

**Lower Green Swamp Preserve
Land Management and Land Use Plan**



**Fox squirrel at the Lower Green Swamp Preserve
(photo: Ross Dickerson)**



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LOWER GREEN SWAMP PRESERVE

LAND MANAGEMENT AND LAND USE PLAN

EXECUTIVE SUMMARY

The West Coast Regional Water Supply Authority (“WCRWSA, now Tampa Bay Water “TBW”) purchased the majority of the 12,809-acre Lower Green Swamp Preserve through bankruptcy proceedings in January 1988. WCRWSA developed a water resource management plan for the preserve, and transferred ownership of the preserve lands to Hillsborough County’s Public Utilities Department in February 1988. The agreement between WCRWSA and the County specified that any potable water developed on the preserve in the future would be developed by WCRWSA. In 1995, the County negotiated a land exchange with CF Industries, in which the County obtained 1,938 acres within 3 sections of land (Sections 15, 22, and 26), and a net gain of 380 acres added to the Preserve, by swapping 1,558 acres with CF Industries (“CFI”) immediately adjacent to CFI’s gypsum stack. The newly acquired lands provided a buffer between the Preserve and CFI’s operations. In 1998, the property was nominated and approved to be included in the Environmental Lands Acquisition and Protection Program (ELAPP) because it met several of the qualifying criteria.

On May 6, 2009, the Hillsborough Board of County Commissioners created the Cone Ranch Environmental Advisory Panel to work with the County staff and with the Florida Conservation and Environmental Group (FCEG) and the Nature Conservancy to develop recommendations for future ownership options for Cone Ranch. The Panel submitted “Final Recommendations to the Board of County Commissioners on the Future of Cone Ranch” on November 16, 2009 (<http://www.hillsboroughcounty.org/coneranch/resources/publications/agendas/recommendations/111609.pdf>). The Panel recommended that: the BOCC authorize ELAPP to update the existing December 1998 ‘Final Draft Plan for the Use and Management of Cone Ranch’ and to pursue a wetlands mitigation bank, conservation bank and carbon credits; allow public access to a portion of the land for passive recreation consistent with protection of the land; and vigorously pursue vacation of the Tampa Bay Water claim to water development rights.

In 2010, the Board of County Commissioners directed the County Administrator to transfer the property from the Utility Enterprise fund to the ELAP Program for the original purchase price of \$12.2 million. The decision of the Board was based on the information provided by the appointed Cone Ranch Advisory Panel.

The Preserve is strategically located to be a critical part of a major wildlife corridor running from the Green Swamp north of the Preserve southwest to the Lower Hillsborough River watershed. The Southwest Florida Water Management District’s Alston Preserve borders the northern boundary of the Preserve, and the Blackwater Creek Preserve, separated from the Lower Green Swamp Preserve by County Road 39, is adjacent to the western boundary. The mosaic of wetlands, streams, and upland systems on the preserve provides a substantial opportunity to restore and manage these ecosystems to benefit many species of wildlife and plants in

Hillsborough, Pasco, and Polk Counties, and for the additional benefit of improved water quality conditions. The primary purpose of acquiring the Lower Green Swamp Preserve was to ensure that the wildlife corridor stays intact providing protection for natural plant communities, the floodplains of Blackwater Creek and Itchepackesassa Creek, and wildlife populations in Hillsborough County. A secondary purpose was to provide passive recreational opportunities based on the natural resources of the Preserve.

Since its purchase, the property has been managed as a cattle ranch and sod farm pursuant to the lease on the property. Beginning in 1991, the Plant City and Tampa East Rotary Clubs, in cooperation with the County, planted more than 1 million slash pine trees on roughly 1,300 acres of former pasture in the southern part of the preserve. The Florida Forest Service, through a contractual agreement with the County, began thinning these pine trees in 2009, and provided a forest management prescription updated in 2011, which was included as an appendix in the proposed management plan.

In 1998, the County developed a “Plan for the Use and Management of Cone Ranch”. The Board of County Commissioners (BOCC) accepted this report but it was not adopted formally. At that time, the WCRWSA was still considering the Lower Green Swamp Preserve as a near-term water supply source. The stated goal of the 1998 plan was: “To provide an environmentally-acceptable well field while conserving and restoring/enhancing, where feasible, the natural resources of Cone Ranch and offering complementary economic and recreation opportunities for present and future generations”.

In 2011, a revision of the 1998 management plan was developed to guide the future management of the Preserve. The plan identifies past management activities and proposes new management initiatives. The County and Tampa Bay Water have agreed that should potable water be developed in the future, Tampa Bay Water will be the water source developer, subject to all required permitting. However, water use permitting regulations require that, when developing water supplies, wetland systems cannot be impacted adversely. Because hundreds of wetlands are located throughout the preserve, it would be difficult to place large groundwater production wells on the preserve without affecting wetlands. Also, since two major surface water tributaries to the Hillsborough River (itself a major regional water supply source) run through the preserve, it would be problematic to withdraw significant quantities of groundwater from the preserve without adversely affecting these surface water sources. Consequently, the potential to develop water sources on the Preserve in the future is limited by current regulations.

While some prescribed burns have been conducted for pine plantation management, pasture maintenance, or natural plant community management, a comprehensive burn plan should be developed for the Preserve. Some invasive exotic plant species have been controlled on the Preserve, but a new inventory and comprehensive plan should be developed. The management plan proposes the development of new options to establish additional revenue-producing activities on the Preserve. These income-producing activities could be coupled with the introduction, in several phases, of compatible passive recreational activities. Through application of these strategies, the preserve will be managed to:

- promote optimal conditions, as defined in the federal/state species-specific management

plans, for the onsite expansion and enhancement of some listed species, including the snowy egret, little blue heron, tricolored heron, white ibis, southeastern American kestrel, Florida sandhill crane, bald eagle, wood stork, crested caracara, Sherman's fox squirrel, American alligator, gopher tortoise, eastern indigo snake, giant wild-pine, and yellow butterwort;

- continue revenue-producing activities and develop additional revenue sources;
- continue coordination with agencies to restore and enhance some of the Preserve's wetland areas;
- begin enhancing and restoring the upland communities;
- conduct research projects relevant to the ecology and organisms of the Preserve.

Incorporated into this plan are all the management activities that have occurred since the preparation of the original management plan. The plan also plots out a course of action for the next forty years. It provides the details necessary to effectively manage the property to promote indigenous species use (with emphasis on listed species), to maintain a temporal and spatial ecological diversity through the application of several management tools (e.g., prescribed fire, removal of exotic species), to continually encourage compatible recreational land uses, and promote ecological restoration and scientific research.

Many issues addressed in this plan, including the habitat descriptions, wildlife use, management strategies, forestry prescriptions, and burn unit histories, are likely to change through time. The information with respect to these (and other) topics documented in this plan represents a snapshot of conditions at the time this plan was developed. Therefore, information with respect to these dynamic characteristics will be stored in interactive databases, which can be updated as necessary.

This plan was developed with full awareness of the ever-changing landscape. The Future Land Use Map (FLUM) of the Hillsborough County Comprehensive Growth Management Plan shows the surrounding areas as agricultural. Future land use changes in and adjacent to the Preserve were considered in the development of the management plan. Today, adjacent land uses are predominantly rural; however, urban and suburban expansion will affect the landscape in the near future. The City of Plant City recently approved a zoning application for land south of the preserve, which includes single family and multifamily residential areas. Many of the people who move adjacent to nature preserves are not aware of routine land management activities such as prescribed burns, timber management, and invasive species control; this can cause conflict with the management of the preserve. The Preserve is interlinked with other natural areas, which provides a corridor for target species are either mobile, (i.e. birds) or are species that can roam beyond the site's boundaries.

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A-2. Exhibit A. Interlocal agreement between Hillsborough County and the West Coast Water Supply Authority, related to financing the acquisition of the Cone Ranch. March 9, 1988.

A-3. Exhibits B-K. Interlocal agreement between Hillsborough County and the West Coast Water Supply Authority; Deed to County. March 31, 1988.

- A-4. Lease agreement between Hillsborough County and Audubon Ranch. August 19, 1992.
- A-5. First Amendment to Audubon Ranch lease. September 6, 1995.
- A-6. Rotary Club ‘Preserve Planet Earth’ agreement for planting slash pines. August 1, 1991.
- A-7. Gopher tortoise relocation agreement between Hillsborough County and Hillsborough County School Board. June 30, 1995.
- A-8. Agreement between the Southwest Florida Water Management District and Hillsborough County for the construction of the Cone Ranch Restoration Project. March 3, 1999.
- A-9. First Amendment to the Agreement between the Southwest Florida Water Management District and Hillsborough County for the construction of the Cone Ranch Restoration Project. December 1, 1999.
- A-10. Florida Conservation and Environmental Group’s Permanent Preservation Plan for Cone Ranch. August 14, 1999.
- A-11. EPCHC Memorandum re feasibility of wetland mitigation banking, authored by Andy Zodrow and Bob Stetler. October 10, 2009.
- A-12. Cone Ranch Environmental Advisory Panel. Report. December 9, 2009.
- A-13. Water Resource Services asset transfer plan. February, 2010.
- A-14. Burn Plan. March 25, 2010.

Appendix B. Lists of observed and/or expected flora and fauna (species of plants, invertebrates, amphibians, reptiles, birds, and mammals).

Appendix C. Florida Division of Forestry 2007, 2011 recommendations.

Appendix D. Participants and meeting minutes from public review of the plan.

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Acronyms

Acronym	Entity
ELAPP	Environmental Lands Acquisition and Protection Program
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
HRGTF	Hillsborough River Greenways Task Force
LHFDA	Lower Hillsborough Flood Detention Area
SWFWMD	Southwest Florida Water Management District
TBW	Tampa Bay Water
WCRWSA	West Coast Regional Water Supply Authority

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LOWER GREEN SWAMP PRESERVE MANAGEMENT PLAN

1.0 GENERAL INFORMATION

1.1 Location of the Lower Green Swamp Preserve

The Lower Green Swamp Preserve (formerly called Cone Ranch) is located in the northeastern corner of Hillsborough County, Florida, in all or portions of 24 sections within Township 27 South, Range 22 East, plus a portion of Section 2, Township 28 South, Range 22 East. The preserve also includes a small portion of Section 6, Township 27 South, Range 23 East in Polk County. The preserve is east of State Road 39, north of Knights-Griffin Road, and south of East County Line Road and property owned by CF Industries (Figure 1).

Surrounding land uses include low-density residential areas, agriculture, aquaculture, ELAPP (Environmental Lands Acquisition and Protection Program) lands acquired or approved for acquisition, other natural areas, and CF Industries, a large phosphate fertilizer facility to the northwest. Section numbers, which are referenced throughout this management plan, are shown on Figure 1. The legal description, easements, and other legal documents for the preserve are included in Appendix A. The adopted 2025 future land use (FLU) designation of the preserve is “Natural Preservation” (Hillsborough County City-County Planning Commission 2010).

The dominant drainages through the 12,809-acre preserve are Blackwater Creek and Itchepackesassa Creek, two major tributary systems within the Hillsborough River watershed (Figure 2).

