



MANAGEMENT PLAN FOR

ROSEMARY SCRUB

NATURAL AREA

FCT PROJECT NO. 93-008-P3A

Prepared by

**Palm Beach County
Department of Environmental Resources Management
2300 North Jog Road, 4th Floor
West Palm Beach, Florida 33411**

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THE PALM BEACH COUNTY NATURAL AREAS SYSTEM MANAGEMENT STATEMENT

The Palm Beach County Natural Areas System is composed of those environmentally sensitive lands that are owned or leased by the County and managed as natural areas by the County's Department of Environmental Resources Management (ERM). These natural areas were selected on the basis of their biological characteristics and were acquired to preserve the rare and diverse native ecosystems present on these sites and the endangered, threatened, and rare species of plants and animals that live there.

Purpose and Goals of the Natural Areas System

- *The purpose of the Natural Areas System is to protect historic native ecosystems and their biological diversity throughout Palm Beach County. Examples of each ecosystem shall be acquired and managed to preserve in perpetuity the full complement of plants and animals characteristic of that ecosystem. The management of each natural area shall be coordinated with that of the other natural areas in the system to support existing populations and to reflect in perpetuity the subtropical biological diversity characteristic of Palm Beach County in pre-development times.*

- *The wilderness values of each natural area shall be preserved.*

- *Where a natural area currently is physically or biologically connected to another publicly- or privately-owned natural area, attempts shall be made to maintain that connection through additional land acquisitions, regulatory preserve set-asides, conservation easements, interlocal agreements, and other appropriate actions.*

Management Considerations

- *The natural areas in the system shall be available to the public for passive, resource-based recreation, environmental education, and scientific research. Public use shall not take precedence over ecosystem protection. Proposed public uses shall take into account the specific environmental conditions of each natural area, and may be modified in response to changing environmental conditions.*

- *Facilities for passive public use shall be provided on each site. These facilities shall be designed to have a minimal impact on native ecosystems and shall be located in previously disturbed areas as much as possible.*
- *Facilities, structures, or roads other than management or access roads that would cause fragmentation of a natural area shall not be permitted within a natural area.*
- *The establishment of compatible land uses and activities on lands adjacent to a natural area shall be encouraged.*
- *To the extent possible, fire-maintained native ecosystems shall be burned at the appropriate interval and season, as determined by historical data, to maintain those ecosystems. Burns shall be conducted by trained personnel, using a prescribed burn plan that addresses safety and smoke concerns. The seasonality of prescribed burns may be adjusted for initial fuel reduction burns and site safety constraints.*
- *Where ecosystems within a natural area have been impacted by invasive, nonnative plant infestations, land-clearing activities, drainage, or flooding, attempts shall be made to restore those ecosystems to their previous condition or to a natural ecosystem best suited to the existing conditions on the natural area.*
- *The special requirements of listed species shall be considered in developing management strategies for each natural area, but management for an individual species shall not take precedence over management of an entire ecosystem or be allowed to have a detrimental impact on that ecosystem's complement of species.*

Management Plan Development and Revision

- *A specific management plan, based on biological, hydrological, and historical information and interpretation of this information, shall be written for each natural area that takes into account the environmental conditions found on that natural area.*

- *Each management plan shall address the strategies and techniques that will be used to manage and restore native ecosystems, to protect listed species, control the occurrence of invasive, nonnative plants and animals, to allow for appropriate public access, and to prevent unauthorized access and activities.*
- *Each initial plan shall be reviewed by the Palm Beach County Natural Areas Management Advisory Committee (NAMAC), a citizens' advisory board, and the public shall be invited to comment on the plan at a public hearing held by NAMAC in the community in which the site is located.*
- *Following NAMAC review of the comments received, the plan shall be sent to the Board of County Commissioners for approval.*
- *Each approved plan shall be subsequently reviewed every ten years thereafter, by NAMAC.*

EXECUTIVE SUMMARY

The 13.59-acre Rosemary Scrub Natural Area is located within the City of Boynton Beach in southeastern Palm Beach County, Florida. The site was acquired in 1995 by Palm Beach County (the County) and the City of Boynton Beach. Funds were provided from the Palm Beach County Environmentally Sensitive Lands Bond Issue Referendum of March 12, 1991. Matching funds for the acquisition were approved by the Florida Communities Trust through its Preservation 2000 Program.

The primary purpose of this acquisition was to preserve important remnants of scrub and scrubby flatwoods vegetation communities. The secondary purposes were to provide for passive recreation, environmental education, and scientific research. The acquisition of the Rosemary Scrub Natural Area has assisted Palm Beach County and the City of Boynton Beach in the implementation of several policies within their respective Comprehensive Plans.

Scrub is the predominant natural community found on the site, with smaller areas of scrubby flatwoods. Scrub is one of the rarest natural communities in the state of Florida. Scrubby flatwoods also are considered to be very rare in the state. In addition, the acquisition and management of the natural area will preserve important habitats for several rare and/or endemic plant and animal species. Thus far, eight plant and seven animal species recorded on the site have been listed by at least one government agency or nonprofit environmental organization.

Fire exclusion, off-road vehicle trespassing, exotic pest plant invasions, agricultural alteration, illegal dumping, and clearing for and construction of adjacent roads and buildings have all impacted the site. In addition, managers face special challenges unique to fragmented natural communities located within urban and suburban environments. In recognition of the significance of the natural vegetation communities on the site, public use is limited to passive, non-consumptive recreation, environmental education, and scientific study. An accessible nature trail, a footpath and an interpretive display provide opportunities for the public to observe the site's distinctive scrub and scrubby flatwoods communities and their associated species, and to appreciate their biological uniqueness. Scientific research opportunities at the site include monitoring of populations of rare and/or endemic species, and evaluation of restoration and management technologies.

An initial management plan for the site was developed in 1997. This plan achieved two major goals: 1) to provide specific information required by the Florida Communities Trust's Preservation 2000 Program and 2) to provide additional information and management recommendations so that management activities could begin promptly. It is the goal of the County to have each management plan reviewed every ten years thereafter, by the Palm Beach County Natural Areas Management Advisory Committee and to revise the management plan as necessary on the basis of new information, improvements in management techniques, or other relevant factors. This is the first revision of the Rosemary Scrub Natural Area Management Plan. The next revision is tentatively scheduled to be completed in 2018.

A stewardship report has been provided to the Florida Communities Trust each year for the past ten years. Stewardship reports for the years 1996 through 2006 show that listed species populations have remained stable within a normal range of fluctuation and the invasive vegetation control program has been successful. Public use facilities have been installed and have worked well, with minimal complaints received from the public. There have been a few negative occurrences at the site, including: damage to one of the fences caused by an automobile accident, canopy damage from several hurricanes, and some lewd acts. This revised management plan addresses these issues and summarizes the actions taken to deal with them.

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1. INTRODUCTION

This revised management plan is intended to provide guidance for the future use and management of the Rosemary Scrub Natural Area. This 13.59-acre site was acquired as part of a much larger effort to acquire the most important privately-held natural areas left in Palm Beach County. On March 12, 1991, the voters of Palm Beach County approved a \$100 million bond referendum to purchase environmentally sensitive lands. The Rosemary Scrub Natural Area was acquired in early 1995 with funds from these bonds and funds from the City of Boynton Beach. State matching funds for the acquisition were provided through the Preservation 2000 Program of the Florida Communities Trust (FCT). Negotiations for the acquisition and other acquisition-related services were provided by the County's contractor, The Nature Conservancy (TNC). Assistance in management of the site is provided by the City of Boynton Beach.

Common names are used in the text and in Appendix A (Natural Resource Inventory and Assessment) for species recorded on the project site. Scientific names of plants are listed in Appendix B; those of animals are listed in Appendix C. The scientific name has been used when a unique common name does not exist for the taxon or if the species has not been recorded for the project site.

1.1 SITE LOCATION

The Rosemary Scrub Natural Area is located on the southern Atlantic coastal strip, within the City of Boynton Beach in Palm Beach County (Figure 1). It lies south of Hypoluxo Road, west of Seacrest Boulevard, north of Gateway Boulevard, and east of Interstate Highway 95. The total area of this site is 13.59 acres.

1.2 SITE HISTORY

Pre-Settlement - 1750 to 1872

The Rosemary Scrub Natural Area is a fragment of a large ridge of predominantly scrub habitat that ran north-south between Lake Worth and an inland lake/marsh system that contained Lake Osborne and the former Lake Webster. The original Native American inhabitants of South Florida lived mainly along the coast, but had virtually disappeared by the 1750s, victims of European diseases and mistreatment by the Spanish. The surviving Native Americans supposedly

were taken by the Spanish to Cuba when Florida was turned over to the British in 1763, but there are stories of “Spanish Indians” that were absorbed by the Seminoles. There are no indications that the natural area was used by Native Americans.

In the early 1700s, Native Americans from the Creek and related tribes in Georgia and Alabama began to move south into north Florida. This movement accelerated in the early 1800s. These Native Americans were being pushed out by white settlers or were on the losing side of a civil war among the Creek tribes. They welcomed runaway black slaves, who joined them as freed allies, or became subject to the Native Americans in a less onerous form of slavery. This agglomeration of tribes became known as the Seminoles which was derived from a word meaning “wild” in their language. Conflicts between white settlers in Georgia and Alabama and the Seminoles and their black allies would lead to three periods of open warfare between 1817 and 1858 that were known as the Seminole Indian Wars. There are no indications that the Seminoles visited the natural area.

Early Settlers and the Construction of Infrastructure - 1873 to 1930

As the Seminole Indian Wars finally ended and the turmoil of the Civil War receded, the Palm Beach County area became attractive to settlers. Although as many as 21 settlers tried to establish home sites around the shores of Lake Worth on free land under the Armed Occupation Act of 1842, none of them remained for long (Palm Beach Post 1999). The first permanent settlers came to Palm Beach County in the mid-1870s, and settled on the shores of the Lake Worth Lagoon in the vicinity of the Town of Hypoluxo. Additional settlers soon followed, although most settled north of the first settlers in the area that would become Palm Beach. In 1886, James Porter and Andrew Garnett homesteaded large tracts of land east of the natural area and west of present-day U.S. Highway 1, but their homesteads did not extend as far west as the natural area.

In 1886, the first Hypoluxo post office was established at the Garnett house on the shores of Lake Worth, with Andrew Garnett as postmaster. A walking mail route was established along the beach to carry the mail from Hypoluxo to Fort Dallas on the Miami River for the sum of \$600 per year, with four Hypoluxo area men splitting the work. Barefoot mailmen were not unusual in Florida in the mid to late 1800s. The first barefoot mailman was Long John Holman, who began carrying the mail between St. Augustine and Ft. Dallas in 1845. The barefoot mailmen were usually temporary mail carriers - as the population of an area grew and could support railroads

and steamship lines, the mail was transferred to more regular forms of transportation. The Hypoluxo to Ft. Dallas beach route was the last barefoot mailman route to be eliminated in Florida (Hutchinson and Paige 1998).

In 1888, James Porter was elected to the Dade County Commission (Linehan and Nelson 1994). At that time, Dade County stretched from the St. Lucie River to Florida Bay. In the election of 1889, the voters in the northern part of the county banded together to support moving the county seat from Biscayne Bay to Juno at the northern end of Lake Worth. They outnumbered the Biscayne Bay/Miami-area voters at that time, and carried the election. James Porter was one of six men who went to Biscayne Bay to get the county records and bring them to the new courthouse at Juno.

After they lost the election, and had to travel to Juno for County business, the Biscayne Bay area citizens began to push for a road to make the trip easier. Small boat travel was easy on the Biscayne Bay and Lake Worth lagoons, but was dangerous in the Atlantic Ocean between the two population centers. The beach route between the two lagoons was difficult and dependent on the schedule of the barefoot mailmen, who acted as guides and whose skiffs were used to cross the inlets. In 1892, an 8-foot-wide sand road was authorized for construction by the Dade County Commission between the south end of Lake Worth and the north end of Biscayne Bay. This road started in the vicinity of present-day Hypoluxo Road at the Garnett boat dock and ended at Lemon City in present-day Miami. This sand road had nine bridges and a ferry where it crossed the New River near Ft. Lauderdale (Linehan 1980).

The 1892 road was located 0.6 miles east of the natural area. It ran north-south through the present-day Hypoluxo Scrub Natural Area, and is still visible today as a bare sandy strip near the middle of the site. The reason behind the route of the road within the Hypoluxo Scrub Natural Area is somewhat of a mystery. It was located approximately 500 feet east of the section line, which would have been the logical place for the road to be located. The road made a jog to the west in the section south of the Hypoluxo Scrub Natural Area, and then followed the section line. It is possible that the road within the Hypoluxo Scrub Natural Area was constructed on what was thought to be the correct section line. Surveys were very rudimentary at that time, and 400-500 foot errors in section lines were not uncommon. However, since the road ran through James Porter's land, he must have had some say in where it was located.

The route of the sand road is easily visible on a 1930 coastal map compiled by the U.S. Coastal and Geodetic Survey (USCGS 1930) from aerial photographs taken by a U.S. Army blimp in 1928. The 1928 photographs are no longer in the public domain, and were not available to ERM. The road is also visible on a 1940 aerial photograph (USGS 1940). By 1893, a “stagecoach” line had been established on the road, with an overnight stay on the New River at a trading post/tent hotel run by Frank Stranahan. The round trip fare was \$16 dollars, and a one-way trip was \$10. The term “stagecoach” line was a bit of a misnomer. The transportation was actually six-passenger wagons pulled by two mules. Only the passengers and freight crossed over at the New River - the wagons returned to their starting point with whatever new cargo they had picked up at the ferry. The arrival of the stagecoach line was the end of the barefoot mailman, as the mail contract was taken over by the stagecoach company (Linehan 1980).

In some places, like the Hypoluxo Scrub Natural Area, the 1892 sand road was abandoned when better transportation routes became available. Other sections of the road became parts of Federal Highway (U.S Highway 1) or local streets such as NE 4th Street in Boynton Beach. Henry Flagler's Florida East Coast (FEC) Railroad was constructed in 1895, approximately 0.75 miles east of the natural area. The completion of the FEC railroad to the Miami area in 1896 caused the demise of the stagecoach line and a decline in the use of the 1892 sand road.

