Christman. 1982. Field techniques for herpetological community analysis. In N.J. Scott, ed.: *Herpetological Communities*, pp. 193-200. Fish and Wildlife Service Wildlife Research Report 13.

Clark, T.W. and T.M. Campbell III. 1983. A small carnivore survey technique. *Great Basin Nat.* 43:438-440.

Corn, P.S. 1994. Straight-line drift fences and pitfalls. Pp. 109-117. in Heyer, M., A. Donnelly, R.W. McDiarmid, L.C. Hayek, and M.S. Foster. *Measuring and Monitoring Biological Diversity. Standard Methods for Amphibians.* Smithsonian Institution Press. Washington, D.C.

Cox, J., D. Inkley, R. Kautz. 1987. Ecology and Habitat Protection Needs of Gopher Tortoise (*Gopherus polyphemus*) Populations Found on Lands Slated for Large-Scale Development in Florida. Nongame Wildlife Program Technical Report No. 4. Florida Fish and Wildlife Conservation Commission. Tallahassee, Florida.

Fitch, H.S. 1992. Methods of sampling snake populations and their relative success. Herpetol. Rev. 23: 17-19.

Fitzpatrick, J.W., G.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and Development-Related Habitat Requirements of the Florida Scrub Jay (*Aphelocoma coerulescens*). Nongame Wildlife Program Technical Report No. 8. Florida Fish and Wildlife Conservation Commission. Tallahassee, Florida.

Grant, B.W., et al. 1992. The use of coverboards in estimating patterns of reptile and amphibian biodiversity. In D. McCollough and R.H. Barrett (eds): Wildlife 2001: Populations, pp. 379-403. Elsevier Science Pub. London, England.

Gysel, L.W. and L.J. Lyon. 1980. Habitat analysis and evaluation. Wildlife Techniques Manual. Pp. 305-327. S.D. Schemnitz (ed.). The Wildlife Society. Washington, D.C.

Rickers, J.R., L.P. Queen, and G.J. Arthaud. 1995. A proximity-based approach to assessing habitat. Landscape Ecol. 10(5): 309-321.

U.S. Fish and Wildlife Service. 1980. Habitat Evaluation Procedures (HEP). Ecological Services Manual 102. U.S. Department of Interior, Fish and Wildlife Service, Division of Ecology Services, Government Printing Office. Washington, D.C.

C. Cultural

a. Archaeological

In response to a request for a review of Florida Site Files, the State Historic Preservation Officer (SHPO) as part of the Florida Division of Historical Resources replied on 11 March 1998 that there are no recorded historical or archaeological sites recorded within the MSS boundary. However, data from similar areas in Brevard County indicate that archaeological sites are likely to occur along the sand ridge.

It should be noted that the Division of Historical Resources will conduct a preliminary archaeological survey of any site acquired with Conservation and Recreation Lands (CARL) funds at no charge. The CARL Archaeological Survey will assist the County in locating unrecorded archaeological sites, and provide assistance in public interpretation of the cultural resources within the MSS.

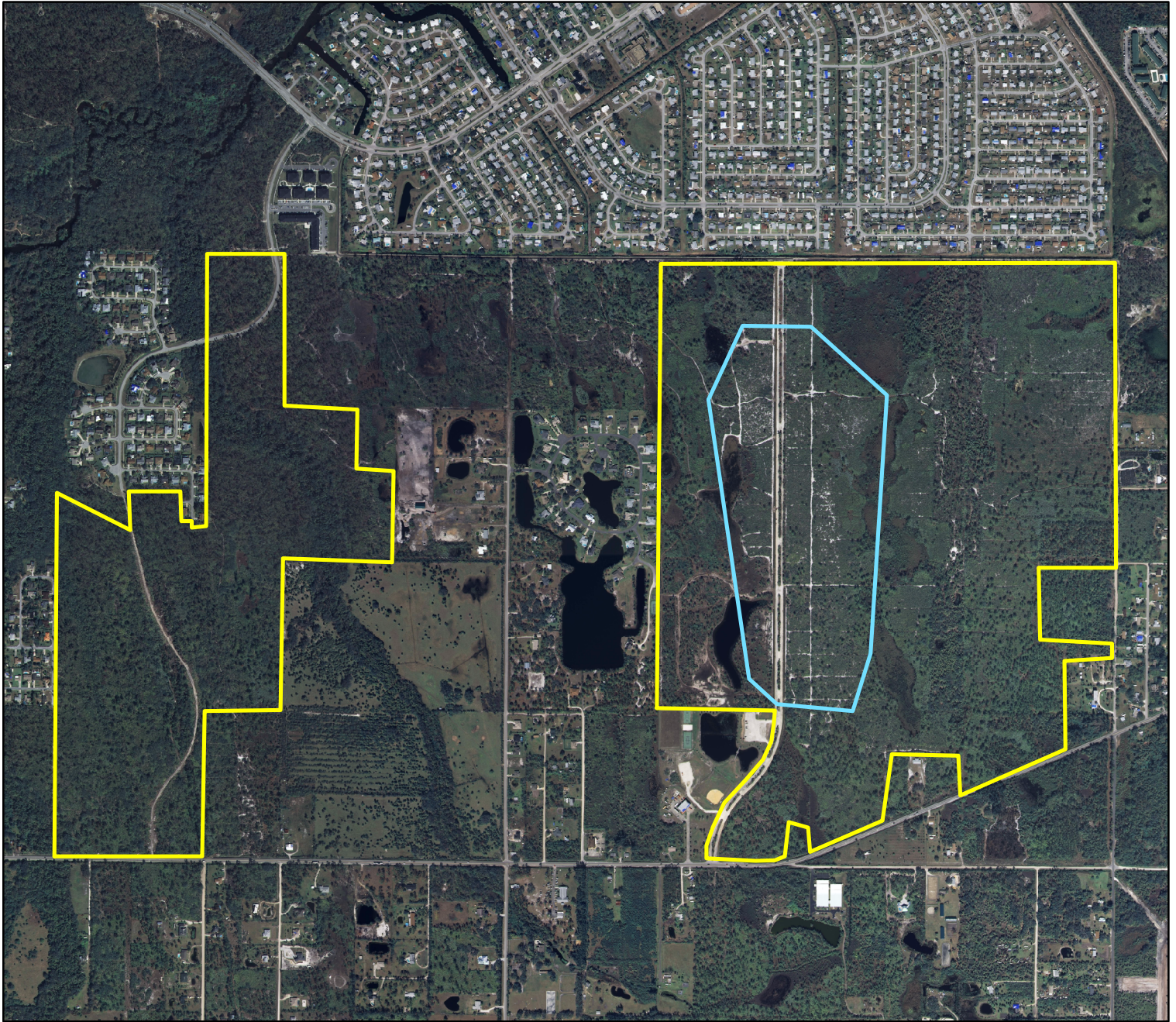
b. Historical

There is no evidence of a homestead or other occupation of the site. Historically, the site may have been used for grazing or other agricultural activities. In the 1980's, an attempt to develop a portion of the property for residential use, called Malabar Woods, was initiated by W.M. Sanderlin within Tract 1. That development met financial difficulties and was subsequently received by the Resolution Trust Corporation. A second development attempt, known as the Tammaron Planned Unit Development, also failed.

c. Land-Use History

In 1993, the Nature Conservancy negotiated for Brevard County the purchase of a 285-acre parcel of Tract 1 from the Resolution Trust Corporation. The EEL Program subsequently acquired three parcels in addition to Tract 1 in 1994 bringing the total property for the MSS to 395 acres. Prior to the County's acquisition of the property, the MSS site was intended for development for single-family residences. Due to financial circumstances, the project did not go forward. Existing from that initial development phase is a concrete road, known as Malabar Woods Boulevard that runs north south and bisects the property. Also, remnants of the preliminary clearing and grubbing activity for the internal roadways are evident. No further development activity has occurred, and review of aeriels and field investigation indicates that the impacts from the roadway network are slowly disappearing.