The Lower Green Swamp Preserve is well positioned to be part of a natural lands and wildlife corridor crossing Hillsborough County, which has been identified by the state as having great value (Cox *et al.* 1994) (Figure 3). The preserve provides linkages to several adjacent natural areas. The Southwest Florida Water Management District (SWFWMD) owns and manages more than 500,000 acres in Hillsborough County along the northern border of Lower Green Swamp Preserve and further north (the Alston Tract leading to the Upper Hillsborough Wildlife Management/Flood Detention Area and the Green Swamp Area of Critical State Concern). Other natural and reclaimed mined lands owned by CF Industries lie along the preserve’s northern boundary. Immediately west of the Lower Green Swamp Preserve on the west side of SR39 is Hillsborough County’s 2,014-acre Blackwater Creek Nature Preserve. This preserve is separated from the Hillsborough River State Park, owned by the Florida Department of Environmental Protection (FDEP), and Lower Hillsborough Flood Detention Area (LHFDA), owned by SWFWMD, by the Two Rivers Ranch, a short section of private land.

1.2 History of Lower Green Swamp Preserve

1800s–1900

During the Second Seminole War, a stockade named Fort Sullivan was constructed (c. 1839) either on the far southeastern section of Lower Green Swamp Preserve (Section 35 T27S) or just to the south of Section 35 (on what would now be the south side of Knights-Griffin Road) (Knetsch 2003). Fort Sullivan is largely known today from the unusually detailed sketch of the compound that survived in the historical records (Knetsch 2003, p. 124). The 1845 Land District State of Florida Maps show a “road” or trail (labeled on the maps as the “road to Fort Sullivan”) that leaves Fort Foster (built in 1836; McGovern 2007), and runs generally in a southeasterly direction, connecting Fort Foster to Fort Sullivan, roughly 10 miles to the southeast. The line representing this road ends in Section 25, to the west of Lower Green Swamp Preserve and SR 39. A detailed examination of the 1938 aerials, the 2010 aerials, and a field attempt to examine the likely routes that a road might have taken to avoid having to cross large wetlands and streams, suggests that a road would most likely have skirted the southern boundary of the preserve and would have possibly run generally along the same track that Knights-Griffin Road runs today, so it is speculative whether the road actually intersected any of the far southwestern portions of the preserve.

The detail of the map showed at least one feature (a garden) of the fort/stockade to be on the north side of the military road that ran along the approximate alignment of Knights-Griffin Road, putting it in relatively close proximity to the existing site security residence in the southeastern corner of Lower Green Swamp Preserve (Section 2 T28S, or Section 35 T27S). The actual fort/stockade was located on the knoll across the road from the entrance to the site security residence, southwest of the intersection of Knights-Griffin and Charlie Taylor Road (in the footprint of the future industrial/commercial development). The historical map suggests that the southwestern corner of what is now known as Lower Green Swamp Preserve may once have been in relatively close proximity to the road from Fort Foster to Fort Sullivan used in the late 1830s; and that Fort Sullivan was either located on the far southeastern section of Lower Green Swamp Preserve or just south of Lower Green Swamp Preserve.

1900-1980

Blackwater Creek and Itchepackesassa Creek were channelized before 1938 and, by 1938 (the date of the earliest known aerial photographs of the preserve), the majority of Lower Green Swamp Preserve already had been cleared of overstory trees and converted to pasture. Cattle ranching was the main activity over much of the Preserve during these decades.

1980-1990

The majority of the Lower Green Swamp Preserve was purchased through bankruptcy proceedings in January, 1988 by the West Coast Regional Water Supply Authority (WCRWSA; now Tampa Bay Water [TBW]) from A. K. Florida Properties, N. V. (a wholly-owned subsidiary of Triad Properties Corporation, which was, in turn, a wholly-owned subsidiary of Triad America Corporation) (WCRWSA 1988a) (Appendix A). The preserve had been a cattle ranch

operation for more than 50 years before it was purchased by the WCRWSA. WCRWSA developed a water resource management plan for the preserve in 1988, then transferred ownership of the preserve lands to Hillsborough County's Public Utilities Department in February 1988, with a proviso that any potable water to be developed on the preserve would be developed by WCRWSA (WCRWSA 1988*b*, WCRWSA 1988*c*). When the preserve was purchased in 1988, most of it was maintained in improved pasture, except the numerous isolated and semi-isolated wetlands, and stream floodplains (Scott Emery, Environment and Health Inc., personal observations, 1986-1988).

The WCRWSA purchased the preserve originally for the future development of a potable water supply well field to supply public water to Hillsborough County residents and some residents in Pasco and Pinellas Counties. Since the 1980s, water supply planning, implementation practices, and regulations have reduced the value of the preserve as a future source of groundwater. One key change, implemented in 1989, to the water use permitting regulations that restricted the water supply potential of the preserve was the requirement that, when developing water supplies, wetland systems on property wholly owned or controlled by the water utility were not allowed to be affected adversely. Since many wetlands are located throughout the preserve, under these guidelines it would not be possible to place large groundwater production wells on the preserve without affecting wetlands (Figure 4).

1990-2010

The County funded the preparation of the first management plan for the preserve in 1990 (Dames and Moore 1990), but it was never implemented. Beginning in 1991, the Plant City and Tampa East Rotary Clubs, in cooperation with the County, planted more than 1 million slash pine trees on roughly 1,300 acres of former pasture in the southern part of the preserve (Figure 4). The Florida Forest Service, through a contractual agreement with the County, began thinning these pine trees in 2009.

In 1995, the County negotiated a land exchange with CF Industries, wherein the County obtained 1,938 acres within 3 sections of land (Sections 15, 22, and 26), and a net gain of 380 acres, in an exchange with CF Industries of 1,558 acres immediately adjacent to their gypsum stack. Of the 1,558 acres transferred to CF Industries, about 975 acres became a buffer on the south and southeast sides of their reclaimed land (Figures 1 and 2). The land exchange added 1 full section (Section 26) of land that has remained in "native rangeland". The land exchange increased the total acreage of the preserve to its current size of 12,809 acres (Hillsborough County Conservation Services Department 2010 GIS mapping estimate). The preserve remained under the control of the Hillsborough County Public Utilities Department (Water Resource Services Department) until 2010, when the County transferred the property as an ELAPP acquisition from Water Resource Services to the Hillsborough County Parks, Recreation, and Conservation Department (PRCD) (Appendix A).

In 1995, the Hillsborough River Greenways Task Force (HRGTF) developed an ecosystem protection plan for the upper Hillsborough River, which included a chapter on the potential future uses for the Lower Green Swamp Preserve (Hillsborough River Greenways Task Force 1995). Also in 1995, the County developed the Hillsborough Greenways Master Plan, in which

the County proposed a system of trails on Lower Green Swamp Preserve. The Greenways Master Plan depicts the entire preserve as a “natural corridor”. At about the same time, the County identified several areas on the preserve as “significant wildlife habitat”. These areas include the forested floodplain areas of the Blackwater and Itchepackesassa Creeks, and almost all of Section 26 (the “native rangeland” area). In the late 1990s, the County, SWFWMD, FDEP, U. S. Environmental Protection Agency, and the HRGTF cooperated to de-channelize a portion of Tiger Creek and re-establish a more natural hydrologic regime in what was formerly a very large cypress marsh (referred to on Hillsborough County 1916 property maps as “Tiger Lake”) located in portions of Sections 20 and 29 (see Figures 2 and 4). In 1998, the County developed a “Plan for the Use and Management of Cone Ranch” (Hillsborough County *et al.* 1998). The Board of County Commissioners (BOCC) accepted this report but it was not formally adopted. At that time, the WCRWSA was still considering the Lower Green Swamp Preserve as a near-term water supply source. The stated goal of the 1998 plan was: “To provide an environmentally-acceptable well field while conserving and restoring/enhancing, where feasible, the natural resources of Cone Ranch and offering complementary economic and recreation opportunities for present and future generations” (p. iii).

The plan had three objectives:

- (1) an Environmental Objective to restore, enhance and protect the significant terrestrial and aquatic values at Lower Green Swamp Preserve on a sustainable basis;
- (2) an Economic Objective to generate revenues from uses that are compatible with the other objectives, for application to restoration and other resource management activities, and to help support compatible development; and
- (3) a Recreation Objective to provide opportunities for low intensity passive recreation, and limited higher intensity active recreational activities which do not conflict with resource values or other uses, are compatible with the surrounding community, and are tied to heritage appreciation.

The plan included a listing of activities recommended as suitable, high value uses for Lower Green Swamp Preserve: water production wells, mitigation bank, restoration projects, wildlife management, silviculture, native seed bank, native plant nursery, scientific research, cattle grazing, improved pasture and hay, honey production, passive recreation, (unpaved) bicycle trails, equestrian trails/stable, small game hunting, (primitive) camping, and education center.

From the time of its purchase by the WCRWSA, transfer to Hillsborough County Public Utilities, to the present, many site investigations have been conducted and technical reports have been prepared about the preserve’s resources, generally with the purpose of assessing the preserve’s potential as a water supply source, and most were funded by the WCRWSA, TBW, or the SWFWMD. As background information, many of the technical reports are listed in the References section of this report.

In comparing aerial photographs of the preserve from 1938 with similar photographs from 2009, it is notable that major ditches had been dug through many of the wetlands, and almost all of the Blackwater and Itchepackesassa Creek alignments had been channelized and deepened to drain

water from the property by 1938 (Figures 5a and 5b, and Table 1) (S. Emery, personal communication, 2005).

Since shortly after the transfer of the Lower Green Swamp Preserve to the Public Utilities Department, the PRCD periodically assisted the Public Utilities Department with the stewardship of the property. PRCD assumed the lead responsibility for the management of the property in 2010.

1.3 Purpose of the Lower Green Swamp Preserve Acquisition

The Environmental Lands Acquisition and Protection Program (ELAPP) was established for the purpose of acquiring, preserving, and protecting endangered and environmentally sensitive lands, beaches, parks, and recreational lands in Hillsborough County. The purpose of acquiring such lands will be for resource protection; however, all lands shall be open for public use and enjoyment to the extent that the County finds such use compatible with the preservation and protection of these lands (Hillsborough County Parks, Recreation and Conservation Department and Hillsborough County Real Estate Department 2006).

The primary purpose of acquiring the Lower Green Swamp Preserve was to ensure that the wildlife corridor stays intact providing protection for natural plant communities, the floodplains of Blackwater Creek and Itchepackesassa Creek, and wildlife populations in Hillsborough County. A secondary purpose was to provide natural resource-based recreation. The Preserve is strategically located to be a critical part of a major wildlife corridor, and the mosaic of wetlands, streams, and upland systems on the preserve provides a substantial opportunity to restore and manage these ecosystems to benefit many species of wildlife and plants in Hillsborough County, Pasco, and Polk Counties, and for the intertwined benefit of improved water quality conditions (Figure 3).

Lower Green Swamp Preserve will be managed for the conservation, protection and enhancement of the local and regional natural resources, to extend the regional wildlife corridor, for public outdoor recreation that is compatible with the conservation, protection and enhancement of the site; and for continued cattle ranching and other revenue-producing activities compatible with science-based natural resource management. The proposed recreational uses will be restricted to activities such as hiking and nature study that are compatible with management of the Preserve's natural resources.

Table 1. Descriptions of site-specific changes from 1938 (Figure 5a) to 2009 (Figure 5b).