The completion of the FEC railroad spurred development in its vicinity. Major Nathan Boynton, a retired Civil War veteran from Michigan, toured the area and wanted to establish a settlement of northerners. He purchased large acreages of land, including a beach tract just south of present-day Ocean Avenue in 1895, and built the Boynton Beach Hotel in 1897. The hotel catered primarily to Michigan residents, many of whom made it their winter home. Major Boynton later returned to Michigan and was subsequently elected to Congress, but he and his family maintained control of their lands. A Boynton post office opened in 1900, and the first mainland subdivisions were platted in 1910. By 1911, the first Ocean Avenue bridge was built across the 50-foot-wide Florida East Coast Canal, the predecessor to the Atlantic Intracoastal Waterway. The first school opened in the Boynton settlement in 1913, and the Town of Boynton was incorporated in 1920.

In 1911, Palm Beach County was formed and the County Commission authorized construction of a shellrock “main line county road” in the vicinity of the FEC railroad tracks. In the vicinity of the natural area, this road was built immediately east and parallel to the railroad. In 1916, the state took over the road, widened it, and made it part of the Dixie Highway system. It is not

known what the County road was called prior to 1916, but it has been called the Dixie Highway ever since, except for those segments that were incorporated into the new U.S. Highway 1 in the late 1920s.

In 1915, the Lake Worth Drainage District (LWDD) was formed, and began to dig a network of canals to drain the area west of the coastal ridge and east of present-day State Road 7/U.S. Highway 441, and between present-day Okeechobee Road and the Hillsboro Canal. Major north-south canals called equalizing canals were dug every 2 to 2.5 miles, and smaller east-west lateral canals were dug every half mile. Equalizing Canal 4 (known as the E-4 Canal north of the L-40 Canal and as the El Rio Canal south of the L-40 Canal) was dug through the Osborne/Webster lake/marsh system one mile west of the natural area, and lowered surface water levels from approximately 15 feet to 8.5 feet. This canal cut through Lake Webster, and drained it completely, causing the lake to disappear. Lowered water levels in Lake Osborne caused the lake in to shrink in size, and ground water levels at the natural area were reduced also.

No lateral canals extended east of the E-4 Canal in the vicinity of the natural area. The E-4/El Rio Canal runs mostly through the center of a wetland swale system located between the coastal sand ridges and the more westerly pine flatwoods. Approximately 1.25 miles south of the natural area, a large east-west canal was constructed that emptied into the southern end of Lake Worth. This canal, known as the Boynton Canal, was the outfall for the central section of the LWDD canal system, and also was a barrier to the northern expansion of the Town of Boynton for many years.

The Seaboard Airline Railroad (present-day CSX Railroad) was constructed in 1926 approximately 350 feet west of the natural area. Once the railroad was completed, virtually all large slash pines in the vicinity of the railroad were removed by logging. However, this may not have had much of an effect on the natural area, since only a few slash pines occurred in the scrubby flatwoods in the northwest corner of the site. In the late 1920s, U.S. Highway 1 (also known as Federal Highway) was constructed through Palm Beach County. In the vicinity of the natural area, it was co-located with Dixie Highway, and the name of the road was changed to Federal Highway.

The 1920s Florida land boom was still in full swing in 1925, and another man who would have a profound effect on the Hypoluxo/Lantana area came on the scene. Albert Greynolds was a contractor, road builder, and developer (Linehan 1980). He bought the Garnett homestead west

of the FEC Railway and north of present-day Hypoluxo Road. He also gained control of the portions of James Porter's homestead south of Hypoluxo Road that Porter had not already platted as part of the Hypoluxo subdivision in 1914. Greynolds also gained control of another 160 acres south of Porter's land. In 1925 and 1926, his company, Greynolds, Clark, and Shay, Inc. platted three units of the Greynolds Highlands subdivision east of the natural area. This subdivision extended from Pine Street in Lantana southwards for more than 1.5 miles to what is present-day Miner Road. The first unit covered the portions in Lantana that were north of present-day Hypoluxo Road. The second unit covered most of James Porter's land with blocks located north, south and west of the Hypoluxo Subdivision. The third unit covered the southern end of the subdivision and extended south to present-day Miner Road.

Mr. Greynolds platted his subdivision with a grand entrance from Dixie Highway via Central Boulevard to Greynolds Circle in Lantana, which he envisioned as the town center. Central Boulevard continued west from Greynolds Circle where it intersected several major north-south streets such as historic Broadway, Arnold, and Washington Avenues. North of present-day Hypoluxo Road, the east-west streets were named for Florida governors. South of present-day Hypoluxo Road, the east-west streets were named for U.S. Presidents. Present-day Hypoluxo Road appears for the first time on these plats, but is shown as Hypoluxo "Drive". The lots in the subdivision were 25 feet wide and 125 to 140 feet long. While these long narrow lots were the fashion in the early 1900s when most of the City of Lake Worth was platted this way, they were becoming obsolete in the mid-1920s. The lot size may have been a factor in the subsequent failure of the Greynolds Highland subdivision.

Before the development went under, Greynolds cleared the historic main north-south roads of Washington, Arnold, and Broadway Avenues. Most of the secondary east-west streets were cleared as well. This street clearing in a long narrow subdivision gave the development a railroad track-like appearance on maps and aerial photographs. The roads in the development are present on the 1930 USCGS map and the 1940 USGS aerial photograph. They remained visible on aerial photographs well into the 1950s (USGS 1953). The 1930 map shows that Washington Avenue was hard-surfaced southward past Hypoluxo Drive for 1/4 mile to east-west Monroe Street (a portion of which is now known as Monroe Boulevard). The 1930 map also shows a hard-surfaced Hypoluxo Drive extending as far west as the Seaboard Airline Railroad tracks, but the 1940 aerial photograph indicates that it only extended as far west as Washington Avenue, with a barely-discernable track continuing westward to the railroad. The area surrounding

Washington Avenue (and portions of Arnold and Broadway Avenues) was later replatted and the portion of Washington Avenue north of Hypoluxo Road disappeared.

The first aerial photographs of the vicinity of the natural area were taken from a blimp by the U.S. Army in 1928, and were compiled into a coastal map by the U.S. Coast and Geodetic Survey in 1930 (USCGS 1930). This map showed the natural area as being part of a large, untouched tract of “short leaf” (sand) pines lying between the FEC and Seaboard railroad tracks. The sand roads of the Greynolds Highland subdivision were present northeast of the natural area, while sand and hard-surfaced roads in the Town of Boynton covered most of the area south of the Boynton Canal and north of Woolbright Road between the railroad tracks. Federal Highway was not yet present, but numerous small roads extended from then-Dixie Highway to the shores of Lake Worth east of the natural area. Small areas of mango orchards and cultivated fields were present west of the Seaboard tracks. Former Lake Webster and the southern extension of Lake Osborne were shown as large marshy areas. The 1930 map also showed the LWDD canal system.

The Florida land boom collapsed in the late 1920s after devastating hurricanes struck Miami in 1926 and West Palm Beach in 1928. Although the hurricanes may not have hit the natural area and vicinity that hard, the relative safety of all of southeastern Florida was now questioned. The land speculation bubble ended as investors withdrew their money. The 1929 stock market crash and the onset of the Depression soon followed, and times were tough in South Florida. Many people and companies were unable to pay the taxes on their properties.

Stagnation and Nearby Development – 1931 to 1955

Prior to 1940, very little development occurred in the vicinity of the natural area. U.S. Geological Survey (USGS) 1940 aerial photographs show almost no differences from the 1930 USCGS map, except that Federal Highway had been constructed. The sparse vegetation and abundant bare sand on the natural area in the 1940 photograph seems to indicate that a wildfire had occurred several years earlier.

World War II had little effect on the area surrounding the natural area. Linehan (1980) states that Hypoluxo Island in the Lake Worth Lagoon was used for jungle training, since its mangrove areas were similar to those found in the south Pacific islands where fighting was occurring. The war did cause the development boom in Florida to re-ignite, as a large number of servicemen

stationed in Florida during the war returned to live there after the war. After World War II ended, development accelerated.

In 1946, the County Commission accepted a posted-and-viewed road known as Miner Road that extended 1.25 miles westward on the section line from Federal Highway to High Ridge Road, crossing the southern portion of the natural area and the Seaboard Railroad tracks. This right-of-way was cleared and a sand road established that ran through the natural area. A 1947 aerial photograph in Linehan (1980) shows Miner Road present as a sand road. It also shows that the areas just north of Miner Road had been cleared. In 1948, the State acquired a 300-foot right-of-way between the natural area and the Seaboard Railroad for a limited-access highway that would later become Interstate 95.

Sometime in the late 1940s, Hypoluxo Drive was extended westward from Washington Avenue for 0.5 miles to the Seaboard Airline Railroad tracks. At the railroad tracks, it joined an existing road that ran westward to Military Trail. The combined roads were called Hypoluxo Road. East of the natural area, new subdivisions were being platted north of Miner Road near Federal Highway. In 1948, the Kroker family platted the Ridge Grove subdivisions. These subdivisions had shellrock roads. In 1949, Loomis Griswold platted the Tropical Terrace subdivision between the Ridge Grove subdivision and the FEC railroad tracks. Tropical Terrace had larger lots and paved streets than did the Ridge Grove subdivision, but it seemed to develop at a slower rate.

The oceanfront portions of the Town of Boynton split off from the rest of the town in 1931 over a tax dispute. A new Town of Boynton Beach was incorporated, but changed its name to Ocean Ridge in 1937. The Town of Boynton then changed its name to Boynton Beach in 1941. Until the early 1950s, the Boynton Canal was still a significant barrier to the northern expansion of Boynton Beach. In 1952, the first of the Rolling Green subdivisions was platted north of the canal. It was located just north of the canal and just west of Federal Highway, and was accessed from Federal Highway via NE 15th Avenue. The first homes were already visible in this subdivision on a 1953 aerial photograph (USGS 1953). The success of the initial plan prompted additional Rolling Green subdivisions to be platted west and north of the first plat in 1953 and 1955. These new plats prompted the construction of a bridge across the Boynton Canal and the northward extension of Seacrest Boulevard (originally Green Street in early Boynton plats) northward to access the new subdivisions. The Boynton Canal ceased to be a barrier to the northern expansion of Boynton Beach after construction of the bridge.

During this time frame, development was also occurring north of the natural area. The 1953 aerial photograph shows that Seacrest Boulevard has been constructed for 0.5 miles south of Hypoluxo Road. A large cleared rectangular area with a small grassed area is present on the west side of Seacrest Boulevard. This location corresponds with the present location of Palm Beach Memorial Park cemetery and is believed to be the first development phase of that cemetery. This cemetery filed its first plat as Lincoln Memorial Gardens in 1951. The 1953 photograph also shows significant home-building activity in the Ridge Grove and Tropical Terrace subdivisions east of the natural area and increased residential and agricultural development along High Ridge Road west of the natural area, as well as a sand-mining operation at the location of the future High Ridge Natural Area.

Neighborhood Development and the Interstate – 1956 to 1985

Development reached the natural area in the mid 1950s, and Federal Highway was widened to four lanes at this time. In 1956, the Rolling Green Ridge subdivision was platted east and south of the site. The North Ridge Estates subdivision north of the site was platted in 1957. These subdivisions were annexed into Boynton Beach at this time, as was the natural area. The Sancastle subdivision was platted northeast of the natural area in 1958 and 1959, but was not annexed by the City. Construction began on Rolling Green Ridge in 1959, but the development ran into financial difficulties and the houses bordering the natural area were not built until 1962. The houses in North Ridge Estates were built beginning in 1960.

Seacrest Boulevard was the access road to the Rolling Green and North Ridge Estates developments, so the missing section bordering the natural area was presumably built in the late 1950s. Both of these subdivisions and the Sancastle subdivision were essentially built out by 1965, although Palm Beach County Property Appraiser's aerial photographs indicate that some minor infill building on vacant lots occurred into the early 1970s. The influx of new residents created a demand for services. A Food Fair supermarket was built in the late 1950s on the north side of Hypoluxo Road just east of the Seaboard Railroad tracks. It later became part of the Pantry Pride supermarket chain, which subsequently went bankrupt. Most of the parking area was lost when the Hypoluxo Road interchange on Interstate 95 was built. The building was remodeled and is currently the Cabot House furniture store. Other commercial buildings would follow along Hypoluxo Road.

In 1961, an easement was granted to Florida Power & Light Co. for the high-voltage electrical transmission line that runs along the northern border of the site. The line was presumably constructed shortly thereafter, because a 1965 Property Appraiser's photograph shows that vegetation had regrown under the line. The convenience store that exists on the east side of the site was built in 1964 as the surrounding subdivisions neared completion. The former disturbed areas on the east side of the site were apparently created about this time, as a result of land clearing associated with road and convenience store construction. The 1965 aerial photograph from the Palm Beach County Property Appraisers gives the first large-scale view of the natural area and vicinity. Seacrest Boulevard is present, as is the convenience store. Rolling Green Elementary School is present 0.25 miles east of the natural area, and Miner Road is paved from Federal Highway westward to Ocean Parkway 0.2 miles east of the natural area.

In the early and mid 1970s, the High Point Condominium development was built north of the natural area on the vacant southern portion of the Palm Beach Memorial Park cemetery plat. Some of the four-unit condominium buildings were constructed in the future path of Interstate 95, and were subsequently cut into four pieces, hauled by trucks, and re-assembled at the nearby Point Overlook Condominium development northeast of the natural area. After the relocations were complete, similar new condominiums were built at the Point Overlook development. In the mid-1970s, Interstate Highway 95 was constructed on the 300-foot right-of-way on the west side of the site. This right-of-way had been left in native vegetation, and had connected the site to other naturally-vegetated lands. Construction of I-95 left the natural area isolated as an island of native vegetation.

Miner Road was finally paved from Ocean Parkway to Seacrest Boulevard in the mid 1970s. The use of the sandy, unpaved portion of Miner Road running through the natural area declined after Seacrest Boulevard was built, and ended completely when I-95 was built without an overpass for Miner Road. This roadbed is completely overgrown today. Additional clearing occurred in the former disturbed areas on the southern border of the natural area at the time I-95 was constructed, but it is unclear whether the clearing was a result of construction activities or to meet City requirements for a mowed strip next to residential housing. A wildfire occurred in the scrubby flatwoods portion of the natural area around 1985.

