

Hardwood Hammock Sanctuary Management Plan



Brevard County Board of County Commissioners
Environmentally Endangered Lands Program
October 13, 2006

**HARDWOOD HAMMOCK SANCTUARY
MANAGEMENT PLAN**

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I. EXECUTIVE SUMMARY

The Hardwood Hammock Sanctuary is part of the sanctuary network established by the Environmentally Endangered Lands (EEL) Program in Brevard County. The intent of the EEL 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 EEL Program, Sanctuary Management Manual, 1995). The EEL Program also offers passive recreation and environmental education opportunities on the acquired lands to Brevard County residents and visitors.

The Hardwood Hammock Sanctuary is comprised of several non-contiguous properties that encompass approximately 30.72 acres, located 15.5 miles south of the Melbourne Causeway (US 192) on State Road A1A and south of the City of Melbourne Beach, Florida. All of the 30.72 acres are located west of State Road A1A and consists of tropical hardwood hammock, maritime hammock and mangrove swamp habitats. The properties are imbedded amongst and bordered by a mixture of conservation lands and residences. Though portions of the sanctuary have been disturbed in the past, removal and treatment of exotic plants and restoration of the sanctuary is ongoing. Native vegetation is recruiting back into the disturbed areas that were cleared of exotic plants.

The Hardwood Hammock Sanctuary, along with the other EEL properties in the South Beaches Regional Management Area will be served by an EEL Center for Regional Management at the Barrier Island Center (BIC), located .5 miles north of the Hardwood Hammock Sanctuary. As described in the Sanctuary Management Manual, the Hardwood Hammock Sanctuary is a proposed Category 3 or Primary Research and Conservation Site as defined in the EEL Program's *Sanctuary Management Manual* and thus is not expected to undergo significant development other than the consideration of compatible secondary uses for passive recreation and education. This management plan uses the State of Florida form for Board of Trustees leases and subleases that are less than 160 acres in size. The primary goals of the sanctuary 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. Several sites within the Hardwood Hammock Sanctuary have already been identified and management goals will be focused on the preservation of these areas. Other management goals include provisions for preservation of natural landscape/topographic features.

Providing site security to protect these significant natural and historical resources is an important initial goal for the Sanctuary. Developing relationships with neighbors and within the community is one of the most important initial management goals for all EEL Sanctuaries. By establishing relationships with the adjacent neighbors of the EEL Program and by coming to a mutual understanding of the purpose and function of a sanctuary, and the EEL program should be able to work with the neighbors to manage the sanctuaries more efficiently.

II. INTRODUCTION

In a 1990 referendum, Brevard County voters approved the Environmentally Endangered Lands (EEL) Program. The EEL 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 EEL Program established a conceptual framework and funding mechanism to implement an EEL sanctuary network in Brevard County. The sanctuary network represents a collection of protected natural areas that form a regional conservation effort focused upon protection of biological diversity. Four management areas are geographically defined within the countywide EEL Sanctuary Network. 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 listed:

- I. Barrier Island Sanctuary
Regional Management Center for South Beaches
- II. Enchanted Forest Sanctuary
Regional Management Center for North Mainland
- III. Malabar Scrub Sanctuary
Regional Management Center for South Mainland
- IV. Pine Island Conservation Area Sams House
Regional Management Center for Central Mainland

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

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:

1. Adaptive Management Natural areas must be managed in the context of the landscape in which they exist and based on scientific knowledge. Resource

managers must adapt to continuing advances in the scientific understanding of ecosystems and changing environmental and human influences on the resources.

2. Partnerships Interagency and private sector partnerships are essential to manage and protect ecosystems. Natural resource management is complex and requires multi-disciplinary skills and experiences.
3. Holistic Approach Ecosystem management includes the maintenance, protection and improvement of both natural and human communities. This system's 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 both 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; and
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 Hardwood Hammock 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 Hardwood Hammock Sanctuary is located within the boundaries of the Archie Carr National Wildlife Refuge (the Refuge). The United States Fish and Wildlife Service (USFWS) established the Refuge in 1989 under the Department of the Interior to "protect sea turtle populations and their nesting habitat along the central Atlantic coastline of Florida".

The Refuge was named after the late Dr. Archie Carr, a pioneer in Florida ecology and sea turtle biology. The 20.5 miles of coastline within the refuge hosts the largest concentration of loggerhead and green sea turtles in the United States. Green turtles nest within the refuge but not in globally significant numbers. The beaches of the Refuge in Brevard County represent the northern extent of leatherback turtle nesting areas in the United States (Brevard County EEL Program, 1995a).

The Hardwood Hammock Sanctuary is comprised of 30.72 acres, and is located 16 miles south of the Melbourne Causeway (US 192) and south of the town of Melbourne Beach, Florida (Section 30, Township 39, Range 07 East), as shown in Figure 1. The sanctuary is comprised of seven parcels whose tax ID's are 30-39-07-00-33, 30-39-07-00-39, 30-39-07-00-40, 30-39-07-00-36, 30-39-07-00-12, 30-39-07-00-14.1, and 30-39-06-00-34. The legal descriptions of the parcels are attached as Appendix A. The EEL Program and the State of Florida acquired the seven parcels as part of the Conservation and Recreational Lands (CARL) Program Maritime Hammocks Initiative Project. All of these Hardwood Hammock Sanctuary parcels are titled to the State, and Brevard County is the designated land management agency. To fulfill its management pledge, the County entered into management lease # 4177 in January 1999. This lease was amended in September 2001 to include the Hardwood Hammock Sanctuary parcels (#4177-3).

All parcels of the Hardwood Hammock Sanctuary (HHS) are bounded to the east by A1A, and to the west by the Indian River Lagoon. Figure 2 outlines the conservation lands adjacent to the property and the seven parcels which make up the Sanctuary. The parcels make up four non-contiguous blocks of land, and are referred to HH-1 thru HH-4. The most northern collective parcel, HH-1 comprises 30-39-07-00-33, 30-39-07-00-40, and 30-39-07-00-40. HH-1 is bounded to the north and south by residential homes. The next collective parcel HH-2 comprises 30-39-07-0036, and 30-39-07-00-12. HH-2 is bounded to the north by a residential home and to the south by residential homes and undeveloped land. The remaining two parcels are somewhat isolated and are referred to as HH-3 (30-39-07-0014.1), and HH-4 (30-39-07-00-34). HH-3 is bounded to the north and south by residential homes. HH-4 is bounded to the north by a residential home and to the south by undeveloped land. The majority of the development on the adjacent parcels is focused on the Indian River Lagoon, leaving large portions of the parcels virtually undisturbed. These undisturbed tracts of land can act as a wildlife corridor, essentially linking all of the Hardwood Hammock parcels.

Several parcels directly adjacent to the east of HH-1, HH-2, and HH-4 are conservation lands owned and managed by other federal or state organizations (figure 2).

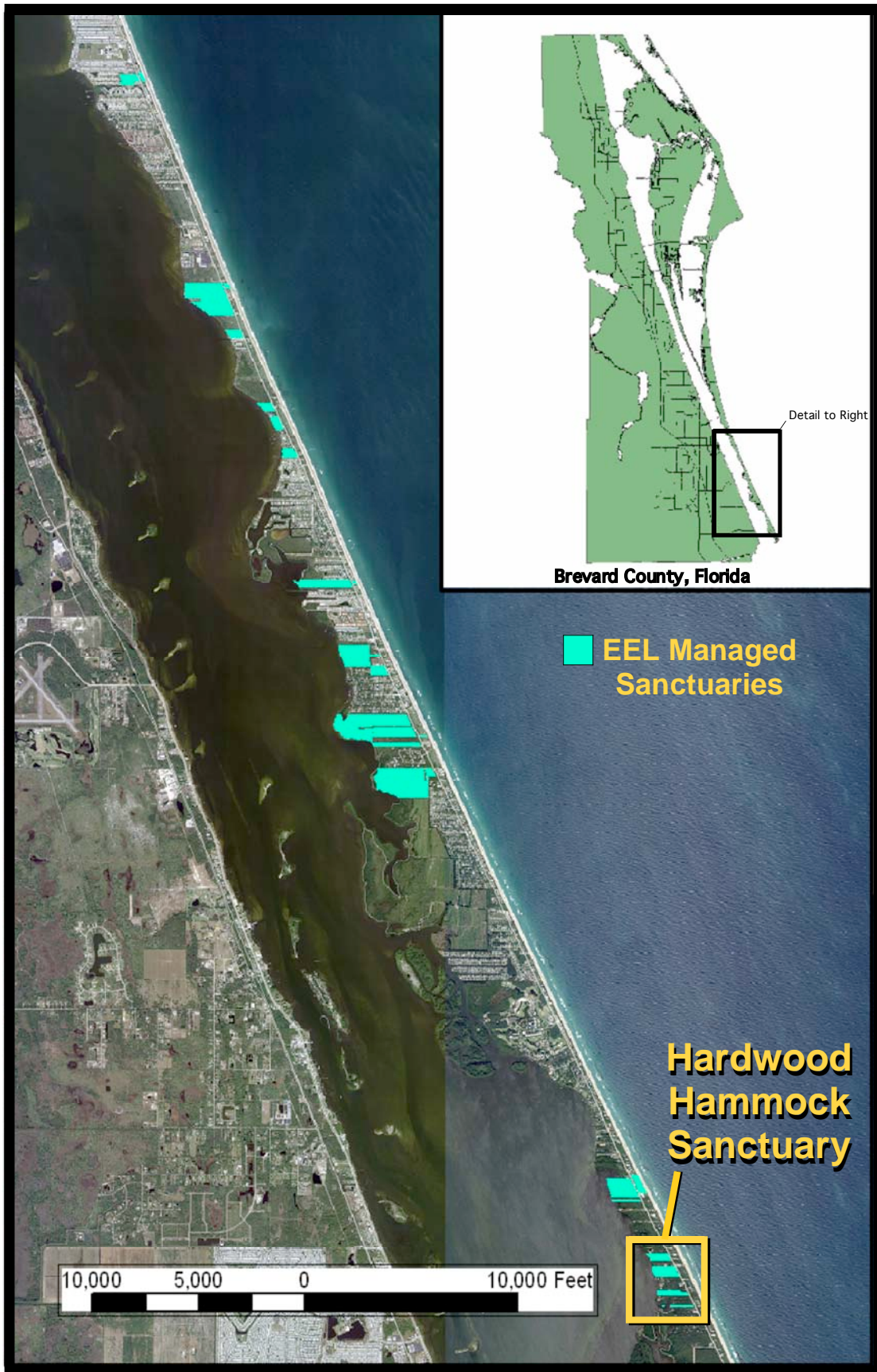


Figure 1. Location of the Hardwood Hammock Sanctuary and other lands managed by the Brevard County EEL Program within the South Beach Region.



- State of Florida (Managed by Brevard County EEL Program)
- State of Florida

Figure 2. Hardwood Hammock Sanctuary and adjacent conservation properties.

Less than one mile to the south of the HHS is Brevard County's Long Point Park, which encompasses 84.5 acres. Long Point Park is bordered to the south by Sebastian Inlet State Park, which protects approximately 800 acres of barrier island habitat.

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

1. Climate

The Hardwood Hammock Sanctuary is located in east central Florida, an isothermal area at the junction of the temperate and sub-tropical climatic zones. Temperature data from representative locations in Brevard County indicate an average annual temperature of approximately 74° F. August is typically the warmest month, averaging 82° F, whereas January is the coolest month, averaging about 62° F (Schmocker, et. al., 1990). Summer temperatures are moderated by frequent afternoon thunderstorms. Periods of extreme cold weather are infrequent due to the site's latitude and proximity to the Atlantic Ocean. The most recent "hard" freeze occurred in the winter of 1989/1990 resulting in the die back of many plants including many red mangroves (Rhizophora mangle) and the exotic Australian Pine (Casuarina equisetifolia). Long-term rainfall data for the area indicate an average of 50 to 52 inches per year in southernmost Brevard County (Schmocker et. al., 1990). Wet and dry seasons are typically well defined, with the wet season occurring between May and October, and the dry season between November and April. Annual and seasonal rainfall is subject to large variation in both amount and distribution.