Latitude	Longitude	Description
28.15399	-82.15068	ditched in 1938
28.15226	-82.14529	old homestead in 1938
28.14894	-82.14715	no ditch in 1938
28.14377	-82.14002	ditch in 1938
28.14459	-82.14547	no finger ditches in 1938
28.13956	-82.14680	cleared in 1938
28.13593	-82.14608	ditched in 1938
28.12882	-82.13667	ditched in 1938
28.13126	-82.13932	whole section connected in 1938
28.13953	-82.13524	ditched in 1938
28.13014	-82.13307	ditched in 1938
28.13450	-82.12186	connected in 1938
28.13256	-82.11934	being cleared in 1938
28.14107	-82.12093	not in 1938
28.14852	-82.13470	no ditches in 1938
28.15142	-82.12902	small trail in 1938
28.14864	-82.12405	ditch in 1938
28.14631	-82.11962	not in 1938
28.15405	-82.11717	no query in 1938
28.16461	-82.11677	more wooded than in 1938
28.14222	-82.11258	ditch clear in 1938
28.14869	-82.10760	creek more wooded in 1938
28.15045	-82.10996	creek more wooded in 1938
28.14563	-82.10655	bigger in 1938
28.13812	-82.10929	connected in 1938
28.13839	-82.10564	yes in 1938
28.13589	-82.10724	connected in 1938
28.13239	-82.11034	connected in 1938
28.12658	-82.14032	no ditch in 1938
28.12613	-82.12881	ditch in 1938
28.12319	-82.13299	yes ditched in 1938
28.12392	-82.12860	no ditch in 1938
28.12422	-82.12596	no ditch in 1938
28.12636	-82.12335	no ditch in 1938
28.12511	-82.12326	no ditch in 1938
28.11936	-82.12547	yes road in 1938
28.11848	-82.11531	possibly connected in 1938
28.12536	-82.10737	yes ditch in 1938
28.12114	-82.10674	connected in 1938
28.12242	-82.10555	fence line? or ditch? not in 1938

Latitude	Longitude	Description
28.11943	-82.14241	ditched in 1938
28.11436	-82.13561	ditched in 1938
28.11309	-82.12842	ditched in 1938
28.11448	-82.11022	all connected in 1938
28.11103	-82.12713	ditched in 1938
28.11304	-82.11046	no ditch in 1938
28.10818	-82.14206	more well-defined channel than in 1938
28.10783	-82.13223	no ditch in 1938
28.10841	-82.12594	ditch ended here in 1938
28.10758	-82.12412	no ditch in 1938
28.10947	-82.10819	possibly connected in 1938
28.10381	-82.13697	ditched in 1938
28.10570	-82.12456	more open water in 1938
28.10237	-82.11832	connected in 1938
28.09964	-82.12697	yes ditched in 1938
28.10257	-82.10756	possibly connected in 1938
28.10161	-82.10701	wetter in 1938
28.09868	-82.12179	no ditch in 1938
28.10051	-82.10311	connected in 1938
28.09481	-82.13233	no road in 1938
28.09354	-82.13421	no road in 1938
28.09681	-82.10725	yes ditch in 1938
28.09405	-82.10681	yes ditch in 1938
28.09113	-82.13504	road ends in 1938
28.08957	-82.13410	ditch in 1938
28.09124	-82.12288	no road in 1938
28.08519	-82.12230	possibly connected in 1938
28.08884	-82.11714	yes ditch in 1938
28.09005	-82.11132	being cleared in 1938
28.08852	-82.10323	yes ditch in 1938
28.15630	-82.09722	no trail in 1938
28.15881	-82.09151	no edge in 1938
28.16130	-82.08817	faint trail in 1938
28.15474	-82.08616	much wetter in 1938
28.15282	-82.07561	most floodplain trees have been removed since 1938
28.15995	-82.07212	most floodplain trees have been removed since 1938
28.15795	-82.06654	most floodplain trees gone in 1938
28.15896	-82.06118	no ditch in 1938
28.15606	-82.05280	yes RR in 1938
28.14672	-82.09345	yes trail in 1938
28.14490	-82.09222	yes ditch in 1938

Latitude	Longitude	Description
28.14870	-82.08615	most floodplain trees removed post 1938
28.14310	-82.07502	yes ditch in 1938
28.14812	-82.06753	yes ditched in 1938
28.14951	-82.05171	natural creek straightened since 1938
28.14544	-82.05069	no road in 1938
28.14129	-82.07224	no ditch in 1938
28.13726	-82.09535	this area was less wooded in 1938
28.13762	-82.08917	yes ditched in 1938
28.13621	-82.07971	no parallel grid of ditches in 1938
28.13536	-82.07561	no parallel ditches in 1938
28.13692	-82.07247	forested in 1938
28.13798	-82.06772	no ditch in 1938
28.13493	-82.06986	forested in 1938
28.13513	-82.06445	no ditches in 1938
28.13368	-82.07608	no road in 1938
28.13111	-82.07251	yes ditch in 1938
28.13207	-82.06991	no ditch in 1938
28.13100	-82.06911	no ditch in 1938
28.13125	-82.07708	no ditch in 1938
28.13110	-82.06229	no ditch in 1938
28.12716	-82.09930	isolated in 1938
28.12895	-82.08742	no ditch in 1938
28.12795	-82.07659	yes ditch in 1938
28.12110	-82.09586	yes ditch in 1938
28.12032	-82.09206	yes trails in 1938
28.12448	-82.08893	no trail in 1938
28.11675	-82.08801	no ditch in 1938
28.12412	-82.08131	faint trail in 1938
28.12090	-82.07358	yes ditched in 1938
28.12073	-82.07214	yes road in 1938
28.12191	-82.06331	no ditch in 1938
28.12434	-82.05624	no ditch in 1938
28.12233	-82.05558	wooded wetland in 1938
28.13004	-82.07586	no ditch in 1938 (wooded)
28.12453	-82.09456	more marsh-like in 1938
28.12247	-82.10024	marsh in 1938
28.12226	-82.07461	yes channelized in 1938
28.11857	-82.08206	well-used dirt road in 1938
28.11439	-82.08886	yes ditch in 1938 (drains marsh)
28.11379	-82.09803	isolated in 1938
28.11044	-82.09470	yes ditch in 1938

Latitude	Longitude	Description
28.10932	-82.09426	TBW SZM
28.10918	-82.10657	yes ditch in 1938
28.11090	-82.07556	no ditch in 1938
28.10958	-82.07339	small marsh in 1938
28.10943	-82.06567	yes ditch in 1938
28.10699	-82.09130	TBW SZC
28.10665	-82.08675	less vegetation in 1938 in this section
28.10700	-82.07911	no ditch in 1938
28.10707	-82.07685	no ditch in 1938
28.10469	-82.08465	yes ditch in 1938
28.10555	-82.07455	doughnut dome in 1938
28.10219	-82.10197	yes ditch in 1938
28.10108	-82.10215	yes ditch in 1938
28.10130	-82.10633	wet and possibly connected in 1938
28.09703	-82.09196	TBW T-5
28.09795	-82.08480	isolated in 1938
28.09905	-82.08146	TBW S-4
28.09724	-82.07967	S 3/4 TBW
28.09554	-82.07797	TBW S-3
28.09859	-82.07657	no fence line in 1938
28.10052	-82.07541	no ditch in 1938
28.09948	-82.07775	yes ditch in 1938
28.09355	-82.07095	more trees today than in 1938
28.09210	-82.05882	yes ditch in 1938
28.09249	-82.08304	TBW S-5
28.09227	-82.08082	small marsh in 1938
28.08951	-82.06859	yes ditch in 1938
28.08730	-82.07087	wetland in 1938
28.08756	-82.07549	TBW ICS
28.08759	-82.08033	creek recently ditched in 1938
28.08761	-82.08574	forested wetland in 1938
28.08424	-82.07671	a wetland in 1938
28.08430	-82.07756	no ditch in 1938
28.08846	-82.09078	all connected in 1938
28.08762	-82.09264	wet in 1938
28.08649	-82.09431	wet in 1938
28.08714	-82.09788	yes ditch in 1938
28.09184	-82.09646	better defined in 1938

1.4 Management Objectives for the Lower Green Swamp Preserve

Management objectives for the Lower Green Swamp Preserve, categorized as preservation, restoration, resource management, or funding objectives, include:

Preservation:

1. Establish the wildlife corridor from the Green Swamp to the Lower Hillsborough Flood Detention Area.

Restoration:

2. Conserve the integrity of the existing natural habitats on the preserve, and implement habitat restoration activities to improve the quality and increase the quantity of the natural and semi-natural habitats.
3. Continue water quality monitoring on Lower Green Swamp Preserve, and implement land management practices that improve existing on site water quality; initiate water monitoring for the Stream Water Watch Program or related monitoring for the life of the program; participate in any local effort among landowners to improve water quality on the Lower Green Swamp Preserve.
4. Develop and implement a long-term program to revert select areas of improved pasture and sod into natural upland and mesic habitats, including pine flatwoods.
5. Develop and implement a wetland mitigation bank and a stream mitigation bank; these operations will serve dual functions: (a) provide a process for the restoration of highly ditched and drained wetland systems and streams on site; (b) provide a funding source for the County ELAPP to use to restore natural systems on the preserve and on other ELAPP sites.
6. Examine the feasibility and desirability of developing a “carbon bank” and/or a “water quality bank”.
7. Develop a long-term program to plant, manage, and selectively harvest hardwood species of trees such as sweet gum, water hickory, and American elm, in conjunction with stream and wetland restoration activities.

Resource Management:

8. Continue science-based habitat management activities such as prescribed burns and invasive exotic species control; and continue with other vegetation management measures such as mowing and roller-chopping, if necessary, to improve habitat conditions and reduce fuel loads for prescribed burns; create or widen fire lanes along perimeter of the preserve.
9. Control invasive exotic plants and animals on the preserve; survey and map invasive plant species, continue monitoring populations using GPS and other tools.

10. Implement a photo-monitoring program; conduct photo-monitoring of natural systems, restoration areas, listed species populations, and other important features on the Preserve.
11. Conduct periodic wildlife surveys on the Lower Green Swamp Preserve, with emphasis on listed species; map locations of listed species using GPS, and implement management strategies for protection of these species.
12. Develop species inventories and species-specific management plans for sensitive species to protect and perpetuate the species populations, and promote the use of the site for endemic and native wildlife and plant species.
13. Work with adjacent landowners to promote the wildlife corridor connections from the Lower Green Swamp Preserve to other preserves.
14. Vacate unneeded right-of-ways and easements if the opportunity arises.
15. Develop and implement a program for the public use of portions of the Lower Green Swamp Preserve, including passive recreation, and defined areas for research and environmental education facilities; keep the southern portion of the preserve open to the public as much as possible while preserving the integrity of the habitat and protection of wildlife populations.
16. Work with neighbors and volunteers for cleanup and security and encourage a sense of shared responsibility for the benefit of the preserve. Maintain site security efforts. Continue perimeter fencing, and install signage around perimeter. Coordinate with the Sheriff's Department and cattle lessee to control poaching, dumping, and other illegal activities.
17. Develop a working relationship with Tampa Bay Water to ensure that future water resource development and preserve restoration efforts remain synchronized and mutually compatible.

Funding:

18. Develop and implement a long-term plan for the continuation of cattle ranching, sod farming, and associated activities on select portions of the preserve.
19. Evaluate adding additional pine plantation acreage, using long leaf pine as well as slash pine as the dominant species.
20. Develop and implement native plant nursery areas or seed banks;
21. Develop and implement native wildflower management areas and combine these with managing endemic pollinators and/or honey beehives to benefit county agricultural producers and/or produce native Florida honey.
22. Examine the feasibility of a captive breeding program for listed or high priority management species.

