# North Thousand Islands Management Plan

*City of Cocoa Beach*
*Lease No. 3923*
*Revised April 2013*
*Adoption October 1994*

# North Thousand Islands

## Land Management Plan Executive Summary

**Lead Agency:** City of Cocoa Beach

**Common Name of the Property:** North Thousand Islands

**Acreage Total:** 397.4 acres

| **Acreage Breakdown:** | **Land Cover Classification** | **Acreage** |
|---|---|---|
| | Seagrass | 160 |
| | Unconsolidated Substrate | 40 |
| | Mangrove/Saltmarsh | 160 |
| | Maritime Hammock | 2 |
| | Spoil Area | 35 |
| | **TOTAL** | **397** |

**Lease:** No. 3923 Thousand Islands – 397.4 acres
**Use:** Single use for conservation and preservation

**Management Responsibilities:** City of Cocoa Beach - Lead Management Agency, Lessee
**Designated Land Use:** Conservation
**Sublease(s):** None
**Contract(s):** None
**Encumbrances:** None
**Type Acquisition:** Land Acquisition Trust Fund: Fee Simple
**Unique Features:** Extensive areas of mangrove islands, salt marsh and shallow open waters vegetated by seagrass
**Archaeological/Historical:** None known
**Management Needs:** Development and implementation of a strategic plan addressing removal and control of exotic/invasive plant species and restoration/enhancement of natural plant communities, assess feasibility of hydrologic restoration of mosquito control ditches and spoil deposits and implementation where appropriate, public education/outreach activities
**Acquisition Needs:** None
**Surplus Lands/Acreage:** None
**Public Involvement:** Management Plan Advisory Group meeting, Public Hearing

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ARC Approval Date:_____ BTIITF Approval Date_____

Comments:

# I. Introduction

The North Thousand Islands is located on the east coast of Florida in Brevard County within the City of Cocoa Beach. Located in the Banana River immediately west of the developed area of the City of Cocoa Beach, the North Thousand Islands includes an extensive area of mangrove islands, salt marsh and shallow open water vegetated by seagrass; see Appendix A – Vicinity Map.

The State of Florida acquired the North Thousand Islands through the Land Acquisition Trust Fund in 1988. In 1991, the property was leased to the City of Cocoa Beach in 1991 (Lease #3923) to manage "for the conservation and protection of natural and historical resources and for resource based public outdoor recreation." The property Lease Agreement and Legal Description can be reviewed in Appendix B.

As required by the terms of the lease, the City developed and submitted a management plan for the North Thousand Islands in 1994, this management plan (without lengthy appendices) is attached as Appendix C.

**Purpose & Scope of Plan**

This management plan for the North Thousand Islands describes general management and use of the land as directed by statutes and the purpose and the intended use of the land described in the land acquisition process. Other statutes, rules and ordinances also govern the use of the property.

The North Thousand Islands is managed to conserve and protect natural and cultural resources to the greatest extent practicable. Public visitation, environmental education, and scientific research are encouraged as long as such activities are consistent with the protection of natural resources.

The goal of this Management Plan is the successful implementation of management strategies for the North Thousand Islands which will protect and enhance biodiversity, conserve natural resources through the restoration, enhancement and protection of natural communities while providing outdoor recreational opportunities that are compatible with these goals.

This management plan is intended to comply with paragraph 8 (Management Plan) of Lease #3923 between the Board of Trustees of the Internal Improvement Fund and the City of Cocoa Beach; Chapters 253 and 259, Florida Statutes, applicable Florida Administrative Code and consistent with the State Land Management Plan.

All development and resource alteration encompassed in this plan are subject to the granting of appropriate permits, easements, licenses and other required legal instruments. Approval of the

management plan does not constitute an exemption from complying with the regulations or policies of appropriate local, state or federal agencies.

**Location**

The North Thousand Islands is located on the central east coast of Florida in Brevard County within the City of Cocoa Beach. Located in the Banana River immediately west of the developed area of the City of Cocoa Beach, the North Thousand Islands encompasses approximately 397.4 acres which include extensive areas of mangrove islands, salt marsh and shallow open water vegetated by seagrass. While portions of the property are adjacent to developed uplands, the property is primarily open water and islands only accessible by boat.

**Regional Significance**

The Banana River, the location of the North Thousand Islands, is part of the Indian River Lagoon system. The Indian River Lagoon system is a Surface Water Improvement and Management (SWIM) priority waterbody, an Estuary of National Significance included in EPA's National Estuary Program and is known as the most diverse estuary in North America. The Banana River itself is Class III waters, an Aquatic Preserve (A-7) and Outstanding Florida Waters.

More than 4,000 plant and animal species are known to occur in the Indian River Lagoon system of which more than fifty are listed as threatened, endangered or species of special concern. Commercial and recreational fisheries (based on estuarine based species) are an important component of the regional and state economy. There are more than 100,000 licensed saltwater anglers in the region who, in combination with commercial fisheries, generate an annual economic impact estimated at $1 billion (IRLNEP, 1994).

The primary goal for the North Thousand Islands is the protection of estuarine and riparian habitats and the protection, restoration or enhancement of wetlands and uplands to improve their function and benefit to the Banana River and the greater Indian River Lagoon system. "Wetlands of the lagoon system provide many benefits to water quality and species productivity" (1994 SWIM Plan). Mangrove wetlands, salt marshes and the seagrass community provide breeding, nursery and feeding areas for a variety of organisms, filter upland runoff, stabilize bottom sediments, maintain water quality and protect shorelines from erosion. Restoration and enhancement of mangrove swamp and saltmarsh will provide protection for the Banana River, increase estuarine habitat, improve water quality, provide habitat for waterfowl and wading birds and improve recreational opportunities for the public. Maintenance and restoration of these functions will be critical to the health of the regional ecosystem and economy.

## Land Acquisition

### Purpose

The North Thousand Islands were acquired through the Land Acquisition Trust Fund to help protect and preserve the natural resources of the Banana River and the greater Indian River Lagoon, one of the nation's most productive, diverse, and recreationally and commercially important estuaries. A third of the nation's manatee population lives in the Indian River Lagoon with much of this population found in the Banana River. The area is important for many migratory bird species as well as for many estuarine and oceanic fish species. In addition, the North Thousand Islands offer a variety of passive, nature-based recreational opportunities for the public.

### History

In 1986, concerned about the potential development of the Thousand Islands, the City of Cocoa Beach approached Brevard County and the State of Florida for assistance in acquiring the North Thousand Islands property. In 1988 the property was purchased for $3,230,950 with the City of Cocoa Beach contributing $1,615,475, Brevard County contributing $700,000 from its Beach and Riverfront Land Acquisition program and the State of Florida contributing $915,475 from the Land Acquisition Trust Fund. In 1991, the property was leased to the City of Cocoa Beach (Lease #3923) to manage "for the conservation and protection of natural and historical resources and for resource based public outdoor recreation." The Closing Statement for this purchase is attached as Appendix D.

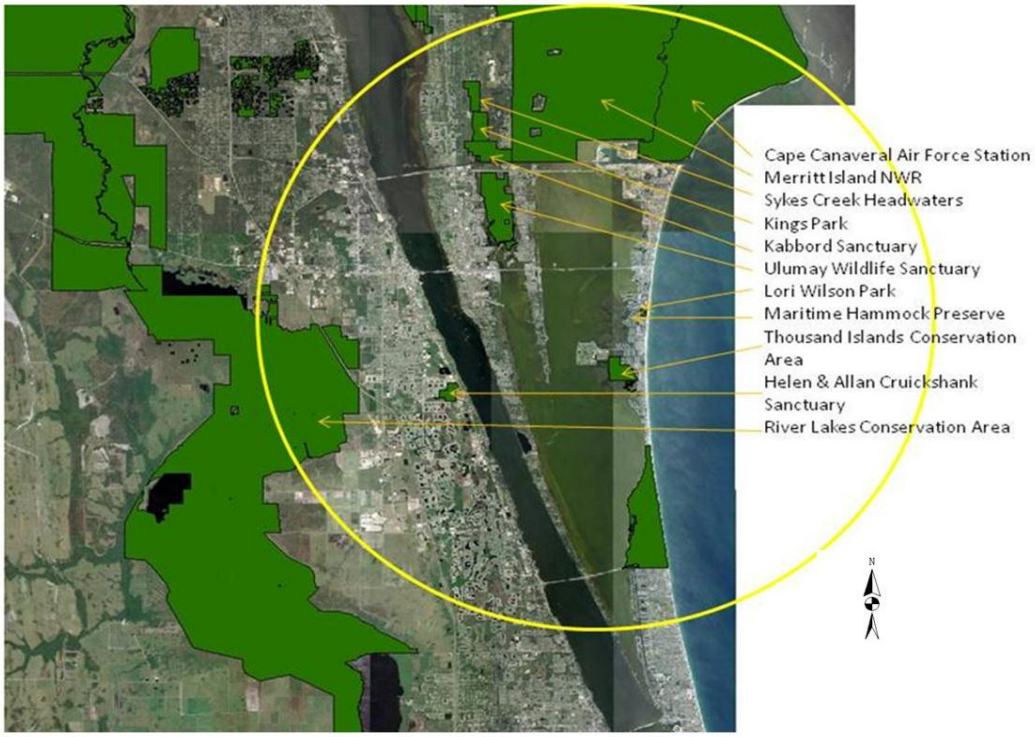


Figure 1. Conservation Areas within 10 Miles of the North Thousand Islands (*SJRWMD basemap*)

**Nearby Public Lands & Designated Water Resources**

More than 10 public conservation lands occur within 10 miles of the North Thousand Islands. The Merritt Island National Wildlife Refuge, the adjacent Thousand Islands Conservation Area, Maritime Hammock Preserve, Sykes Creek Headwaters are just a few of the nearby publicly owned or managed conservation lands. Figure 1 shows conservation areas within 10 miles of the North Thousand Islands.