Tract 2 consists of three individual purchases; the WGML Investments Ltd, National Heritage Ltd properties, (both acquired in 2003) and a small 7 acre parcel purchased from the Brook Hollow Home Owners Association in 2006. No land clearing activity within Tract 2 has been observed, but there is evidence of off-road vehicle use. However, Tract 2 has a road easement that bisects the parcel and is not owned by the county. Currently a dirt road is in place along the easement and is only used in emergency situations.



*Data courtesy of David Breininger

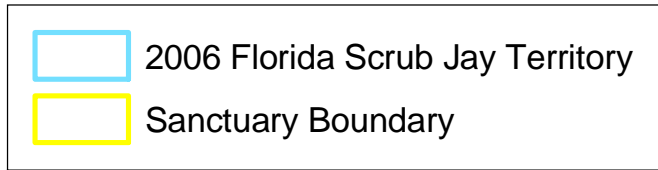
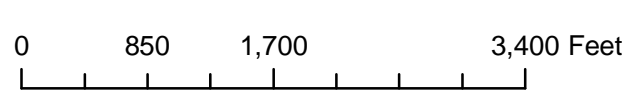


Figure 9: Malabar Scrub Sanctuary
Florida Scrub Jay Territories

d. Public Interest

The conceptual site plan for the MSS (Tract 1) was introduced to the public at a meeting on 2 June 1998, where citizens expressed recreational interests and environmental and educational concerns regarding the MSS. A public meeting regarding the public use of Tract 2 of the MSS was held 31 January 2006, minutes from this meeting are provided in Appendix J. The Recreation and Education Advisory Committee (REAC) supported the proposed public access plan on 9 February 2006. An amendment to the REAC supported public access plan to include a paved trail along the eastern boundary of Tract 1, was approved on 14 March 2007. (Appendix J). The EEL Program Selection and Management Committee (SMC) did approve the management plan without the addition of the paved trail. The SMC preferred to allow a section of the existing concrete road to be utilized for the trail. The Brevard County Board of County Commissioners (BOCC) chose to approve the management plan with the section of paved trail along the eastern boundary. The plan was taken to the Acquisition and Restoration Council (ARC) in October 2007 and deferred, with a request for further information about the trail and location of facilities with MSS. The BOCC requested that both EEL Program advisory committees review the plan again, once the information requested by ARC has been added. On August 14, 2008 the REAC supported the paved trail section along the eastern boundary after length discussion with the following motion. (Appendix J)

“Mark Nathan moved to approve Ross Hinkle’s March 6, 2008 Proposal to Resolve Bike Path Issues at the Malabar Scrub Sanctuary; to yield to the SMC for all trail approvals, with consideration to all potential impacts on EEL Properties; monitoring is key; all problems to be addressed to EEL satisfaction, if there are any; and to explore mitigation for the consequences of the trail, as the SMC would approve, as the REAC committee would like for the SMC to have oversight on that issue.”

Ross Hinkle’s March 6, 2008 proposal to resolve the bike path issues can be found in Appendix J

Before their acquisition, both tracts had been historically utilized for hiking, biking, horseback riding and off-road vehicle use. Where feasible, passive recreation will be encouraged in conjunction with the public access plan, while off-road vehicles will not be allowed.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends

The primary natural trends influencing the diversity of this site are fire frequency and hydroperiod. In the absence of fire, invasion by native and non-native woody species occurs rapidly. Within MSS, the fire regime must be re-established to mimic the natural regime and maintained to insure the continuation of the flora and fauna unique to these pyrogenic natural communities.

Another important factor controlling the communities within the MSS is hydrology and more specifically the hydroperiod, particularly in the flatwoods and marshes. 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.

While the natural hydrologic regime and periodicity of the MSS has been altered by prior development within the site as well as on adjacent lands, the current hydrologic regime has been in place for several years. Investigation into the natural as well as the existing hydroperiod should be undertaken to better understand and enhance the natural ecological processes. If corrections are made to the site's flow patterns in attempt to relieve flooding along the Boulevard, consideration must be given to the consequences of the actions upon the natural communities within the MSS and upon adjacent properties. A stormwater project has been completed to relieve the flooding issues along the Town of Malabar's park. This project was to install a ditch along Malabar Woods Boulevard to alleviate flooding within the park and Malabar Road. This project has not altered the hydrology within the adjacent natural communities due the previous disturbance of the Malabar Woods Boulevard.

Within this sanctuary the Florida Scrub jay population has decreased while under EEL management. This decrease can be attributed to the lack of habitat management prior to EEL acquisition. Nearly 300 acres of Florida Scrub jay habitat have been burned since EEL management began. According to comments provided by Dave Breininger, provide November 7, 2007 (Appendix J) the decrease in population was predicted due to habitat fragmentation and fire suppression. Populations are not expected to recover quickly due to the small isolated population and the habitats within Malabar still remain marginal (Root 1998, Breininger et al. 1998). The EEL Program will continue to use the best scientific information available to manage MSS.

The EEL Program will continue its efforts to restore the scrub to optimal condition. Translocation should be considered as an option for the future. Continual communication with local experts will help insure that the Florida Scrub jay population throughout the County is managed to promote long-term viability on EEL managed lands.

The management for the Florida Scrub jay is a priority at the MSS. If Florida Scrub jays do not naturally recruit into MSS relocation of Florida Scrub jays will be explored as an option. USFWS and the EEL SMC will approve all plans for relocation before an action takes place.

B. Human-Induced Trends

As previously discussed, the vegetation is recovering from the impacts of past development activity. The cleared roadway grid is partially intact, although it is being filled in with native vegetation. Also the stormwater flow caused by Malabar Woods Boulevard is interrupting the hydrologic condition of the site. Other factors influencing the site include: fire suppression, dumping of litter or debris, and localized disruption or

damage to vegetation and hydrology by pedestrian, equestrian, bicycling and off highway vehicle traffic.

Historically ATV's and other off-highway vehicles used this area. Over time continued use lead to increased impacts to the natural resources and dumping of trash. Since acquisition illegal use has disappeared from this site. The 35 tons of trash have been removed through volunteers and in-house workdays.

MSS is the proposed site for development of the south region's management/education center. Every effort has to be made to limit disturbances caused by the construction of such facilities. A final decision has not been made on the final placement of these facilities. Discussion on specific locations is located within the public access section of this plan.

Impacts from proposed recreational activities will be limited by the routing of trails away from sensitive areas and provisions for monitoring and management to protect core resources. Establishing sufficient recreational trails will also minimize unauthorized trail expansion. There has been a proposed 4800 foot paved section of trail along the eastern boundary. The paved section is planned to be 12 feet wide with a 2-foot buffer of native vegetation on each side to protect the edges of the pavement. This paved section of trail is to be placed along the eastern boundary in the existing footprint of the firebreak. The EEL Program will not be responsible for the construction or management of this trail. If possible the trail should run along side Marie Street at the south end of the trail (north side of out-parcel). The installation of this trail will not in any way impede resource management activities within MSS.

Human influences on-site include:

Fire suppression/alteration of natural cycles

Naturally occurring fires have been suppressed during recent times mainly for public safety and the protection of structures. Cattle grazing and timbering also require specific fire cycles that is different than natural regimes. Management activities such as these tend to result in plant and animal compositions that are different than what might have existed under more natural regimes. A more natural cycle under the prescribed burn plan will address this problem.

Invasion of Cogon grass

This invasive grass is located along the western edge of the MSS (Tract 1) and along the north-south road that splits the southern portion of Tract 2. It will spread via grass mowers, rhizomes and wind, and should be treated immediately upon discovery. While other exotic species occur this is a priority.

Small roads/trails that run through property

These will be used as firebreaks and hiking trails. Trails that historically run through sensitive wetland areas will be closed off.

Localized soil disturbance by feral hogs

These animals have been spotted within the MSS and are causing localized disturbances. Hog trapping methods are being pursued in order to eradicate these exotics from the MSS.