23. Solicit funding or assistance to conduct a cultural resources survey on the preserve. Coordinate with the Florida Public Archaeology Network and have the preserve evaluated.
24. Continue to develop and pursue alternative sources of funding including grant opportunities for management programs. It is believed that the implementation of stream and wetland mitigation banking will help alleviate funding shortfalls, and allow more comprehensive restoration actions in the future.

The preservation of wildlife habitats and the development of public recreation and environmental conservation activities on the Lower Green Swamp Preserve will help Hillsborough County in implementing the goals, objectives, and policies of the Recreation and Open Space (ROSE), Future Land Use (FLUE), and Conservation and Aquifer Recharge (CARE) elements of the County's Comprehensive Plan, and to accomplish or further enhance the following plan (<http://www.theplanningcommission.org/hillsborough/comprehensiveplan>) goals and objectives:

1. Preserve, conserve, restore, and appropriately manage the natural resources of Hillsborough County to maintain or enhance environmental quality for present and future generations (CARE Goal).
2. Maintain or improve the ecological integrity of natural lakes, ponds, and streams, and provide for multiple uses such that existing water quality, fisheries habitat, scenic and recreational opportunities, and other natural and community benefits can be maintained, improved and where feasible, restored (CARE Objective 6).
3. Maintain populations of threatened and endangered species and species of special concern occurring in Hillsborough County; and where feasible and appropriate, increase the abundance and distribution of such species (CARE Objective 14).
4. Improve public access to parks and recreational facilities and waterfront lands, including beaches and shores (ROSE Objective 2, Policies 2.2, 2.8).
5. Increase the provision, protection, and enhancement of open spaces by public agencies and private enterprises (ROSE Objective 3, Policy 3.8).
6. Implement an aquatic plan to utilize water resources for active and passive recreational activities (ROSE Objective 10, Policy 10.1).
7. Continue to implement a program to allow appropriate utilization and protection of natural resources (ROSE Objective 11, Policy 11.2).
8. Consider the needs of existing urban and suburban areas and newly developing urban areas when providing and programming needed public facilities (FLUE Policy D-6.3).
9. Meet the standards for county parks and recreational facilities as specified in the Capital Improvements Element (CIE Policy 1.C.1.f).

1.5 Adjacent Land Uses and Potential Conflicts

Adjacent land uses include: buffer lands to the CF Industries industrial facility, preserved lands owned by SWFWMD, surrounding privately-held lands to the east, south, southwest and west (some in cattle, agriculture and fish farming, others in low density residential), and Blackwater Creek Preserve (Figure 4). The City of Plant City recently approved a zoning application for land south of the preserve, which includes single family and multifamily residential areas. Many of the people who move adjacent to nature preserves are not aware of routine land management activities such as prescribed burns, timber management, and invasive species control; this can cause conflict with the management of the preserve. Hillsborough County, through its land development code, requires that a compatibility plan be filed with deed restrictions for developments falling within 1000 feet of preserves. However, other municipalities within Hillsborough County have different requirements. The FDOT has proposed widening SR 39 and the project is currently pending.

1.6 Public Involvement

The PRCD plans to conduct public meetings to take comments on the draft management plan in 2011. The Hillsborough County City-County Planning Commission and the Bond Council will review the draft management plan for compliance with the County's Comprehensive Plan. Adjacent landowners (particularly SWFWMD, Tampa Bay Water, and CF Industries) will provide comments. Following adoption of the Lower Green Swamp Preserve Land Management and Land Use Plan, the ELAPP General Committee or other County agencies will review any proposed modifications, site alterations, or physical improvements that were not addressed in the approved Plan.

2.0 NATURAL RESOURCES

2.1 Soil Resources

2.1.1 Soils Distribution

The "Soil Survey of Hillsborough County" (Doolittle et al. 1989) shows 25 soil types found on the Lower Green Swamp Preserve (Table 2, Figure 6).

Table 2. Soil Types on Lower Green Swamp Preserve.

Map Number	Soil Group	Soil Type	Acres	Percent of Total
002	mesic	Adamsville fine sand fix map name	0.9	0.01%
004	other	Arents, nearly level	741.5	5.79%
005	hydric	Basinger, Holopaw, Samsula, depressional	2702.8	21.10%
007	xeric	Candler fine sand, 0 to 5% slopes	0.1	0.00%
010	hydric	Chobee, loamy fine sand	74.9	0.58%
012	hydric	Chobee, sandy loam, frequently flooded	673.6	5.26%
013	mesic	Eaton fine sand	166.0	1.30%

Map Number	Soil Group	Soil Type	Acres	Percent of Total
014	hydric	Eaton mucky sand, depressional	51.5	0.40%
015	hydric	Felda fine sand	352.4	2.75%
017	hydric	Floridana fine sand	13.7	0.11%
019	xeric	Gainesville loamy fine sand, 0 to 5% slopes	0.1	0.00%
021	mesic	Immokalee fine sand	94.9	0.74%
027	mesic	Malabar fine sand	618.8	4.83%
029	mesic	Myakka fine sand	4373.1	34.14%
033	mesic	Ona fine sand	110.8	0.86%
035	xeric	Orlando fine sand, 0 to 5% slopes	21.0	0.16%
037	mesic	Paisley fine sand, depressional	5.3	0.04%
047	mesic	Seffner fine sand	15.6	0.12%
052	mesic	Smyrna fine sand	17.8	0.14%
046	mesic	St. Johns fine sand	180.1	1.41%
057	mesic	Wabasso fine sand	1182.8	9.23%
059	mesic	Winder fine sand	1397.4	10.91%
061	xeric	Zolfo	14.1	0.11%
		Total	12809.0	100.00%

USDA Natural Resource Conservation Service, Soil Survey Graphic (SSURGO) Database for Hillsborough County, Florida, 2004.

2.1.2 Soils Descriptions

Adamsville fine sand (002). This soil type covers 0.01% in a few scattered locations. It is nearly level and somewhat poorly drained, occurring on broad ridges on the flatwoods. Natural vegetation is bluejack oak, turkey oak, longleaf pine, and slash pine. The understory includes broom sedge bluestem, lopsided indiagrass, saw palmetto, and pineland three awn.

Arents, nearly level (004). Arents are nearly level, heterogeneous soil materials that have been excavated, re-worked, or otherwise re-shaped by man. According to the county soils survey mapping, this soil is found on 5.80% of the total soils by area. This soil type is probably mis-mapped where the sod-growing operation was misinterpreted as earth-moving activities, since a field inspection showed that the area has not been re-graded (S. Emery, personal observations).

Basinger, Holopaw, Samsula soils (depressional) (005). This soil type makes up 21.10% of the total surface soil cover and is found in all land sections on the preserve. This soil complex supports small cypress domes, freshwater marshes, and wet prairie communities. Native vegetation on relatively undisturbed sites includes cypress, sweet gum, and red maple in the canopy, with many understory species: wax myrtle, buttonbush, ferns, maidencane, little blue maidencane, fireflag, smartweed, pickerelweed, duck potato, fetterbush, saw grass, and bluestem.

Candler fine sand, 0 to 5% slopes (007). This soil covers 0.10% of the surface soils on the uplands and is nearly level to gently sloping and excessively drained. The natural vegetation consists of bluejack oak, Chapman oak, scrub live oak, and turkey oak. The understory includes indiagrass, hairy panicum, panicum, and running oak.

Chobee, loamy fine sand (010). This soil covers 0.58% of the surface soils and is nearly level and very poorly drained, located on low-lying flats in the flatwoods. The natural vegetation consists of cypress, cabbage palm, slash pine, and coastal plain willows. The understory includes buttonbush, maidencane, and Jamaica sawgrass.

Chobee sandy loam, frequently flooded (012). This soil type makes up 5.30% of the surface soils and is found along the main channel of Blackwater Creek. The natural vegetation found on relatively undisturbed areas of this soil includes bald cypress, sweet gum, willow, red maple, and cabbage palm. Understory species include several species of ferns, buttonbush, smartweed, sedges, maidencane, and saw grass.

Eaton fine sand (013). Only 1.30% of the surface soils are characterized as Eaton fine sand and it is found primarily within a formerly large cypress marsh system located mostly in sections 20 and 29. This soil typically occurs in sloughs within flatwoods and would normally support longleaf and slash pine, sweet gum, and cabbage palm, with species such as gallberry and panicum in the understory.

Eaton mucky sand, depressional (014). This soil covers 1.30% of the soil surface and is nearly level and very poorly drained. It is in depressions on the flatwoods, where undrained areas are ponded for very long periods. The natural vegetation consists of cypress and sweetgum. The understory includes sand cordgrass, bluestem, maidencane, and wax myrtle.

Felda fine sand (015). Felda fine sand is nearly level and poorly drained, and makes up 2.80% of the surface soils of the preserve. This soil is found in several small areas throughout the preserve. The natural vegetation includes canopy species such as cabbage palm and slash pine, and understory species such as saw palmetto and wax myrtle.

Floridana fine sand (017). This soil type is nearly level and very poorly drained. It occurs on 0.11% of the preserve in scattered locations. It is in sloughs and swales on the flatwoods. The natural vegetation includes cabbage palm and slash pine in the canopy, and bluestem, maidencane, panicum, and pineland threeawn in the understory.

Gainesville loamy fine sand, 0 to 5% slopes (019). This soil is nearly level to gently sloping and well drained. It occurs on the uplands in a small area and occupies 0.1 acre (0.00%) of the preserve. The natural vegetation is bluejack oak, live oak, turkey oak, and slash pine. The understory includes lopsided indiagrass, panicum, and pineland threeawn.

Immokalee fine sand (021). This soil type is nearly level and poorly drained. It is on broad plains on the flatwoods, and covers 0.74% of the soil surface in a few scattered areas. The natural vegetation is longleaf pine and slash pine. The understory includes creeping bluestem, chalky bluestem, lopsided indiagrass, saw palmetto, pineland threeawn, and wax myrtle.

Malabar fine sand (027). The Malabar fine sand soils are usually found in depressions within pine flatwoods, and comprise 4.80% of the total surface soils, found in several small areas scattered throughout the Lower Green Swamp Preserve. The native vegetation on this soil type includes cabbage palm, longleaf pine, slash pine, saw palmetto, and wax myrtle.

Myakka fine sand (029). This soil type is found throughout the preserve and comprises the majority of the preserve with approximately 34.10% of the surface soils. This soil type is nearly level and poorly drained, and supports pine flatwoods with longleaf and slash pine in the canopy, and saw palmetto, gallberry, running oak, and wax myrtle in the understory.

Ona fine sand (033). This soil type is nearly level and poorly drained, located on broad plains on flatwoods on only 0.90% of the preserve. This soil is well suited for pasture. Natural vegetation consists of longleaf and slash pine with species such as saw palmetto and gallberry in the understory.

Orlando fine sand, 0 to 5% slopes (035). This soil is nearly level to gently sloping and well drained. It occurs on 0.16% of the surface soils on the uplands, and the natural vegetation is bluejack oak, live oak, turkey oak, and slash pine, with an understory of panicum, saw palmetto, and pineland threeawn.

Paisley fine sand, depressional (037). This soil is level and very poorly drained. It is in depressions and sloughs, where undrained areas are frequently ponded for very long periods. This soil type covers 0.04% of the soil surface in a few areas. The natural vegetation consists of cypress and sweetgum in the overstory, and the understory includes sand cordgrass, maidencane, and wax myrtle.