In 1981, the owners of the natural area gave an easement to the City to construct a water main across the southern portion of the site and under I-95. The water main was installed shortly thereafter, just south of the unused Miner Road right-of-way, in an area that also contained water

and sewer lines built during the construction of the Rolling Green Ridge subdivision. The water main was for a new industrial/residential subdivision being built west of I-95. Although the southern industrial portion of the subdivision had numerous buildings constructed by 1984, the northern residential portion, known as Cedar Ridge, had not progressed beyond street construction in 1984. The development of the residential portion was financed by a savings and loan institution, and development of the residential portion halted when the savings and loan failed and was taken over by the federal government.

The Rosemary Scrub Natural Area site was previously owned by the developers of the Rolling Green Ridge subdivision. It was apparently set aside for a future shopping center site at the intersection of two major roads, Seacrest Boulevard and Miner Road. The severing of Miner Road by the construction of I-95, as well as a general decline in the surrounding neighborhoods, decreased the site's potential for commercial development. An unsuccessful attempt was made in the mid-1980s to build the Shoppes of Seacrest commercial development on the eastern portion of the site.

In the early and mid 1980s, the residential neighborhoods surrounding the natural area began to decline. These areas had originally been developed as inexpensive housing. As time passed, the original owners died or moved out, and were replaced with renters and low-income families. Many properties became poorly-maintained and run-down, and the crime rate increased. The decline in the surrounding neighborhood had made the natural area unattractive for residential and commercial development.

Road Expansions and Public Acquisition – 1986 to present

In 1988, Seacrest Boulevard was widened from two to five lanes along the eastern border of the natural area. In 1989, Hypoluxo Road was widened from two to five lanes 0.8 miles north of the natural area. At the same time, the unused northern portion of the Palm Beach Memorial Park cemetery was developed as a commercial property with a Sam's Club warehouse store and several fast-food restaurants along Hypoluxo Road. An Inns of America Hotel was added to this commercial development in 1996. Home construction restarted in the single-family portion of the stalled Cedar Ridge subdivision west of the natural area in 1996 and was quickly built out. The multi-family section on this subdivision did not get started until 1999 and was completed in 2002 along with the rest of the industrial buildings.

In 1992, an interchange was built at I-95 and Gateway Boulevard, which is one-half mile south of the natural area. A concrete sound barrier wall was constructed at the same time that extended northward from the interchange, along the east side of I-95, to a point 100 feet north of the southern boundary of the site. In 1996, a similar wall was extended southward to a point 100 feet south of the northern boundary of the site. The purpose of this wall was to provide noise protection for the residential neighborhoods north of the natural area. A request by ERM to the Florida Department of Transportation (FDOT) to construct the sound barrier across the gap at the natural area was not approved due to FDOT guidelines that only provide for sound barrier construction next to residential properties.

In 1986, the County funded an inventory of native ecosystems in Palm Beach County by two Florida Atlantic University professors (Iverson and Austin 1988). The purpose of the study was to delineate and determine the quality of the remaining native ecosystems in the County with a goal of preserving representative portions through acquisition and land development regulations. The study was completed in 1988, with additional work in 1989. A County advisory committee was established in 1989 to recommend which ecosites should be acquired and how to fund the acquisition program. In 1990, the committee recommended 14 priority sites for acquisition through a bond referendum. The Rosemary Scrub ecosite was one of the 14 priority sites. The County scheduled a \$100 million Environmentally Sensitive Lands Bond Issue Referendum for March 12, 1991. The referendum passed by a 2 to 1 margin.

In September 1993, the County and the City of Boynton Beach (City) submitted a joint application for matching funds to the Florida Communities Trust (FCT) Preservation 2000 Program for the natural area (ERM 1993). The application subsequently received enough points to be funded and a Conceptual Approval Agreement for site acquisition was finalized in August 1994. In January 1995, the County and the City purchased the eastern 4.94 acres of the Natural Area from the Resolution Trust Corporation for \$243,000. In March 1995, the remaining 8.65-acre tract in the western portion of the site was purchased from Janmar Properties, Ltd. for \$200,000. In November 1995, the County and City finalized an interlocal agreement (Appendix E) for the management of the site. Matching state funds of \$187,407 were received from FCT in February 1996.

A draft management plan was developed for the natural area in 1996 and was reviewed by the County's Natural Area Management Advisory Committee in the fall of 1996. The management plan was approved by the Board of County Commissioners (BCC) in March 1997, following an

open house and public hearing held on plan in the City of Boynton Beach. The management plan was implemented following BCC approval. The land use and zoning for the natural area were changed from Commercial to Recreation by the City in 2001, and to Conservation in 2003 when the City adopted this new land use and zoning category.

All of the natural area was fenced by October 1995. The 7-foot chain-link fencing was installed one foot underground to restrict gopher tortoises from digging under the fence and wandering outside the natural area. Following installation of the fence, three gopher tortoises were relocated to the site from a County road project. Invasive/exotic plant control efforts began at the natural area in 1995 and have continued on a nearly annual basis. The management roads were completed in 1998, and the public use facilities were substantially completed in March 2001. The site was officially opened to the public shortly thereafter.

The first prescribed burn was completed in March 2000 on the northern portion of the site. This burn was performed after a short period of rainy weather in what would turn out to be an extended dry spell. Much of the understory vegetation had been chopping before the burn, and the low-intensity burn allowed most of the sand pines to survive. However, the stress of the burn and the subsequent drought weakened the sand pines and triggered a pine bark beetle attack that subsequently killed all the pines in the burn unit, as well as some of the pines in the adjacent unburned unit. Because of the drought following the prescribed burn, there was very little sand pine regeneration in the burn unit.

The first planting project at the Rosemary Scrub Natural Area occurred in October 2001, when 15 silk bays were planted just west of the parking area. At the same time, exotic grasses and ferns were removed from the area. In November 2001, 18 cabbage palms were relocated from a Palm Beach Community College construction project and planted in disturbed areas around the parking lot. In December 2001, 16 live oaks were planted in disturbed areas around the parking lot. In March 2003, 20 cabbage palms and 20 saw palmettos were planted in and around the parking area. At the same time, love vine was removed from several oak trees in the vicinity of the parking lot. In June 2003, live oak, gumbo limbo, coco plum, wax myrtle and sea grape were planted in the south-east corner of the site near the parking area. In October 2004, 1,000 sand pine seedlings were planted in three areas in the northern portion of the site, in areas that were burned in March 2000. These seedlings were planted because the burn was deemed unsuccessful in sand pine recruitment. Only 20-30% of the planted seedlings survived. In March 2005, 500 additional sand pine seedlings were planted on the southern and northeastern portions of the site.

This time, irrigation was added at the same time to help increase the survivorship of the plantings. In June 2005, 75 slash pines were planted in the northwest portion of the site. In November 2005, 150 live oaks seedlings were planted in the northeast and southern portion of the site. In March 2006, 126 native trees and shrubs were planted in areas around the parking lot. In July 2006, 1,000 saw palmettos were planted, with irrigation, in various locations around the site.

In August 2003, a man crashed his vehicle into the fence in front of the natural area, causing minimal damage to the fence. The natural area was then struck by Hurricanes Frances and Jeanne in September 2004. As a result of these hurricanes, the site suffered damage to the parking area and adjacent fencing, and had many trees blown down. All of this damage was subsequently repaired or cleaned up. Hurricane Wilma in October 2005 did not cause any significant damage to the natural area. A small wildfire occurred near the nature trail in June 2006. This fire was of unknown origin and burned about 0.1 acres. The wildfire killed eight sand pines and destroyed one of the Tillandsia epicenters.

2. PURPOSE

The primary purpose of the Rosemary Scrub Natural Area acquisition was to ensure the preservation of high-quality scrub and scrubby flatwoods communities, together with their component rare plant and animal species. It has been estimated by ERM that more than 98% of the scrub located in Palm Beach County has already been converted to other land uses. Scrub is listed as G2/S2 by the Florida Natural Areas Inventory (FNAI), which indicates that this natural community is imperiled both globally and in the state (FNAI 2007). In addition, eight plant and seven animal species recorded on the site have been listed by at least one government agency or nonprofit environmental organization (Table 1).

The natural area has been developed as a publicly-owned and operated, natural resource-based, passive outdoor recreational site. The site also is used for environmental education and scientific research. A nature trail, hiking trail and management road have been constructed, using previously existing trails where appropriate. Interpretive markers have been placed along the nature trail to identify the site's resources and their significance. Both the preservation and recreation components of this project have helped Palm Beach County and the City of Boynton Beach comply with portions of their respective comprehensive plans. Preservation of the natural area also helps protect the quality and quantity of local groundwater resources. All signs, literature, and advertising have identified the project site as being publicly owned and operated as a natural area and passive outdoor recreational site, and as having been purchased with funds from the Environmentally Sensitive Lands Bond Referendum of March 1991 and from Florida Communities Trust's Preservation 2000 Program. The City of Boynton Beach has changed the land use designation for the site to Conservation and assigned a zoning designation of Recreation to the site.

The Rosemary Scrub Natural Area consists largely of scrub and scrubby flatwoods natural communities (Figure 2). These communities, which can be considered high-quality within the context of urbanized southeastern Florida, have been somewhat degraded over time as a result of fire exclusion, pest plant invasion, construction of adjacent roads and buildings, illegal dumping, off-road vehicle traffic, and other human-related disturbances. Maintaining and improving the ecological quality of these communities will continue to be a goal of future management efforts for the natural area. These management efforts will include continuation of the invasive vegetation control program and implementing a prescribed burn program for the site.

Management activities for the site are coordinated under the direction of ERM, in cooperation with the City. Volunteers from the community assist in maintaining trails, removing invasive vegetation, and performing other site management activities. The natural area will continue to be managed under the "single-use" concept, which means that it will be managed to preserve and restore natural resource values. Scientific research, environmental education, and passive resource-based recreation will be encouraged so long as they do not jeopardize the protection of natural resources. In general, passive recreation includes such activities as nature appreciation and study, hiking and photography.

Joint acquisition and funding of the site, along with the installation of public use facilities helped the County and the City implement several policies within their respective Comprehensive Plans as they existed at the time of the acquisition. The project furthered City Comprehensive Plan directives to 1) develop and maintain a high-quality natural environment based on the preservation of local natural resources (Conservation Element Goal 4.0); 2) preserve 75% of all high-quality sites identified on the Conservation Overlay, which included the Rosemary Scrub (Conservation Element Objective 4.4); 3) protect the natural habitats for listed species (Conservation Element Objective 4.6); 4) preserve and protect native habitats; 5) request assistance from (Conservation Element Policy 4.4.2) and to participate in (Intergovernmental Coordination Objective 8.24) the land acquisition efforts of the County and the State; 6) cooperate and participate in land acquisition/preservation efforts by the County and State; and 7) achieve levels of services for recreation, as established in its Comprehensive Plan (Recreation and Open Space Element, support document). The County's Conservation Element directed the County to preserve native upland habitats, with priority given to environmentally sensitive land (Objective 2.1) and habitat of significant value to existing populations of listed species (Objective 2.4) and specifically called for the acquisition and management of parcels identified as environmentally sensitive (Policy 2.1-f).

The Rosemary Scrub Natural Area will continue to be managed to protect and maintain native biological diversity and ecosystem functions in perpetuity. The management of this site will be coordinated with the management of other County-managed sites as part of a county-wide system of natural areas. The following objectives will continue to guide the formulation of management policies:

1. Maintenance of ecological integrity by ensuring the long-term viability of native upland biological communities and the protection of listed plant and animal species on the natural area;
2. Provision of viable habitat for other non-listed wildlife species that use, or could potentially use, the natural area;
3. 3) Restoration of disturbed areas back to the original vegetative community or an appropriate successor community and restoration of highly disturbed areas (including areas previously dominated by Brazilian pepper) to scrub and scrubby flatwoods;
4. 4) Maintenance of exotic pest plant vegetation cover to no more than 1% of the total vegetation coverage, exclusion and/or removal of nonnative animals having a detrimental effect on the natural area, and reduction of the coverage of invasive native vines;
5. Provision of facilities and development of policies for public use that allow for passive, resource-based recreational uses, scientific research, and environmental education activities that do not have a detrimental effect on the natural area; and
6. Maintenance of appropriate security and access control measures to prevent unauthorized activities, such as use by off-road vehicles, illegal dumping, lewd acts, collection of plants, poaching and harassment of animals.

3. STRUCTURES AND IMPROVEMENTS

3.1 EXISTING AND PROPOSED PHYSICAL IMPROVEMENTS

The major structures and improvements are described in the following sections and shown on the facilities map (Figure 3). These structures and improvements help to achieve the goals of preserving and restoring the natural resources of the natural area while providing for compatible public uses. The accessible nature trail and parking area comply with Americans with Disabilities Act (ADA) requirements. These facilities occupy approximately 0.48 acres.

Many of the structures and improvements, including a kiosk, signs, the ADA trailhead and the parking area, were placed within previously disturbed areas. An accessible nature trail starts from the parking area, first heading in a north-westerly direction, and then heading west and south, before returning to the parking lot. A hiking trail loops from the northern end of the nature trail. The management road and hiking trail were placed within previously disturbed areas on the site to avoid impacts to native vegetation.

Construction of the structures and improvements was done in compliance with all applicable state, regional and federal laws and regulations. A building permit was obtained from the City and a copy of the permit was provided to FCT. No restroom facilities were provided on the site because of its relatively small size and urban location. Written approval from FCT will be requested prior to the construction or installation of any buildings, structures, improvements, or signs or any removal of native vegetation or major land alteration not discussed in this management plan. Evidence was provided to FCT that all required licenses and permits were obtained prior to the construction of the existing public use facilities.

3.1.1 Fencing and Gates

Due to the sporadic incidence of undesirable off-road vehicle traffic, as well as the potential for poaching of native plants and wildlife from the site, and the historic dumping of trash, the entire Rosemary Scrub Natural Area perimeter has been fenced. Fencing, together with boundary roads and firebreaks, help control the dumping of debris onto the site.