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). Climatic change, seasonal variability, and disturbance contribute to species distribution and community composition.

2. Geology

The ecosystems of the barrier island are largely a result of the fluid geology of the region, which is constantly being sculpted and changed. The following relevant geological information, provided by the EEL Program in the Characterization Report for the Archie Carr National Wildlife Refuge (Brevard County EEL Program, 1995a), is summarized below.

Formation of most North American barrier islands occurred about 7,000 years ago. At the end of the Holocene ice age, 18,000 years before present (YBP), sea level was about 130 meters below its present level. At this time, glacier melting released water to the

oceans creating a rise in sea level. The rise in sea level created flooding and formation of barrier islands along the North American coastline (Parkinson, 1995).

The barrier island in the vicinity of the Hardwood Hammock Sanctuary is believed to be perched on a rise in the underlying coquina rock, or Anastasia Formation. The Anastasia Formation runs from St. Augustine, Florida (St. John's County) south to Boca Raton, Florida (Palm Beach County). This formation is thought to be composed of late Pleistocene sediments that were deposited to the east of the Atlantic Coastal Ridge and lithified in places to form beach rock (Johnson and Barbour, 1990). The Brevard County portion of the barrier island has ridge and swale topography with some ridge elevations in excess of 30 feet (Parkinson, 1995; Parkinson and White, 1994). Maximum elevations at the Hardwood Hammock Sanctuary are 15 feet above mean sea level.

At present, the coastal processes that lead to the development of the geomorphology at the Hardwood Hammock Sanctuary are unknown. Three processes are possible: 1) washover, 2) tidal inlet evolution, and 3) beach ridge progradation. Washover fans occur when waves surge over the crest of the dune, depositing sand on the backbarrier of the island. A flood-tidal delta develops when sand flushes through a tidal inlet under rising tide or storm surge conditions. Unlike washover events, inlets are transitory features that open, migrate, and close in response to the rate of sea-level rise, sediment supply, wave climate, tidal range, and frequency of storm events. Inlet dynamics, washover events and the overall landward retreat of the barrier island have significant impacts on the barrier island ecosystems. Beach ridge progradation occurs when either a large volume of sediment is introduced to the area via long-shore currents and/or sea-level elevation stabilizes or drops. Either process yields a succession of beach ridges separated by low-relief swales. The combination of these processes yields a barrier island ecosystem with a relatively straight sandy seaward shoreline and rugged backbarrier shoreline. The straight seaward shoreline is indicative of erosion and the rugged backbarrier shoreline is indicative of depositions (Parkinson, 1995; Parkinson and White, 1994).

3. Topography

The Hardwood Hammock Sanctuary has a relatively simple topography with elevations up to 10' National Geodetic Vertical Datum (NGVD) on a ridge immediately west of SR A1A. The land slopes off towards the lagoon with a 5-foot line 200 feet west of A1A. The sloping of land from the 10-foot ridge towards the lagoon is not linear but instead is characterized by several swales running north to south (Figure 3). Onsite topography has also been altered somewhat by past land use.

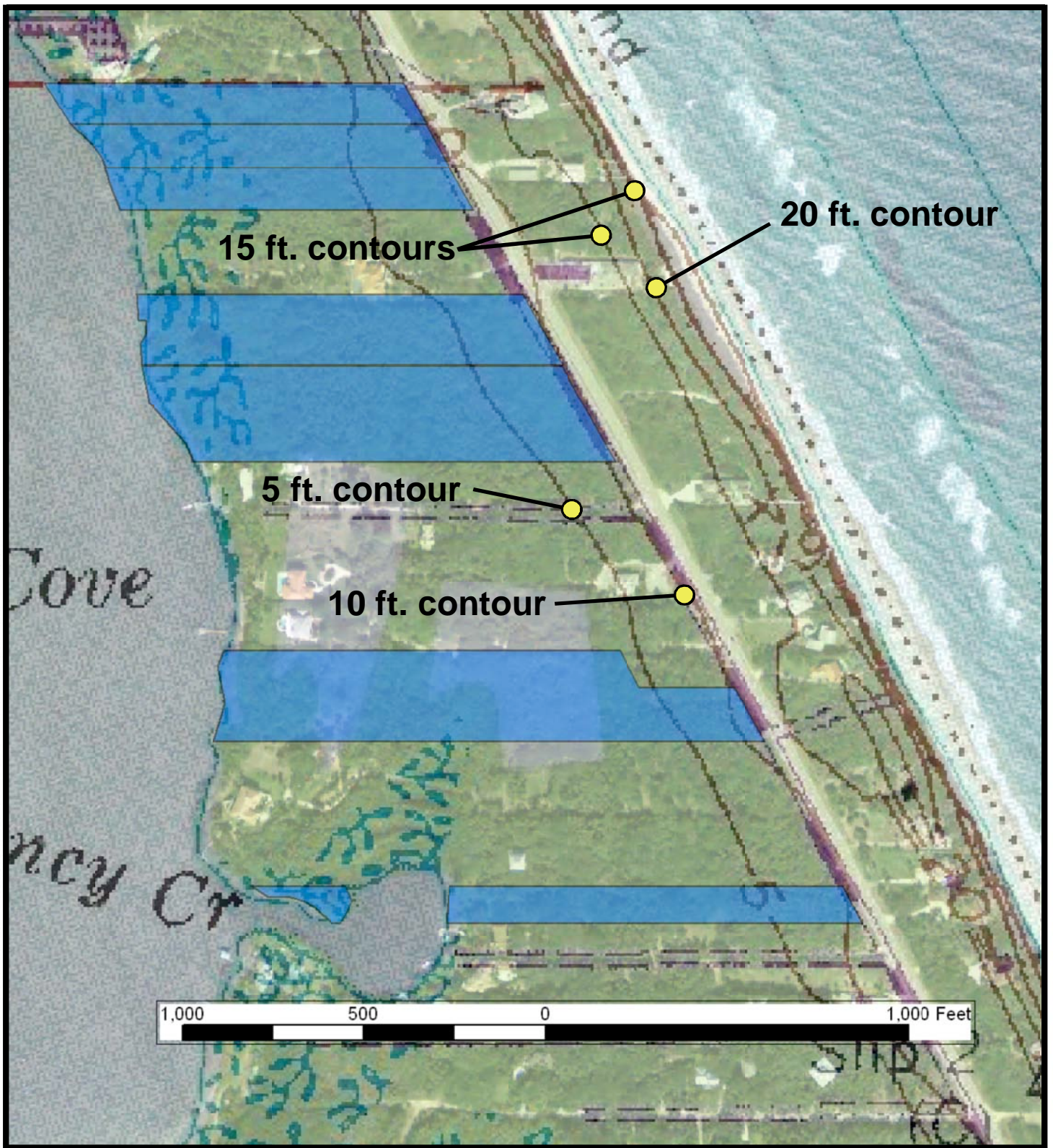


Figure 3. Hardwood Hammock Sanctuary Topography.

4. Soils

The Natural Resource Conservation Service (formerly the Soil Conservation Service) describes the soils within the Hardwood Hammock Sanctuary (Figure 4) as listed:

Palm Beach sand (Pb)

Canaveral Anclote Complex (Ca)

Tidal swamp (Ts)

(Source: Huckle et al., Soil Survey of Brevard County, Florida, 1974)

Palm Beach sand (Pb) is classified as a nearly level to gently sloping, excessively drained soil on dune-like ridges that are approximately parallel to the Atlantic Ocean. The soil is composed of mixed sand and shell fragments. Palm Beach is a young, alkaline soil with abundant shell fragments. Natural vegetation found on Palm Beach sand consists of saw palmetto, sand live oak, sea grape, prickly pear cactus and sea oats. The water table is usually at a depth of more than 9 ft.

Canaveral complex soils (Ca) are located west of the 5 foot contour and east of the tidal swamp. This series consists of nearly level, well-drained sandy soils on broad ridges interposed with long narrow sloughs. The water table is usually at a depth of 10 to 40 inches during the wet season and below 60 inches during the dry season. The soils are composed of sand and shell fragments.

Tidal Swamp (Ts) also classified as Bessie Muck-Tidal is located primarily within the mosquito impoundment though a small area exists west of the impoundment dike. Tidal swamp consists of nearly level areas that are near sea level and are generally covered with mangroves or other marsh vegetation. The soils may be composed of mixed sand and shell fragments along with organic matter.

5. Hydrology

Ground infiltration of precipitation is the primary mechanism for recharge of the surficial aquifer, which is a source of freshwater in the South Beaches. Preservation of the properties composing the Hardwood Hammock Sanctuary conserves valuable water recharge areas for this region.

In addition to the hydrologic impacts due to SR A1A, the hydrology of the parcels have also been altered by the clearing of vegetation, the creation of small ponds and ditches for drainage, and the impoundment of salt marshes for mosquito control on the western portion of some of the parcels. Large portions of the Sanctuary were cleared prior to 1943 historical aerials, particularly group parcels HH-2, and HH-3. Effects from this land clearing are still evident onsite. From examining historical aerials and from onsite interpretation, the salt marshes within group parcels HH-3 and HH-4 do not appear to have been impounded. The Hardwood Hammock Sanctuary group parcels HH-1, and HH-2 salt marshes' were impounded. The impacts to the flora and fauna of mosquito

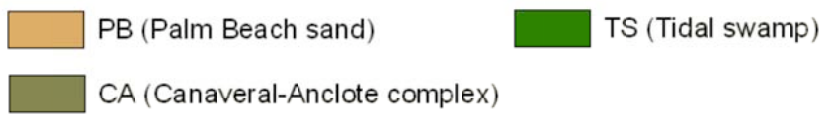


Figure 4. Hardwood Hammock Sanctuary Soils.

control measures undertaken on the site will be discussed in the Biological Resources sections below. Group parcel HH-2 also contains a small pond, which does not appear in historical aerials until the 1990's. This pond is isolated from the Indian River Lagoon, and may have been created for flood control for future onsite development. This pond is frequently utilized by the native wildlife in the area.

A series of ponds were also discovered in mangrove swamp of HH-3. The ponds begin just outside of the hammock canopy and continue almost to the shoreline of the Indian River Lagoon. The ponds do not appear to have any direct connection to the Indian River Lagoon and are separated from one another by a series of small hills or mounds. These depressions do not appear on any of the historical aerials of the site. The edges of these ponds and hills are dominated by Brazilian pepper, which may have concealed the ponds presence in aerial photographs. The treatment of these exotic plants is underway and the exact shape and size of these depressions may be revealed in future aerials. It is unknown how these ponds and hills were formed, but it is extremely unlikely that this has occurred naturally. The mounds associated with these ponds are covered with shell matter and may have been formed or deposited by American Indians collecting shellfish for food from the Indian River Lagoon. The formation of these mounds may have isolated these ponds or depressions from one another. Although somewhat stagnant, the ponds appear to be healthy, supporting populations of small fish and other wildlife.

All of the Hardwood Hammock Sanctuary parcels are within the 100-year flood zone (Federal Emergency Management Agency, FEMA). The entire barrier island system of Brevard County is however, expected to be inundated in the event of a Category 3 or greater hurricane event (Brevard County Planning, 1991).

B. Biological Resources

1. Ecosystem Function

The Hardwood Hammock Sanctuary consists of Tropical Hardwood Hammock and Maritime Hammock habitat, that grades westward into Mangrove Swamp along the Indian River Lagoon (Figure 5). These habitat types are typical for a barrier island ecosystem in a tropical environment that grades from the ancient dune to the Indian River Lagoon. The site has been disturbed in the past 60 years, including land clearing, survey trails, dumping, exotic plant introductions and the installation of mosquito control ditches. The sanctuary contains some undisturbed habitats, especially on the two southern most parcels where the mosquito control ditches were not implemented.