North Boundary Canal Trail

The first stage of the Greenways and Trails project has occurred with no direct impacts to the sanctuary. Phase II of the project was closely monitored by EEL staff to prevent any negative impacts to the sanctuary. Phase II is located partially on sanctuary land, the portion used was an existing maintenance easement and did not impact any habitat. Since construction of Phase II did not occur within the fenced area of MSS no impacts were observed to surrounding habitat. Phase III is an extension of phase II paved trail south along the eastern boundary of MSS, Phase III will be located within the existing fence along the boundary. This will lead the paved trail to the Malabar Trailhead #1. A monitoring plan will be developed by EEL staff to monitor the impacts of this section of paved trail to surrounding habitat. The EEL SMC will approve the monitoring plan. An inter-local agreement will be needed between the EEL Program, Brevard County Parks and Recreation and the Town of Malabar. Trail design will require EEL Program and SMC approval before construction begins. Secondary impacts may include drainage and increase use to this portion of the site. The monitoring plan will include on-going assessments of impacts habitat loss, hydrological impacts, introduced exotics, potential increase use of this area and faunal impacts. Permanent plant transects will be installed before construction begins. Also small mammal trapping will help record potential impacts along the trail.

Management goals and actions must be developed to reduce the impacts of human induced trends on-site. Carrying capacity studies should be implemented. Separate considerations must be considered about individual species, ecosystems and individual activities.

C. External Influences

There are no known encroachments from adjoining property owners or uses. This site is located in an area of residential development. To the south of the MSS (Tract 1) is the Town of Malabar Park. The park includes picnic shelters, walking paths, and active recreational facilities (ball fields, playground equipment, etc.). The uses compliment with the passive recreation of MSS.

Future acquisition is limited to due to the growth and development in the area. A few small parcels are proposed adjacent to MSS. This sanctuary acts as a great example of different entities working together to conserve wildlife corridors. The Town of Malabar has acquired a 100-acre preserve through a Florida Communities Trust (FCT) grant that connects the two tracts of MSS. The City of Palm Bay, in conjunction with the EEL Program, Office Of Greenways and Trails and FCT has acquired a 140-acre sanctuary that is adjacent to Tract 2. Together these parcels make a wildlife corridor that allows species to move freely between several different habitats.

D. Legal Obligations and Constraints

a. Permitting

The following is a summary of permits required, based on the conceptual master plan for the MSS.

Town of Malabar Site Plan Approval

In order to construct the proposed improvements to the MSS, a site plan approval will be required from the Town of Malabar. The site plan review will include staff review of the project layout, building setbacks, parking setbacks, landscaping and stormwater management.

The Town is also responsible for issuing permits for fence, boardwalk, tree removal and land clearing. The EEL Program will comply with all the applicable municipalities' rules and regulations.

Palm Bay Utilities Corporation (Water) Approval

Construction of a proposed water distribution system within the MSS site will require approval from Palm Bay Utilities Corporation (PBUC).

Brevard County Approval

Proposed construction may require the use of an on-site sanitary sewer treatment system (septic tank and drainfield) and will require approval from the Brevard County Consumer Health Department.

In addition, any development that may affect wetlands will be required to comply with the Brevard County Comprehensive Plan Elements that govern wetlands, as well as any applicable state and federal regulations

Department of Environmental Protection (DEP) Water System Permit

Subsequent to PBUC water system approval, a DEP water distribution system permit will be signed by the appropriate representative from PBUC and will be forwarded to DEP for their review and approval.

U.S. Army Corps of Engineers

Minimal, if any, disturbance of wetlands is anticipated from the development of the environmental learning center and other public facilities. However, there are plans to augment the trail system with sections of elevated boardwalk, which may require permits. The U.S. Army Corps of Engineers (USACE) regulates wetlands connected to "Waters of the United States" and isolated wetlands pursuant to Section 404 of the Clean Water Act. Wetlands are defined as "those areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (33 CFR Part 328.3).

Dredge and fill activities within “Waters of the United States” will require either an Individual Permit or verification under the General or Nationwide permit program. Wetland impacts less than one-third acre will typically qualify for a General permit or can be authorized with no “Pre-Discharge Notification.” The permittee will be required to provide the USACE with a copy of the State 401 water quality certification documents or waiver prior to commencement of the fill activity. Wetland impacts between one-third and three acres involving isolated wetlands or wetlands “above the headwaters” will generally qualify for verification under Nationwide Permit No. 26 (NWP 26). Impacts to wetlands connected to flowing and/or navigable waters, or wetland impacts greater than three acres will generally require a Section 404 – Individual Permit. USACE guidelines further require that all impacts “reasonably related” to a particular project be submitted for consideration under one permit application.

In reviewing the proposed activity for permit approval, USACE biologists consider the impacts to wetland function, such as water quality benefits, wildlife utilization, groundwater recharge, etc. In instances where loss of wetland function is proposed, the USACE may, and often does, require measures to compensate for such losses.

A USACE permit authorizing wetland impacts will be required prior to project development. Verification under the NWP 26 is anticipated for this project since the proposed wetland impacts are below the three-acre threshold. Verification under the NWP 26 is generally obtained within 30 days after the permit application has been completed.

Mitigation may be required by the USACE for proposed wetland impacts. Should mitigation be required, the USACE most likely will accept the mitigation that ultimately will be proposed to the St. Johns River Water Management District.

Prior to submitting an application for dredging or filling within Waters of the U.S., it is recommended that the areas proposed for impact be delineated in accordance with the 1987 “Corps of Engineers Wetlands Delineation Manual,” and then reviewed and confirmed by representatives of the USACE.

In addition, USACE regulations require that an investigation must be conducted, prior to permit issuance, to evaluate whether or not the proposed activity is likely to jeopardize the continued existence of any Federally threatened or endangered species as listed or proposed for listing under the Endangered Species Act.

Finally, USACE regulations require that the State Historic Preservation Office (SHPO) of the Division of Historical Resources must be contacted regarding the presence of any archaeological or historic properties in the area that may be impacted by the proposed development.

St. John's River Water Management District

The St. John's River Water Management District (SJRWMD) regulates impacts to wetlands pursuant to Part IV, Chapter 373 of the Florida Statutes and in accordance with Chapters 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 to wetlands greater than 0.5 acre in size. In considering wetland impacts, SJRWMD considers not only direct impacts to wetlands, but also secondary impacts that may affect wetland dependant 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 by SJRWMD staff.

Florida Division of Forestry (DOF)

The Florida DOF issues permits for prescribed fires to land managers that possess certified burn numbers.

b. Other Legal Obligations

Florida Power and Light has a utility easement for utility poles and guy wires within the boundary (northern portion) of the MSS, and the City of Palm Bay has an easement for access to the drainage canal located along the northern boundary of the Sanctuary for maintenance. There are not other known legal obligations such as prescriptive or retained rights restricting use of the property for the purposes of conservation, recreation and environmental education.

The proposed paved trail along the eastern boundary would not be managed or constructed by the EEL Program. This requires the establishment of one or more memorandums of understanding with managing entities to clearly establish responsibilities associated with the paved section of trail. Any stormwater or land clearing will be addressed during the planning and design phase of the project. All mitigation will be the responsibility of the agency constructing the trail. The EEL Program retains management authority over all resources within MSS including the trail as an active fireline.