The waters adjacent to and contiguous with the North Thousand Islands have been designated as an Aquatic Preserve and an Outstanding Florida Water, see Figure 2. Aquatic Preserves are bodies of water that were set aside by the Florida Legislature for the purpose of preserving natural or existing conditions so that their aesthetic, biological and scientific values may endure for the enjoyment of future generations. The Banana River Aquatic Preserve (A-7) was established in June, 1970 and includes approximately 30,000 acres of shallow, mangrove-lined, estuarine waters.

Outstanding Florida Waters (OFW) is defined as waters designated by the Environmental Regulation Commission as worthy of special protection because of their natural attributes. Florida Department of Environmental Protection affords their highest protection to these waters. No degradation of water quality, other than that allowed by rule, is to be permitted.

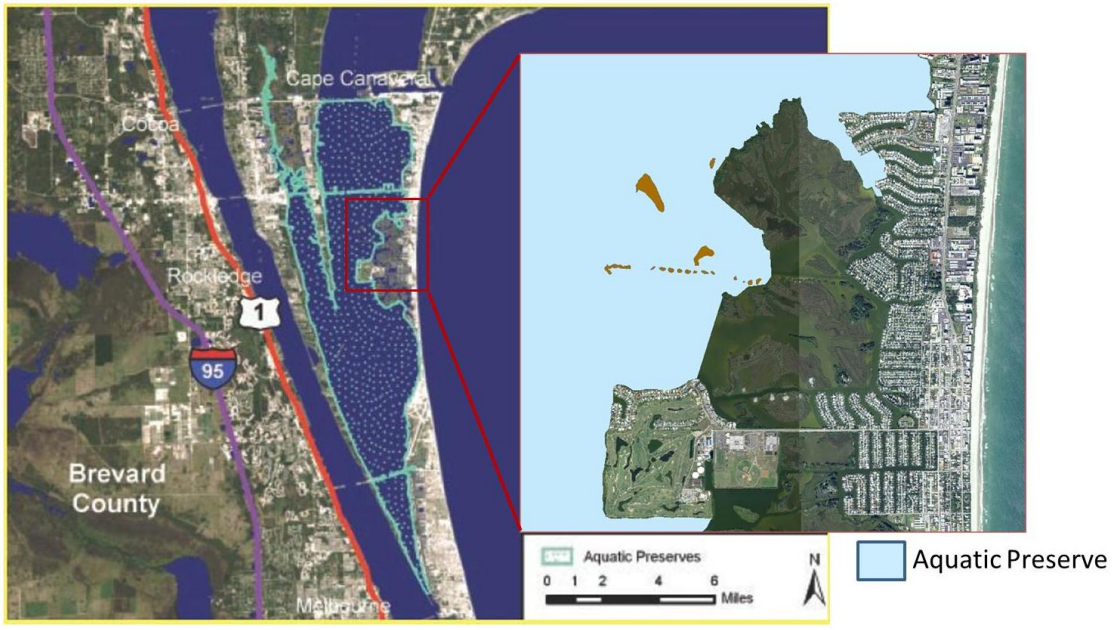


**Figure 2. State Aquatic Preserve Boundaries**

***(FDEP Aquatic Preserve/Google Earth, enhanced)***

**Management Authority**

Management of the North Thousand Islands is addressed in Lease #3923. The Governor and Cabinet sit as the Board of Trustees and are responsible for state-owned lands. The Board of Trustees is authorized to lease state lands for the use and benefit of the people of the State of Florida.

Under Lease #3923 the City of Cocoa Beach is the agency with direct management responsibility for the North Thousand Islands. All management activities undertaken by the City are subject to and consistent with the requirements, directives, or restrictions found in Lease #3923; the requirements of Chapters 253 and 259, Florida Statutes, and applicable Florida Administrative Code as well as other statutes, rules and ordinances that govern the use of the property.

**Public Involvement**

This management plan was developed by an advisory committee of the City of Cocoa Beach through a public process including a series of meetings open to the public. Advisory committee membership, meeting agendas, meeting minutes and other pertinent information may be found in Appendix E. The management plan will also be reviewed/approved by the City Commission through a public process including public meetings.

As required by Chapter 253.032 (10) (b), Florida Statutes, an advisory group was convened to assist in the development of this management plan and to conduct a public hearing. Membership of the group, member affiliations, meeting notices, meeting agendas, meeting minutes and other pertinent information may be found in Appendix F.

## II. Natural & Cultural Resources

This section describes the natural and cultural resources of the North Thousand Islands and problems affecting these resources. Section IV will address how these resources will be managed and problems addressed.

**Physiography**

Topography & Geomorphology

The North Thousand Islands is in Florida's Coastal Lowlands, within the Mid-Peninsular Zone of the state. More specifically, it is within the Atlantic Coastal Ridge province, which is bounded by the Eastern Valley province to the west and the Atlantic Ocean to the east. The Mid-Peninsular Zone is characterized by discontinuous highlands in the form of sub-parallel ridges separated by broad valleys (White, 1970).The major drainage system in the area is the

Indian River Lagoon, a 156 mile long estuary located between the mainland and the barrier islands along Florida's Atlantic coast.

The topography of the North Thousand Islands has been altered by dredge/fill and mosquito control activities which resulted in the placement of fill on some islands, the creation of other islands and the ditching of much of the salt marsh with associated ditch-bank creation.

Geology

Regionally, deposits of varied origin underlie the area. In descending order, these deposits include Holocene sediments, the Anastasia Formation, undifferentiated Quaternary sediments, Tertiary-Quaternary dunes, undifferentiated reworked Cypresshead Formation, the Hawthorn Group (including the Peace River Formation and Arcadia Formation), Suwannee Limestone, Ocala Limestone, and the Avon Park Formation. Described from youngest to oldest respectively, these, deposits represent the Holocene, Miocene, Oligocene and Eocene Series. Surface sediments are relatively recent, dating to the Holocene period (Scott et al., 2001)

Geologically, the North Thousand Islands and the adjacent Thousand Islands Conservation Area are a unique area as the many islands are arranged in a pattern indicative of a relict flood tidal delta. Several sediment cores recovered on these islands contained a sedimentological and stratigraphic pattern consistent with this interpretation (R. Parkinson, personal communication). While historical photography of the eastern coast of Florida indicates the presence of numerous relict flood tidal deltas, urbanization of the coastline has resulted in the loss of most of these features as a result of development and landscape-scale change. The Thousand Islands represents one of the last (if not the last) relatively undisturbed geomorphic features that contains clues to the origin and evolution of Florida's east coast barrier island system.

Soils

Two soil types have been identified in the North Thousand Islands: Tidal swamp (Ts) and Canaveral complex (Ca). Tidal swamp is primarily associated with the mangrove/marsh islands while Canaveral complex is primarily found at sites where spoil was deposited. A copy of the USDA/NRCS soils map for this portion of Brevard County is shown below in Figure 3 and a description of these soils from the soils survey may be found in Appendix G.

**Hydrology/Water Management**

The North Thousand Islands is located within the Banana River and within the Indian River Lagoon system. Significant waterbodies within the region are the Atlantic Ocean, Banana River and the Indian River Lagoon. The Banana River is an Aquatic Preserve (A-7), Outstanding Florida

**Figure 3. USDA/NRCS Soils Map (Color GIS Map for Clarity)**

Waters, an Estuary of National Significance included in EPA's National Estuary Program and a state-designated Surface Water Improvement and Management (SWIM) priority waterbody. The Banana River Aquatic Preserve (A-7) is adjacent to and contiguous with the waters within the North Thousand Islands. Water movement within the Banana River is primarily wind-driven.

The mangrove forest islands are a natural feature created thousands of years ago by what is thought to be a catastrophic tropical barrier island over wash event. The hydrology of the North Thousand Islands has been impacted by human alterations that include dredge/fill activities associated with the development and maintenance of navigational channels and the construction of mosquito control ditches and associated ditch-bank creation. During navigation channel construction, several marsh/mangrove islands or low-lying uplands were used for spoil disposal from dredging operations. In addition, other islands were created by the disposal of dredged material in shallow water areas which likely supported seagrass. One of the islands continues to be used as a dredged material disposal site for canal and channel maintenance activities. Many of the marshes were ditched for mosquito control purposes with the excavated material placed beside the ditches creating ditch-banks or berms. However, unlike most other estuarine wetlands in the Indian River Lagoon region, none of the wetlands in the North Thousand Islands were diked and impounded for mosquito control. These changes in hydrology can be seen in Appendix H - Thousand Islands Historical Maps/Aerial Photographs.