A 7-foot chain-link fence has been installed along the northern, eastern and southern boundaries of the natural area. Galvanized chain-link fencing has been installed on the northern and southern boundaries, and black-vinyl-coated chain-link fencing has been installed on the eastern boundary

of the site along Seacrest Boulevard. The fencing was buried one foot in the ground, so that it approximately six feet extends aboveground. The buried portion of the fence is necessary to help keep reintroduced gopher tortoises from leaving the protection of the site. There is an existing chain-link fence on the western boundary of the site. Post-and-rail fencing with wire mesh stapled to the back side was installed around the perimeter of the parking area. Fencing was installed within previously mowed areas whenever possible to minimize impacts on intact natural communities.

Four access gates were installed on the natural area (Figure 3). One gate was installed at the northeast corner of the site to allow vehicle access to the northern boundary maintenance road/firebreak and electrical transmission line easement. Two 16-foot-wide swing gates were installed at the parking area from Seacrest Boulevard. These gates serve as the parking lot entry and exit gates and provide the public with access to the Rosemary Scrub Natural Area. A maintenance vehicle access gate was placed at the southwest end of the parking lot to access the southern boundary maintenance road/firebreak.

3.1.2 Signs

A permanent dedication sign, which was installed in the parking area, identifies the site as a natural area and passive outdoor recreation site which is open to the public; as having been purchased with funds from the County, the City, and FCT; and as being managed by the County with assistance from the City. An entrance sign was erected at the entrance to the parking area and a sign indicating the hours of operation was placed on the side of the entrance road. A natural areas rules sign was installed at the start of the accessible nature trail. Perimeter signs were placed along the boundary fence. These signs state that the site is a protected natural area and cite the appropriate County and City ordinances. Markers were placed along the nature trail with station numbers corresponding to an interpretive guide. A new interpretive trail guide was developed for the natural area in 2005.

3.1.3 Interpretive Facilities

A kiosk was constructed adjacent to the public parking area near the entrance to the accessible nature trail (Figure 3). The kiosk contains educational exhibits that provide general information about the natural area, including natural communities, listed species, and other natural features of

interpretive value. The kiosk was constructed within a previously disturbed area, and thus did not impact any intact natural communities.

3.1.4 Boundary and Management Roads and Firebreaks

The City requires that a firebreak be maintained where the natural area abuts residential areas. The existing mowed area has been reduced to a width of 15 feet and has been and will continue to be maintained as a boundary/management road and firebreak on the eastern and southern borders (Figure 3). On the northern border, the cleared area associated with the power transmission line averages less than 15 feet in width. Nearly all of the vegetation that was removed in constructing the northern firebreak was either exotic or ruderal.

Boundary roads provide numerous benefits, including more rapid access in the event of a wildfire, protection of adjacent areas from wildfire, and facilitation of the monitoring of dumping and other illegal activities along the preserve edge. The road/firebreak is an unimproved sand road and is maintained at a width of no more than 15 feet, which is the standard width of boundary firebreaks used by the Florida Department of Environmental Protection (DEP) on state lands. This road is used primarily for resource management and onsite monitoring. Prior to construction, the boundary road/firebreak location was surveyed for listed species. Any listed species found during construction of the management road/firebreak area were either avoided or relocated on site.

A previously existing sand off-road vehicle trail ran east-west through the center of the site and was accessed from the eastern boundary firebreak during the last prescribed burn in March 2000. Prior to the prescribed burn, this trail was widened to the full 15-foot width to serve as a temporary management road/firebreak. Any listed species found within the management road/firebreak prior to its widening were relocated elsewhere on site or the path of the road was changed to avoid impacting these species. Although the trail existed prior to the first prescribed burn in March 2000, it has not been used as a management road/firebreak since that time. This firebreak has since been allowed to regenerate with native vegetation. The firebreak will be utilized again for the next prescribed burn scheduled in 2020.

3.1.5 Trails

The primary interpretive feature for public access is an ADA accessible nature trail that is approximately 943 feet long (Figure 3). A looped sand hiking trail is approximately 1,326 feet in length and connects to the nature trail (Figure 3). The management road/firebreak is also available for use as a hiking trail. The nature trail and the hiking trail were both constructed on existing paths, trails, and disturbed portions of the site. Public use of existing secondary trails leading off the nature trail, hiking trail, and management road has been discouraged by placement of brush and dead vegetation to close off access to those trails. The trails are being allowed to re-vegetate naturally. All trail locations were surveyed for listed species prior to trail construction. Several large-flowered rosemary plants were observed within the proposed location of the nature trail. As a result, the nature trail was rerouted to minimize impacts on these species.

The nature trail originates at the parking area and starts out in a northwesterly direction. The trail is comprised of 4-inch-thick poured and formed concrete with a non-slip finish and is 5 feet wide so that it can accommodate wheelchairs. Wooden markers were installed along the trail. The numbers on the markers correspond to a trail guide with interpretive information. The accessible interpretive facilities fulfill ADA requirements.

The hiking trail has a natural soil base and is maintained at a width of at least 3 feet. This trail is used for foot traffic only; it is not intended for vehicle access or use as a firebreak. The hiking trail is available for public use, but will not be improved or marked for interpretive purposes.

The perimeter management road is used primarily for resource management and on-site monitoring. This management road also functions as a firebreak to protect adjacent buildings. Prior to the prescribed burn in March 2000, the management road was widened beyond a minimum 10-foot maintenance width to serve as a firebreak. After the prescribed burn, the firebreak was allowed to regenerate and the maintenance road has been maintained at the specified maintenance width. The management road is available for public use as a hiking trail, but has not been improved or marked for interpretive purposes.

3.2 EASEMENTS AND CONCESSIONS

A 7-foot-wide transmission line easement runs east-west along the north boundary of the project. An 80-foot wide road easement for the extension of Miner Road runs from Seacrest Boulevard

westward into the site, a distance of 324 feet. This easement extends 40 feet north and 40 feet south of the line between Sections 9 and 16, and is just south of the southern property boundary for the adjacent convenience store. A 50-foot wide posted and viewed road exists from the western end of the road easement and runs west to the western limit of the natural area. The posted and viewed road extends 25 feet north and 25 feet south of the line between Sections 9 and 16. Since neither the posted and viewed road or the road easement are needed for public purposes, a request to release/abandon those portions of the posted and viewed road and road easement lying within the natural area will be sent to the proper authorities. The northernmost 20-foot-portion of the 80-foot road easement also is a utility easement. Another 10-foot utility easement runs east-west across the site and lies 30 to 49 feet south of the section line. A 6-foot utility easement runs along the western and southern borders of Lot 10 in the southeast corner of the site.

A conservation easement over the natural area was granted by the County and accepted by SFWMD on June 14, 2007. Conservation easements are one of the most popular conservation tools employed by local and regional land trusts. Approximately 2.6 million acres have been protected in the United States through conservation easements (www.nature.org). Palm Beach County wishes to grant conservation easements to both governmental agencies (e.g., the South Florida Water Management District) and nonprofit organizations (e.g., The Nature Conservancy) as a means to provide an additional layer of protection for all of its environmentally sensitive lands. Conservation easements will help to prevent the future development of these lands and their use for purposes other than those for which they were acquired.

No additional easements, concessions, or leases are anticipated at this natural area at this time. If any of the following activities or interests are ever proposed at the natural area, the County will provide FCT with at least 60 days prior written notice and will provide information to FCT, upon reasonable request, so that FCT may evaluate the legal and tax consequences of the proposed activity:

1. any lease of any interest in, or operation of any concession on, the Rosemary Scrub Natural Area to any person or organization;
2. any sales contract or option to buy things attached to the Rosemary Scrub Natural Area to be severed from the site, with any person or organization;

3. any use of the Rosemary Scrub Natural Area by any person other than in such person's capacity as a member of the general public;
4. a management contract for the Rosemary Scrub Natural Area with any person or organization; and
5. such other activity or interest as may be specified from time to time in writing by FCT.

These activities or interests may not be permitted because they may have negative legal and tax consequences under Florida law and federal income tax law.

3.3 PUBLIC ACCESS

Public access to the Rosemary Scrub Natural Area is provided via Seacrest Boulevard to an on-site parking lot. Bicycle racks are provided to encourage the use of alternative transportation to the site. A concrete sidewalk on the west side of Seacrest Boulevard provides pedestrian access to the site. The natural area is open to the public during daylight hours. The hours of operation are posted at the site. Accessible parking and an accessible nature trail have been provided. There are no permanent water bodies on or adjacent to the site; therefore, no water body access is planned.

A 0.37 acre parking area containing five parking spaces and one bus space has been constructed off Seacrest Boulevard in the southeastern corner of the site. The parking area holds a maximum of six vehicles. The area impacted by this parking area was disturbed by previous land-clearing and mowing activities. A survey was conducted within the proposed parking area prior to its construction to verify that no listed species would be impacted.

4. KEY MANAGEMENT ACTIVITIES

4.1 MAINTENANCE

ERM has assumed primary responsibility for site management. Responsibilities for management of the natural area are outlined in the interlocal agreement between the City and the County (Appendix E). Maintenance activities include litter cleanup, invasive vegetation control, prescribed burning, trail maintenance and facilities maintenance (i.e., fences, gates, kiosk and parking area). Volunteers assist in trail maintenance and litter pickup.

In the unlikely occurrence that an unforeseen event, either natural or human-caused, severely alters the natural values of the natural area, ERM staff will assess the nature of the alteration and will take remedial action to secure and/or stabilize the site if necessary. Natural events such as fires, floods and hurricanes may shift the ecology of the site from its present condition and cause damage to human-made structures (i.e., kiosk, signs and fencing), but in no way would they severely limit or eliminate the natural values of the site. The first priority following a natural or human-caused event will be to secure the site with any necessary fencing repairs and gate closures to prevent dumping and vandalism.

Following a natural or human-caused event, the natural area may be closed for public use until the site is stabilized and repairs are made to the structures. The native communities on the natural area will be managed in a manner that facilitates the natural regeneration of native communities following such an event. The County will inform the City of the altered condition of the site, and future management plans and objectives. If the natural values of the site are severely limited or eliminated, the City, County and State will discuss future plans for the site. All major events affecting the native communities of the natural area will be discussed in the subsequent annual report to FCT. Management practices will be modified for the new condition of the site, and the management plan will be updated to reflect these changes.

4.1.1 Removal of Debris and Litter

All significant debris located within the site was removed by the County prior to the receipt of state matching funds for the property. Any remaining debris was subsequently removed, unless such removal would have caused undesirable damage to natural communities or listed species. Two mounted trash cans were installed - one adjacent to the kiosk, the other in the middle of the

parking area. Both trash cans are serviced weekly by the City. The perimeter fence functions to prevent the dumping of trash and hazardous material on the site. Periodic site clean-ups to remove litter are conducted by City and/or County staff with volunteers.

4.1.2 Trail Maintenance

Periodic trail maintenance is performed by City and/or County staff and community volunteers. All trails which are not necessary for site management, or which are not part of the designated hiking trail are not being maintained. This discourages their use by members of the public and is allowing the trails to become vegetated with native species.

4.1.3 Facilities Maintenance

County staff is responsible for the upkeep of fences, gates, interpretive facilities, parking area, and signs. The City will continue to mow the firebreak/boundary road on a periodic basis, with the County performing supplemental mowing as needed.

4.2 SECURITY

The City has assumed primary responsibility for public safety and law enforcement at the natural area. This includes routine patrols of the boundaries and the prevention of vandalism, vehicular trespass, dumping, and damage to the property and natural resources. There are no on-site managers or security guards at this site. The County currently has no local stewards for the site.

The County has adopted a Natural Areas Ordinance (No. 94-13) that regulates public use of the natural area. The ordinance provides for passive recreational activities such as hiking, nature study, and photography; for environmental education; and for scientific research. It prohibits destructive uses such as off-road vehicle use, dumping, and poaching of plants and animals. The ordinance gives law enforcement personnel the authority to arrest persons damaging a natural area. Section 58.02 of the City Code of Ordinances also prohibits dumping on property owned by others. No dogs, cats or other pets are permitted on the Rosemary Scrub Natural Area. No vehicles (e.g., ORV's, bicycles and skates) are permitted beyond the parking area, except during staff authorized maintenance activities.

The natural area is open to the public during daylight hours only. Access hours are posted at the main entrance. Either the City or a steward is responsible for opening and closing the main gate.

Access gates for the maintenance roads remain locked when not in use. Only the City and the County have keys for these gates.

4.3 STAFFING

Because of the relatively small size of the Rosemary Scrub Natural Area, there will be no on-site staffing. However, ERM has created a management team that has assumed responsibility for management at this site and other County-owned natural areas. This management team has been trained to conduct all levels of management activities including invasive vegetation control, prescribed burning and monitoring. City staff and volunteers from local citizens' organizations provide additional support where feasible and necessary. There is strong support for the protection of the natural area from homeowners in the neighborhood adjacent to the sites, who have indicated that they wish to be involved in management activities. It is anticipated that site stewards, and individuals from the community and local environmental organizations will continue to be trained by County staff to lead nature walks on the site.

4.4 NATURAL RESOURCE PROTECTION

The primary goals of site management are to enhance and maintain the scrub and scrubby flatwoods natural communities, including their component species, as described in Appendix A. Particular care will continue to be exercised to prevent the extirpation of listed species from the site. Habitats for listed species are being managed for the needs of individual species when such management is compatible with the overall management of the ecosystems on the natural area. This site is being managed in conjunction with other publicly-owned conservation lands in south Palm Beach County in order to provide synergistic benefits for resource conservation and to promote the recovery and maintenance of listed animal species.

Long-term resource management of the site began with the baseline inventory and assessment of natural communities and listed species (Appendix A). A thorough day-long survey of vegetative communities and plant species on this site was conducted by ERM staff in October 1994. The information from this survey was combined with data from earlier ERM staff surveys dating back to January 1991 during the preparation of the baseline assessment. This assessment was used as the basis for the initial management activities used to protect, restore, and preserve the natural resources of the site and to help determine the location and type of passive public recreation use facilities. Subsequent monitoring activities have identified additional species at the site and have

added to the overall knowledge of the native ecosystems found at the site. All of this information has been used in this first revision of the Rosemary Scrub Management Plan.

Information on all listed species recorded for the site will continue to be reported to FNAI on the forms provided in Appendix J. Because of the upland characteristics of the site, no hydroperiod restoration projects are proposed for the site.