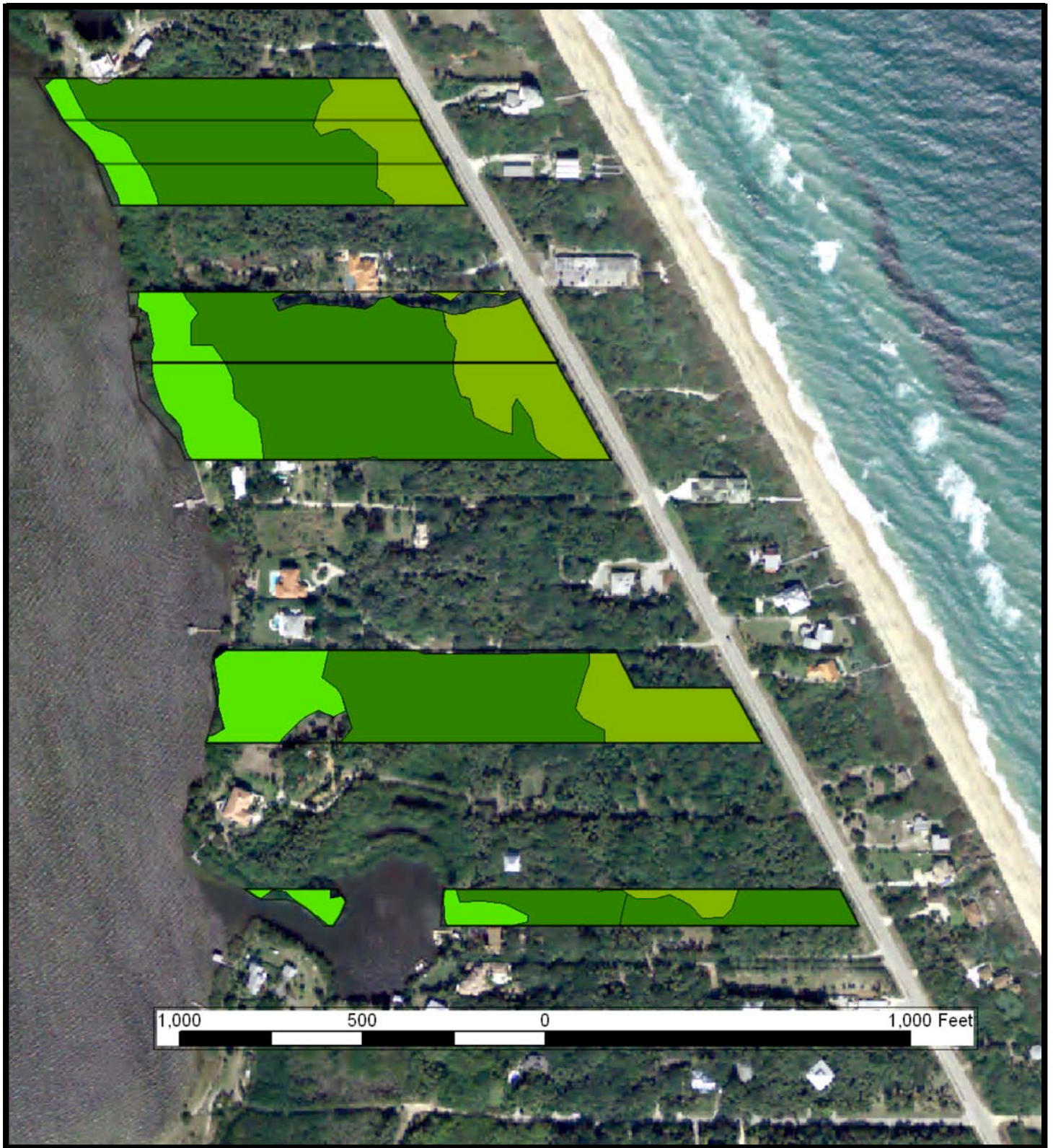


Figure 5. Hardwood Hammock Sanctuary Natural Communities.

2. Flora

In the summer of 2005, Nichole Strickler, Assistant Land Manger for South Beach Region, generated a plant species list for Hardwood Hammock Sanctuary (refer to Appendix B). Parcels HH-1, HH-2, and HH-3 have had some history of land clearing and alteration onsite that has also led to the proliferation of exotic plant species. HH-1 and HH-2 were further impacted by the installation of mosquito impoundments. The primary invasive exotic plant on the site is the Brazilian pepper (Schinus terebinthifolius), with some Australian pine (Casuarina equisetifolia), Wild papaya (Carica papaya), and Air potato (Dioscorea bulbifera).

In May of 2004, the EEL Program was awarded a grant through the Florida Department of Environmental Protection (FDEP) for the removal of both Brazilian pepper and Australian pine from the Hardwood Hammock Sanctuary. Herbicide treatment using a combination of basal bark application of Garlon 4 and JLB oil (10-20% solution depending on the size of the individual plants) removed both Brazilian Pepper and Australian pine. Dense areas with larger Brazilian pepper trees were mechanically removed using brontosaurus machinery. Vegetation in these areas is still recovering and will have to be closely monitored for re-growth of exotics. Some Brazilian pepper trees found in the interior salt marsh and along the shoreline of the Indian River Lagoon are still undergoing treatment. The parcels are currently receiving initial and follow-up treatments on all Brazilian pepper present. Additional FDEP grant applications are pending to treat the remainder of the parcels.

The EEL Program is dedicated to the long-term removal of invasive exotic plants from within the Hardwood Hammock Sanctuary and will work with adjacent property managers to ensure the success of this program. Plans are currently underway to assess the extent of the other invasive exotic plant species on the sanctuary and to develop specific plans for their removal.

The plant species diversity varies between the Hardwood Hammock Sanctuary parcels due to the variation in the levels of past disturbance, particularly between the two northern group parcels (HH-1, HH-2) and the two southern group parcels (HH-3, HH-4). The two northern group parcels HH-1 and HH-2 had extensive exotic plant species, which were easily accessed and removed by heavy machinery. The native vegetation in these areas is still recovering, and close observation of these areas should reveal what pioneer plant species will recruit back into these restoration areas. This is something that should be researched in further detail, especially in later years when comparisons between the vegetation diversity of natural and restored hammocks can be examined. This information will help guide future land management decisions.

The understory of the more disturbed parcels (HH-1, HH-2) consists of Wild coffee (Psychotria nervosa), Wild lime (Zanthoxylum fagara), Pigeon plum (Coccoloba diversifolia), Snowberry (Chiococca alba), and Nightshade (Solanum ssp.) Exotic plants like Papaya (Carica papaya) and Brazilian pepper (Schinus terebinthifolius) will often

invade these new opened areas. The canopy is comprised of sparse groups of large Mastic (Sideroxylon foetidissimum) and Gumbo Limbo (Bursera simaruba) trees.

Due to its history of land clearing, HH-3 was also invaded by Brazilian pepper, particularly in the mangrove swamp portion of the parcel and along A1A. The two southern group parcels HH-3 and HH-4 did not have their exotic plants removed by heavy machinery, because of access limitations, but are instead being treated manually.

Both parcels HH-3, and HH-4 have a significant increase in species diversity when compared to the other group parcels. Portions of HH-3's and HH-4's habitat remain natural, containing areas of pristine tropical hardwood and maritime hammock. The understory consists of Marlberry (Ardisia escallonioides), Myrsine (Rapanea punctata), White (Eugenia axillaris) and Simpson stopper (Myrcianthes fragrans), Wild lime (Zanthoxylum fagara), Pigeon plum (Coccoloba diversifolia), Snowberry (Chiococca alba) and Wild coffee (Psychotria nervosa). The canopy is fairly closed and is comprised of Mastic (Sideroxylon foetidissimum), Gumbo Limbo (Bursera simaruba), Red Bay (Persea borbonia), Virginia live oak (Quercus virginiana), Cabbage palm (Sabal palmetto), and Sea grape (Coccoloba uvifera). A full plant species list can be found in Appendix B of the document. Group parcel HH-4, which received the least amount of disturbance, is relatively free of exotics.

As you transition from the hammock habitat into the salt marsh, the plant diversity decreases because of the limiting environmental conditions of the marsh. The abundant plants found there are mangrove and other marsh plant species. Unfortunately Brazilian Pepper and Australian Pine dominates portions of this area as well. This area is often inundated with water and the use herbicides in these conditions will be carefully monitored. A more detailed flora survey is an initial goal of the EEL program for the Hardwood Hammock Sanctuary.

3. Fauna

No formal faunal surveys have been conducted on the Hardwood Hammock Sanctuary. Detailed faunal surveys are an initial goal of the EEL Program for the Hardwood Hammock Sanctuary.

4. Designated Species

Animals

Designated animals observed onsite or recorded by the Natural Areas Inventory include American alligator, (Alligator mississippiensis), and Wood stork, (Mysteria americana). Several species of wading birds are known to utilize the habitat in this area, particularly along the Indian River Lagoon. These birds include, the Little blue heron (Egretta caerulea), Snowy egret (Egretta thula), White ibis (Eudocimus albus), Brown pelican (Pelecanus occidentalis) and Roseate spoonbill (Ajaia ajaja).

In addition, the endangered Green (Chelonia mydas) and Loggerhead (Caretta caretta) and Leatherback (Dermochelys coriacea) sea turtles are known to nest on the beach adjacent to the beaches east of the Sanctuary.

Plants

Several designated plant species, including Florida shrubverbena (Lantana depressa var. floridana) are found in the sanctuary (Schmalzer & Foster, 2005). Florida Natural Areas Inventory also recorded Fragrant Prickly Apple (Harrisia fragrans) in the area, and Johnson's Seagrass (Halophila johnsonii) in the adjacent lagoon. The next step will be the to generate a more detailed map illustrating plant size and a photographic series detailing the extent of coverage of the designated species followed by careful resource monitoring. Once a baseline has been established, additional management goals (e.g. replanting) can be addressed. Continued efforts to remove invasive exotic plants will allow for the natural progression of native species.

5. Biological Diversity

Aside from the limited plant surveys described above, no work has been conducted with an eye towards assessing biological diversity. Additional data will need to be collected in order to assess the biological diversity (both richness and evenness) so that changes in diversity can be tracked over time. Methodologies will need to be established for all of the relevant taxonomic groups and researchers and staff tasked to address this particular need.

C. CULTURAL

1. Archaeological

The following information is summarized from the Inventory and Assessment of Cultural Resources in the Archie Carr Sea Turtle Refuge (Glowacki & Newman, October 2003):

Toward the management of state cultural resources, CARL (Conservation and Recreational Lands) staff visited the Archie Carr Sea Turtle Refuge area on three occasions prior to the 2003 CARL Site Inventory. Drawing on these previous CARL projects and the Florida Master Site File, a list of archaeological sites was created. This list included site 8BR 559, which spans across the two southern parcels of Hardwood Hammock Sanctuary, HH-3 and HH-4. The site is also referred to as Bob's Midden, a pre-historic shell midden. An exact time period was not determined for this site, but is believed to have been between St. Johns I-St. Johns II. The site covers an area of approximately 6,000 m². Originally discovered in 1989, it was described as being only 1,250 m². The site was primarily composed of oyster and crossed bar venus clam shell, with some tulip and surf clam present. Pottery from the site includes St. Johns Plain, St.

Johns Punctuated and sand-tempered red slip plainware. The site is located in the vicinity of a large strand of Mastic and Gumbo limbo trees. There are no immediate threats to the site and every effort should be made to preserve it.

In preparation for the 2003 site survey and inventory of Archie Carr, CARL staff examined maps, aerial photos, reports, and historical records to determine areas of site probability. One high probability area was a secondary sand dune ridgeline. This single, north-south oriented ridge runs the length of the Barrier Island and is pronounced south of Melbourne Beach where the Archie Carr refuge is located. Two new archaeological sites were located and documented within the Hardwood Hammock Sanctuary during this survey; 8BR 1865 (referred to as Hardwood), and 8BR 1866 (referred to as Hardwood II). The Hardwood site is a prehistoric shell midden that was developed during the St. Johns II period, which began in A.D. 750. This site in combination with other similar sites located along the dune ridge immediately west of SR A1A, is likely to be eligible to be inclusion on the National Register. Hardwood is a reasonably intact shell midden, and appears to be located on HH-2. Together with other comparable sites, it may represent a form of settlement complex. Every effort should be made to preserve this site.