No springs, sinkholes or wells are known to occur within the North Thousand Islands.

**Biogeography & Climate**

The northern limits of the Indian River Lagoon region are within the temperate region, while the southern end of the lagoon is in the subtropical biogeographic region. The transitional area between the two zones supports a high degree of biodiversity, with species from both regions represented here as well as species that are unique to the Indian River Lagoon system (Hill, 2002).

The climate is characterized by mild, dry winters and warm, wet summers. The climate of the North Thousand Islands is moderated by its proximity to the Atlantic Ocean and location within the Banana River. As a result, freezing conditions and extreme low temperatures are uncommon. From data obtained from the Southeast Regional Climate Center, the average rainfall in nearby Melbourne is 4.1 inches per month. The monthly high average rainfall occurs in September (7.7") while the lowest average rainfall occurs in December (2.0"). Average annual temperature is 72.3° F. July is typically the hottest month, averaging 90° F, with January typically having the lowest average temperature (51.1° F). Average annual wind speed is 8.3 mph with extreme high winds occurring during hurricane season. Although unpredictable in nature, hurricanes typically impact Central Florida every six years. The most recent hurricane to

impact the North Thousand Islands area was Hurricane Jeanne in 2004. Sustained winds of more than 100 mph and gusts greater than 120 mph were recorded at nearby Kennedy Space Center during this storm.

Tropical storms also impact the region. The most significant of these in recent history was Tropical Storm Fay (2008) with recorded rainfall in Melbourne of 11 inches in a 24 hour period, resulting in extensive flooding.

**Natural Communities**

The natural community classification used in this plan was developed by the Florida Natural areas Inventory (FNAI) and the Florida Department of Environmental Regulation (FDEP). The community types are defined by a variety of factors, such as vegetation structure and composition, hydrology, fire regime, topography and soil type. The community types are named for the most characteristic biological or physical feature (FNAI and FDEP, 1990). FNAI also assigns Global (G) and State (S) ranks to each natural community and species that FNAI tracks. These ranks reflect the status of the natural community or species worldwide (G) and in Florida (S). Lower numbers reflect a higher degree of imperilment (e.g., G1 represents the most imperiled natural communities worldwide, S1 represents the most imperiled communities in Florida). A review of the FNAI ranking system and descriptions of the various communities may be found at: http://www.fnai.org/pdf/nc/FNAI_NatComGuide_2010.pdf

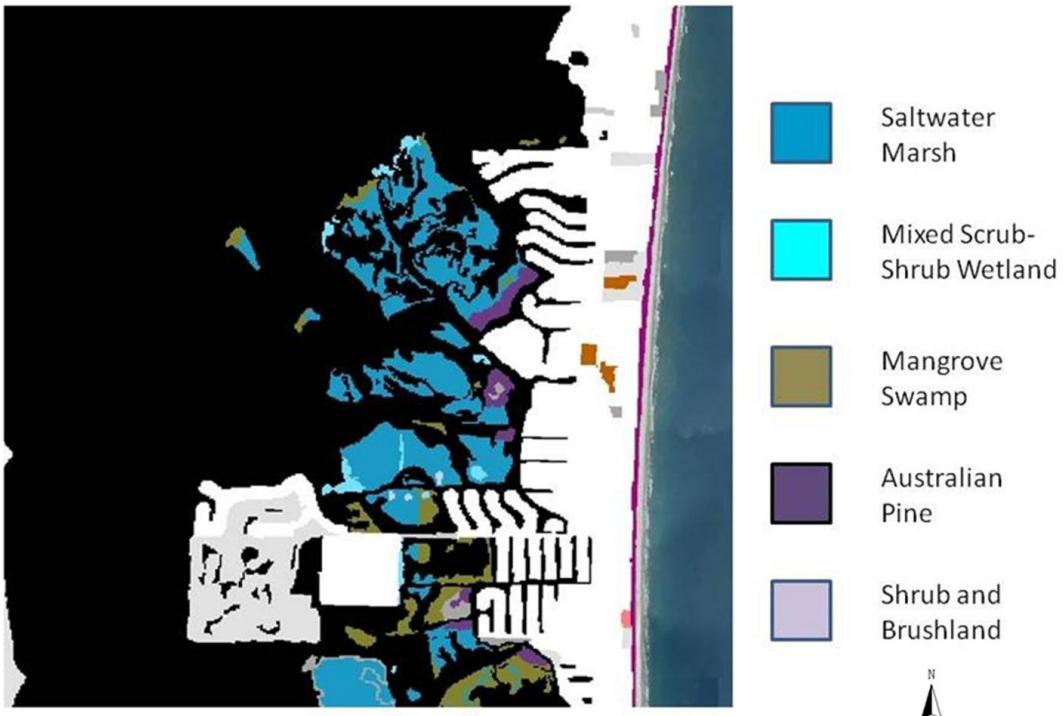


Figure 4. North Thousand Islands Natural Communities (*SJRWMD*)

Natural communities mapped in the North Thousand Islands include: salt marsh, mangrove swamp, seagrass bed, unconsolidated substrate and maritime hammock. An additional altered land cover type (spoil area) is also found. Three of these communities (salt marsh, mangrove swamp, seagrass bed) constitute the majority of the natural communities found in the North Thousand Islands. These natural communities are delineated in Figure 4.

**Seagrass Bed**: The predominant land cover in the North Thousand Islands is open water. Open water comprises an estimated 50% (~200 acres) of the total property acreage. Much of the open water area in the North Thousand Islands is shallow and, until recently, the bottoms were vegetated by seagrass. Seagrass beds historically covered an estimated 80% (~160 acres) of the total open water acreage. The seagrass bed community is ranked G2/S2; "imperiled" both globally and in Florida. In the Indian River Lagoon system the seagrass community is one of the key natural communities sustaining biodiversity and productivity as this community provides critical habitat for many of the species found in the Indian River Lagoon. The primary seagrass species found in the North Thousand Islands is shoal grass (*Halodule wrightii*) with manatee grass (*Syringodium filiforme*), Widgeon grass (*Ruppia maritima*) and *Halophila* sp. commonly found. Other submerged aquatic vegetation commonly found include the macroalgae species *Gracilaria* and *Caulerpa*.


Figure 5. North Thousand Islands Seagrass Coverage, 2007 (*SJRWMD*)

Seagrass coverage in the North Thousand Islands is shown in Figure 5. This figure is based on mapping of seagrass throughout the Indian River Lagoon performed by the SJRWMD in 2007. Subsequent mapping by SJRWMD in 2009 showed little change. However, aerial imagery taken in summer 2011 during an extensive and intensive algal bloom in much of the Indian River Lagoon (IRL) system showed substantial loss of seagrass in this section of the Banana River. This seagrass loss between 2009 and 2011 can be seen in Figure 6. As part of the periodic mapping of the seagrass community throughout the Indian River Lagoon, another mapping project is planned by SJRWMD in 2013 with final maps anticipated to be available by mid-2014.