E. Management Constraints

a. Fire

Utilizing prescribed fire within the MSS is benefiting the ecosystems, and individual plants and animals that have evolved under the influences of this natural process in Florida. The EEL Program's prescribed fire goals include:

- Restore or preserve fire-adapted communities with the reintroduction of fire
- Maximize biological diversity by the creation and maintenance of a vegetational mosaic
- Manage Threatened and Endangered species
- Provide educational opportunities
- Reduce fire hazards by managing fuels and fire
- Conduct safe prescribed fires
- Actively encourage cooperation between all parties with a vested interest in prescribed fire

The EEL Program Fire Management Manual is a separate document which addresses in great detail the overall fire objectives of the EEL Program, lists equipment needed to perform prescribed fires, outlines fire's effects on natural communities and Threatened and Endangered species found within the Sanctuary network and contains copies of all necessary paperwork needed to perform prescribed fires. Attached to the MSS Management Plan as an Appendix G will be a site-specific Fire Management Plan that bridges the EEL Program Fire Management Manual and the Unit-specific Burn Prescription. This site-specific plan will include:

- Sanctuary Fire Management Goals
- Burn Unit Descriptions, Fire Regime
- Fire History and Map
- Species of Special Concern
- Archaeological, Cultural and Historic Resources
- Fire Sensitive Areas
- Smoke Management Issues
- Public Notification
- Wildfire Policy
- Cooperation with Other Agencies
- Fireline Maintenance
- Fire Effects Monitoring and Photopoint Location

The MSS has been broken up into burn units (Figure 10) that allow the EEL Program to safely conduct prescribed fires and to allow for the natural heterogeneity inherent in more natural fires to be created. These Units were chosen based on existing roads/trails.

b. Exotic Control

Plants

Invasive, exotic and/or nuisance plants have the potential to displace native species and to significantly alter natural ecosystem function. The following plants have been observed within MSS: Brazilian pepper, cogon grass, downey rose-myrtle, climbing fern (both Japanese and Old-World), air potato (*Dioscorea bulbifera*), Australian pine (*Casuarina equisetifolia*), melaleuca. All are slowly being eradicated within the Sanctuary's borders. Continual monitoring will be needed to insure that these invasive exotics are kept at very low levels on-site.

Animals

Exotic and non-indigenous animal species also have the potential to adversely effect ecosystem function, and to significantly alter population levels of native animals through predation or displacement. The brown anole (*Anolis sagrei*) has become ubiquitous in central Florida, as has the nine-banded armadillo (*Dasypus novemcinctus*). Wild forms of domesticated animals such as the feral hog (*Sus scrofa*) are also widespread, and can cause significant harm to the vegetation and soils due to their rooting.

Although the only non-indigenous animal species noted within the MSS are the nine-banded armadillo and the brown anole, EEL staff should be prepared to implement quick control of feral dog, cat or hog populations should they become a nuisance in the future. With the proximity of residential homes to the MSS, the impacts from feral dogs and cats as well as from other domestic pets must be monitored (see Feral Cats Ordinance: Section 14-64 of Brevard County Ordinance 99-39 and Parks and Recreation Ordinances 98-53 and 96-31). Entities currently implementing exotic animal control programs such as the Florida Fish and Wildlife Conservation Commission, the U.S. Fish and Wildlife Service, the Water Management Districts, should be contacted for guidance on the development of control protocols.

The control of the red imported fire ant (*Solenopsis invicta*) will be an on-going task, with spot treatment using Amdro or a similar chemical as needed. Since they prefer to nest in disturbed habitats, the power line and firebreaks throughout the flatwoods will be monitored for new mounds.

c. Habitat Restoration

The restoration of natural upland communities on-site is primarily focused on vegetation management to improve Florida Scrub jay habitat. Reduction of slash pines to 1-2 mature pines per acre and removal of all sand pines throughout will be accomplished through timbering. Maintaining the average height of vegetation throughout the scrub and scrubby flatwoods at 1.2–1.7 meters. This will be accomplished through the implementation of an adaptive fire regime and mechanical treatments in areas that are already above 2 meters in height. Restoration activities will likely occur in phases on small parcels as schedules and funding allow.

There are areas impacted as part of past development activities. The soil profile of some of these areas was altered due to the use of off-road vehicles. Grading and selective plantings will be used to repair these areas.

In the 1943 aerials, an area, a few hundred feet wide, running north south through the sanctuary, east of Malabar Woods Boulevard was disturbed. While there is no record of why this area has disturbed over the years a large number of cabbage palms have recruited to this area. This excess number of cabbage palms has created a barrier between two scrub areas that could potentially inhibit the movement of Florida scrub jays in this area. It would be beneficial to remove the majority of the cabbage palms within this area and restore the area to a more natural habitat.

The footprint of the Boulevard does not offer ecological benefits to the sanctuary. Removal of at least half of the boulevard will be explored in the future. Currently this not feasible because of the large cost associated with this work. A portion of the boulevard will be kept for recreational use.

Restoration efforts may be constrained by certain limitations such as the, the potential for success, the assurance of a sound scientific basis for the restoration and economic feasibility. The areas proposed for restoration will be analyzed in the context of the vegetative community intended to be re-established, so as to ensure that the restoration is consistent with the principles set forth by the EEL Program and the primary goal of maintaining biological diversity.

Portions of the disturbed areas on-site will be utilized for the placement of a Management Center, associated parking and infrastructure requirements.

F. Public Access and Passive Recreation

Public access and opportunities for passive recreation will be provided at MSS pursuant to public use and recreational policies of the EEL Program Sanctuary Management Manual adopted by Brevard County Board of County Commissioners. 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 of 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.”

Figure 12 references the following recreational facilities:
The term multi-use trail refers to hiking, biking and horseback riding.

1) Parking and Public Access

Parking areas for the MSS are currently provided at several locations: along Malabar Boulevard, adjacent to the Town of Malabar Park, and within the Town of Malabar's Marie Street Trailhead. Parking for the Tract 2 of Malabar Scrub Sanctuary will be provided on a limited basis by the Town of Malabar trailhead at the north end of Corey Road providing access to EEL property through the Cameron Preserve. A small parking area is available at Turkey Creek Sanctuary to the north managed by the City of Palm Bay.

2) Hiking

Hiking trails are designed to follow existing firebreaks, roads and older existing trails. Hiking trails are located to give visitors the opportunity to experience the diverse habitats within the Sanctuary, and are split between short trails and longer, more difficult trails. These hiking trails bring visitors through the diverse habitats of the MSS, from wet flatwoods to xeric oak scrub. Informative signs will be placed along the trails, and any research or restoration projects that may be ongoing (such as prescribed fire) will be included in the signage.