At the Hardwood II, site the cultural period was not determined, but CARL staff identified considerable shell scatter with some areas more concentrated than others. This site appears to be located within HH-1. A map from the Inventory and Assessment showing the location of the archaeological sites BR559, BR 1866, and BR 1865 is also included within this report (Appendix D). Every effort should be made to preserve these important archaeological sites.

2. Historical

The following information is summarized from the Characterization Report for the Archie Carr National Wildlife Refuge (Draft, October 1995):

Ais Indians (1000 BC – 1500 AD)

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

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

Twenty-six shell middens and four burial sites have been recorded on the Barrier Island within the Archie Carr National Wildlife Refuge. One shell midden (burial mound) is located on the Hog Point Sanctuary.

Turn of the Century to Present

During the late 1800s and early 1900s, naturalists were the primary visitors to Brevard County. Notable scientists came to this species rich, semi-tropical region to collect specimens for natural history museums. These specimens included rare bird life such as the Carolina parakeet (*Conuopsis carolinensis*), which is now extinct. Many of these visitors stayed at Mrs. Latham's Oak Lodge located on the barrier island in the current location of the Mullet Creek Islands (Austin, 1967).

In the early 1900s, people came to Brevard County from around the country via the Florida East Coast Railway. There was an increase in settlement and development of towns brought about by the creation of railroads and canals. At that time, Melbourne Beach was accessible by the Melbourne Beach Improvement Company's motor train (Shofner, 1995).

The increase in population was also the result of the 1916 Drainage Acts of Florida and the establishment of Mosquito Control measures beginning in 1927. The Drainage Acts rerouted drainage patterns that permanently lowered water tables in areas where standing water naturally existed for six or more months each year. Mosquito control (pesticide spraying) lowered the mosquito population to acceptable levels (Barille, 1988).

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

3. Land-use History

The availability of aerial photographs beginning in 1943 provides a glimpse into the land-use history of the Hardwood Hammock Sanctuary, HHS (figure 6). In 1943, Highway A1A was already running north/south along the Atlantic Ocean, at this time portions of the HHS had already been cleared for development. Two large areas, which appear to be several acres in size, were cleared for the development of homes or for agriculture. The portions of the HHS most affected by this land clearing were collective parcels HH-2 and HH-3. One of the cleared areas was rectangular in shape and ran along the Indian River Lagoon, hugging the shoreline. The second area is L-shaped and is just to the west of the first cleared area. The shape of the cleared areas and the time period they were created would seem to indicate that they were going to be developed for agriculture.

In 1956, the mosquito impoundment was created along the Indian River Lagoon. The impoundments did not run through the entire sanctuary, reaching only the two northern most parcels (HH-1, HH-2). The impoundment dikes continue on again just south of the Sanctuary. It is not evident exactly why the impoundment was not continued through the entire Sanctuary, but access to the site was clearly not an issue. If the previously cleared

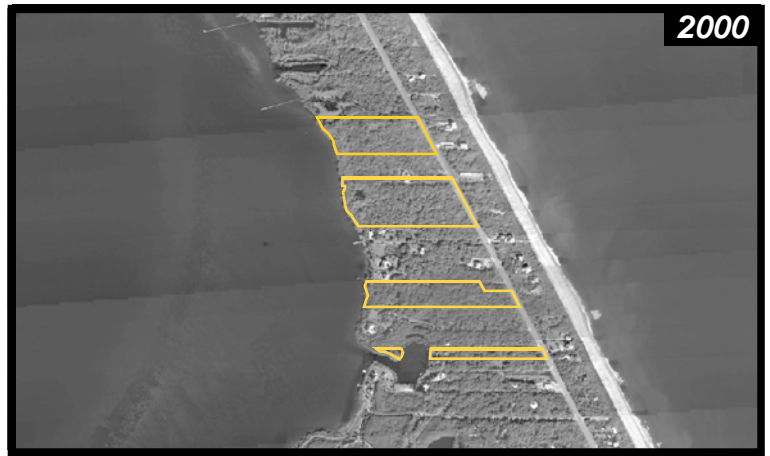
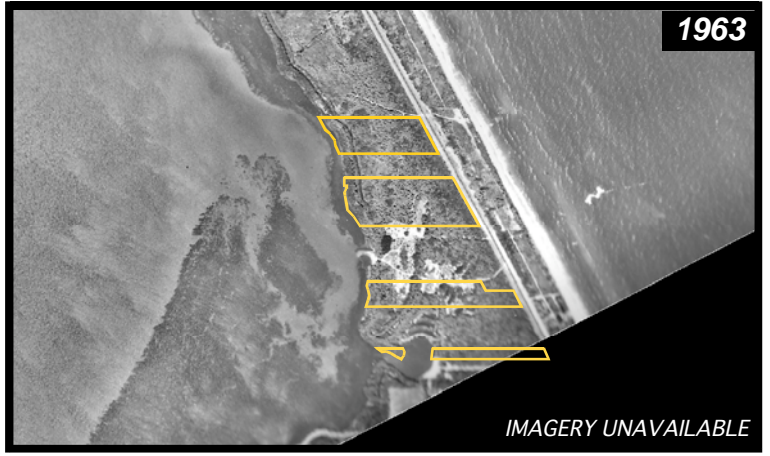
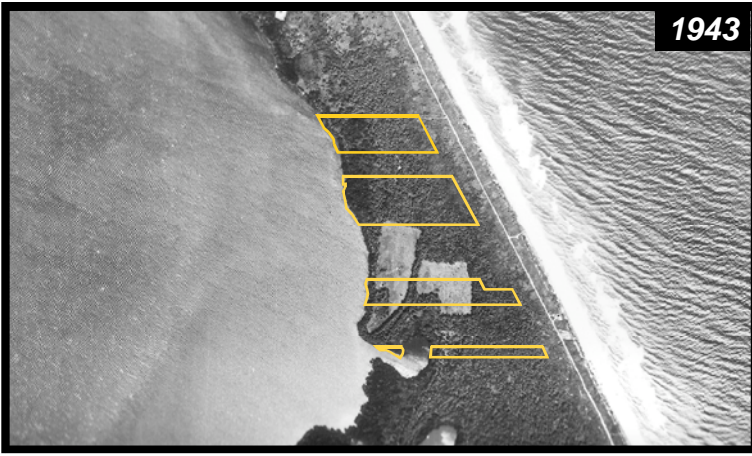


Figure 6. Hardwood Hammock Sanctuary Historic Aerial Photos.

areas on the property were going to be used for agriculture, then the owners probably would not have wanted the marsh impounded and portions of the property flooded.

In the areas that the marsh was impounded, large areas of open water are visible as strips adjacent to upland ridges. This is probably a result of black mangrove (Avicennia germinans) and buttonwoods (Conocarpus erectus) that were unable to adjust to the lack of natural tidal cycles and/or the full time inundation of water prescribed for mosquito control. Red (Rhizophora mangle) and white (Laguncularia racemosa) mangroves that could withstand long-term inundation later colonized these areas. Up until 1996, when culverts were installed to reconnect the impounded areas to the lagoon, the impoundment was managed by maintaining high water levels eliminating oviposition by salt marsh mosquitoes. This was accomplished by trapping rainwater and periodically pumping lagoon water into the impoundment using portable diesel pumps, to replace water lost through evaporation and seepage through the dike. The reduction of salinity allowed the invasive exotic Brazilian pepper to exploit areas previously occupied by black mangroves and buttonwoods. Australian pines were also planted along the lagoon to act as a wind-break.

At looking at 1963 aerials of the Sanctuary, the installed mosquito impoundments are evident, and so are the cleared areas and survey lines that people and heavy equipment utilized to access the salt marsh and the lagoon. Thanks to the impoundment of the salt marshes in the area, development steadily grew in this region. Many more acres of land were cleared for agriculture or residential homes. By 1963, the two large cleared areas on or surrounding HH-2 and HH-3 were still undeveloped and remained somewhat open. The old A1A is still visible and the new A1A has been constructed just to the west of it. A road has been cut from A1A directly to the Indian River Lagoon, and a small portion of that shoreline was also cleared. People appeared to be using these cleared areas as a station to access the Indian River Lagoon. At this point some vegetation on the eastern cleared area was beginning to recruit back in.

By 1993 most of the cleared areas on or around HH-2, and HH-3 were used for the development of residential homes or had been overtaken by vegetation. The old road running east-west to the Indian River Lagoon was kept clear. The northwest portion of the cleared area near HH-3 remained opened and was used for the site of a residential home. Another residential home was also developed just north of that one. Development of the homes around the sanctuary appears to be primarily along the Indian River Lagoon, leaving the land east of the lagoon in an almost natural state.

By 2004 several more homes had been developed in the areas surrounding the Sanctuary, with development primarily on the Atlantic Ocean. A road was cleared for the development of a residential home just north of HH-2. This road opened the entire northern boundary of HH-2. A similar road was also developed just to the north of HH-1, although here a buffer of vegetation exists between the Sanctuary and the residential home and road.

The residential development along most of the Sanctuary has been minimal, leaving the majority of the eastern portion of the surrounding properties undisturbed. There are some minor encroachment issues with some of the neighbors who have been depositing yard waste on the Sanctuary over the years. Encroachment is something that will be addressed and hopefully eliminated by developing relationships with the neighbors of the HHS.

Some of the newly disturbed areas on or near the Sanctuary have been further colonized by exotic plant species including Brazilian pepper, Australian pine, and Wild papaya. These exotics can out compete native plant species, severely alter the habitat, and decrease overall plant and animal diversity. Aside from the slight disturbances over the past 50 years, the parcels that make up the Hardwood Hammock Sanctuary are essentially extensions of the same habitat types that were evident in the 1943 photos.

4. Public Interest

Public interest for the EEL Program has been enthusiastic and supportive. A public meeting held on June 8, 1998 that introduced the Master Site Plan for the Barrier Island Sanctuary Management and Center was very well received. Additional partners in the management and maintenance of the sanctuary include the Archie Carr National Wildlife Refuge, Brevard County schools, and local universities. The Archie Carr National Wildlife Refuge is also served by a working group composed of local, state, federal, citizen and private groups dedicated to the preservation and management of the Refuge's resources. Public interest in the Hardwood Hammock Sanctuary has been focused on the exotic plant removal program.

Since the State titled portion of the Hardwood Hammock Sanctuary is less than 160 acres, a formal public review of this management plan is not required. Public involvement in this plan is limited to occasional public speaking events with local residents regarding the Sanctuary. In addition, the Selection & Management Committee, a citizen advisory board to the EEL Program made up of local scientists, has reviewed and approved the plan on October 17, 2006. The Brevard County Board of County Commissioners, in regular session, approved the management plan on November 14, 2006 for adherence to the Local Government Comprehensive Plan (Appendix E).

V. FACTORS INFLUENCING MANAGEMENT

A. NATURAL TRENDS

The primary variable that affects the formation and succession of Florida's barrier island communities is the ocean, including associated storms, wind, and salt. Each of the coastal plant communities is specifically adapted to its geographic and topographic position. Natural alterations are frequent, resulting from storm surges and overwash, or loss of canopy trees due to age, wind and occasional fire. The loss of dunes due to storm surge or human activity can greatly affect the back dune, coastal strand and maritime hammock communities. If possible land management practices developed for the Hardwood Hammock Sanctuary should consider the restoration and maintenance of the barrier dunes.

B. HUMAN-INDUCED TRENDS

The mild sub-tropical climate and easy access to major population centers makes the barrier island a prime residential, resort and retirement area. Humans have altered the surrounding landscape through activities such as development, agriculture, beach armoring, runoff, the introduction of exotic plants and animals, recreation and tourism.