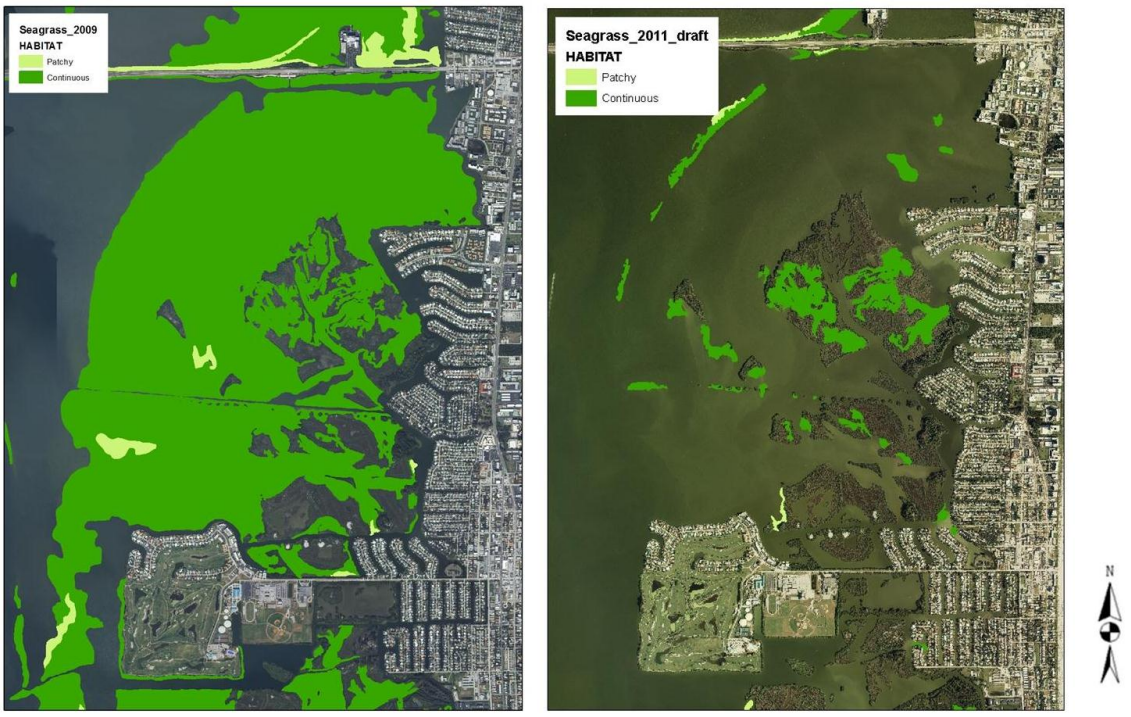


**Figure 6. North Thousand Islands Seagrass Coverage, Comparison between 2009 & 2011 *(SJRWMD)***

In 2011 - 2012, from data developed from seagrass transects monitored annually by SJRWMD and from general observation, seagrass coverage in much of the IRL system declined dramatically. Losses approaching 100% were reported in some areas. As shown in Figure 6, substantial loss of seagrass has been noted in the North Thousand Islands as well. The cause of this loss of seagrass acreage in the IRL system has not been definitively determined but is being studied by a consortium of agencies, academia and research institutions. Further study, mapping and monitoring will be required to determine the health and extent of the seagrass community in the Indian River Lagoon system and the North Thousand Islands.

In 2013, from recent seagrass transect data and observations; it appears that some recovery of seagrass coverage may be occurring in certain areas of the Indian River Lagoon system. Again, further mapping and monitoring will be required to confirm this trend and the status of the seagrass community in the North Thousand Islands.

**Unconsolidated Substrate:** The remainder of the open water area in the North Thousand Islands is unconsolidated substrate, composing an estimated 20% (~40 acres) of the total open water area. This acreage includes two navigation channels which traverse the property east-west, another navigation channel along the eastern boundary of the property adjacent to residential areas, and portions of several residential canals along the eastern property boundary. Sediments in these channels and canals range from sand to mixes of sand, shell, silt and mud to muck with a high organic content. Unconsolidated substrate is ranked G5/S5, "demonstrably secure" both globally and in Florida.

**Mangrove Swamp/Salt Marsh**: Combined, Mangrove Swamp/Salt Marsh totals an estimated 40% (~160 acres) of the total acreage. All three species of mangrove (Red, Black, White) are present, in addition to buttonwood. The salt marsh community is dominated by species that can tolerate high salinities, consisting of either succulents, such as saltwort (*Batis maritima*), perennial glasswort (*Sarcocornia ambigua*), annual glasswort (*Salicornia biglovii*) and bushy seaside oxeye (*Borrichia frutescens*), or short grasses such as saltgrass (*Distichilis spicata*) and seashore paspalum (*Paspalum vaginatum*). Shrubs, such as groundsel tree (*Baccharis halmifolia*), saltwater falsewillow (*Baccharis angustifolia*) marshelder (*Iva frutescens*) and christmasberry (*Lycium carolinianum*) are also found. Both mangrove swamp and salt marsh are ranked G5/S4, "demonstrably secure" globally and "apparently secure" in Florida. Similar to the seagrass community, the mangrove swamp/saltmarsh community is a key habitat sustaining biodiversity and productivity in the Indian River Lagoon system.

**Maritime Hammock:** Maritime hammock covers an estimated 1% (~2 acres) of the total acreage. Kozusko (2001) in his study of the adjacent southern Thousand Islands identified tropical hammocks at several locations in that area; only small fragments remain in the North Thousand Islands. Tropical species identified by Kozusko include *Amyris, Bursera, Capparis, Chiococca, Erythrina, Ficus, Randia* and several others, most at or near the extreme northern extent of their range. Maritime hammock is ranked G3/S2, "very rare" globally and "imperiled" in Florida.

**Spoil Area:** Spoil area is the dominant upland land cover type covering an estimated 9% (~35 acres) of the total acreage. The spoil area acreage is a collection of 25 upland islands resulting from dredge/fill activities where fill was either placed on natural marsh/mangrove

islands to create uplands or new islands were created. The 25 spoil islands range from 0.1 acres to 14 acres in size. Most (15 of 25) are less than 1 acre in size.

The vegetative community on spoil areas primarily consists of exotic species, largely Australian pine (*Casuarina* sp.), Brazilian pepper (*Schinus terebenthifolius*), some Melaleuca (*Melaleuca quinquenervia*) and several other exotic species. It should be noted, however, that a variety of native species may also be found on spoil areas.

**Native Species**

A broad variety of native plants and animals have been identified within the North Thousand Islands. As additional surveys and monitoring projects are conducted it is likely that the list of known species will increase.

Native Plants

More than 100 native plant species have been identified as occurring within the Thousand Islands as the result of several surveys. A list of native plants may be found in Appendix I. The seagrass, saltmarsh and mangrove communities and associated species are the most extensive of the native plant communities found in the North Thousand Islands.

Native Animals

The listing of native animals found in the Thousand Islands found in Appendix J is a list of representative species which are known to occur on the property. Numerous additional species are present ranging from a host of benthic invertebrates to a variety of fishes to additional reptiles, small mammals, birds and insects.

Fourteen listed animal species have been confirmed as occurring within the North Thousand Islands (Table 1). An additional five species are likely to occur in the North Thousand Islands as suitable habitat is present and these species are known to be present nearby. More extensive lists will be developed as data from observations, surveys, monitoring and studies becomes available.

Some species that by many accounts are said to be declining in number are found in the North Thousand Islands. Among these are the horseshoe crab (*Limulus polyphemus*), and the diamond back terrapin (*Malaclemys terrapin*). The Thousand Islands is one of the few remaining locations containing semi-abundant diamondback terrapin populations in the Indian River Lagoon region (M. Virgilio/FDEP Aquatic Preserve, personal communications).

A group of islands which serve as a rookery for the Brown Pelican (*Pelicanus occidentalis,* a State-designated Species of Special Concern) is located near the northeast corner of the

North Thousand Islands property (Figure 5). Consistent with the requirements of the City of Cocoa Beach Comprehensive Growth Management Plan, Conservation Element, Policy IV.3.7, the City may designate these islands as rookeries and wildlife habitat and post appropriate signage.


**Figure 7. North Thousand Islands Potential Bird Rookery, *(Goggle Earth)***

## Listed Species

Statutorily recognized lists of threatened and endangered species are developed at the federal level by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). At the state level, these lists are developed by Florida Fish and Wildlife Conservation Commission (FWCC) and the Florida Department of Agriculture and Consumer Services (FDACS). State listings include an additional classification: Species of Special Concern. The Florida Natural Areas Inventory (FNAI) also produces a list of rare and endangered species, and maintains a database of occurrences of these species within Florida. FNAI lists 32 types of plants and 68 vertebrates designated as “rare” or “endangered” which are found in Brevard County.

### Listed Plant Species

Two state- listed plant species are known to occur within the North Thousand Islands. These include: *Tillandsia utriculata*; Giant Wild Pine or Giant Air Plant, and *Opuntia stricta*; Erect

prickly-pear cactus. Both are upland plants occurring on the islands. Both species are listed as Threatened species. Threats include illegal collection and displacement by exotic species

Listed Animal Species

Fourteen listed animal species have been confirmed as occurring within the North Thousand Islands (Table 1). An additional five listed species are likely to occur in the North Thousand Islands as suitable habitat is present and these species are known to be present nearby.

**Table 1. Project Listed Animals Species**

| Scientific Name | Common Name | State Status | U.S. Status | Confirmed Occurance | Potential Occurrence |
|---|---|---|---|---|---|
| *Ajaia ajaia* | Roseate Spoonbill | SSC | | X | |
| *Alligator mississippiensis* | Alligator | SSC | | X | |
| *Centropomus unidecimalis* | Common Snook | SSC | | X | |
| *Chelonia mydas* | Green Turtle | E | E | X | |
| *Egretta caerulea* | Little Blue Heron | SSC | | X | |
| *Egretta rufescens* | Reddish Egret | SSC | | X | |
| *Egretta thula* | Snowy Egret | SSC | | X | |
| *Egretta tricolor* | Tri-colored Heron | SSC | | X | |
| *Eudocimus albus* | White Ibis | SSC | | X | |
| *Gopherus polyphemus* | Gopher Tortoise | SSC | | | X |
| *Haematopus palliatus* | American Oystercatcher | SSC | | | X |
| *Haliaeetus leucocephalus* | Bald Eagle | T | T | X | |
| *Mycteria americana* | Wood Stork | E | E | X | |
| *Nerodia fasciata taenita* | Saltmarsh Snake | T | T | | X |
| *Pelicanus occidentalis* | Brown Pelican | SSC | | X | |
| *Podomys floridanus* | Florida Mouse | SSC | | | X |
| *Rhynchops niger* | Black Skimmer | SSC | | | X |
| *Sterna antillarum* | Least Tern | T | | X | |
| *Trichecus manatus* | Florida Manatee | E | E | X | |

**Invasive Non-Native Species**

At least a dozen non-native plant species occur in the North Thousand Islands. In addition there are at least an equal number of non-native animal species either known to occur on the property or adjacent areas. A list of identified non-native plant species may be found in Table 2.