4.4.1 Management of Natural Communities

The Rosemary Scrub Natural Area is managed under the "single use" concept, which means that it is and will continue to be managed in a manner that perpetuates natural resource values. Two native vegetation communities are present on the site (Figure 2): scrub and scrubby flatwoods. Where past human activities have caused the degradation of natural communities, efforts will continue to be made to restore these communities to a pre-disturbance condition. Prescribed burning and invasive vegetation control are the primary management techniques used. These management activities are discussed in Section 5.1, Restoration Methods, and Section 5.1.3, Invasive Species Control. The specific types of management and enhancement activities recommended for each vegetation community present on the natural area are described in the following sections.

4.4.1.1 Scrub

The scrub community has been, and will continue to be, enhanced and maintained through the implementation of prescribed burning and invasive vegetation control programs. A specific fire management plan was written for the site within one year of the acquisition of the property, and half of the scrub on the site was burned in March 2000. The other half of the scrub habitat is scheduled to be burned in 2020. Future management burns in each unit will follow at intervals of 40 years. Only half of the site's scrub habitat will be burned at a time in order to provide a refuge for scrub-dependent plants and animals on the unburned half. This interval will also provide time for sand pine regeneration on the burned portion of the site before second half is burned. As with most scrub areas this site may burn in a patchy manner, and pre-burn mechanical cutting of some vegetation may be needed for safety reasons. It is possible that portions of these areas may not burn well, and may require frequent ignition points and the use of spot fires.

The invasive vegetation control program instituted in 1996 involves hand-pulling, selective pruning, and/or selective herbicide treatments as described in Section 5.1.3, Invasive Species

Control. The initial program has been completed and follow-up treatments are conducted on an annual to semi-annual basis.

4.4.1.2 Scrubby Flatwoods

The scrubby flatwoods area in the northwest corner of the site will continue to be maintained through the implementation of the prescribed burning and invasive vegetation control programs. A specific fire management plan was written for the site within one year of the acquisition of the property, and this habitat was burned in March 2000. Because scrubby flatwoods burn at a shorter interval than scrub, this habitat will be burned each time one of the scrub units is prescribed burned. This small area will be burned at intervals of 15 to 20 years. Because scrubby flatwoods communities are more flammable than scrub, when a maintenance burn of this community coincides with that of the adjacent scrub community, it should enhance the effectiveness of the prescribed fire by helping to ignite the scrub community.

The invasive vegetation control program for this community involves hand-pulling, selective pruning, and/or selective herbicide treatments as described in Section 5.1.3, Invasive Species Control. The initial program has been completed and follow-up treatments are conducted on an annual to semi-annual basis.

4.4.1.4 Former Disturbed Scrub

The former disturbed scrub areas on the site have been restored to scrub through the removal/control of invasive vegetation and the replanting of appropriate native trees and shrubs. From now on, these areas will be managed the same as their “parent” scrub community.

Those former disturbed scrub areas which are within Unit 1 (Figure 4) were included in the first prescribed burn in March 2000. The remainder of the former disturbed scrub areas will be burned whenever Unit 2 (Figure 4) is burned. This unit is tentatively scheduled to be burned in 2020. Prescribed burning of the former disturbed scrub areas will continue to remove/control invasive vegetation and encourage scrub regeneration.

The invasive vegetation control program used in the former disturbed scrub areas involved hand-pulling, selective pruning, and/or selective herbicide treatments as described in Section 5.1.3, Invasive Species Control. The initial program has been completed and follow-up treatments are conducted on an annual to semi-annual basis.

4.4.2 Protection and Enhancement of Listed Species - Flora

Eight plant species recorded at the natural area have been listed by at least one of the following: United States Department of the Interior, Fish and Wildlife Service (USFWS); Florida Department of Agriculture and Consumer Services (FDACS); and FNAI. These species are listed in Table 1 and are discussed in Appendix A. Definitions of the legal status and rank designations used are provided in Appendix D. The following sections summarize and prioritize the recommended procedures for management of these species.

4.4.2.1 Priority A

Priority A species are species considered by FNAI to be imperiled or critically imperiled in Florida. These species should receive the highest level of management attention. Under no circumstances should extirpation of these species from the natural area be allowed to occur. When possible and appropriate, efforts should be made to increase the size of existing populations.

No Priority A species are currently found on the site.

4.4.2.2 Priority B

Priority B species are species considered by FNAI to be rare in Florida. These species should receive significant management attention. Under no circumstances should extirpation of these species from the natural area be allowed to occur. When possible and appropriate, efforts should be made to increase the size of existing populations, so long as this does not adversely impact natural community-level management of the site.

Curtiss' milkweed (*Asclepias curtissii*)

This perennial forb was originally recorded at the natural area by ERM in July 1991, when several individuals were located in the sandy ecotone between the scrub and scrubby flatwoods natural communities. This species is and will continue to be monitored on an annual basis. Because of the small size and inconspicuous appearance of this plant when not in bloom (Ward 1978), individuals along open sandy trails are often the only ones spotted, even though more plants may be present in vegetated areas. This species has been and will continue to be protected by maintaining open sandy habitats through implementation of the prescribed burn program.

Large-flowered Rosemary (*Conradina grandiflora*)

This short-lived, low shrub is widespread in the scrub habitat at the natural area. A few individuals in declining health were originally found on the natural area in January 1991. This species has increased in numbers throughout the years. This shrubby mint lives for three to four years and produces large quantities of seeds. Open, sunny sites are most favorable for seed germination and flower and seed production, although this plant will grow in the shade in a less vigorous condition. This species has been, and will continue to be, protected through implementation of a prescribed burning program that maintains a portion of the scrub habitat in the early successional stage favored by this plant.

Nodding pinweed (*Lechea cernua*)

This perennial forb was originally recorded at the natural area by ERM in January 1991. A small population continues to be present along the edges of the previous central sand trail in the western portion of the site. This population had been somewhat impacted by intermittent off-road vehicle traffic when the road was still in use, but has since become stable with discontinued use of the road. It is a pioneer, open-sand scrub species that requires full sunlight and a lack of competition from other scrub herbs. This species tends to be located in areas of past disturbance. It has been, and will continue to be, protected by implementation of a prescribed burning program that maintains a portion of the scrub habitat in the early successional stage.

4.4.2.3 Priority C

Priority C species are those listed as endangered or threatened by FDACS, but not listed by FNAI. These species should receive moderate management attention. At a minimum, extirpation of these species from the natural area should be prevented. When possible and appropriate, efforts should be made to increase the size of existing populations, so long as this does not adversely impact natural community-level management of the site.

Giant sword fern (*Nephrolepis biserrata*)

This terrestrial fern was originally recorded at the natural area by ERM in October 1994. This species will continue to be protected by enhancing and maintaining the natural communities in the natural area.

Common wild pine (*Tillandsia fasciculata*)

Reflexed wild pine (*Tillandsia balbisiana*)

Giant wild pine (*Tillandsia utriculata*)

These epiphytic bromeliads were originally recorded at the natural area by ERM in January 1991. They are not fire-tolerant, but can quickly recolonize burned areas. They are endangered (*T. fasciculata* and *T. utriculata*) and threatened (*T. balbisiana*) because of attack by the bromeliad weevil. These species will continue to be protected by enhancing and maintaining the natural communities on the site, by monitoring the mortality caused by the bromeliad weevil, and by protecting the site from plant collectors. One of the *Tillandsia* epicenters was destroyed by a wildfire in June 2006.

Shell-mound pricklypear (*Opuntia stricta*)

This shrubby cactus was originally recorded at the natural area by ERM in October 1994 in the disturbed scrub habitat in the southwest corner of the site. The small population of this species was intermittently impacted by mowing of this habitat before the site was purchased. This species will continue to be protected by limiting mowing to the perimeter management road/firebreak, relocating individual plants out of the management road/firebreak, and implementing a prescribed burning program to maintain the scrub communities.

4.4.2.4 Priority D

Priority D species are species listed by FDACS as commercially exploited. These species should receive some management attention. Reasonable steps should be taken to encourage the continued existence of these species at the natural area.

No Priority D species are currently found on the site.

4.4.3 Protection and Enhancement of Listed Species - Fauna

Seven animal species recorded at the natural area have been listed by at least one of the following: FNAI, FFWCC, and USFWS (Table 2). Recommended procedures for management of these species are described in the following sections. County staff has and will continue to coordinate with FFWCC for appropriate guidance, recommendations, and necessary permits to avoid impacts on listed animal species on the natural area.

4.4.3.1 Priority A

Priority A species are species considered by FNAI to be critically imperiled, imperiled, or rare in Florida and/or are known to occur in viable numbers with a resident or breeding population at the natural area. These species should receive the highest level of management attention. Under no circumstances should extirpation of these species from the natural area be allowed to occur. When possible and appropriate, efforts should be made to increase the size of existing populations.

Florida scrub lizard (*Sceloporus woodi*)

This small, spiny-scaled lizard was originally recorded at the natural area in 2001. Efforts have been made to identify any populations of this species at the site. Coastal populations of this species are declining rapidly due to habitat destruction (Moler 1992). Habitat for this species will continue to be enhanced through the maintenance of scrub and scrubby flatwoods communities on the site by continued implementation of the prescribed burn program.

Gopher tortoise (*Gopherus polyphemus*)

Formal gopher tortoise population surveys began in 2001, with 6 active burrows recorded and an estimated 7 tortoises utilizing the natural area. A survey conducted in 2003 showed an increase in the gopher tortoise population to 13 active burrows and an estimated 12 tortoises. The 2005 survey recorded 7 active burrows with an estimated 7 tortoises. This decrease was thought to be caused by hurricanes and dog activity on the site. The latest survey was conducted in November 2007 and recorded 8 active burrows with an estimated 8 tortoises. While the number of tortoises and amount of suitable habitat at Rosemary Scrub are too low to consider the population viable, evidence of the tortoises maintaining current numbers suggests that the population has sufficient habitat to support the existing gopher tortoise population.

Rosemary Scrub is a 13.59 acre site comprised mostly of scrub-type habitats with the largest portion being scrub. Tortoises at the site appear to be distributed evenly throughout the site. Based upon estimates in Cox, et al. (1987), densities of tortoises in favorable habitats range between 1.3 to 1.7 tortoises per acre. Based on these range area requirements, the number of tortoises is either at or above capacity for the site.

The gopher tortoise is considered to be a keystone species in upland natural communities in Florida. Many other species of animals depend upon gopher tortoise burrows for critical habitat. The gopher tortoises' burrowing habits return leached nutrients to the surface and it serves as a seed dispersal agent for native grasses and forbs (Moler 1992). According to Moler (1992), the distribution of this species in southern Florida is limited and fragmented by unsuitable habitat and habitat loss due to urbanization, and tortoise populations are continuing to decline. The individuals on this site will be protected through the management and maintenance of the natural communities on the site. No relocation of additional tortoises to this site will be allowed because of the size of the existing tortoise population.

4.4.3.2 Priority B

Priority B species are species considered by FNAI to be rare in Florida, that do not have a viable resident population at the natural area, or those species that are transitory in southern Palm Beach County. These species should receive management attention. When possible and appropriate, efforts should be made to increase the size of existing residential populations, as long as this does not adversely impact natural community level management. Efforts also should be made to provide suitable habitat for transitory species, as long as this does not adversely impact community-level management. If viable numbers of a Priority B species are recorded at the natural area, or the species becomes established at the natural area, then this species should be elevated to Priority A.

American redstart (*Setophaga ruticilla*)

This migratory songbird was originally recorded at the natural area by ERM in April 1993, and has been observed on several other occasions. Kale and Maehr (1990) list its habitats in Florida as pine scrub, mangrove, hardwood swamp, cypress swamp, mesic hammock, mixed pine and hardwood forest, pine flatwoods, urban and agricultural environments, and sandhill. It is listed as transitory in coastal xeric scrubs in the Treasure Coast Region by Fernald (1989). Stevenson and Anderson (1994) noted that this species is more common in southern Florida during the fall migratory period than in the spring, and that the largest numbers in the spring are on the east coast. Habitat for this species will continue to be enhanced through the maintenance of scrub and scrubby flatwoods communities on site by continued implementation of the prescribed burning program.

Cooper's hawk (*Accipiter cooperii*)

This migratory hawk was first recorded at the site in 2003. Kale and Maehr (1990) listed its habitats in Florida as pine scrub, mesic hammocks, mixed pine and hardwood forest, pine flatwoods, sandhills, and agricultural environments. It is a common winter resident in much of Florida, but is not known to breed in Palm Beach County (Stevenson and Anderson 1994). Habitat for this species will continue to be enhanced through the maintenance of the natural communities on site.

Merlin (*Falco columbarius*)

This bird of prey was originally recorded at the natural area in 2001 and seen again in 2004. This species will be managed as a component of the natural communities on the site. Migrant merlins can be seen in Florida after the first fall cold front and some remain all winter. No special needs for this bird have been identified at the natural area. This species will continue to be protected by enhancing and maintaining the natural communities on the site.

Osprey (*Pandion haliaetus*)

This bird of prey was first recorded at the natural area in 1997, and has since been observed feeding at the natural area. It is found typically on or near large lakes, rivers and coastal areas where nesting sites can be found. It feeds primarily on fish. The species is not known to nest at the natural area. If an osprey nest is observed, visitor uses will be discouraged in the vicinity of the nest. No special needs for this species have been identified on this site. This species will continue to be protected by enhancing and maintaining the natural communities on the site.

Painted bunting (*Passerina ciris*)

This migratory songbird was originally recorded at the natural area in 2005. Kale and Maehr (1990) lists its habitats in Florida as dense, brushy vegetation along roads and woodland edges. It feeds primarily on seeds, but also eats small fruits and insects. According to Sibley (2001), there are two disjunct breeding populations of this species: an eastern population that breeds along the Atlantic Coast from southern North Carolina to north-central Florida; and a western population that breeds from southern Missouri south to southeastern Louisiana, west through Texas and south into northern Mexico. Birds from the eastern population winter in southern Florida, the

Caribbean, and southern Central America; birds from the western population winter in southern Mexico. Sibley (2001) noted that both breeding populations are declining significantly, that the eastern population uses coastal and riparian areas that are under significant development pressure and that the eastern population also suffers more from brood parasitism by the brown-headed cowbird, which has expanded its range into southeastern scrub habitat. This species will continue to be protected by enhancing and maintaining the natural communities on the site.