The major historical influences onsite are detailed in Figure 7. The location of Route A1A has obvious influences on the survivorship of designated species such as gopher tortoises. The impoundment of salt marshes located within the Sanctuary, has also had obvious effects on the hydrology of the property and all of the organisms inhabiting the area. Fragmentation of habitat, due to rapid development of our coastline has most severely affected the barrier island ecosystem. Populations of rare or endangered species have become isolated from one another and are no longer able to survive. Large predators such as the Florida Panther, which require a large territory to hunt and reproduce, are now almost non-existent on the fragmented barrier island habitats. Without these larger predators in the area, nuisance animal species like the raccoon can become out of control, reeking havoc on the endangered sea turtle nests. The invasion of exotic plant species is the only issue that altered this ecosystem more severely.

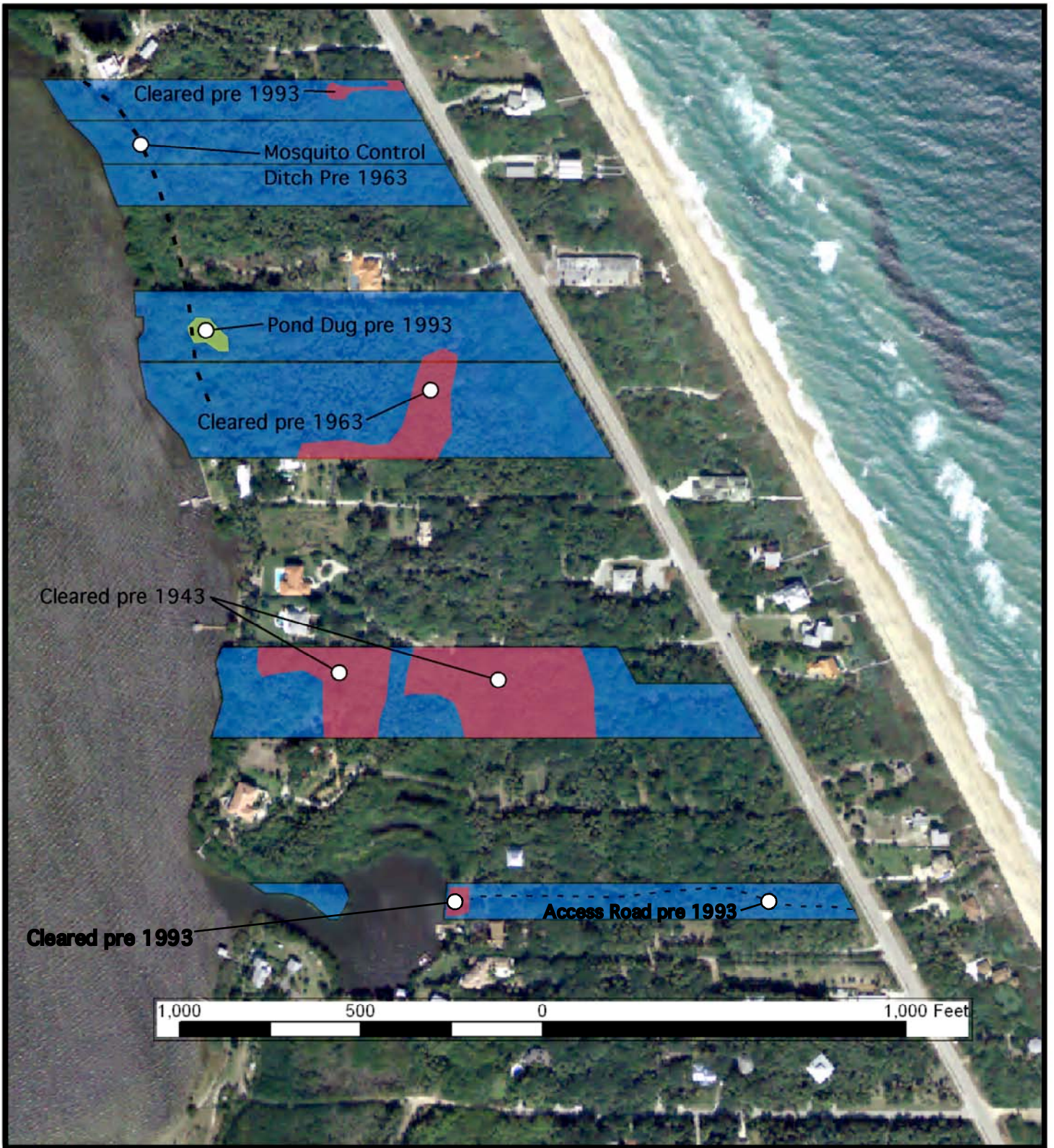


Figure 7. Hardwood Hammock Sanctuary Human Impacts.

C. EXTERNAL INFLUENCES

External influences that have the potential to impact the Sanctuary include the introduction of exotic plants and animals from adjacent properties, and illegal dumping or unpermitted use of the property. The EEL Program has been working with its neighbors within the Archie Carr Wildlife Refuge to eliminate exotic plant species from their properties as well as the sanctuaries. This is the only way to keep these exotics from continually moving back into EEL properties.

There are minor encroachments from some adjoining property owners on the Hardwood Hammock Sanctuary, particularly on HH-2 and HH-3. Neighbors have used portions of the HHS to dispose of yard waste in past years. Encroachment is something that will be addressed and hopefully eliminated by developing relationships with the neighbors of the HHS. By establishing relationships with the adjacent neighbors of EEL Sanctuaries and by coming to a mutual understanding of the purpose and function of a sanctuary, the EEL Program should be able to work with the neighbors to manage the sanctuaries more efficiently.

The majority of the development on the adjacent parcels is focused on the Indian River Lagoon, leaving large portions of the parcels virtually undisturbed. These undisturbed tracts of land can act as a wildlife corridor, essentially linking all of the Hardwood Hammock Sanctuary. The EEL Program intends to fence and post signage on the front portions of the Sanctuary (on A1A) to deter any illegal activities. Established relationships and communication with the neighbors should eliminate the need to install a fence running east-west through the parcels. Neighbors will be able to enjoy their property in a natural state without obstruction, wildlife will still be able to utilize the property as a corridor, and will save the County money.

No portions of any of the State owned parcels that make up the Maritime Hammock Sanctuary are of a condition that would warrant their being declared surplus.

There are no adjacent parcels of undeveloped land that should be purchased because they are essential to management.

D. LEGAL OBLIGATIONS AND CONSTRAINTS

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

State of Florida

To fulfill its pledge to manage the properties Brevard County entered into management lease # 4711 on January 28, 1999, which was the initial lease for all properties acquired within the Maritime Hammock Initiatives CARL project. The term of the lease is fifty (50) years from the date of the initial lease. In September of 2001, Brevard County and

State of Florida entered into Amendment # 3 of the lease to include the Hardwood Hammock properties. The original lease is for a period of fifty (50) years with the State of Florida. The County is obligated to manage all the properties composing the Hardwood Hammock Sanctuary according to the terms of Lease #4177.

This management plan is consistent with the State Lands Management Plan adopted by the Trustees on March 17, 1981.

E. MANAGEMENT CONSTRAINTS

1. Exotic Plant Species

Invasive, exotic, and/or nuisance plants have the potential to displace native species and to significantly alter natural ecosystem function. Exotic species are a major concern within the Hardwood Hammock Sanctuary, particularly along roads, old survey trails and along the shore of the Indian River Lagoon. The primary species of concern, Brazilian pepper (Schinus terebinthifolius), Australian pine (Casuarina equisetifolia), and Wild papaya (Carica papaya) are currently being targeted through a grant under the Florida Department of Environmental Protection's Invasive Plant Management Program. The treatment of exotic plants will be an ongoing for several years.

A thorough survey of the extent of exotic plant species needs to be conducted throughout the sanctuary. Once determined, these species can be treated and monitored. The EEL Program is currently developing a comprehensive treatment and monitoring program to ensure the long-term removal of these species from the Hardwood Hammock Sanctuary and other EEL managed properties.

2. Exotic Animal Species

The list of non-indigenous animal species noted with the Hardwood Hammock Sanctuary includes the Cuban tree frog (Osteopilus septentrionalis), the brown anole (Anolis sagrei), and several other exotic herptile and ant species. Further investigation into the levels and impacts of these species will be conducted prior to the establishment of a control strategy.

F. PUBLIC ACCESS AND PASSIVE RECREATION

The EEL Program is committed to providing a range of public use opportunities that are consistent with the conservation and protection goals of the voter approved referendum. The EEL Program's Selection & Management Committee determined that passive recreation activities best support the EEL Program goals. This is supported in the EEL Program *Sanctuary Management Manual* (SMM) adopted by the Board of County Commissioners in 1997. The SMM defines passive recreation as:

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

The Hardwood Hammock Sanctuary is proposed as a Category 3 or Primary Research and Conservation Site as defined in EEL Program's *Sanctuary Management Manual* and thus is not expected to undergo significant development other than boundary posting and fencing (figure 8). The configuration of the property does not allow for public access that would not negatively affect adjacent property owners. Due to the sensitive nature of the archaeological sites that are located within the Sanctuary, and the close proximity of the vast recreational opportunities within a 5 mile radius of the Sanctuary, a trail will not be implemented on the Sanctuary.

However, this site will be utilized as a research and educational resource for the Barrier Island Sanctuary Management and Education Center. The undisturbed areas interspersed with areas that have been disturbed by human use can be used to illustrate the ways in which habitats recover. Whenever possible, research and restoration conducted on site will be used to guide educational programs.



— 2-rail wood fence

Figure 8. Hardwood Hammock Sanctuary Planned Improvements.

VI. MANAGEMENT ACTION PLANS

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

A. GOALS

The *Sanctuary Management Manual* of the EEL Program provides the following management goals for EEL sanctuaries, which apply to the Hardwood Hammock Sanctuary.

- Documentation of historic public use
- Conservation of ecosystem function
- Conservation of natural (native) communities
- Conservation of species (including endemic, rare, threatened and endangered species)
- Preservation of significant archeological and historical sites
- Provision of public access for responsible public use
- Assessment of carrying capacity of natural resources with public use
- Provision of environmental education programs
- Provision of opportunities for compatible uses
- Assurance of 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 Hardwood Hammock Sanctuary.

GOAL: DOCUMENTATION OF HISTORIC PUBLIC USE

Strategy 1: Document historic public use

Actions:

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

GOAL: CONSERVATION OF ECOSYSTEM FUNCTION

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

Actions:

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

- Research hydrologic patterns on and off-site
- Research native species' movement patterns on and off-site
- Focus natural community restoration efforts on enhancing native diversity
- Investigate the historic hydroperiod and restore natural hydrologic patterns

GOAL: CONSERVATION OF NATURAL (NATIVE) COMMUNITIES

Strategy 3: Restore degraded, disturbed, or altered uplands within the Hardwood Hammock Sanctuary

Actions:

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

Strategy 4: Design and implement a "natural" fire management program

Actions:

- Identify natural communities that require prescribed fire management
- Identify and evaluate individual proposed burn management units
- Identify the goal of the application of fire to each proposed burn unit
- Document listed species within each burn unit
- Identify and plan perimeter and internal fire breaks
- Develop and implement public education campaign including programs and literature regarding the need for periodic controlled burns
- Secure the necessary permits from the State Division of Forestry
- 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 5: 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 FGFWFC guidance concerning listed species
- Implement habitat restoration activities for listed species (i.e. removal of exotic/nuisance species, restoration of ecosystem function)
- Establish periodic monitoring of habitat suitability (where indices are available for a given species), species population levels, diversity levels, and exotic/nuisance species, as a means of evaluating the success of management strategies

GOAL: DOCUMENTATION OF SIGNIFICANT ARCHAEOLOGICAL AND HISTORIC SITES

Strategy 6: Survey of archaeological and historical sites within the Hardwood Hammock Sanctuary.

Actions:

- Review the State Division of Historic Resources Phase I Assessment of the historical and archaeological sites within the Hardwood Hammock Sanctuary
- Review available maps and historic records for indications of past usage of the site
- Map all archaeological and historic sites for future reference
- Limit public access to these sites by fencing access points and by continuous monitoring of sanctuary.

GOAL: ASSURANCE OF GENERAL UPKEEP AND SECURITY OF THE PROPERTY

Strategy 7: Secure and maintain the Sanctuary to the highest degree possible using EEL staff, Parks and Recreation staff, contract employees and volunteers.