Seffner fine sand (047). This soil type occurs on 0.12% of the surface soil on the preserve. It is nearly level and somewhat poorly drained. It is on the rims of depressions and on broad, low ridges on the flatwoods. The natural vegetation consists of longleaf pine, slash pine, and laurel oak in the overstory, with creeping bluestem, grassleaf goldenaster, lopsided indiagrass, saw palmetto, and pineland threeawn in the understory.

Smyrna fine sand (052). This soil is nearly level and poorly drained. It is on broad, low-lying, convex swells on the flatwoods, occurring on 0.14% of the surface soils of the preserve. The natural vegetation consists of longleaf pine and slash pine. The understory includes gallberry, running oak, saw palmetto, pineland threeawn, and wax myrtle.

St. Johns fine sand (046). This soil type is found in several locations on 1.40% of the total surface soil cover. This nearly level, poorly drained soil can support longleaf and slash pine in the overstory, with such species as gallberry and saw palmetto in the understory.

Wabasso fine sand (057). This soil type comprises 9.20% of the surface soils and is located in several sites, scattered throughout the preserve. This nearly level, poorly drained soil supports flatwoods vegetation such as longleaf, slash pine, and cabbage palm with an understory of palmetto.

Winder fine sand (059). This is a nearly level, poorly drained soil found in sloughs in the flatwoods on 10.90% of the preserve, and it is located in many areas scattered throughout much of the preserve. Natural vegetation on these soils consists of live oak, slash pine, and cabbage palm. The understory consists of saw palmetto, wax myrtle, and pineland three-awn.

Zolfo (061). This soil, on broad, low ridges on the flatwoods, is nearly level, and somewhat poorly drained. It occurs on 0.11% of the surface soils of the preserve. Natural vegetation on these soils consists of live oak, turkey oak, longleaf pine, and slash pine in the overstory, with an understory including broomsedge, bluestem, lopsided indiagrass, saw palmetto, and pineland threeawn.

2.1.3 Soils Management Measures

Management measures for the Lower Green Swamp Preserve include protecting the natural vegetation to prevent soil erosion, developing and maintaining the trail system and firebreaks, and preventing off-road vehicles from accessing the preserve. The goals and objectives of the management plan will preserve the integrity of the native soils by preserving and enhancing the native vegetation communities on the preserve and by taking action to prevent erosion. The facilities or actions proposed in this plan that would result in permanent impacts to soils are maintenance of the existing firebreaks, and the development of new trails. There are no known oil, gas, phosphate or other mineral resources on the preserve (the adjacent phosphate facility does not mine rock on the site but, rather, imports all raw materials from other parts of the state). Several of the proposed actions for the preserve are dependent on the soil types for successful implementation. Any future management measures not included in this plan that require earthwork will implement U. S. Forest Service Best Management Practices for forested soils (http://www.na.fs.fed.us/spfo/pubs/n_resource/wetlands/index.htm) prior to construction to preserve the character of the ecosystems.

2.2 Natural Communities

2.2.1 Mapping Process

Ecological communities are distinct vegetation associations on the Lower Green Swamp Preserve. The Florida Natural Areas Inventory (FNAI 2010) developed the system of classifying the natural communities employed in this plan. The premise of this system is that physical factors such as geology, climate, soils, hydrology, and fire determine the species composition of an area and that areas that are similar with respect to these factors will tend to have natural communities with similar species compositions. The plant species found through the publication date of this management plan on the Lower Green Swamp Preserve are listed in Appendix B. The vegetation communities identified on the preserve, and their areas, are listed in Table 3. The Hillsborough County Parks, Recreation, and Conservation Department, Conservation Services staff, mapped the area of each vegetation community using GIS and photo-interpretation, with field verification (S. Emery, personal observations).

Table 3. Land Cover on Lower Green Swamp Preserve.

Land Cover Type	Acreage	Percentage
Agricultural		
Pasture and Croplands	5755.0	44.9%
Pine Plantation	1299.0	10.1%
Other Agricultural Lands	15.5	0.1%
<i>Total Agricultural Lands</i>	<i>7069.5</i>	<i>55.2%</i>
Hydric		
Cypress Swamp	1151.5	9.0%
Freshwater Marsh	937.0	7.3%
Riverine Swamp	2362.0	18.4%
Wet Prairie	249.0	1.9%
Water	11.0	0.1%
<i>Total Hydric Lands</i>	<i>4710.5</i>	<i>36.8%</i>
Mesic		
Palmetto Prairie	494.0	3.9%
Pine Flatwoods	152.0	1.2%
Hardwood Hammock	304.0	2.4%
<i>Total Mesic Lands</i>	<i>950.0</i>	<i>7.4%</i>
Other		
Infrastructure	29.0	0.2%
Other Disturbed Lands	50.0	0.4%
<i>Total Other Disturbed Lands</i>	<i>79.0</i>	<i>0.6%</i>
Total All Lands	12809.0	100.0%

2.2.2 Vegetation Community Descriptions

This section describes the distinct communities that comprise 100 acres or more of the property, their estimated extent, and location within the preserve (Figure 4). The large size of the preserve and the variation in disturbance of the plant communities means that the summary table and descriptions of the vegetative cover will vary somewhat from location to location. As part of the long-term management process, the Conservation Services Section will continue refining the delineation of plant community types based on field mapping, as well as continuing to update the floral and faunal species lists.

Agricultural. The largest vegetative community type is pasture and cropland. This type currently comprises 5,755 acres (44.9%) of the total preserve acreage. This acreage has been reduced since the mid-1990s, when 1,299 acres (10.1%) that were formerly pasture were planted

in slash pines and converted to pine plantation. The pine plantation was thinned first in 2009 and will be thinned in the future. Before the pines were planted, all upland areas of the preserve, except one section in “native range”, were in improved pasture, dominated by bahia grass and some native herbaceous species. Cattle have grazed these large areas of pasture for more than 50 years. Other agricultural lands total 15.5 acres (about 0.1% of the preserve). The total agricultural acreage (pasture plus pine plantation plus other) is 7,069.5 acres (55.2% of the preserve land).

Management measures for agricultural. Agricultural lands are prone to infestations of various undesirable plants like tropical soda apple, so regular weed suppression is necessary. Feral hogs or other wildlife can damage pasture and crops; continue a feral hog management program.

Riverine swamp hammock. Riverine swamp habitat on Lower Green Swamp Preserve is associated primarily with the two creeks flowing through the preserve. This community comprises 18.4% of the total land cover and has the highest species richness on the preserve. Dominant and sub-dominant canopy species include bald cypress, cabbage palm, American elm, pop ash, black gum, water oak, laurel oak, water hickory, red maple, and hackberry. A shrub layer includes saplings of canopy trees as well as buttonbush, swamp dogwood, fetterbush, wax myrtle, and wild coffee. Ground cover species include a variety of ferns, spoon flower, lizard’s tail, dayflower, star rush, wild petunia, and water grass.



Riverine swamp hammock (photo: Scott Emery)

Management measures for riverine swamp hammock. This type of community is prone to infestations of air potato, skunk vine, climbing fern, and others, so maintenance of invasive exotic vines is an important issue. Feral hogs are especially damaging in these wetland communities because they create soil disturbances that easily erode during strong flows and high water events, so control of hogs is important.

Cypress swamp. The cypress swamp communities include strands, sloughs and domes, and are found throughout the preserve, comprising approximately 9.0% of the total land cover. A canopy dominated by either bald cypress or pond cypress with gum trees, dahoon, occasional cabbage palms, laurel oak, water oak, and red maple characterizes these communities. The composition and density of ground cover species is dependent upon the amount of impact and adjacent land uses, as well as canopy closure. Common understory species present include soft rush, water pennywort, lizard's tail, water hyssop, hornwort, blue flag iris, day flower, a variety of ferns, button bush, wax myrtle, persimmon, and multiple vine species.



Cypress swamp (photo: Scott Emery)

Management measures for cypress swamp. The management of the cypress swamps includes preventing the infestation of exotic vegetation and maintaining the hydrology. Invasive exotic vines in cypress swamps include climbing ferns, air potato, and skunk vine. Maintaining the hydrology is important not only to support the chemical and physical processes of the ecosystem, but also to support the physical properties of the soil that sustain the ecosystem. In wetlands slated for restoration, cattle should be kept out from the cypress, as their hooves tend to destabilize the mucky sediments, and they eat the understory plants.

Freshwater marsh and wet prairies. Freshwater marshes and wet prairie areas form a matrix of wetlands throughout the Lower Green Swamp Preserve. The marshes constitute about 7.3% of the total land cover and the wet prairies constitute 1.9%. The wetlands range in size from less than 0.25 acre to large systems approaching 100 acres in size. One or more of the following activities have affected most of these wetlands: ditching/drainage, edge conversion to pasture, cattle, pine plantation planting, or sod farming, and the vegetation varies widely. Those wetlands with a shorter hydroperiod and a shallow water depth (either naturally or due to ditching) are still hydrologically capable of supporting pipe wort, marsh penny wort, smart weed, beakrush, sand

cord grass, maidencane, various species of St. Johnswort, several species of dog fennel, little blue maidencane, broomsedge, and soft rush. Deeper wetlands can support those same species plus such plants as pickerelweed, duck potato, fireflag, soft rush, and spike rush. Both wetland types are occasionally surrounded by a shrub perimeter, with species such as wax myrtle, buttonbush, and Carolina willow. In the deeper marshes, the Carolina willow and buttonbush may also grow within the center of the wetland, along with a few gum trees.



Wet prairie/freshwater marsh (photo: Scott Emery)

Management measures for wet prairie/freshwater marsh.

A prescribed burn plan should be developed for these marshes because these wetland areas usually burn every 2 to 4 years naturally (FNAI 2010); without occasional fires these wetlands would become shrub swamps with Carolina willow and buttonbush establishing in the central marsh. Other management measures include controlling invasive exotic vegetation, maintaining hydrology, and preventing off-road vehicle impacts. Cattle grazing should be monitored, as over-grazing may suppress the natural plant community and create mono-specific communities of soft rush (*Juncus effusus*), as most other vegetative species are eventually consumed by the cattle.

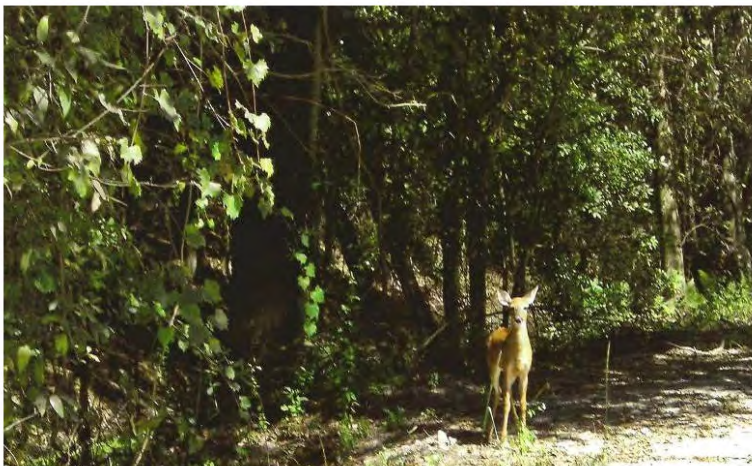
Saw palmetto prairie. The palmetto prairie community constitutes 3.9% of the land cover on the Lower Green Swamp Preserve. The majority of the pines were logged out in the early 1900s, and others were killed by wildfires and lightning strikes, but some longleaf and slash pines are regenerating in a few areas. The largest such area is within Section 26, the area remaining as “native range”.