Seven of the non-native plant species are considered Category 1 invasive plants by the Florida Exotic Pest Plant Council (EPPC). The FLEPPC 2011 List of Invasive Species is attached as Appendix K. Category 1 plants are the most invasive, altering native plant communities by displacing native species, changing community structure or ecological function. Of the seven

Category 1 species present, four are listed as “prohibited” (Chapter 5B-64.011, FAC) by Florida Fish & Wildlife Conservation Commission and five are listed as “noxious weeds” (Chapter 5B-57.007, FAC) by the Florida Department of Agriculture and Consumer Services.

Invasive Non-Native Plants

The uplands within the North Thousand Islands are heavily infested with non-native plants. The most problematic exotic species are Brazilian pepper and Australian pine. These two species account for the vast majority of the acreage of invasive non-native vegetation. While most of the Australian pine is limited to the larger spoil islands (~20 acres), Brazilian pepper is mixed with Australian pine on the larger spoil islands as well as smaller spoil islands, and

**Table 2. FLEPPC Non-Native Invasive Plants Present in the North Thousand Islands**

| Scientific Name | Common Name | EPPC Category | Govt. List | Degree of Infestation |
|---|---|---|---|---|
| *Cassia javanica* | Pink Shower | | | Moderate |
| *Casuarina equisetifolia* | Australian Pine | I | N, P | High |
| *Casuarina glauca* | Suckering Australian Pine | I | N, P | High |
| *Catharanthus roseus* | Madagascar Periwinkle | | | Moderate |
| *Cupaniospis anacardioides* | Carrotwood | I | N | Moderate |
| *Lantana camara* | Lantana | I | | Moderate |
| *Melaleuca quinquenervia* | Melaleuca or Punk Tree | I | N, P | Moderate |
| *Momordica charantia* | Balsam Apple | | | Moderate |
| *Schefflera actinophylla* | Australian Umbrella Tree or Octopus Tree | I | | Moderate |
| *Schinus terebenthifolius* | Brazilian Pepper | I | N, P | High |
| *Washingtonia robusta* | Washington Fan Palm | II | | Low |
| *Yucca aloifolia* | Spanish Bayonet or Aloe Yucca | | | Low |

on the higher portions of ditch banks associated with ditches created for mosquito control. Melaleuca is found in a few discrete upland areas estimated to total less than 5 acres.

Invasive Non-native Animals

Non-native species present in the North Thousand Islands include brown anoles, fire ants, European starlings and Eurasian collared doves. Exotic species found in nearby areas include feral cats, house mice, Norway and black rats, curly-tailed lizards, peacocks and parrot species , among others. Several aquatic exotic species are found in nearby waters including green mussel, charru mussel, Australian spotted jellyfish and tilapia. It is possible that some of these species may also occur within the North Thousand Islands.

**Problem Species**

Salt marsh mosquitoes (*Ochlerotatus taeniorhyncus* and *Ochlerotatus sollicitans*) are nuisance native species in the Indian River Lagoon region. The species are aggressive biters of humans and have the ability to transmit diseases including West Nile Virus to both humans and animals. Early Florida development tended to avoid areas of high mosquito density. Today, the barrier island is highly developed and populated and mosquito control is necessary for the health and comfort of residents (O'Bryan and Mason, 2003).

In most areas of the Indian River Lagoon, marshes were impounded and flooded to control mosquitoes. In the North Thousand Islands, the marshes were ditched to maintain water on the marsh and to provide access for fishes known to consume mosquito larvae. No impoundments were constructed. Any marsh restoration or enhancement efforts will be coordinated with Brevard County Mosquito Control to ensure that necessary mosquito control is maintained. Mosquito control activities in the North Thousand Islands will be consistent with and in compliance with the requirements of Chapter 388.4111, Florida Statutes (Public Lands; arthropod control); see Appendix L - Mosquito Control FL Statute Compliance Statement.

**Forest Resources**

Sustainable forestry is an important component of Florida's economy and can provide funds for management of lands. Chapter 253, Florida Statutes, requires that management plans for 1000+ acre parcels contain an analysis of multiple-use potential, to include a professional forester's assessment of the resource conservation and revenue-producing potentials of the tract's forests.

A Timber Management Assessment has not been conducted for the North Thousand Islands due to the small size of the site and the absence of any significant forestry resources on the property.

**Mineral Resources**

No mineral resources are known to exist in the North Thousand Islands.

**Cultural, Archaeological & Historic Resources**

On October 5, 1994, the Department of State, Division of Historic Resources in response to an inquiry from the City of Cocoa Beach concerning the North Thousand Islands stated "Our review indicates that no archaeological sites or historic buildings are recorded on the subject tract. Furthermore, it is the opinion of this agency that there is a low probability of significant, unrecorded sites being located in this tract." A statement was received from the State Division of Historic Resources during the 1994 Management Plan process. This document can be

reviewed in Appendix M - Division of Historical Resources, Letter & Management Procedures. However, observations by local residents with some training and interest in archaeology have indicated that there may be archaeological resources present in the Thousand Islands. These sites were not deemed "significant" and date to the St. Johns Period (Thomas Penders, personal communication).

In the event that archaeological or historic sites are discovered on the property, the Department of State, Division of Historic Preservation will be notified. The collection of artifacts or the disturbance of archaeological or historic sites will be prohibited unless prior authorization has been obtained from the Department of State, Division of Historic Resources. The management of any archaeological and historic resources will comply with the provisions of Chapter 267, Florida Statutes, specifically Sections 267.061 (2) (a) and (b), and sites will be stabilized/protected as needed. Prior to any construction on the undeveloped/unaltered portions of the property measures will be taken to determine the presence of any archaeological sites. Typical measures will be to invite staff of regional universities or members of chartered archaeological organizations to survey the area to be disturbed for evidence of archaeological artifacts.

**Scenic Resources**

The North Thousand Islands is located just off the Indian River Lagoon Scenic Highway (SR A1A). The property offers several scenic vistas of islands and open water as well as opportunities to view wildlife.

## III. Use of the Property

**Previous Use & Development**

Previous uses of the North Thousand Islands were primarily as natural lands used for boating, fishing, hunting and similar outdoor recreational pursuits. Some portions of the site were used as spoil sites (dredged material disposal areas) for navigational channels constructed through the property. Two navigational channels (200 channel/Houseboat Cut; 300 channel) maintained by the City of Cocoa Beach along with associated channel markers traverse the property east-west. A third channel (also maintained by the City) is located adjacent to residential areas along the eastern property boundary. Portions of several residential canals developed in the 1950s and 1960s are located along the eastern boundary and are included within the property. There is no record of unauthorized uses.

**Current Public Use & Land Uses**

Present uses are as conservation lands with one area set aside as a dredged material disposal site for canal and channel maintenance. Public use of the property is recreational; typical uses include boating, fishing, picnicking, nature watching and similar low impact uses.

**Planned Uses and Assessment of their Impacts**

Planned uses of the property (preservation/passive recreation) are anticipated to have minimal impact on the renewable and non-renewable resources of the property. One area within the North Thousand Islands is set aside as a dredged material disposal area for channel and canal maintenance. The original upland portion of the islands was created through channel dredging conducted in the 1950s through approximately 1980. These marked channels and canals become filled in through both natural and manmade activities, and need to be dredged infrequently on a long-term basis. The stormwater component of the dredging need is being reduced through both capital stormwater water quality improvements and through operational strategies such as streetsweeping and upstream erosion/sediment control. A description of the maintenance dredging activity and state/federal permit compliance can be found in Appendix N - Maintenance Dredging Statement of Need & Permit Compliance.

Potential future amenities (primitive picnic and camping sites, canoe/kayak/hiking/ nature trails) will be sited, designed and constructed to have minimal impacts on these resources. No capital facilities or infrastructure are planned for the North Thousand Islands.

**Adjacent Land Uses**

Adjacent land uses on uplands to the east and south are primarily residential. A portion of the southern boundary abuts the Thousand Islands Conservation Area, recently acquired through the Florida Communities Trust program in partnership with Brevard County and the City of Cocoa Beach and managed by the Brevard County Environmentally Endangered Lands program. Uses on adjacent open waters of the Banana River to the north and west are recreational. Impacts to the North Thousand Islands from adjacent land uses are primarily water quality impacts related to stormwater discharges from adjacent developed lands.

**Potential Surplus Lands**

No portion of the North Thousand Islands is considered surplus property.

**Prospective Land Acquisition**

No inholdings exist within the property and no nearby or adjacent parcels have been identified for acquisition.

**Analysis of Multiple-Use Potential**

Alternative or multiple uses of the property were considered however some uses were not adopted as they were deemed impractical or inconsistent with the conservation, protection and enhancement of the natural resources found on the property.

**Proposed Single Use or Multiple-Use Management**

The City of Cocoa Beach intends to manage the North Thousand Islands as a single use property for conservation within the guidelines of Chapters 253 and 259, Florida Statutes. Other activities may be permitted provided they do not interfere with the primary purpose of acquisition.