Actions:

- Employ a land manager to oversee maintenance and security activities;
- Contract with Brevard County, Parks and Recreation for maintenance of parking areas, fire breaks, trails, boardwalks, bridges, benches etc.;
- Coordinate daily maintenance tasks using staff and volunteers.

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION

The implementation of the management plan is outlined in a recommended timeline. This timeline includes 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 Hardwood Hammock Sanctuary.

<u>ACTION</u>	<u>TIMELINE</u>
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Strategy 1: Document historic public use

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

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

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

Strategy 3: Restore degraded, disturbed, or altered uplands with the Hardwood Hammock Sanctuary

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

Strategy 4: Design and implement a “natural” fire management program

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

Strategy 5: 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	On-going
Periodically update these baseline survey data to determine possible changes in designated species distribution or density	Short-Term
Review management plans for consistency with USFWS and FGFWFC guidance concerning listed species	Immediate
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	Immediate

Strategy 6: Survey for archaeological and historic sites within the Hardwood Hammock Sanctuary.

Review the State Division of Historic Resources Phase I survey of the site	Complete
Review available maps and historic records for indications of past usage of the site	Immediate
Map all archaeological and historic sites for future reference	Immediate
Limit public access to these sites by fencing access points and by continuous monitoring of the Sanctuary	Immediate

Strategy 7: Secure and maintain the Sanctuary to the highest degree possible using EEL staff. Parks and Recreation staff, contract employees and volunteers

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

VIII. FINANCIAL CONSIDERATIONS

The following is a breakdown of the general costs estimated for capital improvement and annual management of the Hardwood Hammock Sanctuary:

Capital Improvement

Property Boundary Fencing (HH-1)	\$4,200.00
Property Boundary Fencing (HH-2)	\$5,200.00
Property Boundary Fencing (HH-3)	\$1,300.00
Property Boundary Fencing (HH-4)	\$1,200.00
Property Boundary Signs	\$1,000.00
Initial Treatment of Brazilian pepper *(HH; FY 2004, FDEP, Bureau of Invasive Plant Management Grant)	\$10,000.00

Annual Management

Follow-up treatment of Brazilian Pepper and other exotics	\$ 1000.00
Treatment for other invasive plants species	\$ 500.00
Upkeep of fences and boundary signs	\$ 500.00

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Appendix A.
Hardwood Hammock Sanctuary Legal Descriptions

Parcel 30-39-07-00-33

N 117.99 FT OF GOVT LOT 1 & 2 W OF A1A & 1/5 INT IN S 7 FT OF N 280 FT OF GOVT LOT 1 E OF A1A

Parcel 30-39-07-00-39

S 117.99 FT OF N 235.98 FT OF GOVT LOTS 1 & 2 LYING W OF A1A & 1/5 INT IN S 7 FT OF N 280 FT OF GOVT LOT 1 LYING E OF A1A

Parcel 30-39-07-00-40

S 117.99 FT OF N 359.97 FT OF GOVT LOTS 1 & 2 LYING W OF A1A & 1/5 INT IN S 7 FT OF N 280 FT OF GOVT LOT 1 LYING E OF A1A

Parcel 30-39-07-00-36

THAT PART OF N 200.01 FT OF S 728.49 FT OF GOVT LOTS 1,2 LYING WEST OF ST RD A1A AS DES INORB 1140 PG 484

Parcel 30-39-07-00-12

N 254.96 FT OF S 528.48 FT OF GOVT LOTS 1 & 2 W OF A1A PAR 35

Parcel 30-39-07-00-14.1

S 400 FT OF N 1/2 OF GOVT LOT 4 W OF A1A & S 460 FT OF N 716.93 FT OF GOVT LOT 3 EXC N 100 FT OF S 400 OF E 600 FT OF N 1/2 OF GOVT LOT 4 W OF A1A, ORB 3030 PG 1695, 3063 PG 4553

Parcel 30-39-07-00-34

N 100 FT OF S 400 FT OF GOVT LOT 4 LYING W OF A1A

Appendix B.
Hardwood Hammock Sanctuary Observed Plant Species

BOLD=Protected

SCIENTIFIC NAME	COMMON NAME	Exotic
<i>Acrostichum danaeifolium</i>	Giant leather fern	
<i>Ardisia escallonioides</i>	Marlberry	
<i>Bidens alba</i>	Beggerticks	
<i>Bursera simaruba</i>	Gumbo limbo	
<i>Callicarpa americana</i>	American beautyberry	
<i>Carica papaya</i>	Wild papaya	X
<i>Casuarina equisetifolia</i>	Australian pine	X
<i>Catharanthus roseus</i>	Madagascar periwinkle	X
<i>Chamaecrista fasciculata</i>	Partridge pea	
<i>Chiococca alba</i>	Snowberry	
<i>Cissus trifoliata</i>	Sorrelvine	
<i>Citharexylum spinosum</i>	Florida fiddlewood	
<i>Cnidioscolus stimulosus</i>	Tread softly	
<i>Coccoloba diversifolia</i>	Pigeon plum	
<i>Coccoloba uvifera</i>	Seagrape	
<i>Commelina erecta</i>	Whitemouth dayflower	
<i>Erythrina herbacea</i>	Coral bean	
<i>Eugenia axillaris</i>	White stopper	
<i>Eugenia foetida</i>	Spanish stopper	
<i>Eupatorium capillifolium</i>	Dogfennel	
<i>Ficus aurea</i>	Strangler fig	
<i>Forestiera segregata</i>	Florida swampprivet	
<i>Glandularia maritima</i>	Coastal mock-vervain	
<i>Helianthus debilis</i>	Dune sunflower	
<i>Heterotheca subaxillaris</i>	Camphorweed	
<i>Lantana camara x depressa</i>	Lantana (hybrid)	
<i>Lantana depressa var. floridana</i>	Florida shrubverbena	
<i>Licania michauxii</i>	Gopher apple	
<i>Sideroxylon foetidissium</i>	False mastic	
<i>Mentzelia floridana</i>	Poorman's patch	
<i>Mikania cordifolia</i>	Florida keys hempvine	
<i>Myrcianthes fragrans</i>	Twinberry	

<i>Myrica cerifera</i>	Wax myrtle	
<i>Ocotea coriacea</i>	Lancewood	
<i>Opuntia humifusa</i>	Pricklypear	
<i>Opuntia stricta</i>	Erect pricklypear	
<i>Parthenocissus quinquefolia</i>	Virginia creeper	
<i>Persea borbonia</i>	Red bay	
<i>Phlebodium aureum</i>	Golden polypody	
<i>Pleopeltis polypodioides</i>	Resurrection fern	
<i>Poinsettia cyathophora</i>	Paintedleaf	
<i>Psychotria nervosa</i>	Wild coffee	
<i>Pteridium aquilinum</i>	Bracken	
<i>Quercus virginiana</i>	Virginia live oak	
<i>Rapanea punctata</i>	Myrsine	
<i>Sabal palmetto</i>	Cabbage palm	
<i>Sarcostemma clausum</i>	White twinevine	
<i>Schinus terebinthifolius</i>	Brazilian pepper	X
<i>Schoepfia chrysophylloides</i>	Greytwig	
<i>Serenoa repens</i>	Saw palmetto	
<i>Sideroxylon tenax</i>	Tough bully	
<i>Smilax auriculata</i>	Earleaf greenbrier	
<i>Solidago sempervirens</i>	Seaside goldenrod	
<i>Sophora tomentosa</i>	Yellow necklacepod	
<i>Tillandsia fasciculata</i>	Cardinal airplant	
<i>Tillandsia usneoides</i>	Spanish moss	
<i>Toxicodendron radicans</i>	Eastern poison ivy	
<i>Trichostema dichotomum</i>	Forked bluecurls	
<i>Vitis rotundifolia</i>	Muscadine grape	
<i>Vittaria lineata</i>	Shoestring fern	
<i>Ximenia americana</i>	Tallowwood, hog plum	
<i>Yucca aliofolia</i>	Spanish bayonet	X
<i>Zanthoxylum clava-herculis</i>	Hercules' club	



1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

Nichole Strickler
Brevard County
EEL Program

June 21, 2005

Dear Ms. Strickler:

Thank you for your request for information from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for your project area.

Project: Hardwood Hammock Sanctuary
Date Received: May 31, 2005
Location: Township 30 S, Range 39 E, Section 7
Brevard County

Based on the information available, this site appears to be located on or very near a significant region of scrub habitat, a natural community in decline that provides important habitat for several rare species within a small area. Additional consideration should be given to avoid and/or mitigate impacts to these natural resources, and to design land uses that are compatible with these resources.

Element Occurrences

A search of our maps and database indicates that currently we have several Element Occurrences mapped within the vicinity of the study area (see enclosed map and table). Please be advised that a lack of element occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The Element Occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates the precision of the element occurrence location, defined as second (within about 300 feet of the point), minute (within about one mile), or general (within about 5 miles). For animals and plants, Element Occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some element occurrences represent historically documented observations that may no longer be extant.

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



Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Tracking Florida's Biodiversity

Land Acquisition Projects

This site appears to be located within the Archie Carr Sea Turtle Florida Forever BOT Project, which is part of the State of Florida's Conservation and Recreation Lands land acquisition program. For more information on this Florida Forever Project, contact the Florida Department of Environmental Protection, Division of State Lands or visit

<http://www.dep.state.fl.us/lands/acquisition/FloridaForever/FFAnnual2004/default.htm>

Florida Forever Board of Trustees (BOT) projects are proposed and acquired through the Florida Department of Environmental Protection, Division of State Lands. The state has no regulatory authority over these lands until they are purchased.

Potential Habitat for Rare Species

Portions of the site appear to be located on or near Potential Habitat for Rare Species. This potential habitat is associated with a known occurrence in the vicinity of: wood stork (*Mycteria americana*), Johnson's seagrass (*Halophila johnsonii*), leatherback (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), loggerhead (*Caretta caretta*), Atlantic Coast Florida lantana (*Lantana depressa var. depressa*) and Simpson's prickly apple (*Harrisia simpsonii*).

FNAI Potential Habitat for Rare Species indicates areas, which based on landcover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Potential habitat layers have been developed for approximately 250 of the most rare species tracked by the Inventory, including all federally listed species.

Potential Habitat is not a regulatory designation, and should not be confused with "critical habitat", which is an official designation made by the U.S. Fish and Wildlife Service. Information on critical habitats can be found in the Code of Federal Regulations, 50 CFR 17.95, which lists all critical habitats that have been designated. The Code of Federal Regulations can be accessed through the following website: "www.access.gpo.gov/nara/cfr/cfr-table-search.html".

The Inventory always recommends that professionals familiar with Florida's flora and fauna should conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/data.cfm for county or statewide element occurrence distributions and links to more element information.