Management measures for saw palmetto prairie. Restoration of dry prairies (pine/palmetto and palmetto/gallberry/hardwood area) to re-establish native grasses and shrubs is accomplished with prescribed burns, supplemented by mechanical or chemical techniques if necessary, and protection of the hydrology of the community (Watts et al. 2004 <http://www.ces.fau.edu/fdpc/proceedings.php>). Other management measures include vigilant site security to limit illegal off-road vehicles, and other forms of vandalism.

Pine flatwoods. The nearly level pine flatwoods comprise 1.2% of the preserve, in the native range area in Section 26, and the areas of pine plantation. The understory varies in composition depending on the timing and intensity of the last fire. Some areas will support a dense understory of saw palmetto, gallberry, wax myrtle, wiregrass, and broomsedge. More xeric areas contain sand live oak, paw paw, shiny blueberry, while hat pins, gallberry, and St. Johns wort characterize more mesic flatwoods. Saplings of pines are expected to recruit along with dense stands of palmetto, broomsedge, and winged sumac.

Management measures for pine flatwoods. Existing and proposed pine plantation areas should be shifted back gradually into natural pine flatwoods communities. The proper management of pine flatwoods includes conducting prescribed burns to help maintain an open canopy of longleaf and slash pine and reduce wildfires, controlling exotic vegetation, and preventing impacts to the soil and native vegetation (Myers and Ewel 1990). Minor changes in the flat topography can have significant impacts to the character of the habitat by changing drainage patterns. Other management measures include mowing, roller-chopping, preventing off-road vehicle impacts, and other forms of vandalism.

Hardwood hammock. Several small, hardwood hammock areas occur on the preserve, comprising 2.4% of the total land cover. A canopy of mixed hardwood species (most commonly live oak) draped in Spanish moss, and a carpet of leaf litter in the understory characterize these areas. Lower species richness occurs in the deep shade. These areas likely have occurred because of historic fire suppression and pasture conversion with the use of live oaks as shade areas for cattle.



Management measures for hardwood hammock. Proposed management includes the control of invasive exotic plants, restricting off-road vehicles, and controlling other forms of vandalism.

White-tailed deer (photo: Richard and Karen Warren)

Management measures for all vegetation communities: The long-term program proposes the gradual reduction of the acreage in improved pasture and resulting increase in acreage of natural habitat, with an emphasis toward the establishment and long-term maintenance of a wildlife corridor from the Alston Tract along the north boundary of the property to the SR 39 boundary on the west. The transition from pasture to natural habitats will be implemented in phases (see Section 6.0, and Figures 8 and 9).

To manage the vegetation communities properly, periodic surveys should be conducted to determine the species composition and ecological integrity of these communities, on a schedule related to the proposed restoration and management activities by incremental land use changes. The surveys would help determine what listed plant species are present, and any needed changes to the ongoing management activities for the preservation, restoration, or protection of the listed species or plant community.

2.3 Water Resources

2.3.1 Aquatic Preserves and Outstanding Florida Waters

There are no areas categorized as Florida Department of Environmental Protection “Aquatic Preserves” within or near the Lower Green Swamp Preserve. The Blackwater and Itchepackesassa Creeks are major tributaries to the Hillsborough River, which was designated as an “Outstanding Florida Water (OFW)” in 1995 from Fletcher Avenue to the river’s origin in the Green Swamp (<http://www.dep.state.fl.us/water/wqssp/ofwqa.htm>). The OFW designation provides that no water quality degradation should be allowed, and all stormwater discharges must meet certain water quality standards.

2.3.2 Water Quality

The Lower Green Swamp Preserve lies within the Upper Hillsborough River Watershed (Figure 3). The long-term average daily flow of Blackwater Creek at the SR 39 Bridge (downstream of its confluence with Itchepackesassa Creek) is 79 cfs (Hillsborough County 1997). The Florida Department of Environmental Protection (<http://www.dep.state.fl.us/water/watersheds/assessment/docs/303d/maps/Hillsborough.pdf>) describes the Blackwater/Itchepackesassa Creek system as an impaired water body. Because of concern for water quality in the creeks, the EPCHC established several water quality monitoring stations within the preserve. Results from water quality monitoring stations on the preserve are compared to an Environmental Protection Commission sampling station at Blackwater Creek, just downstream of Lower Green Swamp Preserve. Water quality parameters sampled by EPCHC staff include air temperature, water temperature, dissolved oxygen, pH, water clarity, total nitrogen, phosphorus, fecal coliform, and enterococci. The monitoring results have been reported in annual ELAPP stewardship reports and are available online (<http://www.hillsborough.wateratlas.usf.edu/DataDownload/GraphData.aspx>).

The WCRWSA has conducted ground water quality sampling on Cone Ranch beginning in the mid 1980s and continuing periodically into the 1990s, primarily associated with aquifer performance testing activities (S. Emery, personal communication). Results indicated water was of sufficient quality to warrant consideration as a potable ground water source.

Hillsborough County remains committed to hydrological improvements in the watershed, particularly when there is a potential to improve conditions on Lower Green Swamp Preserve. In 1999, the Hillsborough County Public Works Section partnered with the Southwest Florida Water Management District and other organizations to create a 400-acre wetland restoration project at Tiger Lake on the Lower Green Swamp Preserve (Figure 2). A ditch block was installed within the project area, and water was re-routed through a number of created herbaceous wetlands. The project enabled large-scale wetland rehydration and habitat improvement of cypress domes and freshwater marshes, and provided water treatment to waters along Tiger Creek and Blackwater Creek.

2.3.3 Water Resource Management Measures

The County is committed to protecting and enhancing the water quality on Lower Green Swamp Preserve, and preserving and restoring the natural hydrology. Management measures required with respect to maintaining or improving the water quality on the preserve are a major focus of many of the wetland and stream actions detailed within this plan, and could include:

- control exotic vegetation with approved herbicides used according to the label, or use biological control agents if available;
- Implement Phase I Environmental Audit (Meryman Environmental, Inc. 2012)
- prevent overgrazing of vegetation; minimize cattle access to creeks.
- periodically remove trash (coming from upstream sources) from the creeks;
- implement best management practices during any construction or other disturbance of the soils or vegetation;
- Continue the agreement with the Southwest Florida Water Management District to monitor on site wells and identify opportunities to partner with the District's SWIM program to improve hydrological conditions in Blackwater Creek;
- Participate with other landowners, stakeholders, or university research institutes to develop and implement plans for maintaining water quality standards in the creeks.

2.4 Fish and Wildlife Resources

2.4.1 Existing Conditions

The Lower Green Swamp Preserve has been used intensively for agriculture for over 50 years, and 7,069.5 acres of the native upland habitat has been replaced with cattle grazing on improved pasture, sod farming, or slash pine plantations. Water flow on the preserve was controlled with extensive ditching and stream



Palm warbler (photo: Audubon)

channelization (Figure 10). Although most of Blackwater and Itchepackesassa creeks were channelized in the late 1920s to early 1930s, extensive forested floodplains remain along much of the channels.

Since much of the preserve has been altered from its original condition from a combination of stream channelization, ditching, drainage, logging, bahia grass pasture, etc., relatively little undisturbed habitat remains, and much of the botanical diversity and richness has been reduced. At least 2 plant species that are currently, or have been considered for “listing” as rare, threatened or endangered by at least one state or federal agency, have been found on Lower Green Swamp Preserve (S. Emery, personal observations; Henigar and Ray 1988).

Wildlife observations from Lower Green Swamp Preserve monitoring reports since 1988 (WCRWSA 1988, Henigar and Ray 1988, S. Emery, personal observations, 1986-2011) plus wildlife surveys performed by an interagency restoration team led by the Florida Game and Freshwater Fish Commission from 1994-96 indicate there are at least 231 species of birds, mammals, reptiles, and amphibians. (6 amphibian species, 50 reptile species, 132 bird species, and 23 mammal species), and 358 plant species occurring on the preserve. Other species could occur, based on published databases and on the characteristics and extent of the available habitat. Qualitative plant and animal surveys have been conducted on the preserve for almost 25 years (S. Emery, personal observations; HCCSA staff, personal observations; Henigar and Ray 1988, WCRWSA 1988). These surveys were combined to produce a list of observed and/or expected flora and fauna (species of plants, invertebrates, amphibians, reptiles, birds, and mammals) (Appendix B – flora and fauna lists). The lists will be updated in the future as new species are observed.

2.4.2 Management Measures for Fish and Wildlife and Plants

Fish and wildlife species and their habitats will be managed using best available scientific information. Standard management techniques for habitat management include actions such as the prescribed burn program to enhance and manage various habitats, and the control of invasive exotic vegetation and animals (Cox and Kautz 2000). The main management measures are tied directly to the various actions proposed in this management plan. These management measures will be conducted on the preserve on an as-needed basis, and as prioritized by the Conservation Services staff.



Additional management measures for fish and wildlife include maintaining or improving wildlife corridors inside and outside the preserve. The Hillsborough Greenways Committee studied the status of wildlife corridors in Hillsborough County with respect to gaps and barriers and prepared list of gaps and barrier sites to be improved. State Road 39 was determined to be one of the top ten man-made barriers within the County, affecting

Wild turkey displaying (photo: Richard and Karen Warren)

wildlife movement on the Lower Green Swamp Preserve (Hillsborough County Greenways Committee 2006).

Scientifically designed surveys to establish an inventory of wildlife species present on the preserve should include sampling all habitat types to search for invertebrates, herptiles (reptiles and amphibians), small mammals, and birds throughout the preserve. Surveys should be conducted seasonally to determine the use of the site by resident, seasonally active, and migrant species. The large size of the preserve precludes doing survey work continuously over the entire preserve every year. Studies should be structured to select habitats and sample species as they are prioritized, on a multi-year schedule, so that the habitats are adequately represented over time. Some of these surveys could be coordinated to occur as part of the baseline inventory needed for alternate management scenarios proposed for the preserve.

2.5 Special Status Species

Information regarding the special status species on Lower Green Swamp Preserve was compiled from reports and field observations (S. Emery, personal observations, Conservation Services staff, personal observations, Henigar and Ray 1988). At least 13 federally or state-listed animal species have been observed on the preserve (Table 4) (Florida Fish and Wildlife Conservation Commission 2010). The Florida Natural Areas Inventory (FNAI) maintains inventories of plants and animals found throughout the state. Hillsborough County coordinates extensively with the Florida Fish and Wildlife Conservation Commission and the U. S. Fish and Wildlife Service to implement the management of specific listed species.

The survey results described in Section 2.4 above and restoration projects associated with the various actions described in Section 6.0 will provide basic inventory information for planning future facilities in areas that will not disturb protected species.

Table 4. Special status animal and plant species observed on the Lower Green Swamp Preserve.