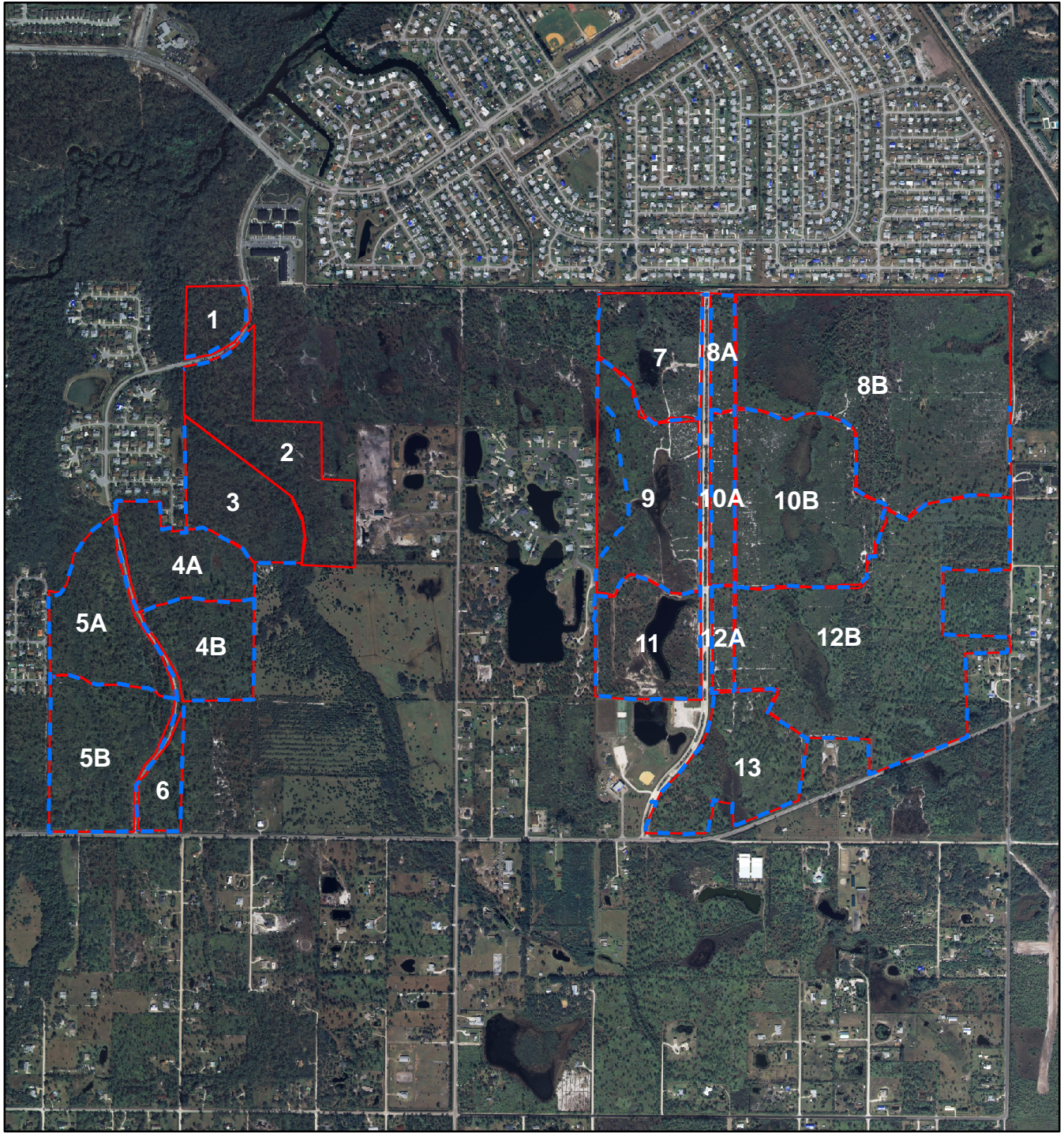
3) Horseback Riding and Mountain Biking

These activities are acceptable passive recreational activities within the MSS. Biking and horseback riding will be allowed only within the designated trail to avoid damage to the natural communities. The EEL Program retains the ability to close off trails to these, and other activities, if negative impacts are observed.

4) Hunting

No hunting will be allowed within the MSS unless agreed upon by special permit.

Expected environmental impacts for the proposed facilities and amenities should be minimized, but unavoidable. This loss of habitat can be minimized and management activities can compensate for some of the potential impacts. The EEL Program should use systematic monitoring/management activities to watch over the impacted areas and guide management activities. Suggested monitoring actions/actions include regular "walk-throughs" over frequently used sites to assess the need for changes in routing/user types, or user intensity; re-routing users from sensitive areas or popular sites; and re-aligning public use when areas become overused or degraded.

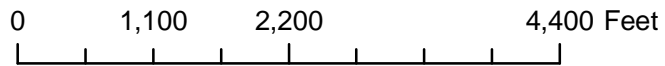
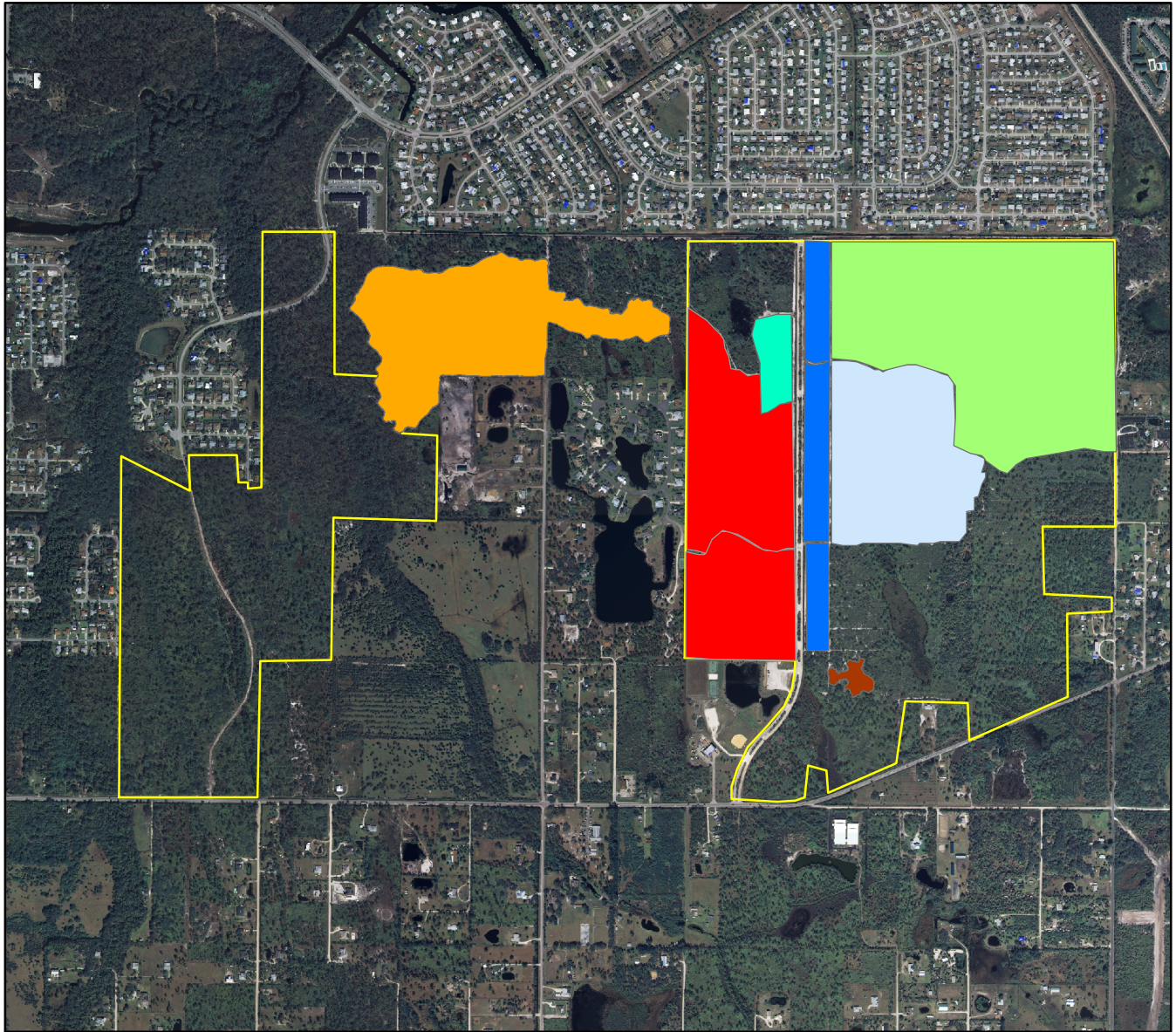