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

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

Nichole Strickler

6/21/2005

Page 3 of 3

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

Sincerely,

Edwin A. Abbey

Edwin A. Abbey
Environmental Reviewer

encl

1018 Thomasville Road
 Suite 200-C
 Tallahassee, FL 32303
 850-224-8207
 fax 850-681-9364
 www.fnai.org



Element Occurrences

- Precision:
 second minute general
- Animals
 - ▲ Plants
 - Communities
 - Other

U.S. Fish & Wildlife Service
 Scrub Jay Survey 1992-96

FL Fish & Wildlife Cons. Comm.
 Breeding Bird Atlas Project 1986-91
 center point of 10 sq mi survey block

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

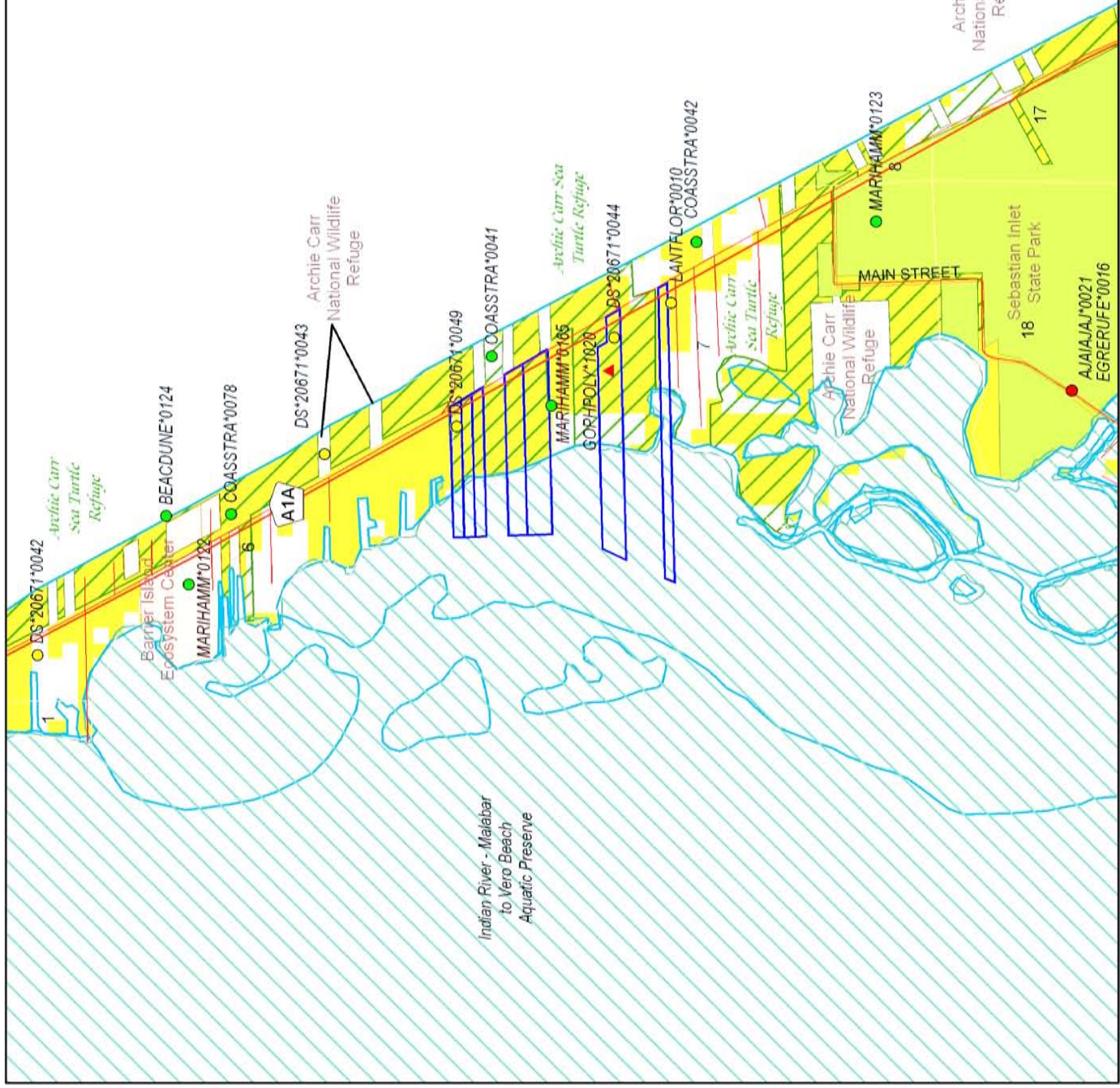
Land Acquisition Projects

- Florida Forever
- Board of Trustees Projects

Non-Managed Natural Areas

- FNAI Potential Habitat for Rare Species
- FNAI Potential Natural Areas

- County Boundary
- Interstate
- Turnpike
- Major Highway
- Local Road
- Water



Map produced by EAA
 Data Source: '03/2005

NOTE
 Map should not be interpreted without accompanying documents. Shading of water bodies does not reflect known depths.



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Florida Natural Areas Inventory

ELEMENT OCCURRENCES MAPPED ON OR NEAR
 PROJECT SITE



Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
EGRERUFE*0016	<i>Egretta rufescens</i>	Reddish Egret	G4	S2	N	LS	1989-06-10	POOLS SURROUNDED BY MANGROVES. 1 BIRD FEEDING.	
GOPHPOLY*1020	<i>Gopherus polyphemus</i>	Gopher Tortoise	G3	S3	N	LS	1993	No data given in U93COA01FLUS.	Species reported as on-site by U93COA01FLUS; additional data needed.
AJAJAJ*0021	<i>Ajaia ajaja</i>	Roseate Spoonbill	G5	S2	N	LS	1989-06-10	POOLS SURROUNDED BY MANGROVES.	2 BIRDS FEEDING CLOSE BEHIND A TRICOLOR HERON AS IT WALKED THROUGH THE WATER.
LANTFLOR*0010	<i>Lantana depressa</i> var. <i>floridana</i>	Atlantic Coast Florida Lantana	G2T1	S1	N	LE	1990-12-04	MARGIN OF COASTAL STRAND.	ONE "SURE" AND ONE APPARENT HYBRID PLANT (MULTI-COLORED FLOWERS) ON MARGIN OF STRAND. PLANTS CA. 2' TALL WITH LEAVES ROLLED UPWARD. ASSOCIATED SPECIES: QUERCUS VIRGINIANA, PERSEA BORBONIA, BUMELIA TENAX, MYRCIANTHES FRAGRANS.
DS*20671*0049	DATA SENSITIVE	DATA SENSITIVE	G2	S2	N	LE	1990-12-04		
DS*20671*0044	DATA SENSITIVE	DATA SENSITIVE	G2	S2	N	LE	1988-04-09		
DS*20671*0043	DATA SENSITIVE	DATA SENSITIVE	G2	S2	N	LE	1988-04-09		
DS*20671*0042	DATA SENSITIVE	DATA SENSITIVE	G2	S2	N	LE	1988-04-09		
BEACDUNE*0124	Beach dune		G3	S2	N	N	1990-12-04	NARROW SEA OATS LEDGE BACKED BY ABRUPTLY SLOPING SEA GRAPE RIDGE. RECENT ULTRA HIGH TIDES CUT INTO LEDGE.	UNIOLA PANICULATA-A, HELIANTHUS DEBILIS-F, SESUVIUM PORTULACA STRUM-F.
COASSTRA*0078	Coastal strand		G3	S2	N	N	1990-12-04	LOW, DENSE HEDGE OF DIVERSE SHRUBS GRADING TO PURE SAW PALMETTO ALONG BEACH.	PERSEA BORBONIA-ABUNDANT; SERENOA REPENS-LOCALLY ABUNDANT; BUMELIA TENAX-A; COCCOLOBA UVIFERA (X)-4; RANDIA ACULEATA-R; FORESTIERA SEGREGATA-OCCASIONAL; SABAL PALMETTO-0; RAPANEA PUNCTATA-0; ZANTHOXYLUM CLAVA-HERCULIS-0; MYRCIANTHES FRAGRANS-LA. SEE ATTA



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Florida Natural Areas Inventory

ELEMENT OCCURRENCES MAPPED ON OR NEAR
 PROJECT SITE



Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
COASSTRA*0041	Coastal strand		G3	S2	N	N	1990-12-04	5-7 HEDGE OF SHRUBS AND DWARFED TREES. MAPPED SEPARATELY FROM ADJACENT STRAND BECAUSE OF MORE TROPICAL PLANT SPECIES COMPOSITION.	ZANTHOXYLUM FAGARA (X)-A, MYRICA CERIFERA-A, EUGENIA FOETIDA (X)-LA, MYRCIANTHES FRAGRANS-A, BUMELIA TENAX-A, AMYRIS ELEMIFFERA (X)-O, BURSERA SIMAROUNBA (X)-O, CHIOCOCCA ALBA-F, SERENOA REPENS-LA, SOPHORA TOMENTOSA-R, ERNODEA LITTORALIS-O.
COASSTRA*0042	Coastal strand		G3	S2	N	N	1990-12-04	SHRUBBY STAND DOMINATED BY LOW OAK, BUCKTHORN, AND PURE SAW PALMETTO ON SEAWARD SIDE. MAPPED SEPARATELY FROM ADJACENT STRAND BECAUSE OF TEMPERATE SPECIES COMPOSITION.	QUERCUS VIRGINIANA (6-7' TALL)-A, BUMELIA TENAX-A, ECHITES COCCOLOBA UVIFERA (X)-LA, RAPANEA PUNCTAT (X)-O, CHIOCOCCA ALBA-O, PERSEA BORBONIA-O, MYRICA CERIFERA-O, SERENOA REPENS-LA.
MARIHAMM*0123	Maritime hammock		G3	S2	N	N	1990-12-04	TALL (25 FT.) WELL-FORMED HAMMOCK OF OAKS AND PALMS WITH TROPICAL SPECIES (INKWOOD, PIDGEON PLUM) MORE PROMINENT THAN TO N OF HERE.	QUERCUS VIRGINIANA, Q. LAURIFOLIA, SABAL PALMETTO, EXOTHEA PARNICULATA, UNDERSTORY: ARDISIA ESCALLONIOIDES, RAPANEA PUNCTATA, EUGENIA AXILLARIS, COCCOLOBA DIVERSIFOLIA, SERENOA REPENS, TOXICODENDRON RADICANS. SEE ATTACHED FOR 1990-12-04 SPECIES
MARIHAMM*0122	Maritime hammock		G3	S2	N	N	1990-02-22	NARROW PALM/OAK HAMMOCK FRINGING MANGROVES WITH PALMS PREDOMINATING. SCATTERED TROPICAL TREES. MEDIUM INVASION OF BRAZILIAN PEPPER INTO UNDERSTORY. MAPPED SEPARATELY FROM ADJACENT HAMMOCK BECAUSE OF DIFFERENCES IN SPECIES COMPOSITION. HAMMOCK GRADES INTO	SABAL PALMETTO - ABUNDANT; QUERCUS VIRGINIANA - RARE; MYRCIANTHES FRAGRANS - OCCASIONAL; BURSERA SIMAROUNBA (X) - R; MASTICHODENDRON FOETIDISSIMUM (X) - R; EXOTHEA PANICULATA (X) - R; GUAPIRA DISCOLOR - R;
MARIHAMM*0165	Maritime hammock		G3	S2	N	N	1990-12-04	No general description given	BURSERA SIMAROUNBA (X)-A, FICUS AUREA (X)-O, ZANTHOXYLUM FAGARA (X)-A, QUERCUS VIRGINIANA-O, SABAL PALMETTO-O. UNDERSTORY: ARDISIA ESCALLONIOIDES (X)-A, MYRCIANTHES FRAGRANS-A, EUGENIA FOETIDA (X)-LA, CARICA PAPAYA-LA, ECHITES UMBELLATA-A. MAPPED SEPARATE



FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Nichole Strickler
Brevard County Parks and Recreation
Environmentally Endangered Lands Program
5560 North U.S. Highway 1
Melbourne, Florida 32940

June 30, 2005

RE: DHR Project File Number: 2005-6115
Received by DHR June 16, 2005
Environmentally Endangered Lands Program Land Management Plan
Hardwood Hammocks Sanctuary – Seven Parcels (54-Acres)
30-39-07-00-33, 30-39-07-00-39, 30-39-07-00-40, 30-39-07-00-36, 30-39-07-00-12,
30-39-07-00-14.1, and 30-39-07-00-34
Brevard County

Dear Ms. Strickler:

In accordance with this agency's responsibilities under Sections 253.034(5) and 259.032(3)(h), *Florida Statutes*, we have reviewed the information in the Florida Master Site File to determine whether any historic properties are recorded in the referenced management area, and also to determine the potential for such resources, which are presently unrecorded to be located within it.

A review of the Florida Master Site File and our records indicated that there are three archaeological sites, prehistoric shell middens, (8BR559, 8BR1865, and 8BR1866), recorded within some of the parcels (see map). We note that the parcels are designated for conservation and there will be no building construction or land clearing.