4.4.3.3 Priority C

Priority C species are species considered by FNAI to be rare in Florida but whose occurrence at the natural area should be considered accidental. Management specifically for these species at this site would therefore serve no meaningful purpose.

No Priority C species are currently found on the site

4.5 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

No archaeological or historic resources are currently known at the natural area (ERM 1993). If any archaeological or historic sites are discovered on the site, the County will comply with Chapter 267, Florida Statutes, specifically Sections 267.061(2)(a) and (b). The collection of artifacts or disturbance of any archaeological or historical site on the natural area is prohibited unless prior authorization has been obtained from the Department of State, Division of Historical Resources.

4.6 COORDINATION WITH ADJACENT LAND USERS

The successful ongoing management of the natural area will require the cooperation of the neighborhood residents. The City of Boynton Beach provides site security and is responsible for opening and closing the entrance and exit gates to the parking lot. Several local residents currently serve as site stewards and assist in the management of the site. The City may delegate opening and/or closing of the parking lot gates to one or more of the stewards.

County staff periodically uses press releases, newspaper articles, and other means to educate the surrounding community on the benefits of managed natural areas and the role of invasive plant control activities in maintaining the native habitat found on the site. The County has and will continue to review any proposed land use changes or development orders related to adjacent

properties. In addition, the County has and will continue to participate in the development and review process to ensure the protection of biological communities on the site and to avoid adverse impacts on listed species.

4.7 NATURAL AREAS MANAGEMENT ADVISORY COMMITTEE REVIEW

On August 16, 1994, the BCC adopted Resolution 94-1051, which established a seven-member Natural Areas Management Advisory Committee (NAMAC) to review and comment on management plans developed by staff for natural areas acquired and/or managed by the County and to hold public hearings on these plans prior to their review and adoption by the BCC. The first members of NAMAC were appointed on November 1, 1994. The membership categories currently include: a member with experience in the management of natural areas, a biological scientist, a professional educator with knowledge of South Florida ecosystems, a representative of a local municipal government public recreation program, a member of the Palm Beach County Parks & Recreation Department staff, a citizen having an interest in natural areas, and a citizen with an interest in natural areas.

As part of their responsibilities, the members of NAMAC held a public hearing on the initial management plan for the Rosemary Scrub Natural Area in November 1996. The public hearing was held in the evening at the Rolling Green Elementary School following an afternoon open house at which the public was able to review the management plan, and the public use facilities, and discuss these with County staff. Copies of the plan were available at public facilities, such as libraries, for two weeks prior to the open house and public hearing. Members of the public who could not attend the hearing were encouraged to submit written comments to the County during the week following the hearing.

NAMAC members took those comments into consideration prior to their approval of the initial plan and then recommended that the plan be forwarded to the BCC. Members of the public also were able to comment on the plan at the time it was considered and adopted by the Board in March 1997. This is the first revision to the initial management plan. Hereinafter, the Rosemary Scrub Management Plan will be reviewed every ten years by NAMAC and revised as necessary on the basis of new information, research data, improvements in management techniques, or other relevant factors. NAMAC has reviewed the revised plan at one or more publicly-noticed meetings. The public was allowed to comment on the revised plan at these meetings and provide written comments to County staff during a specified review period. The City of Boynton Beach,

as a management partner with the County, was invited to provide recommendations for revision of the plan and to participate in the NAMAC meetings.

4.8 ENVIRONMENTAL EDUCATION AND SCIENTIFIC RESEARCH

In conjunction with the construction of the nature trail, County staff prepared and installed interpretive markers keyed to a printed trail guide. The trail guide was updated in 2005. County staff has recruited and trained site stewards and will train interested stewards and local volunteers to give guided tours of the natural area. County staff also is available to assist the faculty of local schools in developing educational programs for school use of the natural area. The timing and frequency of the educational programs will depend on the interest shown in the site by the faculty of local schools. Local schools and youth programs have participated in several volunteer events at the natural area.

At this time, ERM staff does not anticipate performing any scientific research on site other than compiling and interpreting the data from monitoring activities. Researchers affiliated with local institutes of higher learning will be allowed to conduct scientific research on a permit basis.

5. RESOURCE ENHANCEMENT

Resource restoration and enhancement is ongoing throughout most of the natural area and will be coordinated with the land managers of nearby conservation and preservation lands. The principal restoration and enhancement activities undertaken at this site include invasive species control and elimination of inappropriate uses of the site. Active restoration (including direct seeding and out-planting) has been necessary in some areas. The goal of these activities is to restore all native vegetation communities to a maintenance condition. The high quality scrub and scrubby flatwoods communities occurring on the site will continue to be preserved and properly maintained to ensure the long-term viability of these vegetative communities.

5.1 RESTORATION METHODS

It should be recognized that even the largest and least disturbed sites in southeastern Florida have been impacted significantly by fragmentation from other natural areas, changes in the regional water table, air pollution, the loss of large predators and species extinctions. These types of impacts are mostly irreversible, given the current political and social realities of southeastern Florida. Almost all sites in southeastern Florida also have been affected by reversible changes such as the exclusion of fire and invasion by exotic pest plants.

In southeastern Florida, the exclusion of natural fire is one classic example of a reversible impact that can be at least partially mitigated through human intervention. Natural fire cannot be expected to travel between natural area fragments. However, this interrupted natural ecological function may be partially mitigated for through the use of prescribed burning as a management tool.

Human intervention also can help minimize adverse impacts related to invasive exotic plant species. Management techniques such as mechanical removal, herbicide treatments, prescribed burns, hydrological restoration/enhancement and planting native species, when appropriate, can help to minimize adverse impacts related to invasive exotic plants and to restore a more natural plant community.

The goal of this management plan is to provide guidance for the restoration and maintenance of as many of the functions and values of the historically-occurring natural communities on the natural area as possible. This restoration will continue to be accomplished through the

maintenance removal/eradication of exotic plant species, replanting with native species when appropriate, and exclusion of unauthorized uses. Areas of good to high-quality vegetation have been and will continue to be enhanced and preserved through the initial and maintenance removal/eradication of relatively small areas of exotic vegetation. Prescribed burns have been and will continue to be performed on this site.

5.1.1 Management Unit Design

The natural area is composed of a mosaic of historic natural vegetation communities that have been modified by fire exclusion, exotic pest plant invasions, hydrologic alterations, construction of adjacent roads and buildings, clearing and off-road vehicle traffic. Each of the two represented natural communities historically would have been part of a greater regional mosaic of upland ecosystems. The natural area is now completely isolated from nearby remnants of native vegetation, and is continuously affected by human and human-induced disturbances such as the dissemination of invasive species from nearby residential areas and predation by domestic pets.

The site has been subdivided into two management units (Figure 4). Each management unit encompasses natural vegetation communities, together with their ecotones. Management units have been designed to maximize the long-term diversity of natural vegetation communities and plant and animal species on the site. As described in Section 5.1.2, Fire Management, these units are small enough to allow for safe and practical fire management.

5.1.2 Fire Management

Both of the site's natural communities are dependent upon fire for their long-term restoration and maintenance. Given the extensive alterations that have been made to the local landscape, lightning-induced fires cannot be expected to fulfill the fire needs of these communities. In addition, given the proximity of the site to adjoining residential properties, major roads, and other forms of urban and suburban development, the risk of damage to these developments from wildfire is high. As such, the use of a combination of controlled, prescribed fire, together with firebreaks and other safety precautions, continues to be necessary to fully achieve the stated management objectives.

A successful prescribed burn was conducted in the scrub and scrubby flatwoods communities of Unit 1 in March 2000. The primary responsibility for prescribed burning is assumed by ERM. Assistance is provided by the City and/or Palm Beach County Fire-Rescue, including the

provision of fire-fighting staff and equipment to protect surrounding homes from damage. Additional assistance may be provided by the Florida Division of Forestry (DOF), FFWCC, TNC, and trained volunteers. Fire-related safety training is required of all County staff and others participating in a prescribed burn. All prescribed burns comply with the legal mandates stated in the Florida Prescribed Burning Act, Chapter 590.026 of the Florida Statutes.

The overall goal of the prescribed burn program is to introduce a fire regime (i.e., a repeatable pattern of fire with predictable results) onto the natural area that will sustain the predominant native vegetative communities. Specific objectives for different areas of the site will depend upon site conditions and other management objectives for that area. In general, these objectives will include:

1. To ensure the long-term existence and viability of the native vegetative communities, and the listed plant and animal species that utilize those habitats.
2. To control the regrowth and regeneration of invasive vegetation following treatment or removal activities.
3. To provide viable wildlife habitat for wildlife species that use, or could potentially use, the site.
4. To reduce the danger of wildfire by reducing the build-up of fuels that has resulted from the limited occurrence of fire in recent years.

A perimeter management road has been established as a permanent firebreak within the site to prevent potentially destructive wildfires, as well as to adequately control prescribed fires (Figure 3). Existing trails are used whenever appropriate. Management roads used as firebreaks are at least 15 feet wide at the time of a prescribed burn. Vegetation may be cut along the shoulders of specific management roads, if necessary, to widen them further prior to a controlled burn. After the burn, the vegetation is allowed to regenerate naturally, and management roads are maintained at a width of 10 feet to allow for maintenance vehicle access.

Prior to the construction of the management road, the area was surveyed for listed species. Whenever a listed species was found, the location of the road was adjusted to avoid affecting that species, or the listed species was relocated to another onsite location prior to construction of the

firebreak/management road. Management roads may be used for other management activities (e.g., exotic pest plant control) and as hiking trails.

The two burn/management units range in size from 6.6 to 7.0 acres. They are as large as possible for a relatively small site, so that fires can burn through ecotones and move in a more natural, spotty fashion across the landscape. The resulting patchwork of burned and unburned stands within a management unit produces a mosaic of vegetation at various stages of maturity, thereby maximizing diversity within and among communities. This provides habitat for individual species which typically use, or may even be restricted to, communities in a particular state of maturity. Burn units must not be so large that control of a prescribed fire and attendant smoke becomes difficult or uncertain. Depending on the specific conditions and objectives of a burn, a burn unit may be further subdivided into smaller units for conducting the prescribed burn.

Active fire suppression measures that rely upon the use of heavy machinery and plowlines are extremely destructive to vegetation and other natural features. Active fire suppression measures are to be avoided as much as possible, but will be used to safeguard adjacent residences if necessary. If such measures are undertaken to control a fire, all plowlines and other disturbed areas will be will be rehabilitated to the greatest extent possible.

An initial fire management plan was written for the Rosemary Scrub Natural Area in 1997. This plan was used during the March 2000 prescribed burn. An updated plan was prepared for the site in 2007 as the result of information learned from the 2000 burn and new fire management techniques. The updated fire management plan is provided as Appendix H. The development of this plan was coordinated with DOF and FFWCC. The plan considers the surrounding land uses, safety issues in the event of a wildfire, and the ecological consequences of specific fire management strategies. It also addresses each of the vegetation communities on the site.

The March 2000 burn was performed after a short period of rainy weather in what would turn out to be an extended dry spell. Most of the understory vegetation in the burn unit was chopped before the burn, and the resulting low-intensity burn allowed most of the sand pines to survive initially. However, the stress of the burn and the subsequent drought weakened the sand pines and triggered a pine bark beetle attack that ultimately killed all the pines in the burn unit and some of the pines in the adjacent unburned unit. The extended drought also had an adverse affect on sand pine seed germination and, as a result, there was very little sand pine regeneration in the burn unit.

A flexible, fire management program was initiated in 2000. Prior to burning a unit, a survey will be done for fire-intolerant listed plant species. If necessary, individual plants will be relocated outside the burn area. Fire management began with the prescribed burn of Burn Unit 1 in 2000, and will be followed by a burn of Unit 2 in 2020.

To the extent possible, the seasonality and frequency of prescribed fires should seek to approximate the natural incidence of fire in the site's communities. Generally, prescribed fires should be conducted during the early growing season, which extends from March to July. Natural lightning-induced fires normally occur during the growing season and natural incidence of winter fires is presumed likely to be quite low. Prescribed winter fires, therefore, should be similarly rare in occurrence to ensure that fire events correspond with the fire-adapted life histories and reproductive cycles of resident species. However, where fire has been suppressed for a long period of time and fuel loads have become heavy, prescribed winter fires may be used to begin restoration of a natural fire regime. Winter fires are generally cooler fires that can reduce accumulations of excess fuel while limiting the undesirable destruction of vegetation. In areas such as the Rosemary Scrub Natural Area, where safety is of the utmost concern, winter fuel reduction fires may be more appropriate, at least in the short term. Pre-burn mechanical cutting of understory vegetation may also be employed to lower fire intensity and reduce flame heights and to decrease smoke production by use of backing fires.

Backing fires and other techniques will be used for prescribed burns in the scrubby flatwoods natural community to reduce fire intensity and slash pine mortality. Slash pines are a natural component of the scrubby flatwoods community, and their population levels will be maintained in this habitat.

If a wildfire occurs, the fire suppression authorities will determine how and when the wildfire should be suppressed. The last wildfire known to have occurred on the site was in June 2006.

A public education campaign has been developed that includes informing residents of areas surrounding the natural area of the necessity and benefits of fire, the safety features of prescribed burning versus wildfires, and the strategies that will be developed to minimize the impacts of smoke on nearby communities. The County has and will continue to coordinate with the City prior to conducting a controlled burn. County staff has and will continue to meet with local community groups such as homeowners' associations before each burn to coordinate with residents, to provide information on the necessity of conducting prescribed burns, and to describe

the safety precautions that will be taken to protect adjacent lands. A pre-burn checklist is included in the fire management plan.

A specific burn plan will be prepared for each burn unit prior to conducting a prescribed burn. A summary of key information on prescribed burning is provided in the fire management plan (Appendix H).

5.1.3 Invasive Species Control

Many species of exotic plants have been recorded within the natural area, some of which are invasive. These species are included in Appendix B. The presence of numerous exotic plant species is typical for a small habitat preserve surrounded by urban and suburban development, and is not an indication that the site is of low quality. These species and additional exotic species will continue to colonize the site as long as sexually reproducing exotic plants are present in the surrounding urban and suburban areas.