0 875 1,750 3,500 Feet

- Fire Units
- Existing Fire Breaks



Figure 10: Malabar Scrub Sanctuary Fire Units



 Sanctuary Boundary

Rx Burns

 2/2002


 2/2003


 3/2003

 4/2004

 2/2008

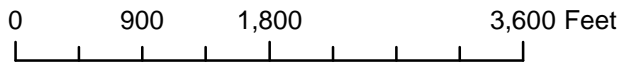
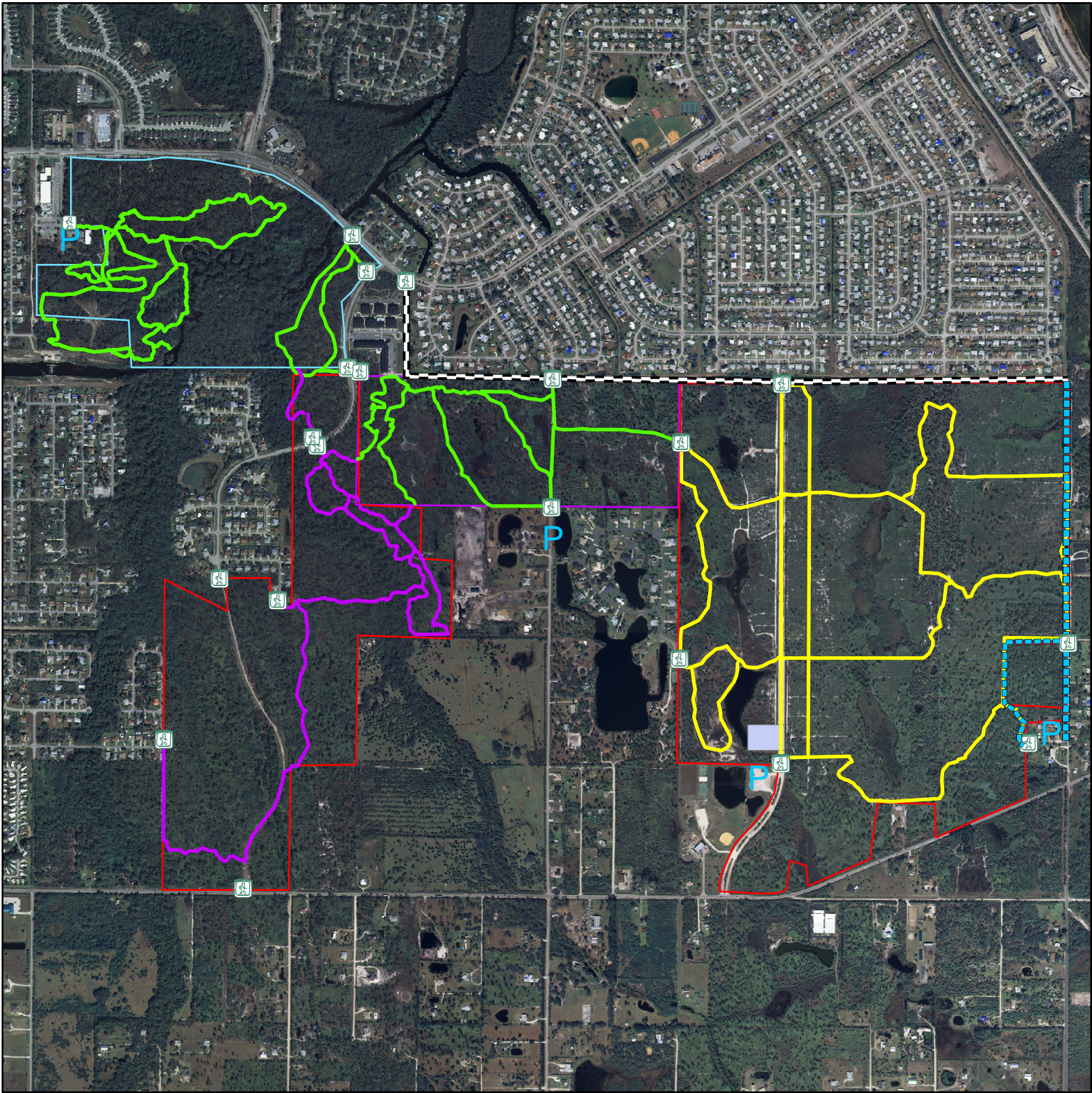
Wildfires

 3/2004 wf

 7/2004 wf

Note: Unit 12 A was previously burned by Rx fire 2/2000

Figure 11: Malabar Scrub Sanctuary Fire History














- | | | | | | |
|--|----------------------------------|---|--------------------------------|---|---------------------------------|
|  | Malabar Scrub Sanctuary Boundary |  | Trail Access Points |  | North Boundary Trail |
|  | Cameron Preserve Boundary |  | Multi-Use Trails |  | Proposed Linear Trail Extension |
|  | Turkey Creek Boundary |  | Horse Excluded Trails |  | Parking |
|  | Potential Facilities Site |  | Other Conservation Land Trails | | |

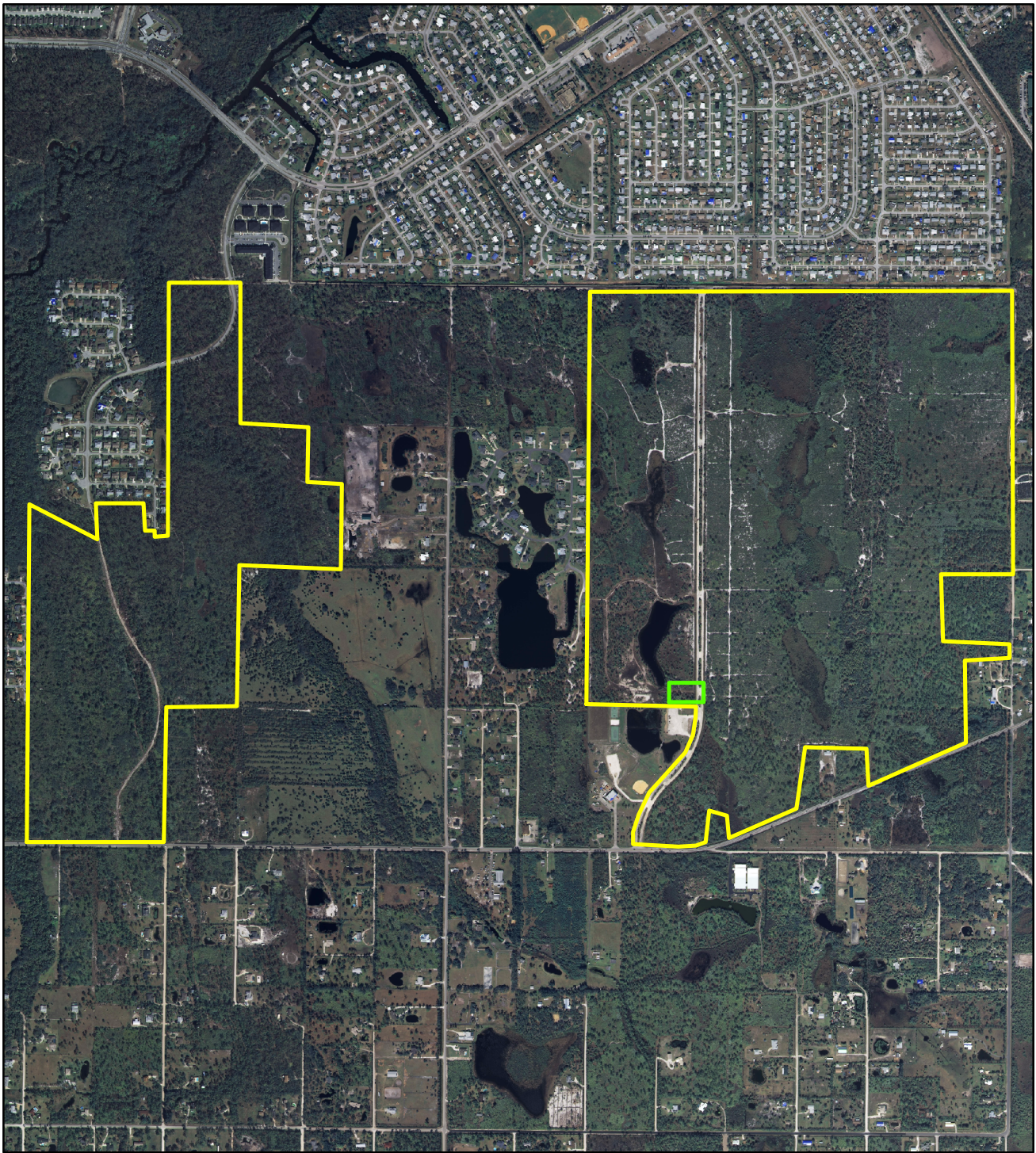
Figure 12: Malabar Scrub Sanctuary Recreation Plan

During the approval process of this management plan a proposal for a paved linear trail within the eastern boundary, parallel to Marie Str, was suggested. EEL staff brought this proposal to the EEL Program's public advisor committees. During discussion by the committees several issues were raised concerning the impacts of a paved linear trail within the sanctuary.