In the event that fortuitous finds or unexpected discoveries, such as prehistoric or historic artifacts, including pottery or ceramics, stone tools or metal implements, or other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the parcels, the Division of Historical Resources should be contacted. The contact person is Ms. Susan Harp, Historic Preservation Planner and she can be reached at 850-245-6333 or 800-847-7278.

We have enclosed for your use a copy of Management Procedures for Archaeological and Historic Sites and Properties on State-Owned or Controlled Lands. This document should be referred to where appropriate in your land management plan, and attached to it.

RECEIVED

JUL 11 2005

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

Director's Office
(850) 245-6300 • FAX: 245-6436

Archaeological Research
(850) 245-6444 • FAX: 245-6436

Historic Preservation
(850) 245-6333 • FAX: 245-6437

Environmental Endangered Lands Program
(850) 245-6400 • FAX: 245-6433

Southeast Regional Office
(954) 467-4990 • FAX: 467-4991

Northeast Regional Office
(904) 825-5045 • FAX: 825-5044

Central Florida Regional Office
(813) 272-3843 • FAX: 272-2340

Ms. Strickler
June 30, 2005
Page 2

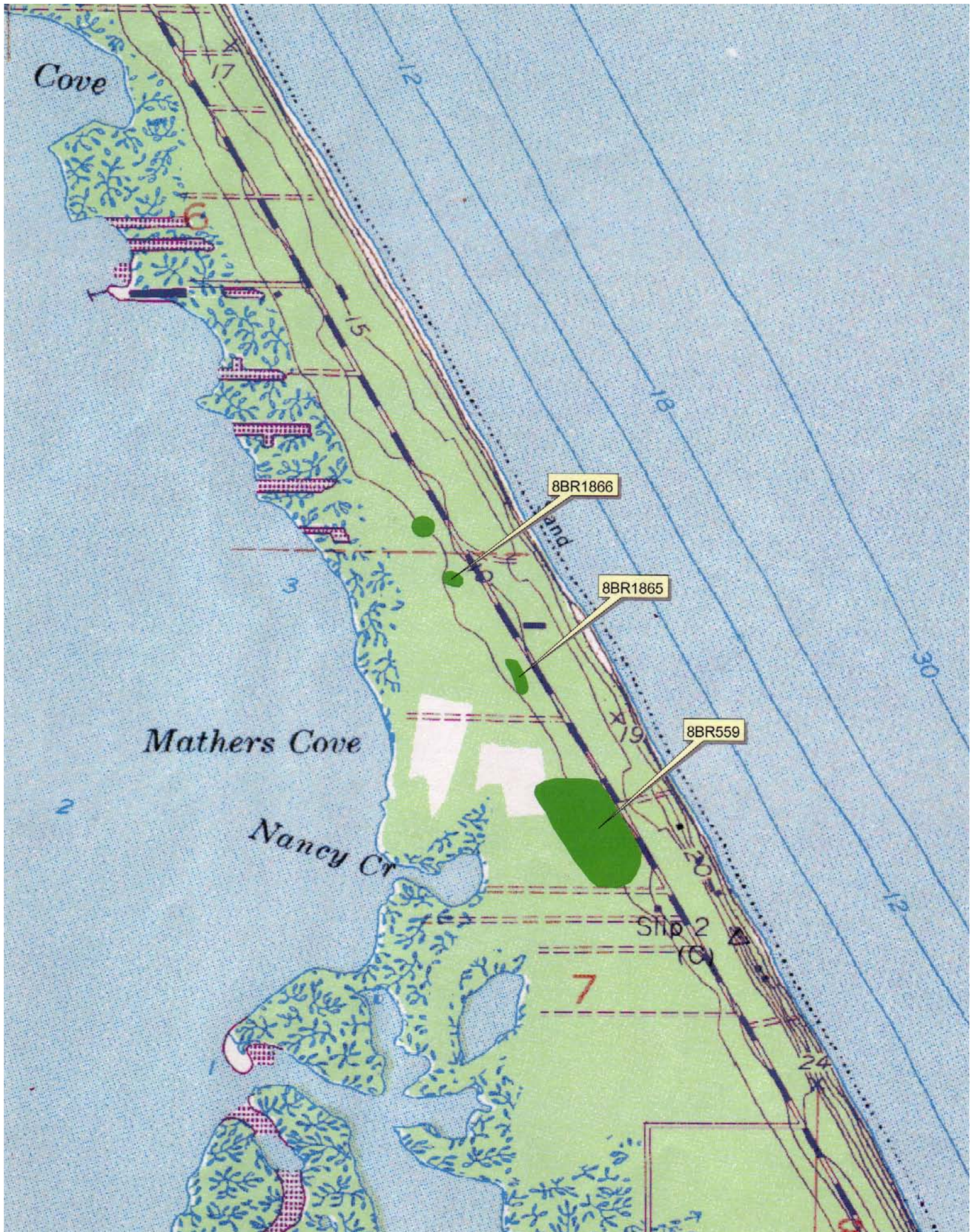
If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail sedwards@dos.state.fl.us, or at 850-245-6333 or 800-847-7278.

Sincerely,



for Frederick P. Gaske, Director, and
State Historic Preservation Officer

Enclosures



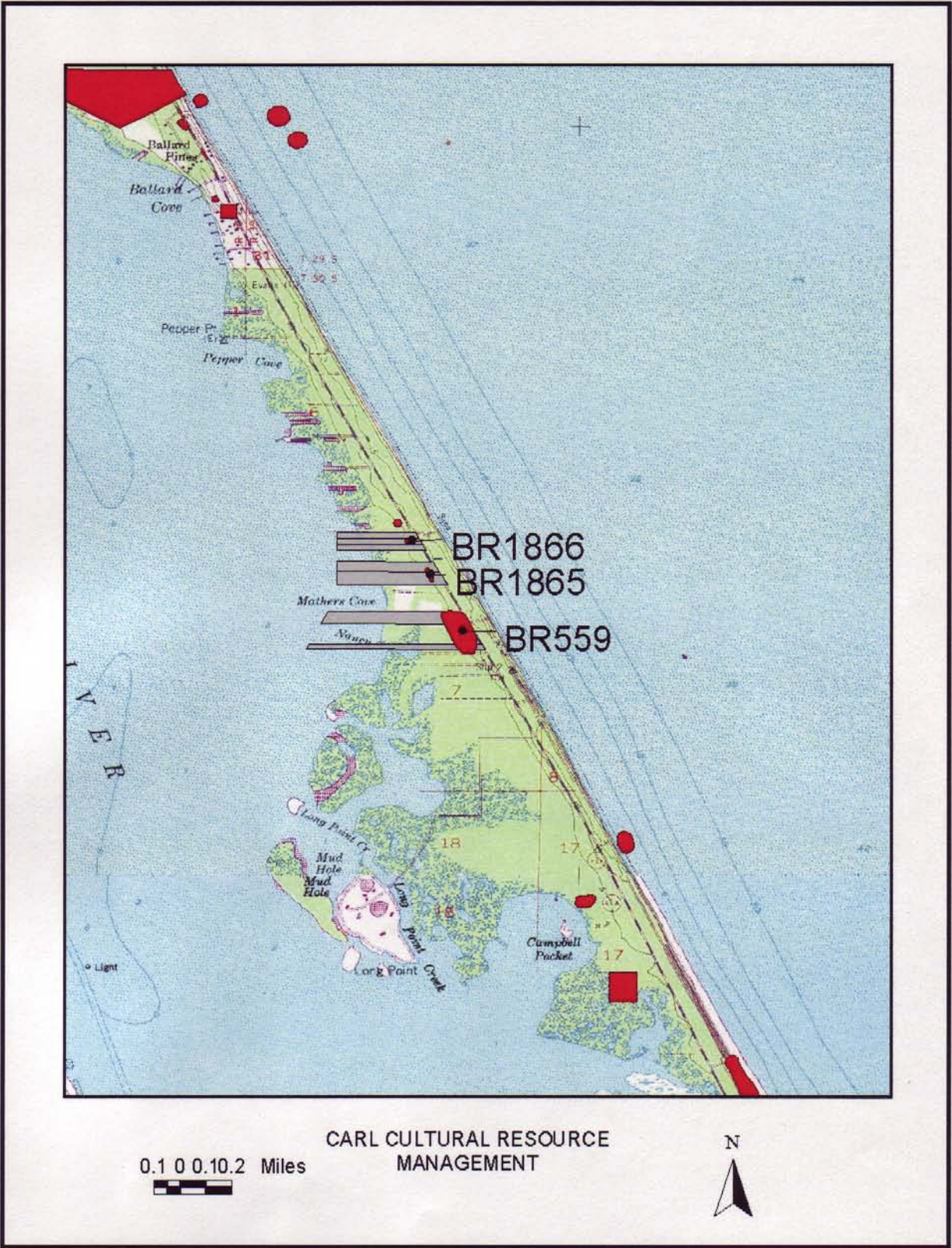


Figure 3b. Archie Carr showing 2003 updated and recorded archaeological sites. Gray areas show refuge tracts; red areas represent archaeological sites.



Meeting Date
November 14, 2006

AGENDA	
Section	CONSENT
Item No.	IB 11

AGENDA REPORT
BREVARD COUNTY BOARD OF COUNTY COMMISSIONERS

SUBJECT: Hardwood Hammock Sanctuary Management Plan – District 3
DEPT. / OFFICE: Parks & Recreation Department
 Environmentally Endangered Lands Program

Requested Action:
 Approve the attached Hardwood Hammock Sanctuary Management Plan under the Environmentally Endangered Lands Program.

Summary Explanation & Background:
 The Hardwood Hammock Sanctuary is a 31 ± acre site that was purchased by the State (100%). The site is currently managed by the EEL Program through a lease agreement with the State of Florida (Amendment 3, Lease Number 4177). The sanctuary is located in unincorporated south Melbourne Beach along State Highway A1A.

The Hardwood Hammock Sanctuary Management Plan is being distributed in the form of compact disk to reduce paper use.

The accompanying management plan on CD outlines the land management activities proposed for the property. This site has been designated as a Category 3 site. As described in the Sanctuary Management Manual (Chapter 4.2.3 pg. 24), the site will be managed primarily for conservation and research. Management activities will primarily consist of removal of exotic plant species, and monitoring listed species.

EEL staff, the EEL Recreation Education Advisory Committee, and the EEL Selection & Management Committee have reviewed and approved the plan. Following Brevard County Board approval, EEL staff will present the plan to the State's Acquisition and Restoration Council for final approval.

Cost/Benefit Analysis: Proposed management activities will use EEL Program Funds (Fund 1617, Cost Center 300501). There are no impacts to General Revenue Funds. This action advances the conservation, environmental education and passive recreation goals of the EEL Program.

Contact: Mike Knight, EEL Program Manager, 255-4466 or mknight@brevardparks.com

Exhibits Attached:

- Hardwood Hammock Sanctuary Management Plan on CD
- Sanctuary Map

Contract /Agreement (If attached): Reviewed by County Attorney Yes No

County Manager's Office	Department
Peggy Busacca, County Manager	Don Lusk, Interim Director, Parks and Recreation



TAMARA J. RICARD, Clerk to the Board, 400 South Street • P.O. Box 999, Titusville, Florida 32781-0999

Telephone: (321) 637-2001
Fax: (321) 264-6972

November 15, 2006

RECEIVED
NOV 22 2006
ENVIRONMENTALLY
ENDANGERED LAND PROJ.

MEMORANDUM

TO: Don Lusk, Interim Parks and Recreation Department Director, Attn: Mike Knight

RE: Item I.B.11, Hardwood Hammock Sanctuary Management Plan

The Board of County Commissioners, in regular session on November 14, 2006, approved the Hardwood Hammock Sanctuary Management Plan, outlining the land management activities for the property, under the Environmentally Endangered Lands Program.

Your continued cooperation is greatly appreciated.

Sincerely yours,

BOARD OF COUNTY COMMISSIONERS
SCOTT ELLIS, CLERK

Tamara Ricard, Deputy Clerk

/crc

orig. Mike - EEL
cc: Agency file
Clerk file
EEL file

206 NOV 21 AM 9:24

PARKS & REC.
BREVARD CO.
GOVT. BLDG.