**Table 3. Project Multiple Use/Recreation List**

| Activity | Approved | Conditional | Rejected |
|---|---|---|---|
| Protection of Endangered/Threatened Species | Y | | |
| Ecosystem Maintenance | Y | | |
| Soil & Water Conservation | Y | | |
| Hunting | | | Y* |
| Fishing | Y | | |
| Wildlife Observation | Y | | |
| Hiking/Nature Trails | Y | | |
| Boating/Canoeing/Kayaking | Y | | |
| Bicycling | | | Y |
| Camping | | Y** | |
| Picnicking | | Y** | |
| Environmental Education | Y | | |
| Preservation of Archaeological/Historical sites | Y | | |

*Hunting is prohibited within the City of Cocoa Beach.

**Any camping or picnicking facilities are anticipated to be primitive in nature with no facilities or utilities.

# IV. Management Issues, Goals and Objectives

### Program Goals

The goal of this Management Plan is the successful implementation of management strategies for the North Thousand Islands which will protect and enhance biodiversity, conserve natural resources through the restoration, enhancement and protection of natural communities while providing outdoor recreational opportunities that are compatible with these goals. Comparison of FL Statutes Management Goals and the Project Management Goals are listed in Table 5.

### Desired Future Conditions

Future conditions in the North Thousand Islands would find a functional and productive conservation area which provides for public access and uses compatible and consistent with the goals established for the property. Within the open waters, the bottoms are densely vegetated by seagrass and populated by a diverse and healthy variety of fish, crabs, shrimp and other aquatic species. These waters would also support wading birds such as the spoonbill, various herons and egrets, as well as waterfowl, reptiles and mammals including dolphin and manatee. Similarly, the mangrove and saltmarsh communities would feature lush vegetation and also support a healthy and diverse population of native plant and animal species. Where deemed appropriate, ditches and associated ditch banks or berms constructed for mosquito control have been leveled to marsh elevation, restoring the natural hydrology of the area while maintaining needed mosquito control.

Some of the smaller spoil areas have also been leveled, restoring these areas to elevations which will support either the marsh/mangrove community or seagrass. Other islands have been cleared of exotic or invasive plants and vegetated with native species, providing a variety of habitats ranging from xeric to hydric.

Visitors to the North Thousand Islands can follow canoe/kayak trails through the islands or access designated areas by boat, enjoying primitive picnic areas or following short nature trails.

### Major Accomplishments

**Table 4. Major Accomplishments from Purchase to Date**

| Accomplishment | Year |
|---|---|
| Acquisition of property | 1988 |
| Lease to City of Cocoa Beach | 1991 |
| Management Plan submitted | 1994 |
| FDEP/Bureau of Invasive Plant Management Grant Application (funded) | 2004 |
| FDEP/Bureau of Invasive Plant Management Grant Application (unfunded) | 2005 |
| Revised Management Plan Submitted to FDEP | 2012 |

**Management Goals - North Thousand Islands Management Plan vs. Chapter 253.034(5)(b), FS, Management Goals**

| Chapter 253.034 (5) (b), Florida Statutes, Management Goals | North Thousand Islands Management Plan Goals | Present Condition | Core Objectives | Measure | Timeframe | Expenses & Manpower Budget |
|---|---|---|---|---|---|---|
| 1. Habitat restoration and improvement | **Goal 1**: Habitat Restoration and Management (pg. 23) | Much of the uplands of the North Thousand Islands are characterized by exotic invasive species primarily Brazilian pepper, Australian pine and *Melaleuca* . | **Objective 1A**: Development and implementation of a strategic plan for the removal control of exotic, invasive or nuisance species and strategies for the restoration, enhancement or creation of natural communities. **Objective 1B**: Protection of existing habitat. | Development of plan for removal/management of exotic/invasive plants; Acres of exotic or invasive plants removed/managed; acres of native plant communities restored/created. | Plan development: 2014; Implementation of plan ongoing as funding and resources are available. | $15,000 |
| 2. Public access and recreational opportunities | **Goal 5**: Public Access and Recreational Opportunities (pg 26) | Public access to the North Thousand Islands is primarily by boat. Recreational activities primarily consist of boating, fishing, nature viewing and similar passive recreational activities. | **Objective 5A**: Provide for outdoor recreational opportunities that are compatible with the conservation, protection and enhancement of the natural resources of the North Thousand Islands | Completion of evaluation of recreational use and amenities, identification and evaluation of potential enhancements to improve access and recreational opportunities | Evaluation of recreational use and amenities, identification of potential improvements: 2014. Implementation of selected improvements ongoing as funding and resources are available | $25,000 |
| 3. Hydrological preservation and restoration | **Goal 3**: Hydrologic Preservation and Restoration (pg 25) | Mosquito control activities have resulted in the creation of numerous ditches and berms. Dredging of navigation channels has resulted in several dredge spoil deposits. However many of these ditches and berms are now vegetated by native vegetation and the spoil deposits offer an opportunity for restoration of uplands communities. | **Objective 3A**: Evaluate the hydrology of the North Thousand Islands | Completion of evaluation; Development of strategy to undertake restoration or other beneficial uses; Acres of habitat restored or other projects implemented. | Completion of evaluation and development of strategy: 2016; Implementation of beneficial and feasible hydrologic restoration projects ongoing as funding and resources are available. | $20,000 |
| 4. Sustainable forest management | A Timber Management Assessment has not been conducted for the North Thousand Islands due to the small size of the site and the absence of any significant forestry resources on the property. | As only small, scattered areas of upland hammock are present, typical forestry management practices are not anticipated to be implemented. | N/A | N/A | N/A | N/A |
| 5. Exotic and invasive species maintenance and control | **Goal 1**: Habitat Restoration and Management (pg 23) | Much of the uplands of the North Thousand Islands are characterized by exotic invasive species primarily Brazilian pepper, Australian pine and *Melaleuca* . | **Objective 1A**: Development and implementation of a strategic plan for the removal or control of exotic, invasive or nuisance species and for the restoration of native plant communities | Development of a strategic plan for removal or control of exotic or invasive species; acres of exotic or invasive species removed or controlled | Strategic plan development: 2014; Implementation of plan ongoing as funding and resources are available. | $181,000 |
| 6. Capital facilities and infrastructure | No capital facilities or infrastructure exist in the North Thousand Islands with the exception of the existing dredged material containment area. This facility will continue to be operated and maintained by the City of Cocoa Beach as required. | No capital facilities or infrastructure exist or are currently planned with the exception of the existing dredged material containment area. This facility will continue to be operated and maintained by the City of Cocoa Beach as required. | N/A | N/A | N/A | N/A |
| 7. Cultural and historical resources | **Goal 4**: Cultural and Historic Resources (pg 26) | No significant cultural or historic resources are presently known to exist in the North Thousand Islands. | **Objective 4A**: Detection and protection of cultural and historic resources | N/A | Ongoing | N/A |
| 8. Imperiled species habitat maintenance, enhancement, restoration or population restoration | **Goal 2**: Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration (pg 25) | Several endangered/threatened/species of special concern use habitats found in the North Thousand Islands | **Objective 2A**: Protection, enhancement and restoration of imperiled species and their habitat | Number of restoration/enhancement/management projects benefitting imperiled species; Acreage of habitats restored. | Ongoing as funding and resources are available. | Habitat restoration addressed in Management Plan Goals 1 & 2 |

**Goals and objectives for 2013 to 2023**

Goals and Objectives for 2013 to 2023 are focused on resource management which, in turn, will be focused on protecting relatively undisturbed resources such as the mangrove/saltmarsh islands, seagrass beds and maritime hammock communities and the various species that inhabit or use these habitats, removing or controlling exotic or invasive species and restoring native communities. Protection will be accomplished through a variety of existing laws, rules and ordinances enforced by the City of Cocoa Beach as well as state and federal agencies. To enhance these efforts, ongoing environmental education programs and events undertaken by these agencies as well as private interest groups will be promoted, supported and, where appropriate, expanded.

Removal or control of exotic or invasive species and restoration and enhancement efforts will be primarily focused on islands where spoil was deposited and on ditches and spoil banks created by mosquito control activities. The primary focus of restoration and enhancement activities will be the removal and control of exotic and invasive plants found mostly on the spoil deposit islands.

<u>Goal 1: Habitat Restoration and Management</u>

The habitat restoration and management goal for the North Thousand Islands includes two major sub-goals: 1) Protection, restoration and management of native habitats, and, 2) Removal, maintenance and control of exotic and invasive species. To accomplish these objectives a strategic plan addressing the removal and maintenance of exotic and invasive species as well as the restoration of native habitats will be developed.