- Loss of habitat: There will be loss of habitat due to the installation on the proposed linear trail. The EEL Program will monitor the impacts of the trail. It has been suggested that the installation of this trail will allow the EEL Program more opportunity for outreach and education. It was determined that there is not enough right-of-way to place the paved linear trail outside the MSS west of the boundary, or along Malabar Road.
- Habitat fragmentation: The chance for fragmentation exists, every effort will be made to keep the paved linear trail on the east side of the out-parcel. The width of the proposed paved linear trail is 12' with a 2' buffer on each side, this is to meet the Florida Department of Transportation grant requirements. However, the trail planners expect to be able to obtain a trail width waiver that will allow the trail to be constructed at a maximum width of 8 feet with a 2 foot compacted buffer on each side.
- Hydrological impacts: "The trail will be built with pervious surface if compatible to structural integrity for equipment access and free movement of chair bound visitors" as stated in comments provided by Ross Hinkle (Appendix K) and supported by the REAC. There is no retention within the current plans or proposed footprint. St John's River Water Management District suggested that initial plans would require some retention. If retention is required it must occur outside the boundary of MSS.
- Listed species: There are currently no listed species within the footprint of paved linear trail. Monitoring will take place during all phases of construction. If listed species are found it will be the responsibility of the trail planners to obtain the necessary permits. All permitting is the requirement of the planning and construction entities.
- Disturbance/exotic species: Currently, exotics exist within the footprint of the paved linear trail. Those exotics area being treated and will continue to be treated. The monitoring plan will record changes in percent cover of exotic species.

Operational aspects of the trail have been raised as potential concerns. Potential impacts by the increased numbers of users to the sanctuary property will be monitored. The trail may be closed for periods of time to protect the resources adjacent to the paved linear trail.

The central theme for environmental education at the Malabar Scrub Sanctuary will be the ecosystem interactions, with specific information relating to the unique resources of Malabar. Proposed sites for the education and/or management center can be seen in Figure 13.



0 1,100 2,200 4,400 Feet



-  Malabar Proposed Facility Site
-  Sanctuary Boundary



Figure 13: Proposed Facility Site

The best potential location has been identified within the site for construction of the Management and Education Center. The site is identified based on historical disturbance, the current habitat quality, and to minimize cost of development and aesthetic impacts.

The Education and Management Center location is proposed inside the main entrance to the sanctuary along and within the existing paved boulevard. An adjacent disturbed area between the boulevard and the man-made pond can be used if the area on the boulevard is used for parking. As per discussion at the November 18, 2008 SMC meeting the Town of Malabar is exploring options for the placement of a new town hall. One of the options being explored is the placement of the town hall just south of the sanctuary boundary at the town park. The town may require use of the existing boulevard that currently has an ingress/egress right of way, for parking that could be used for both facilities. No town facilities will be located within the sanctuary boundaries. The advantage of this location would include a larger space for development, and access to the Malabar Town Park's, bathrooms and parking. This location would also allow the maintenance facility to be more easily separated from educational operations.

The type of facility has not been determined. Currently EEL Program staff is deciding the needs of the regions staff both management and educational to design a facility that could meet both needs. A "Cracker" style house would allow the facility to blend in with the historic aspects of the town. The management aspects of the facility would be shielded from the visitors as much as possible. Design and plans for the facility will continue to change due staff and financial restraints.

The location was chosen to reduce potential impacts to resources within the sanctuary. In the current proposed location the footprint of the facility can be within the existing concrete road. If needed there is a disturbed area to the west of the concrete road that can be utilized with little impact to natural areas. The final placement of the facility within the described footprint, will depend on the placement of the Town of Malabar's Town Hall, but not outside the described footprint. The facility itself is expected to be less than 7000 sf. This will house both management and education facilities in one building and allow for the majority of education to take place in the field.

EEL staff will work with area schools, school board and agencies/organizations offering education programs to augment the educational programs at the MSS. The existing Malabar Boulevard can serve as a universally accessible trail.

Another important element of public access to the MSS includes the EEL Volunteer Program. It is the intent of the EEL Program to work closely with local communities to ensure that effective volunteer groups are established for each Category 1 site. The long-term success of the EEL Program and the EEL Sanctuary network is directly linked to the level of citizen support, active participation and commitment to conservation. The EEL Program actively recruits volunteers from diverse backgrounds and promotes the involvement of disabled citizens.

Due to environmental and public health concerns, dogs and other pets are not permitted in the MSS (also as per County Ordinance #96-31), except for service animals needed for the disabled.

VI. MANAGEMENT ACTION PLANS

Although much of the proposed resource management and public access strategies have been discussed, the following is a comprehensive outline of the goals, strategies and actions necessary to manage the MSS.

A. Goals

The Sanctuary Management Manual of the EEL Program provides the following management goals for the all Sanctuaries within the EEL Program.

- 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 MSS.

GOAL: DOCUMENTATION OF HISTORIC PUBLIC USE

Strategy 1: Document historic public use

Actions:

- Collect historic information (such as aerials, historic photos, interviews with previous landowners) 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 and restore natural hydrologic patterns.

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

- Collect data to analyze the existing community interfaces;
- Protect communities from deleterious impacts deriving from external influences;
- Restore/enhance natural communities where and as possible.

GOAL: CONSERVATION OF NATURAL (NATIVE) COMMUNITIES

Strategy 4: Restore degraded, disturbed, or altered wetlands within the MSS.

Actions:

- Establish baseline conditions within wetlands;
- Use native plants for restoration efforts;
- Consult local experts and current literature regarding best scientific methods for wetland restoration
- Prioritize the wetland communities in need of restoration based upon ease of accomplishment, expected habitat value yield, or financial considerations;
- 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 MSS.

- 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;
- 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.

- Identify natural communities that require prescribed fire management;
- Document listed species within Sanctuary that require fire for their propagation
- Install perimeter firebreaks;
- Identify and evaluate individual proposed burn management units;
- Identify the goal of the application of fire to each proposed burn unit;
- Incorporate all of the above into a Sanctuary-specific fire management plan to be attached to this plan as an Appendix;
- Develop and implement public education campaign including programs and literature regarding the need for prescribed fires;
- Secure the necessary permits from the State Division of Forestry;
- 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, designated 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 FFWCC guidance concerning listed species;
- Implement habitat restoration activities for listed species (i.e. removal of exotic/nuisance species, restoration of ecosystem function);
- In scrub areas use the Florida Scrub-jay as a keynote species to maintain the long term survival of the species;
- 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 Malabar 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;
- Perform Public Access Site Assessment;
- Install boundary fencing and posting with EEL Program signage;
- 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;

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 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 criteria and process of evaluation for program review and refinement;
- Coordinate outreach and on-site programs for school-aged children with school board and area schools;
- Provide a “special collection” of books and other materials specifically related to the environmental and cultural character of the MSS.

GOAL: OPPORTUNITIES FOR MULTIPLE USES AND COMPATIBILITY

Strategy 12: Provide opportunities for multiple use and compatibility when practical.

Actions:

- Use fire breaks for multi-use recreation trails when not needed for resource management;
- Include multiple benefits of natural community restoration efforts in education program.

GOAL: GENERAL UPKEEP AND SECURITY OF THE PROPERTY

Strategy 13: Secure and maintain the Sanctuary to the highest degree possible using EEL staff, Parks and Recreation staff, contract employees and volunteers.

Actions:

- Retain a land manager to oversee maintenance and security activities;
- Install perimeter fencing or signs clearly marking the site’s boundary;
- Employ full-time maintenance staff and part-time interns;
- Once a Management Center is constructed, develop a security plan for the MSS to include provisions for perimeter barriers, security alarm and lighting systems, patrol schedules, arrangements for assistance and necessary back-up from Sheriff and municipal police;
- Develop a specific maintenance plan identifying specific task, frequency and responsible entities or individuals, with consideration given to hiring a part- or full-time maintenance employee;
- Coordinate daily maintenance tasks using staff and volunteers;

- Based on the maintenance, security and resource management plan develop an annual budget for the MSS.