Most of the invasive pest plant species at the natural area constitute a minor to moderate problem. Many have originated from vegetation dumping piles on the site's perimeter or have spread onto the site from the back yards of adjacent residences. Fourteen of the exotic plant species recorded for the site have been identified by the Florida Exotic Pest Plant Council (FLEPPC) as Category I, or those considered to be most invasive: Asian sword fern, asparagus fern, Brazilian pepper, Brazilian jasmine, carrotwood, earleaf acacia, laurel fig, natal grass, Australian umbrella tree, rosary pea, shrubverbena, Surinam cherry, sword fern and torpedo grass. Of these, Brazilian pepper, earleaf acacia, rosary pea, natal grass and torpedo grass have been a re-occurring problem at this site. Control of the Category I plants will continue to be the primary focus of the invasive plant control activities on this site.

Eleven of the exotic plant species have been identified by FLEPPC as Category II, or potentially invasive: bowstring hemp, Caesar's weed, Ganges primrose, Guinea grass, life plant, oyster-plant, puncture vine, queen palm, simple-leaf chaste tree, sisal hemp and wedeila. Of these, Caesar's weed and Guinea grass have been a re-occurring problem at the site. For the most part, these species prefer open, disturbed sites, and normally do not invade and disrupt functioning native plant communities. The control of exotic species that are normally not invasive will be given a low priority. They will be controlled through good management practices such as the elimination of unnecessary disturbances.

In this management plan, the phrase "invasive species" includes all those plants listed as Category I and II by FLEPPC, as well as certain species within the following three groups of plants: species of uncertain origin, ruderal species (species which are found almost exclusively in disturbed areas), and native plants. Although invasive exotic species are the traditional targets of eradication activities, invasive native species also can have adverse impacts on fragmented natural vegetative communities. This is especially true of aggressive native vines, which, with the exclusion of fire, often shade out preferred native trees, shrubs and herbs. When this is the case, portions of the site will be treated for invasive native species as needed on a case by case basis. Ruderal species usually are not problematic, but in some cases they can slow down or arrest restoration processes.

The capital portion of the invasive vegetation control program was initiated in 1995 and completed in 1998. Each of the individual treatments was conducted approximately six months apart, and the treated natural vegetation communities are now in a maintenance condition. Follow-up control activities are conducted on an annual or semi-annual basis. A management unit is considered to be in a maintenance condition (with regard to invasive species) when the cover of invasive tree and shrub species does not exceed one percent of the canopy or understory layers within any management year.

In this plan, invasive vegetation species are not discussed on a species-by-species basis, but are grouped into the following categories: (1) vines; (2) trees; (3) shrubs; and (4) groundcover. Management priorities and techniques for each of these categories are described in the following sections.

5.1.3.1 Vines

This category includes exotic and ruderal species, as well as aggressive native vines. If possible, exotic vines will be eradicated from the natural area. Aggressive native vines will be treated as invasive species until the site reaches a maintenance condition. Once this occurs, aggressive native vines will be allowed to regenerate until they reach historically accurate densities and cover.

Vines pose a significant threat to the natural communities at the natural area because they cover the leaves of shrubs and trees and cause death through the reduction of photosynthetic food production. Invasive exotic and native vines recorded at the natural area include balsampear,

fetid passionflower, Ganges primrose, love vine, muscadine, pink trumpet creeper, Brazilian jasmine and rosary pea. Of these, balsampear, fetid passionflower and rosary pea continue to be found on a regular basis during exotic treatments.

During invasive vegetation control treatments, most species of vines are cut at a height of six feet and again near ground level if they are growing into canopy trees. The bases of the vines are then hand-pulled or treated with an appropriate systemic herbicide. Vines remaining in the canopy are typically left to decompose in the trees. Vines growing on shrubs or saplings under six feet in height are cut near ground level and removed from the supporting plant. The bases of the vines are hand-pulled or treated with a systemic herbicide. Lateral stems of vines growing along the ground surface are cut, hand-pulled and/or treated with a systemic herbicide.

Love vine is a parasitic native vine that may become abundant in fire-maintained natural vegetation communities in the absence of fire. Love vine and muscadine are managed by utilizing physical removal methods. These species are also controlled through prescribed burning.

5.1.3.2 Trees

This category includes woody plants that typically grow over 12 feet in height. In the past, invasive exotic trees were not a major threat to natural communities in southeastern Florida. However, more recently, several species of exotic trees have become established in natural vegetation communities. These trees are especially invasive in disturbed and unburned fire-maintained communities. Invasive/exotic trees found at the natural area include carrotwood, laurel fig, mango, queen palm, Australian umbrella tree, Brazilian pepper and earleaf acacia. Of these, Brazilian pepper and earleaf acacia were the most problematic species when the site was purchased. These species are now under control.

During invasive vegetation control treatments, seedlings of invasive trees were, and continue to be hand-pulled. In general, saplings and mature trees were, and continue to be left standing and treated with an appropriate systemic herbicide. Because Brazilian pepper is a sprawling, shrub-like tree, special treatments such as cutting and mechanical removal were used in especially dense areas.

5.1.3.3 Shrubs

Shrubs are similar to trees, except that they generally affect a smaller area in the subcanopy and understory. Invasive/exotic shrubs that have been recorded at the natural area include Caesar's weed, corn plant, java glory bean, spineless yucca and Surinam cherry, aloe, Cape honeysuckle, cochineal cactus, shrubverbena, simple-leaf chaste tree, sisal hemp and valamuerto. Of these, Caesar's weed has been a re-occurring problem at this site.

During invasive vegetation control treatments, any seedlings of invasive/exotic shrubs were, and will continue to be, hand-pulled. Clumps of seedlings were treated with herbicides, and saplings and adults were, and will continue to be, cut near ground level and the bases treated with an appropriate systemic herbicide.

5.1.3.4 Groundcover

The groundcover category includes invasive/exotic grasses, sedges, perennial forbs, annual and short-lived forbs, and other low level herbaceous plants. These plants can become a significant problem in fire-maintained communities. Exotic and invasive groundcover recorded at the natural area include: Bahiagrass, Bermudagrass, Durban crowfootgrass, Guinea grass, natal grass, smutgrass, Baldwin's flatsedge, tropical signalgrass, torpedo grass, coast sandbur, gophertail lovegrass, bowstring hemp, aloe, Asian sword fern, Sprenger's asparagus fern, life plant, oyster-plant, sword fern, wedelia, coatbuttons, Florida tasselflower, llima, Madagascar periwinkle, puncture vine, rough Mexican clover, shrubby false buttonweed, rattlebox, tropical Mexican clover, zarzabacoa comun, common ragweed, common wireweed, largeflower Mexican clover, wandering jew and grassleaf lettuce. Of these, Guinea grass, rattlebox, torpedo grass and natal grass have been a re-occurring problem at the site.

During invasive vegetation control treatments, most invasive/exotic grasses were, and will continue to be, hand-pulled. It is possible that gopher tortoises are foraging on these grasses, so the use of appropriate herbicides will be used only when necessary. However, there are a few remaining clumps of Guinea grass on the natural area. This large grass has been and will continue to be controlled by cutting the plant down and treating the re-sprouts with an appropriate herbicide. Of most concern is torpedo grass which is capable of invading and disturbing natural community fragments. This species is best controlled through careful applications of an appropriate herbicide.

Invasive perennial forbs can become a problem in all types of natural communities. These species require special treatment. Because they have thick, succulent leaves that prevent herbicides from adhering or being absorbed, hand-pulling may be the only way to eliminate them. They have underground "tubers" and rhizomes that can break off and form new plants. Care has been taken to collect as many of these tubers and rhizomes as possible during invasive vegetation control treatments and remove them from the site. Bowstring hemp is difficult to eradicate, but can be successfully eliminated with selective herbicide use in conjunction with repeated excavation of untreated or resprouting underground rhizomes. Most of the bowstring hemp has been removed from the natural area, however, a few plants continue to resprout in the north-central portion of the site. This area will continue to be treated for this species until it no longer resprouts.

In general, annual or short-lived forbs cause temporary problems and are difficult to eradicate due to their high seed production. Most respond to disturbance; therefore, their populations will drop in numbers as the restoration process proceeds. All will be monitored to determine what (if any) actions should be taken in the future. Control measures, when necessary, usually involve hand-pulling of each individual and spot-treatment with herbicides. Lima, which is a woody-stemmed, short-lived forb, seemed to decline and disappeared from the natural area without the disturbance of periodic mowing.

5.1.3.5 Exotic Animals

One species of invertebrate (the imported fire ant), one species of amphibian (greenhouse frog) and six species of vertebrates (brown anole, northern curly-tailed lizard, European starling, monk parakeet, rock dove and Eurasian collard dove) recorded at the natural area are not indigenous to the south Florida mainland. Domestic dogs and cats may also use the site occasionally. The imported fire ant has been recorded in the former disturbed area. This aggressive ant has nearly eliminated the native fire ant from all native habitats except for intact scrub, and poses a threat to the young of ground-nesting birds. There are no effective and acceptable methods to control the ant at this time.

The northern curly-tailed lizard was first introduced from the Bahamas in the 1930s to control insect pests in sugarcane fields. It also is a popular species in the pet trade and is now common in a variety of habitats in its limited range, which includes Miami-Dade, Broward, and Palm

Beach counties (Bartlett and Bartlett 1999). No specific control strategy will be used for this species since their numbers are relatively low at this time.

According to Bartlett and Bartlett (1999), the brown anole was introduced into Florida in the early 1900s through shipments from the West Indies and is now common to abundant in the southern four-fifths of the peninsula. Although two subspecies, the Bahamian brown anole (*Anolis sagrei ordinatus*) and the Cuban brown anole (*Anolis sagrei sagrei*) were originally introduced into Florida, these have intergraded and are no longer considered to be subspecies (Bartlett and Bartlett 1999). They are considered by some authorities to compete with and reduce the population size of the native green anole, but will not be subject to population control methods unless a significant impact on the population of native anoles is observed.

Eurasian collard doves have been observed at the site. These species were introduced from Europe and now are common in urban areas of southern Florida. It is not expected that they use the site in any significant way. Potential control efforts for this species will be explored in the future if their presence threatens native species. European starlings have been seen on the edges of scrub bordering developed areas. The starling was introduced in New York a hundred years ago and quickly spread across the continent. It is bold and aggressive, and often competes successfully with native species for nest holes (National Geographic Society, 2002). These birds also compete with native bird species for food. Potential control efforts for this species will be explored in the future if their presence threatens native species. Rock doves have been seen flying overhead throughout the site. Being predominantly urban birds introduced from Europe, it is not expected that these doves use or affect the natural area in any significant way. Monk parakeets have also been seen flying overhead and are believed to be nesting in nearby residential areas. These parakeets compete for nesting cavities with native birds and are vectors for the spread of large-seeded exotic plants. Control efforts will not be utilized unless a significant impact is observed in the future. Control of domestic cats and dogs will continue to focus on educating the surrounding community and with selective live-trapping, if necessary.

5.1.4 Restoration and Management

Since its acquisition, Rosemary Scrub Natural Area has been the subject of eleven small restoration planting projects. The first planting project occurred in October 2001 when 15 silk bays were planted just west of the parking area. At the same time, exotic grasses and ferns were removed from this area. In November 2001, 18 cabbage palms were relocated from a Palm Beach

Community College construction project and planted in disturbed areas around the parking lot. In December 2001, 16 live oaks were planted in disturbed areas around the parking lot.

In March 2003, 20 cabbage palms and 20 saw palmettos were planted in and around the parking area. At the same time, love vine was removed from several oak trees in the vicinity of the parking lot. In June 2003, live oak, gumbo limbo, coco plum, wax myrtle and sea grape were planted in the south-east corner of the site near the parking area.

In February 2004, 1,000 sand pine seedlings were planted in three areas on the northern portion of the site that was burned in March 2000, because the burn was deemed unsuccessful in triggering sand pine recruitment. In two of the areas, a polymer was added to the planting hole to help absorb and retain water in the soil. However, when too much polymer was used during planting, expansion of the polymer following a rain event actually pushed some of the seedlings out of the soil, resulting in their death. Only a few seedlings survived in the easternmost planted area, even though the polymer was used in this area. The disturbed nature of the eastern planting area, altered soil characteristics which resulted from the adjacent road construction, a lack of a tree canopy to provide some protection from the intense sun and a lack of rainfall/irrigation may have been factors causing the low survivorship. The other two planted areas had a 20-30% survival rate after the first year.

In March 2005, 500 sand pine seedlings were planted on the southern and northeast portions of the site. Irrigation was added during this planting event to help increase seedling survival rates. 16% of these pines survived after one year. In June 2005, 75 slash pines were planted without irrigation in the northwest portion of the site. The plants were not watered after planting and, as a result, none of the plants survived.

In November 2005, 150 live oaks seedlings were planted in the northeast and southern portion of the site. No irrigation was added, but the plants were watered on a weekly basis.

In March 2006, 126 native trees and shrubs (scrub oaks, ficus, red bay, hog plum and gopher apple) were planted with irrigation in areas around the parking lot. In July 2006, 1,000 saw palmettos seedlings were planted in various locations around the site and these seedlings were also provided with irrigation.

5.2 COORDINATION WITH ADJACENT LAND USERS

Both direct and indirect impacts from adjacent land uses are to be expected. Direct impacts include illegal dumping, the invasion of exotic plant species from adjacent properties into the natural area, and the predation of wildlife by dogs and cats. These types of impacts will be mitigated through interpretive programs, public outreach, an aggressive exotic plant control program, and the enforcement of Natural Areas Ordinance (Appendix F) provisions concerning the prohibition of dumping and the allowance of pets on the natural area.

Perhaps the greatest off-site threats to the long-term management of the Rosemary Scrub Natural Area are public fear of fire and the general dislike of attendant smoke. Smoke management is one of the key issues addressed in the fire management plan. An active public education campaign has been developed that describes the necessity of fire, the safety features of prescribed burning versus wildfires, and the strategies that have been developed to minimize the impacts of smoke on nearby communities.