Removing or controlling exotic, invasive or undesirable species on the property will be a challenge and a gradual, long-term effort. A primary issue will be the transportation of personnel and equipment to island sites. With the exception of a small portion of the property located adjacent to Minuteman Causeway, the only access is by boat. Many of the islands are located in shallow waters where bottoms are vegetated by seagrass. These conditions limit access to small, shallow draft watercraft. Once the shoreline of the islands is reached, access is further complicated by dense growth of mangrove along most island shores. On the larger islands, both Brazilian pepper and Australian pine are abundant enough to warrant the use of heavy equipment for clearing. However, in light of the physical constraints on access and the sensitive habitats present on the property, much of the exotic control work will be done with chain saws and other readily portable equipment. Much of the control work will be conducted manually, a slow and labor-intensive process. Despite all these issues, the final goal is to remove all exotic, invasive and nuisance plants on all portions of the property.

Given the complexities of site access, the sensitive nature of the property and the limited resources available for removal or control of exotic, invasive and undesirable species an

effective, efficient, comprehensive and environmentally sensitive removal/control strategy will be developed for the property. The strategy will identify the location and extent of exotic invasive and undesirable species, removal/control strategies for each location and establish a prioritized list for removal/control. Development of this strategy will be the one of the initial efforts undertaken under this management plan.

In the development of the management plan for the adjacent Thousand Islands Conservation Area there was extensive discussion about the removal of Australian pines, which are viewed by some of the public as a valuable resource both for nesting birds and for the shade and aesthetic amenities they provide. To address these concerns and accomplish removal or control of invasive and exotic species, a strategic plan was developed. It is anticipated that similar concerns will be expressed as the strategic plan for removal of exotic, invasive or undesirable species in the North Thousand Islands is developed. The City of Cocoa Beach will undertake to educate the public about this issue however it is likely that similar to the Thousand Islands Conservation Area removal of Australian pines in the North Thousand Islands will need to be staged over time.

Some of the areas where exotic, invasive or undesirable plants are treated or removed will be revegetated with appropriate native species such as mangrove, sabal palm, palmetto, seagrape, oak, wax myrtle, Florida privet and similar species. In the adjacent Thousand Islands Conservation Area, planted sites were generally located adjacent to developed areas and planted for aesthetic purposes as well as habitat restoration/creation. In some areas, natural recruitment will likely be the primary method of restoration following removal of exotic species. Decisions on where planting is appropriate or necessary will be made based on an assessment of individual sites. The habitat restoration component of the strategic plan will be considered equally important in the effort to restore the North Thousand Islands and will include an irrigation plan to ensure the success of new plantings.

Objective 1A: Development and implementation of a strategic plan for the removal or control of exotic, invasive or nuisance species and for the restoration of native plant communities

Task 1: Map location, extent and composition of exotic, invasive or nuisance species

Task 2: Develop a strategic plan for removal or control of exotic, invasive or nuisance species and for the restoration, enhancement or creation of native plant communities

Task 3: Seek funding for implementation of strategic plan

Task 4: Implement strategic plan

Task 5: Conduct periodic monitoring and long-term maintenance of exotic, invasive or nuisance species

Objective 1B: Protection of existing habitat

Task 1: Enforcement of existing statutes, rules and ordinances

Task 2: Periodic monitoring

Goal 2: Imperiled Species Habitat Maintenance, Enhancement, Restoration or Population Restoration

Protection, management and restoration of habitats found on the property will be the primary native, declining and listed species management action undertaken at the North Thousand Islands. Enhanced habits will benefit all species found on the site. Any proposed restoration efforts will be coordinated with appropriate state and federal agencies to ensure that these actions are consistent with the management or recovery plans for native, declining or listed species.

Objective 2A: Protection, enhancement & restoration of imperiled or declining species and their habitat

Task 1: Implement habitat restoration and management as outlined in Goal 1

Task 2: Enforcement of existing statutes, rules and ordinances dealing with native, declining or imperiled species and their habitats

Task 3: Periodic monitoring

Goal 3: Hydrologic Preservation and Restoration

Hydrologic restoration of the mosquito control ditches and associated ditchbanks as well as spoil islands will be evaluated. Backfilling ditches with material from ditchbanks or removal of spoil islands could result in additional emergent or submergent wetland plant community reestablishment. Costs, environmental benefits or impacts as well as potential effects to mosquito control and recreational uses will be considered as part of this process.

Objective 3A: Evaluate the hydrology of the North Thousand Islands

Task 1: Evaluate ditches and berms constructed by mosquito control and spoil deposits to determine their impact on the hydrology of the North Thousand Islands, the potential benefits or impacts of restoration, cost and feasibility.

Task 2: Development and prioritization of hydrologic restoration projects deemed beneficial and feasible.

Task 3: Seek funding for project implementation

Task 4: Implement hydrologic restoration projects

Task 5: Periodic monitoring

Goal 4: Cultural and Historic Resources

While the Department of State, Division of Historic Resources indicated that it has no records of significant cultural or historic resources within the North Thousand Islands and opines that there is a low probability of significant unrecorded sites being found on the site, archaeological research will be encouraged and any significant discoveries will be reported to the Division of Historic Resources.

Objective 4A: Detection and protection of cultural and historic resources

Task 1: Archaeological research will be promoted on the property to ensure that any cultural or historic or resources present are documented and protected

Task 2: Any significant archaeological or historic resources discovered will be reported to the Department of State, Bureau of Historic Preservation and appropriate action taken to protect these resources

Goal 5: Public Access and Recreational Opportunities

The North Thousand Islands consists of a collection of islands located in the open waters of the Banana River. Currently, visitors access the islands by boat and camp or picnic at various locations. Long-term plans may include designation of certain sites for primitive camping or picnicking. In addition, canoe/kayak and short nature trails may be designated and additional canoe/kayak access points may be proposed.

Four City parks provide public access to the Banana River in the vicinity of the North Thousand Islands. Cove Park is a neighborhood waterfront park located adjacent to the North Thousand Islands which provides parking, picnic tables and a playground. Cash Park is a small waterfront park located adjacent to the North Thousand Islands which provides benches for sitting and viewing the islands and the Banana River. Bicentennial Park is a waterfront park located along SR 520 causeway north of the property which provides parking, picnic tables and a boat ramp. Ramp Road Park is a waterfront park located adjacent to the Thousand Islands Conservation Area, which, in turn is adjacent to the North Thousand Islands. Ramp Road Park provides parking, boat ramps, rest rooms, picnic tables, a playground and access to the Thousand Islands and North Thousand Islands.

Educational efforts will build on existing programs undertaken in support of the adjacent Thousand Islands Conservation Area. These programs are aimed at reaching various age groups within the community from grade school children through senior citizens. Regularly scheduled classes, lectures and tours are conducted by City staff, Brevard County Environmentally Endangered Lands staff, volunteers, biologists, community organizations and teachers from area schools. Articles concerning the Thousand Islands are published in the City newsletter and

flyers and other informational materials are published. In addition, signs and kiosks providing information about the property and its natural resources are placed at strategic locations.

Objective 5A: Provide for outdoor recreational opportunities that are compatible with the conservation, protection and enhancement of the natural resources of the North Thousand Islands.

Task 1: Assessment of current recreational uses of the North Thousand Islands

Task 2: Develop plan identifying, evaluating and prioritizing potential enhancements to improve access and recreational opportunities.

Task 3: Implement prioritized improved access and recreational opportunities.

Task 4: Provide public involvement and education activities.

Goal 6: Research & Monitoring

Scientific research will be encouraged and promoted on the property. However, to ensure the protection of the resources found within the property any proposed research projects will be coordinated with the City of Cocoa Beach and the Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas prior to their initiation. Proposed research projects will be evaluated based on potential damage or harm to resources found within the property and the adjacent Banana River, benefits of the proposed research to the property and the environment in general, the availability of resources within the property to support the research project and other site-specific concerns.

The City of Cocoa Beach will conduct or coordinate biological monitoring of the property. Monitoring will occur twice annually; once during the spring/summer and once during the fall/winter. These site visits will include a survey of the property for the presence of listed plant or animal species, invasive or undesirable plant species, feral animals, or evidence of inappropriate use of the property. These visits will also assess the general overall condition of the property as well as the general overall condition of the natural communities located on the site. Monitoring will also include an assessment of progress in restoration of these communities. Additional periodic inspections of the property, particularly to monitor for the presence of invasive or undesirable or invasive plants, are anticipated to occur. Should a listed species be identified and confirmed as present on the property, this occurrence will be reported to the Florida Natural Areas Inventory.

Objective 6A: Promote scientific research within the North Thousand Islands.

Task 1: Coordinate review of proposed research projects with Department of Environmental Protection/Office of Coastal and Aquatic Managed Areas.

Objective 6B: Conduct or coordinate biological monitoring of the North Thousand Islands.

Task 1: Conduct monitoring twice each year (Spring/Summer; Fall/Winter).