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 Malabar Scrub Sanctuary.

| ACTION | ACTIVITY TIMELINE |
|--------|----------------------|
|--------|----------------------|

Strategy 1: Document historic public use

| | |
|--|-----------|
| Collect historic information (aerials, historic photos, interviews) regarding the types of activities that have occurred on-site | On-Going |
| Evaluate how historic public use impacted the site's natural resources | Completed |
| Consider historic public use patterns in planning future public uses | On-Going |

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

| | |
|--|------------|
| Research and monitor baseline conditions of natural systems | On-Going |
| Research the connection of on-site natural resources with adjacent resources | Immediate |
| Research hydrologic patterns on and off-site | Short-Term |
| Focus natural community restoration efforts on enhancing native diversity | Short-Term |
| Investigate the historic hydroperiod and restore natural hydrologic patterns | Short-Term |

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

| | |
|--|----------|
| Collect data to analyze the existing community interfaces | On-Going |
| Protect communities from deleterious impacts deriving from external influences | On-Going |
| Restore/enhance natural communities where and as possible | On-Going |

Strategy 4: Restore degraded, disturbed, or altered wetlands within the MSS

| | |
|--|-----------|
| Establish baseline conditions within wetlands | Immediate |
| Use native plants for restoration efforts | On-Going |
| Consult local experts and current literature regarding best scientific methods for wetland restoration | On-Going |

| | |
|--|----------|
| Prioritize the wetland communities in need of restoration based upon ease of accomplishment, expected habitat value yield, or financial considerations | On-Going |
| Assess possible impacts of proposed restoration on adjacent communities and offsite properties | On-Going |
| Implement the selected restoration activities (remove exotic species, restore natural hydrologic flood, etc.) | On-Going |
| 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 MSS.

| | |
|---|-----------|
| Establish baseline conditions within the upland communities | Immediate |
| Consult local experts and current literature regarding best scientific methods for upland restoration | On-Going |
| Prioritize the upland communities in need of restoration based upon ease of accomplishment, expected habitat value yield, or financial considerations | On-Going |
| Use native plants for restoration efforts, | On-Going |
| Assess possible impacts of proposed restoration on adjacent communities and off-site properties | On-Going |
| Implement the selected restoration activities | On-Going |
| Monitor the effects of the restoration activities, evaluate the success of the restoration projects, and revise the restoration plan as necessary | Long-Term |

Strategy 6: Design and implement a “natural” fire management program

| | |
|---|-----------|
| Identify natural communities that require prescribed fire management | Completed |
| Document listed species within the Sanctuary that require fire for their propagation | On-Going |
| Install perimeter firebreaks | Immediate |
| Identify and evaluate individual proposed burn management units | Completed |
| Identify the goal of the application of fire to each proposed burn unit | Completed |
| Incorporate all of the above into a Sanctuary-specific fire management plan to be attached to this plan | Completed |
| Develop and implement public education campaign including programs and literature regarding the need for periodic controlled burns | On-Going |
| Secure the necessary permits from the State Division of Forestry | On-Going |
| Begin prescribed fire management program | Completed |
| 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 | Immediate |
| Survey for, and identify, designated plant and animal species | On-Going |
| | |

| | |
|---|------------|
| 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 | Immediate |
| Periodically update these baseline survey data to determine possible changes in designated species distribution or density | On-Going |
| Review management plans for consistency with guidance concerning listed species | On-Going |
| Implement habitat restoration activities for listed species | Short-Term |
| 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 within the MSS

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

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 |
| Perform Public Access Site Assessment | Completed |
| 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 | On-Going |
| Minimize unauthorized trail expansion by establishing sufficient trails, constructing handrails, and the development of written guidelines | On-Going |

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 | Immediate |
| Establish a methodology and record keeping system to document public use | Short-Term |
| 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 | On-Going |
| Design and develop outdoor exhibits, signs and printed materials | On-Going |
| 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 for use by docents and other educators | Short-Term |
| Develop criteria and process of evaluation for program review and refinement | Short-Term |
| Coordinate outreach and on-site programs for school-aged children with school board and area schools | Short-Term |
| Provide a collection of books and other materials specifically related to the environmental and cultural character of MSS | Short-Term |

Strategy 12: Provide opportunities for multiple use and compatibility when practical

| | |
|---|----------|
| Use fire breaks for multi-use recreation trails when not needed for resource management | On-Going |
| Include multiple benefits of natural community restoration efforts in education program | On-Going |

Strategy 13: Secure and maintain the Sanctuary to the highest degree possible using EEL staff. Parks and Recreation staff, contract employees and volunteers

| | |
|---|------------|
| Retain a land manager to oversee maintenance and security activities | On-Going |
| Install perimeter fencing or signs clearly marking the site's boundary | Immediate |
| Employ full-time maintenance staff and part-time interns | On-Going |
| Once a Management Center is constructed, develop a security plan for the MSS to include provisions for perimeter barriers, security alarm and lighting systems, patrol schedules, arrangements for assistance and necessary back-up from Sheriff and municipal police | Short-Term |
| Develop a specific maintenance plan identifying specific task, frequency and responsible entities or individuals, with consideration given to hiring a part-time or full-time maintenance employee | Short-Term |
| Coordinate daily maintenance tasks using staff and volunteers | On-Going |
| Based on the maintenance, security and resource management plan, develop an annual budget for the MSS | On-Going |

VIII. FINANCIAL CONSIDERATIONS

The Brevard County Environmentally Endangered Lands Program receives land acquisition and management revenues from ad valorem revenues collected pursuant to the 1990 and 2004 voter-approved EEL Referendum. 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 until the year 2025, the sunset date of the ad valorem collection. 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 annually EEL Program capital and non-capital expenditures. Specific appropriations for the Malabar Scrub Sanctuary property will be made each fiscal year as part of this overall 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 2025, 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 the annual operations of the MSS, as well as past expenditures on capital improvements:

| Annual Management | |
|--|-----------------------|
| Staff Salaries (2009)/sanctuary | |
| Land Manager (f.t.) | \$6,833 |
| Assistant Land Manager (f.t.) | \$5,333 |
| Land Management Technician (f.t.) | \$3,833 |
| Land Management Technician (f.t.) | \$3,833 |
| Management Cost | \$10,000.00/ year |
| (prescribed fire, exotic control, fence repair, center management) | |

A land manager and assistant land manager have been hired as of December 2004 to oversee maintenance, resource management activities for the MSS as part of their land management responsibilities within the South Mainland Management Area. Other position, Sanctuary Steward, Naturalist, and Maintenance Technician, will be hired in conjunction with the on-site facility. The cost estimate for expected personnel is based on the large size of the South Mainland Area and the time expected to accomplish basic maintenance tasks such as exotic control and boundary inspections. Contract maintenance is expected to include annual costs for vegetation management utilizing heavy equipment, and will vary year to year. In addition to the on-going maintenance and operations costs, past and proposed capital expenditures are listed below, including start-up costs for a proposed Management and Education Center.

Capital Improvement

| | |
|---|--------------------------------|
| Environmental Education/Maintenance Ctr | \$500,000.00 |
| Management Vehicles (tractor, etc.) | \$33,000.00 (purchased) |
| Perimeter fencing | \$120,000.00 (installed) |
| Firebreaks/Vegetation treatment | \$10,000.00 |
| Kiosks | \$2,500.00 (4 installed) |
| Gates | \$1,000.00 (8 installed) |
| Interpretive panels | \$1,000.00 (fifteen installed) |
| Boardwalks over wetlands | \$6,000.00 (three installed) |

Any of these costs might be adjusted depending upon the availability of assistance through grant programs and cooperative ventures with non-profit and private groups. Capital items might also be added or removed dependant upon changes in Sanctuary boundaries as acquisitions continue.

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X. APPENDICES

- A. Malabar Scrub Sanctuary Plant Species
- B. Malabar Scrub Sanctuary Avian Species
- C. Malabar Scrub Sanctuary Herptile Species
- D. Malabar Scrub Sanctuary Mammal Species
- E. Malabar Scrub Sanctuary Legal Description
- F. Florida Natural Areas Inventory Element Occurrences Map
- G. Malabar Scrub Sanctuary Fire Management Plan
- H. Florida Master Site File
- I. Division of Historical Resources Documentation Review
- J. Public Comments
- K. Timber Assessment
- L. Acquisition History and Board of County Commissioners Actions