6. COST ESTIMATES AND FUNDING SOURCES

Cost estimates for long-term maintenance and operation of the site are provided in Table 3. Estimated annual maintenance and operation costs are expected to be \$78,294 per year in 2008 dollars. It is expected that annual maintenance and replacement costs will be paid using the Natural Areas Fund. All future expenditures by the County are subject to annual appropriations by the County's Board of County Commissioners.

The primary funding source for site development was the \$100 million Palm Beach County Environmentally Sensitive Lands Bond Referendum approved by the voters on March 12, 1991. The County has the primary responsibility for maintenance and management of the natural area, including supplemental mowing of the perimeter management road/firebreak. The City is responsible for periodic mowing of the perimeter management road/firebreak, site security and opening and closing the gates to the parking lot. Staffing for habitat management and facility maintenance will continue to be accomplished with existing County personnel, with assistance from City staff and community volunteers.

6.1 DEVELOPMENT COSTS

Major expenditures for initial site development and restoration included exotic vegetation removal; fencing, signs, and gates; the parking area; an accessible nature trail; a kiosk with interpretive displays; an initial fuel reduction burn; and design, engineering, and permit fees. Funding for initial site development was provided from the 1991 Palm Beach County Environmentally Sensitive Lands Bond Referendum.

6.2 KEY MANAGEMENT ACTIVITIES AND RESOURCE ENHANCEMENT COSTS

Management costs have been minimized through the cooperation of local citizens' organizations and by coordinating the management of natural areas on a county-wide basis. The Audubon Society of the Everglades, the Palm Beach County Chapter of the Florida Native Plant Society, the Loxahatchee Chapter of the Florida Trail Association, and the Sierra Club - Loxahatchee Group along with various school, business, and civic groups have provided and continue to provide volunteer services for the management of natural areas acquired by the County. However, it is recognized by both the County and the City that the management of this natural area requires more than volunteer assistance. Some activities, such as herbicide applications, chainsaw work, and other hazardous or extremely technical operations are not generally suited to

volunteers. County staff have provided such services, or obtained assistance from contractors where necessary.

The County has established a Natural Areas Stewardship Endowment Fund. Monies from restricted gifts, donations from individuals and businesses, and other sources are invested and the interest earned is used to provide operating funds for the management of County-owned and County-leased natural areas. The County also has applied for, and will continue to apply for, funds that may be available from the State for the control of exotic species and other management purposes.

In addition, funds are available via Article 14 Chapter C (Vegetation Preservation and Protection) of the Palm Beach County Unified Land Development Code. Monies from penalties for violations of the provisions of this section are deposited into the Natural Areas Fund, and can be used for the management of lands acquired by the County as natural areas. Monies from the sale of development rights on lands purchased by the County as natural areas and from leases of County-owned land in the Agricultural Reserve also can be used for management purposes.

7. PRIORITY SCHEDULE

A priority schedule for the initial development of the site was included in the initial management plan for Rosemary Scrub Natural Area. All of these initial activities have been completed. Initial site development activities focused on securing the site against unauthorized uses. Fencing, signs and gates were purchased and installed within six months of acquisition. The first formal gopher tortoise survey was conducted in 2001. An initial fire management plan was prepared, a prescribed burn was completed, and the initial removal of invasive vegetation has been completed. The nature trail and parking area were constructed, management roads cleared, a kiosk with interpretive displays installed, a nature trail guide prepared, and site stewards were recruited and trained. Management for this site has now shifted into the maintenance mode.

Over the next ten years, the site will be monitored on a semi-annual to annual basis, and treated as needed, for invasive/exotic vegetation. Annual and bi-annual listed species surveys will also be conducted depending upon the species being monitored. Migratory and non-migratory wildlife surveys will be conducted each year. A summary of all these activities will be included in an annual stewardship report prepared and submitted to FCT each year, until such time as this requirement is waived by FCT. The next revision of the Rosemary Scrub Natural Area management plan is scheduled to begin in 2017, with the final approval of the next revision due in 2018.

8. MONITORING

A monitoring program was initiated in 1997 to measure whether the management objectives for natural communities and listed species were being achieved. The monitoring program was designed to evaluate the success of prescribed fires, invasive vegetation control and disturbed habitat restoration activities, and to determine significant changes in population sizes or distribution of listed species. Management practices have been adjusted when an evaluation of the monitoring data revealed that these objectives were not being met.

A detailed monitoring protocol has been developed to ensure consistency in monitoring activities on all natural areas managed by ERM. A general description of the types of monitoring to be conducted is provided in the following paragraphs. Assistance will be sought from institutions of higher education and volunteers in carrying out the monitoring program, and in the evaluation and interpretation of the data collected. Monitoring data were used as the basis for this revision of the management plan.

8.1 PHOTOMONITORING

The objective of photomonitoring is to obtain a qualitative, long-term visual record of changes in vegetative composition and/or structure over time, including the effects of planned management activities. Two permanent photopoints were initially established in areas where planned management activities were anticipated to occur and natural vegetative succession of management interest was expected to occur. Two additional temporary photopoint stations were established – one in each of the two management units in 2005. These photopoints were established to document success of some of the restoration plantings. The photopoints were located with a global positioning system (GPS) unit and their locations clearly described on a photopoint monitoring record form. Additional reference points (such as trees, structures, or other unique features) have also been described on the form for easier location of the photopoint.

One set of images are taken at each photopoint annually. The images are combined into a panoramic photograph using digital imaging software and stored electronically with the name of the site, the management unit number, and the photopoint identification number. Additional information collected included the height and species name of the predominant tree, shrub and/or herbaceous plant located at the photopoint. A reference collection of all images has been and will continue to be maintained by ERM. Information obtained from these images has been used to help create this revised management plan and will help guide future revisions of this

management plan. Results of the annual photomonitorings have been and will continue to be included in the annual stewardship report for the site.

8.2 WILDLIFE SURVEYS

Migratory and non-migratory wildlife surveys have been and will continue to be performed annually. Systematic surveys are undertaken each year when listed resident breeding species are present and when migratory species are expected to be present. Opportunistic surveys are conducted during other monitoring events. The systematic surveys consist of a random walk-through of representative habitats and/or transects, point counts, or quadrants described by Elzinga, et al. (2001). Survey information collected includes qualitative and quantitative observations of animals, tracks, burrows/nests, or other signs.

Between 1998 and 2005, 33 new species of animals were recorded at the natural area. Results of each year's wildlife surveys have been and will continue to be included in the annual stewardship report for the site.

8.3 LISTED ANIMAL SPECIES SURVEYS

Periodic population surveys have been and will continue to be made for all endangered and threatened animal species recorded for the natural area. Populations or portions of populations of animal species of special concern recorded for the site have been and will continue to be periodically surveyed to determine whether these species are experiencing any unusual population declines. Locations of nests or burrows have been and will continue to be pinpointed and mapped with a GPS receiver with sub-meter accuracy. Surveys are scheduled at the time of year when the target species is most visible and are usually conducted in coordination with other activities. Specific surveys have been developed for specific species. Qualitative evaluations have been and will continue to be made in conjunction with all quantitative surveys.

The gopher tortoise population is currently surveyed once every two years. Formal gopher tortoise population surveys began in 2001, with 6 active burrows recorded and an estimated 7 tortoises utilizing the natural area. A survey conducted in 2003 showed an increase in the gopher tortoise population to 13 active burrows and an estimated 12 tortoises. The 2005 survey recorded 7 active burrows with an estimated 7 tortoises. This decrease was thought to be caused by hurricanes and dog activity on the site. The latest survey was conducted in November 2007 and recorded 8 active burrows with an estimated 8 tortoises. While the number of tortoises and

amount of suitable habitat at Rosemary Scrub is too low to consider the population viable, evidence of the tortoises maintaining current numbers suggests that the population has sufficient habitat to support the existing gopher tortoise population.

8.4 LISTED PLANT SPECIES SURVEYS

Annual population surveys have been and will continue to be conducted for all endangered plant species recorded for the natural area. If the population of an endangered plant species is too large to practically count individual plants, only a representative portion of the population is surveyed or occurrence estimates are made using a logarithmic scale system (for example, 1-10, 11-100, 101-1,000, etc.). Locations of individual plants or groups of plants are mapped with a GPS unit. Annual population counts are also conducted for threatened plants with extremely limited populations recorded for this site. GPS units and mapping are used for these species as necessary.

Annual surveys have been and will continue to be conducted for threatened plant species with large populations (greater than 200 individuals) and commercially-exploited species to determine whether these species are experiencing any unusual population declines. When the population of a threatened or commercially-exploited species is too large to practically count individual plants, only a representative portion of the population is surveyed or occurrence estimates are made using a logarithmic scale system. Surveys for specific plants are undertaken at the time of year when those plants are most visible. Qualitative evaluations have been and will continue to be made in conjunction with all quantitative surveys.

Listed plant surveys began in 1998 for common wild pine, giant wild pine, reflexed wild pine, Curtiss' milkweed, nodding pinweed and large-flowered Rosemary. These listed plant populations were relatively stable until 2003 when hurricane damage reduced most of the surveyed species populations. All listed plant species have since begun to increase in numbers and current populations appear to be stable.

8.5 ANNUAL REPORT

ERM has and will continue to prepare and submit an annual stewardship report to FCT. The annual report includes information on major structural improvements, management activities, restoration plans and activities, and the degree of success of these activities. The annual report also includes any changes to the monitoring plan and information on density credits from the

natural area that have been “banked” as a part of the County's Transfer of Development Rights Program. A general review of management efforts related to natural vegetation communities and the status of listed species is also completed at the end of each management year and included in the annual stewardship report. If an annual stewardship report is no longer required by FCT at some point in the future, a general review of management efforts and the status of listed species will continue to be performed and reported in an annual site evaluation report that will be used by County staff to make and/or adjust management strategies for the natural area.

9. GLOSSARY

Burn unit - an area of predetermined size and shape that remains fixed for monitoring purposes throughout a course of fire management

Density - the number of individual plants or animals per unit of habitable area

Diversity - the number of species that live together in an ecosystem; a measure of the variety of species in an ecosystem that takes into account the relative abundance of each species

Dominant - the characteristic species in a particular plant community, contributing most to the general appearance and influencing which other plants and animals live there; typically the largest plant species or the one with the greatest aerial coverage

Ecosystem - an assemblage of living organisms (plants, animals, microorganisms, etc.) and nonliving components (soil, water, air, etc.) that functions as a dynamic whole through organized energy flows

Ecosystem management - an integrated, flexible approach to management of Florida's biological and physical environments -- conducted through the use of tools such as planning, land acquisition, environmental education, regulation, and pollution prevention -- designed to maintain, protect and improve the state's natural, managed, and human communities

Ecotone - a zone of transition between two ecosystems that has characteristics of both

Endemic - a species or other biological grouping whose distribution is restricted to a particular region or locality

Enhancement - an action taken to introduce, reintroduce or restore vegetation and associated animals into an area where the native ecosystem has been disturbed

Firebreak - a strip of land where the vegetation has been cut or removed to stop the spread of a fire; it typically does not exceed 15 feet in width and may be used as a management road and/or a hiking trail

Fire regime - a prevailing condition in which ecosystems have evolved under periodic exposure to natural fires such that the vegetative communities have adapted to, are dependent upon, and are reproductively enhanced by this exposure

Footpath - a narrow trail with a natural soil base that is intended for foot traffic only and does not have interpretive signage

Forb - a broad-leaved herbaceous plant that is not a grass

Habitat - the area or type of environment in which a specific kind of organism normally lives

Hiking trail - an unpaved footpath with a natural soil base and directional signage only; may be combined with management roads

Hydroperiod - the average length of time that soils are saturated during a given year

Kiosk - a small structure used to shelter informational displays

Listed species - a species that is considered to be endangered or threatened with extinction, or a species of special concern, or a species that has been designated in some way by a jurisdictional governmental agency as meriting special protection or consideration

Management road - an unimproved, single-lane dirt or sand road that is designated for vehicular management activities; it does not exceed 15 feet in width and may be used as a firebreak and/or hiking trail

Mosaic - a pattern of vegetation in which two or more different plant communities are interspersed in patches

Natural area - an area containing one or more aquatic, terrestrial, or transitional ecosystems or a combination of ecosystems that has essentially retained its primitive conditions; an area that is a least-disturbed known example of a type of natural ecosystem

Nature trail - a hard-surfaced, accessible trail with interpretive signage

Off-road vehicle - a vehicle capable of traveling in roadless areas

Passive recreation - any recreational activity which has minimal or no impact on natural resources or ecosystems, such as trail-walking, photography, and plant and wildlife observation

Restoration - the process of repairing damage caused by human activity or a natural disaster to the diversity and dynamics of a native system

Ruderal - a species which generally is considered to be native, but often grows in disturbed areas

Subcanopy - the layer of shrubs or trees that is below the canopy, or uppermost layer of vegetation in a forest or woodland

Systemic herbicide - a chemical agent used to destroy or inhibit plant growth that is absorbed into and is effective throughout the entire organism

Taxon (plural - taxa) - a general term for any taxonomic category (for example, a species, genus, family, or order)

Transect - a long, narrow area used for sampling vegetation or counting animals; transects are used for the collection and analysis of data such as frequency of occurrence, size, or number of organisms or kinds of organisms

Transitory taxon (plural - taxa) - a species that is present on a site only for a brief period, often as a response to changing environmental conditions

Vegetative community - the plant component of an ecosystem

Viability - the capability of a seed or organism to grow and develop or the capability of a population of a species or a biological community to reproduce and maintain itself indefinitely

Water table - the level below which soil is saturated with water; the surface of the zone of saturation

10. ACRONYMS

ADA - Americans with Disabilities Act

DEP - Florida Department of Environmental Protection

DOF - Florida Department of Agricultural and Consumer Services, Division of Forestry

ERM - Palm Beach County Department of Environmental Resources Management

FCT - Florida Communities Trust

FDACS - Florida Department of Agricultural and Consumer Services

FFWCC - Florida Fish and Wildlife Conservation Commission

FNAI- Florida Natural Areas Inventory

GPS- Global Positioning System

NAMAC - Palm Beach County Natural Areas Management Advisory Committee

ORV- Off-road vehicle

SFWMD - South Florida Water Management District

USCGS- U.S. Coastal and Geodetic Survey

USGS- U.S. Geological Survey

USFWS - United States Department of the Interior, Fish and Wildlife Service

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