Species		Ranking	
Common Name	Scientific Name	FED ^a	STATE ^b
Birds			
snowy egret	<i>Egretta thula</i>		SSC
little blue heron	<i>Egretta caerulea</i>		SSC
tricolored heron	<i>Egretta tricolor</i>		SSC
white ibis	<i>Eudocimus albus</i>		SSC
Southeast American kestrel	<i>Falco sparverius paulus</i>		T
Florida sandhill crane	<i>Grus canadensis pratensis</i>		T
bald eagle	<i>Haliaeetus leucocephalus</i>	EA ^c	
wood stork	<i>Mycteria americana</i>	E	E
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T	T
Mammals			

Species		Ranking	
Sherman's fox squirrel	<i>Sciurus niger shermani</i>		SSC
Reptiles and Amphibians			
American alligator	<i>Alligator mississippiensis</i>	SAT	
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T	T
gopher tortoise	<i>Gopherus polyphemus</i>		T
Plants			
giant wild-pine	<i>Tillandsia utriculata</i>		E
yellow butterwort	<i>Pinguicula lutea</i>		T

Sources:

- Birds, mammals, reptiles, and amphibians: Florida's Endangered and Threatened Species (FFWCC November 2010);
- Plants: Coile and Garland 2003 (<http://www.virtualherbarium.org/EPAC/Notes2003.pdf>); Florida Department of Agriculture and Consumer Services 5B-40.0055 Regulated Plant Index (Preservation of Native Flora of Florida Act: 581.185-187 F.S.)

Notes:

- <http://fac.dos.state.fl.us/>;
- <http://www.fws.gov/endangered/wildlife.html>;
- Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended.

2.5.1 Descriptions of Special Status Species



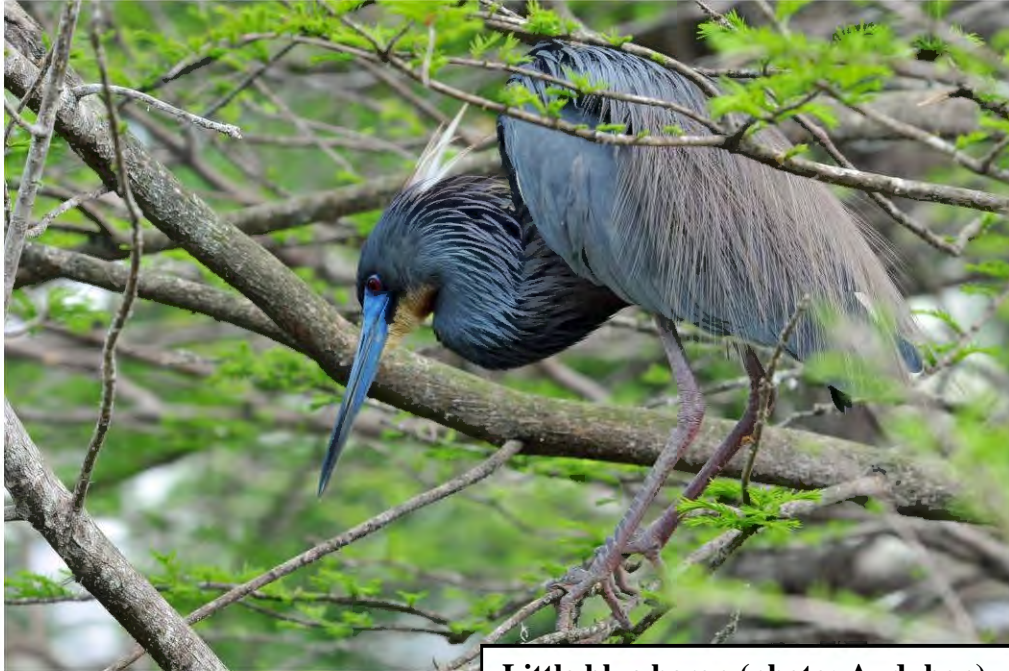
Snowy egret (photo: Audubon)

Snowy egret. The snowy egret is one of 13 species of colonial waterbirds that nest in colonies in both coastal and inland wetlands in Florida. Most coastal nesting is on islands separated from the mainland by broad expanses of open water, generally in mangroves or associated shrubs. Inland, waterbirds nest generally on small islands in lakes, old phosphate pits, and stormwater ponds where copses of willows, Brazilian pepper, saltbush, elderberry, or buttonbush have developed surrounded by a broad expanse of open water to reduce nest predation (Rodgers *et al.* 1996), but nesting in trees within flooded floodplains may occur. Rarely, waterbirds, particularly wood storks, nest among cypress or other tall trees.

Snowy egrets forage in shallow water, and their diet consists of small fish, frogs, small rodents, prawns, crayfish, grasshoppers, worms, and a variety of other aquatic invertebrates. The snowy egret is declining due predominantly to the loss of nesting and foraging habitats (Rodgers *et al.* 1996). Snowy egrets are commonly observed on the Lower Green Swamp Preserve, which provides foraging habitat but neither they, nor any other waterbirds, nest on site (S. Emery, personal observations; Heniger and Ray 1988).

Management measures for snowy egret. Habitat management includes the preservation of foraging opportunities within existing wetlands on site by managing the water regime to emulate the natural wet/dry season pool drawdowns, preserving natural vegetation on the site, maintaining water quality to support aquatic invertebrates, fish, and vertebrate populations, control of invasive exotic plant species, especially in wetlands, control of feral dogs and cats, and limiting human disturbance.

Shallow, short hydroperiod wetlands with dense forage populations are crucial to high nesting productivity for snowy egrets and other colonial waterbirds, so the water management regime for ponds should be coordinated with the nesting season. As wetlands and stream segments are restored through management plan actions, the value of the preserve for these opportunistic wading birds, shorebirds, and many other species will increase over time. Colonial waterbirds use some areas as night roosts, but do not nest on the preserve because there is no suitable colony site. The existing cypress domes and cattle watering ponds could be evaluated to assess whether any could be modified to support colonial waterbird nesting. In larger watering ponds, it might be possible to create a small “island” in the middle of the pond, using the spoil material from the mounds placed when it was excavated to build the pond. These islands, if surrounded by deep water, with an alligator to protect the colony from terrestrial predators, could provide roosting or possibly nesting habitat. Establishing a heronry would provide nesting habitat for multiple species of wading birds, those that are “listed” and others common to the west-central Florida avifauna.



Little blue heron (photo: Audubon)

Little blue heron. Little blue herons, another colonial waterbird, require shallow freshwater, brackish, or saltwater habitats for foraging. Their diet consists of fish, amphibians, and invertebrates, but nesting herons need freshwater prey for their young chicks, which develop salt excreting glands as they grow older. Their numbers have been steadily declining due to the alteration of wetland hydrocycles resulting in the loss of foraging habitat as wetlands have been drained or their hydroperiods altered. Also contributing to their decline is exposure to pesticides and heavy metal contamination (Rodgers *et al.* 1996). Little blue herons occur commonly on the Lower Green Swamp Preserve (S. Emery, personal observations, Henigar and Ray 1988) as the preserve provides foraging and roosting habitat, but this heron does not currently nest on the site. This heron, similar to other wading birds, generally nests on islands surrounded by a broad expanse of open water to reduce nest predation.

Management measures for little blue heron. Management measures are similar to those described for the other small herons and colonial waterbirds in general.

Tricolored heron. The tricolored heron, a colonial waterbird, nests commonly in colonies on mangrove islands, but also nests in Carolina willow or similar shrubs (buttonbush, cypress, Brazilian pepper, and saltbush) in freshwater wetlands. Nesting areas are typical colonial waterbird sites on trees or shrubs over standing water or on islands. Tricolored herons forage in shallow wetlands and on the edges of ponds and lakes. Their diet is primarily small fish, and other aquatic invertebrates. These birds are declining due to the loss of nesting and feeding habitat, and due to disturbance during breeding (Rodgers *et al.* 1996). Lower Green Swamp Preserve provides foraging and roosting habitat for the tricolored heron, but this heron does not nest currently on the preserve.

Management measures for tricolored heron. Management measures are similar to those listed for the other small herons and colonial waterbirds in general.

White ibis. White ibis occur commonly on the preserve foraging for insects, crayfish, and small amphibian and reptiles, and fish. There is no suitable nesting habitat on site, but the shallow wetland areas and grazed pastures on the preserve are important foraging areas for the white ibis, especially during the breeding season. Nesting ibis require freshwater prey because their fledglings are intolerant to salt (Rodgers *et al.* 1996). White ibis are very vulnerable to disturbance and one episode of human impact on a nesting colony can result in massive mortality of young birds (Rodgers *et al.* 1996).



Adult white ibis (photo: Scott Emery)

Management measures for white ibis. Management measures for ibis include those listed for the small herons and colonial waterbirds in general.

Southeastern American kestrel. Two kestrel species occur in Florida, the resident subspecies *Falco sparverius paulus* and the migratory subspecies *F. s. sparverius*, which does not nest in Florida. While the northern races are abundant and are frequently observed in central Florida as migrants and winter residents, the locally breeding sub-species is uncommon statewide, is currently listed as threatened, and is very rare in Florida (Rodgers *et al.* 1996). Resident kestrel populations have been declining due to the loss of nesting habitat, and are uncommon on the preserve (S. Emery, personal observations). Kestrels typically perch above an open field where

they can locate insects, small rodents, and reptiles and swoop down to capture their prey. They prefer to nest in longleaf pine snags in open areas with low herbaceous cover.

Management measures for southeastern American kestrel. Maintain abundant pine snags and conduct prescribed burns to keep herbaceous habitat open.

Bald eagle. Bald eagles were recently removed from the federal list of protected species, but are still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles nested in the northeast corner of the preserve for many years, but the nest tree was hit by lightning in the late 1990s and the nest collapsed a year later (S. Emery, personal observations). The eagles relocated their nest to a tree just east of the preserve boundary. This eagle pair produces chicks regularly, and adult and immature eagles have been observed regularly on the preserve perched on live oak branches in the pastures, on large pine trees adjacent to the pastures, on the spoil mounds of the cattle watering ponds, and standing along the shoreline of the Itchepackesassa Creek (S. Emery, personal observations). Up to 6 eagles have been observed at one time on the preserve (Karen and Richard Warren, Audubon Ranch, personal observations). Four other nests have been reported from the area west of Highway 98, east of Highway 41/301, and north of I-4 (FWC Eagle Nest Locator <https://public.myfwc.com/FWRI/EagleNests/nestlocator.aspx#search>). Eagles are wide-ranging and opportunistic in foraging, and prey on fish and terrestrial vertebrates. The eagles, along with the numerous vultures on the preserve, forage on carrion (cows and feral hogs) (K. and R. Warren, S. Emery, personal observations), and hunt the flocks of cattle egrets that commonly follow the cattle herds.



Adult bald eagle (photo: Richard and Karen Warren)

Management measures for bald eagle. To provide possible alternate nest sites in the future, evaluate large pine trees for nest site suitability before harvesting them, and prevent human disturbance.

Florida sandhill crane. Florida sandhill cranes require freshwater herbaceous marshes with a minimum of 0.5 acre for nesting, and several of the numerous depression wetlands on the preserve are large enough to support nesting cranes (S. Emery, personal observations; Henigar and Ray 1988). The flatwoods and other open, low-lying uplands provide excellent foraging habitat for cranes. They are omnivorous, feeding on insects and other invertebrates, seeds and berries, and small vertebrates. Florida sandhill cranes begin nesting in late winter or early spring and fledge in the late summer (<http://myfwc.com/wildlifehabitats/profiles/birds/cranes/sandhill-crane/>).

Management measures for Florida sandhill crane. The greatest threats to sandhill cranes are loss or degradation of habitat, mammalian predators, and human disturbance. Herbaceous marshes should be evaluated and crane nesting sites should be identified, then access to marshes with nesting cranes should be limited during the nesting season. Management activities such as prescribed burns and nuisance vegetation control should not be conducted around active nests during nesting season. Mammalian predator populations should be monitored and the growing coyote population should be controlled.