## Table 6. North Thousand Islands Management Plan - Cost Estimate and 10-Year Budget

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Resource Management** | | | | | | | | | | |
| Invasive Plant Removal & Habitat Restoration Strategic Plan | $2,500 | $2,500 | | | | | | | | |
| Herbicide Treatment (initial)* | | $50,000 | | | | | | | | |
| Exotic/Invasive Removal* | | | $50,000 | | | $50,000 | | | $50,000 | |
| Herbicide Maintenance* | | | $1,000 | $1,000 | $10,000 | $1,000 | $1,000 | $10,000 | $1,000 | $1,000 |
| **Habitat Restoration** | | | | | | | | | | |
| Native Species plantings | | | $15,000 | | | $15,000 | | | $15,000 | |
| **Hydrologic Management** | | | | | | | | | | |
| Hydrologic Assessment/Study* | | $10,000 | | | | | | | | |
| Restoration projects* | | | | $10,000 | | | | | | |
| **Cultural & Historical Management** | | | | | | | | | | |
| **Public Access - Recreation - Education** | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 | $2,500 |
| **Capital Projects (N/A)** | | | | | | | | | | |
| **Timber Management (N/A)** | | | | | | | | | | |
| **Monitoring** | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 |
| **Administration** | | | | | | | | | | |
| Reporting | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 |
| Management Coordination | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 |
| Project Management & Misc | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 |
| **TOTAL** | **$11,000** | **$71,000** | **$74,500** | **$19,500** | **$18,500** | **$74,500** | **$9,500** | **$18,500** | **$74,500** | **$9,500** |

* Grant Funding Potential

**NOTE: Budget figures are preliminary and subject to the development of a Strategic Plan for Invasive Plant Removal and Habitat Restoration. Any municipal funding is subject to the annual City of Cocoa Beach budgeting process.**

## V. Cost Estimate and Funding Source

**Operations & Facilities**

A 10-year budget and cost estimates for Management Plan implementation is shown in Table 6. Any City funding for these activities or projects will be considered as part of the annual City budget development process. Availability of municipal funds for the projects and activities in Table 6 in any budget year is dependent on a wide variety of factors which govern revenue generation and funding priorities. As a result, alternative funding sources will be sought to supplement whatever municipal funds may be provided for these activities. These alternative funding sources could include grants, mitigation funds, in-kind services and similar sources.

An analysis of potential uses of private managers to facilitate or conduct several management activities was conducted. From this analysis it appears that private firms could be engaged to undertake many of these tasks however it seems unlikely that private entities will be contracted for general or long-term management. Results of this analysis are shown in Table 7.

**Table 7. Management Plan Activity Analysis**

| Management Activity | Potential Private Management | Private Management Unlikely |
|---|---|---|
| General or Long-Term Management | | X |
| Exotic Species Assessment/Planning | X | |
| Exotic Species Removal/Management | X | |
| Trash/Debris Removal | X | |
| Native Species Restoration Planning/Planting | X | |
| Hydrologic Assessment/Planning | X | |
| Hydrologic Restoration | X | |
| Educational Activities | X | |

**Partnerships, Regional Coordination & Potential Funding Sources**

Management of the North Thousand Islands will be undertaken with several entities with interest in or programs supporting the protection of natural resources on a local, regional, state and national basis. Coordination activities may range from simply requesting review of proposed management activities, such as this management plan, to partnerships in or funding of projects implementing management or restoration activities. The primary organizations anticipated to be involved in coordination efforts and potential funding sources include:

US Fish & Wildlife Service
- Endangered Species
- Coastal Program

National Oceanic & Atmospheric Administration
- National Marine Fisheries Service
- Coastal & Marine Habitat Conservation

Florida Department of Environmental Protection
- Division of State Lands
- Office of Coastal and Aquatic Managed Areas
- Office of Greenways and Trails

Florida Fish and Wildlife Conservation Commission
- Division of Wildlife
- Bureau of Protected Species
- Bureau of Invasive Plant Management

St. Johns River Water Management District
- Indian River Lagoon Program
  - National Estuary Program
  - Surface Water Improvement & Management Program

Florida Inland Navigation District

Florida Coordinating Council on Mosquito Control
- Subcommittee on Managed Marshes

Brevard County
- Environmentally Endangered Lands Program
- Office of Natural Resources
- Parks & Recreation Department
- Mosquito Control

Friends of the Thousand Islands

Indian River Lagoon Scenic Byway

Native Plant Society – Sea Rocket & Conradina Chapters

Indian River Audubon Society

Turtle Coast Sierra Club

Marine Resources Council

Keep Brevard Beautiful

**Compliance with State & Local Government Requirements**

This land management plan is in compliance with the City of Cocoa Beach Local Government Comprehensive Growth Management Plan; see Appendix O – City Board Review & Comprehensive Plan Compliance. The plan is intended to be in compliance with the State Land Management Plan adopted March 17, 1981, by the Board of Trustees of the Internal Improvement Trust Fund and considering balanced public utilization, specific agency statutory authority and other legislative or executive constraints.

**Land Management Review**

Land management review teams were established by Section 259.036, Florida Statutes, to evaluate management of conservation, preservation and recreation lands titled in the name of the Board of Trustees of the Internal Improvement Trust Fund. The teams determine whether the lands being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032 by the Board of Trustees, acting through the Department of Environmental Protection. The managing agency is to consider the findings and recommendations of the land management review team in finalizing the required ten-year update of its management plan.

This document represents a total revision of the management plan for the North Thousand Islands submitted in 1994 and, following present-day guidelines, includes substantial new and expanded background, natural resources, cultural/historical/archaeological resource and property use information as well as new management issues, goals and objectives, cost estimate and priority schedule. No ten-year update or land management review has been performed on the 1994 North Thousand Islands Management Plan. It is suggested that this document be treated as an initial plan for the North Thousand Islands.

## VI. Priority Schedule

Improvements for the North Thousand Islands will be implemented over a 10-years schedule at a minimum and will start with development of a Strategic Plan for Invasive Plant Removal, which, prior to adoption, will be attached as Appendix P. This strategic plan will be developed through a public process so that invasive plant removal on the islands is publicly noticed and so the City Commission is made aware of the Management Plan and budgetary requirements.

The following list defines the process that will be followed when implementing the Management Plan. The timeline for the implementation can be found in Table 8.

**Table 8. North Thousand Islands Priority Schedule**

| Management Plan Actions | 2014 - 2015 | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Invasive Plant Evaluation/Survey | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Develop Strategic Plan for Invasive Removal | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | |
| Hydrological Assessment/Survey | | | | | | | | | | | | | | | | | | | | | X | X | X | |
| Public Access & Recreational Opportunities Evaluation/Development | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Public Outreach/Presentation | | | | | | | | | X | | | | | | | | | | | | X | | | |
| | **2016 - 2021** | | | | | | | | | | | | | | | | | | | | | | | |
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Implement Strategic Plan - Invasive Plant Removal | X | X | X | X | X | | | | X | X | X | | | X | X | X | X | | | | X | X | X | |
| Invasive Plant Survey/Monitoring | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Herbicide Maintenance for Invasive Plant Regrowth | | X | X | X | X | | | | X | X | X | | | X | X | X | X | | | | X | X | X | |
| Native Species plantings | | X | X | X | | | | | X | X | | | | X | X | X | | | | | X | X | | |
| Public Access & Recreational Opportunities Evaluation/Development | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Public Outreach/Presentation | | | | | | | | | X | | | | | | | | | | | | X | | | |
| | **2021 - 2022** | | | | | | | | | | | | | | | | | | | | | | | |
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Implement Strategic Plan - Invasive Plant Removal | X | X | X | X | X | | | | X | X | X | | | X | X | X | X | | | | X | X | X | |
| Invasive Plant Survey/Monitoring | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Herbicide Maintenance for Invasive Plant Regrowth | | X | X | X | X | | | | X | X | X | | | X | X | X | X | | | | X | X | X | |
| Native Species plantings | | X | X | X | | | | | X | X | | | | X | X | X | | | | | X | X | | |
| Hydrological Restoration, if deemed necessary* | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Public Access & Recreational Opportunities Evaluation/Development | | | | X | X | | | | X | X | | | | | | X | X | | | | X | X | | |
| Public Outreach/Presentation | | | | | | | | | X | | | | | | | | | | | | X | | | |

* Mosquito ditches/draglines and associated dredge material island deposition occurred from 1950 ~ 1980 and necessity of restoration is culturally sensitive and not ecologically evaluated as of 2012.

**Priority List of Management, Research and Information Needs**

- Document exotic, invasive and undesirable plant and animal species populations and devise a strategic plan to remove or control these species
- Enhance existing natural communities through exotic plant removal and replacement with native species
- Conduct a hydrologic study of the North Thousand Islands and implement prioritized restoration projects
- Coordinate with Brevard County Mosquito Control on arthropod management and potential restoration projects
- Build on the public outreach and education activities associated with the Thousand Islands Conservation Area to include the North Thousand Islands and to keep the public informed of plans and activities in the North Thousand Islands
- Encourage community support and volunteer participation in activities within the North Thousand Islands
- Continue to obtain current data, maps and other information assessing the health and extent of the seagrass, mangrove and marsh communities in the Banana River and the North Thousand Islands from the St. Johns River Water Management District (SJRWMD) and others monitoring these communities in the Indian River Lagoon system.
- Encourage and support research on declining species found in the North Thousand Islands such as the Horseshoe crab and Diamondback terrapin, including indentifying important habitats for these species such as nesting and breeding areas, factors affecting their viability in the Thousand Islands and development and implementation of potential management strategies to protect these species.

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