Sandhill crane (photo: Scott Emery)

Wood stork. Wood storks nest colonially in freshwater and brackish wetlands, primarily in tall flooded cypress strands or coastal mangrove swamps. Wood storks forage commonly on the preserve, but none nest there currently (S. Emery, personal observations), although there are other inland wood stork colonies nearby in Hillsborough, Pasco, and Polk counties or further

(http://www.fws.gov/northflorida/WoodStorks/Documents/20100224_map_WOST_FL_Nesting_Colonies_Foraging_Areas.pdf). Wood storks forage for aquatic invertebrates and fish most effectively in shallow, short hydro-period wetlands (depressions in freshwater marshes or swamps creeks, and ditches) where fish prey become concentrated during periods of falling water levels and easily accessible in relatively high densities in the shallow water (<http://www.fws.gov/verobeach/images/pdflibrary/wost.pdf>).

Management measures for wood stork. Management actions should include all those previously enumerated for the other wading bird species, normal pool water management for cypress stands, and re-hydrating ditched wetlands. Wetland restoration on the preserve will benefit storks because it will re-establish historic drawdown patterns, and improve forage production by re-establishing natural hydroperiods. Restoring short hydroperiod wetlands is particularly important (Hodgson and Paul 2010).



Wood storks foraging (photo: Scott Emery)

Audubon's crested caracara. The Florida caracara population is slowly expanding and, while the Lower Green Swamp Preserve is further north than the current known breeding range, some birds have been observed periodically foraging on the preserve, usually during post-nesting dispersal. Caracaras typically nest in isolated sabal palm trees in open fields, and prey on terrestrial insects, fungus, and forage along the shores of shallow ponds hunting small mammals and cattle egrets, or feed on dead carrion.

Management measures for Audubon's crested caracara. Recommended management actions include retaining pasture, grassland, and pond/wetland areas within pastures for foraging. Should caracaras nest on the preserve, recommendations include retaining mature cabbage palm trees as possible nest trees, protecting nest trees, establishing buffer areas within 300m of a nest tree, retaining dead cabbage palms within 300m of a nest, planting additional palm trees

(possible future nest trees), which will benefit other birds as well as caracaras, and periodically monitoring for nesting caracaras (Morrison 2001).

American alligator. Alligators are common in the ponds and marshes, and nest successfully on the preserve (S. Emery, D. and K. Warren, observers from West Coast Regional Water Supply Authority and Tampa Bay Water, personal observations). Alligators are carnivorous, and eat crustaceans, fish, turtles, lizards, snakes, small mammals, birds, and other small prey (Moler 1992).

Management measures for American alligator. Protect alligators on the preserve from poaching, avoid water quality degradations, prevent significant fluctuations in water elevation, protect nest sites and young, and prevent human interference.

Gopher tortoise. The gopher tortoise lives in extensive subterranean burrows in dry upland habitats such as longleaf pine sandhill, xeric oak hammocks, scrub, pine flatwoods, dry prairies, and coastal dunes. Tortoises can also live in man-made environments, such as pastures, old fields, and grassy roadsides. To be suitable for gopher tortoises, the habitat must have well-drained sandy soils for digging burrows, herbaceous food plants, and open sunny areas for nesting and basking. Periodic natural fires play an important role in maintaining tortoise habitat by opening up the canopy and promoting growth of herbaceous food plants (Moler 1992). Gopher tortoise burrows remain at a fairly constant temperature and humidity level year-round, thus providing shelter for the tortoise during periods of extreme temperatures, drought, and fire, and providing habitat for commensal animals including listed species such as the eastern indigo snake, Florida pine snake, gopher frog, Florida mouse, and gopher cricket (Moler 1992). In 2007, the Florida Fish and Wildlife Conservation Commission (FWC) upgraded the status of gopher tortoise from “species of special concern (SSC)” to “threatened”. At least two areas of the preserve currently have gopher tortoises: (1) within section 26, the native range area; and (2) within portions of Sections 27, 28, 34, and 36 that contain the pine plantation (Figure 4). Some of these tortoises may have been moved to the preserve pursuant to an agreement between the Hillsborough County School District and the Hillsborough County Water Resources Department (Appendix A).



Gopher tortoise (photo: Scott Emery)

Management measures for gopher tortoise. Management measures for the gopher tortoise include surveying the population and mapping burrows using GIS to determine the distribution on the preserve. Areas where the burrows occur should be restricted so that vehicles do not crush active burrows and prescribed burns should continue in these areas to maintain a vigorous

herbaceous layer. Egg and hatchling predation should be reduced as much as possible, by assessing raccoon, coyote, and fire ant populations on the preserve and managing these predators as appropriate. The Conservation Services staff has prepared gopher tortoise relocation policies for County ELAPP properties using the guidelines established by the FWC. The revised state management plan for gopher tortoises can be accessed at <http://www.myfwc.com/imperiledspecies/plans.htm>. Using these guidelines, a mark re-capture program could be initiated to inventory the population and determine if the preserve could receive more relocated tortoises. If additional funding can be obtained additional research could be conducted on tortoise biology and behavior.

Eastern indigo snake. The Eastern indigo snake is a large, docile, non-venomous snake that has declined in numbers over the last 100 years due to the loss of habitat, pesticide use, and collection for the pet trade. The snake is a commensal species with gopher tortoises and other burrowing animals, using their burrows for egg laying and denning. The preferred diet of these snakes is frogs, other snakes, toads, salamanders, small mammals, and birds. The Eastern indigo snake can be found in many habitat types from wetlands to xeric pinelands and scrub (Moler 1992). The USFWS recovery plan for this species is available at <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spscode=C026>. One specimen was observed in the native range in Section 26 (S. Emery, personal observations).

Management measures for Eastern indigo snake. Protection and management of the Eastern indigo snake's habitat, and protection from poaching will ensure the success of this species. Conducting the prescribed burn program, controlling the exotic vegetation, maintaining the hydrology of areas where snake populations are present, and preventing or controlling the influx of exotic animals such as feral pigs are measures that would protect the Eastern indigo snake and its habitat.

Sherman's fox squirrel. Sherman's fox squirrel is one of three subspecies of fox squirrels that occur in Florida. The Sherman's fox squirrel is found in the Florida panhandle from northern counties to the Tampa Bay area over to Lake Okeechobee. Fox squirrels south of this region are Big Cypress fox squirrels. These squirrels are larger than the common gray squirrel and are declining due to the loss of their specific habitat areas as a result of conversion to pine plantation, row crops, or development.



These squirrels require mature, fire maintained long-leaf pine-turkey oak sandhill and flatwoods community types. Acorns from turkey oak and live oak, as well as long-leaf pine seeds are the major components of the fox squirrel diets, but they also eat fungi, other nuts, bulbs, vegetative buds, and insects. They build leaf nests in large oaks, and typically have two breeding

Sherman's fox squirrel (photo: Ross Dickerson)

periods per year, with only 2 to 3 young per season (FNAI 2001, Humphrey 1992).

Management measures for Sherman's fox squirrel. Management measures recommend that the habitat should be burned every two to five years (April - July if possible) to control shrubby vegetation and maintain park-like conditions. Longleaf pine/wiregrass communities should be preserved. The population of Sherman's fox squirrel on the ranch should be surveyed and monitored, and the areas in which the squirrels are located should be protected in perpetuity. Sherman fox squirrels have been observed on the preserve for the past 20 years (see Figures 8 and 9 – locations where squirrels have been observed) (S. Emery, personal observations). The existing live oaks plus pines should be maintained in these areas, and the propagation of additional pines and live oaks should be encouraged.

Airplants (giant wild-pine *Tillandsia utriculata*, northern needleleaf *Tillandsia balbisiana*, common wild-pine *Tillandsia fasciculata*). Several species of air plants (bromeliads) are native to many varied natural habitats such as swamps, sloughs, and cypress forests to pine flatwoods, sandhill, scrub, oak hammocks, and many other similar natural habitats, both wet and dry, throughout central and southern Florida and the Keys. They are epiphytic on tree trunks, branches, and large twigs that can support the plant's weight. Ten of Florida's 16 native bromeliad species are listed as threatened or endangered, of which at least three occur in Hillsborough County. Giant wild-pine was observed on the Preserve.



Giant wild-pine plants (photo: Bill Carlisle)

Management measures for air plants.

Loss of habitat, illegal collecting of specimens from natural areas, and the non-native Mexican bromeliad weevil (*Metamasius callizona*) are the greatest threats to Florida's bromeliads (Florida's Native Bromeliads <http://edis.ifas.ufl.edu/uw205#FIGURE 9>).

The Mexican weevil, which has been observed in the vicinity, but has not yet been documented in the Preserve, has been decimating the populations of bromeliads throughout south and central Florida, but recent efforts to develop a natural predator program for the weevil have been optimistic, using a new parasitic fly recently released into a Hillsborough County park and other locations around the state.

A survey to locate air plants on the Preserve should be conducted, and those plants should be mapped. The trees on which plants are growing should be protected from harvesting, and any populations of air plants in the Preserve should be monitored to assure they are not being poached. If plants are infested with the Mexican weevil steps should be taken to prevent it from spreading. Preventative steps could include the release of the parasitic fly and the isolation and quarantine of the infected plants.

2.5.2 Management Measures for All Special Status Species

Not surprisingly, many special status species are associated with floodplain forest, swamp forest, and mesic forest habitats (the portions of the preserve that are the least affected from human activities). It is anticipated that plant species diversity will increase over time with restoration efforts.

In addition to the vertebrate species of special concern that have been observed on the preserve, other animal species are possibly present on the preserve or roaming widely enough that they might become possible visitors to the preserve. These include the Florida mouse (*Peromyscus floridanus*), Florida black bear (*Ursus americanus floridanus*), Florida panther (*Puma concolor coryi*), burrowing owl (*Athene cunicularis*), Florida pine snake (*Pituophis melanoleucus mugitus*), and crawfish frog (*Lithobates areolatus*). As habitat restoration activities are undertaken, other wildlife species, including high priority management species, may immigrate to the preserve. As the pine plantation areas are gradually changed into pine flatwoods, they will attract more cavity-nesting bird species, many of which are Watch-listed (American Bird Conservancy 2010).



Red-cockaded woodpecker
(photo: Tall Timbers Research Station)

At the nearby Blackwater Creek Preserve, County staff suggested that the pine flatwoods areas of the Preserve be managed with the intent for use as red-cockaded woodpecker (RCW) introduction habitat. It is not known whether these woodpeckers occurred in the past on the Lower Green Swamp Preserve and whether an introduction would be feasible. The Multi-Species Recovery Plan for South Florida for the red-cockaded woodpecker provides very specific recommendations regarding habitat needs for this species (<http://www.fws.gov/verobeach/images/pdflibrary/rcwo.pdf>). An introduction would require a significant amount of planning, careful timing of prescribed burns, and trees appropriate for cavities with a diameter at breast height (dbh) of at least 9 inches.

Management measures for all protected species on the preserve include the management of invasive vegetation and animals, maintenance or restoration of natural hydroperiods and drainage

patterns, restriction of vehicular traffic and inappropriate recreational uses, apprehension and prosecution of poachers and trespassers, and periodic monitoring to assess the status of the various species.

Protecting wildlife corridors has been a major objective of the ELAP Program, which has purchased several parcels within the watershed. The Hillsborough River Greenways Task Force (now the Hillsborough River Watershed Alliance) has also been instrumental in protecting the river and its tributaries by obtaining OFW status on portions of the river, and by assisting in the acquisition, protection, and conservation of natural lands in the corridor (Hillsborough County 2001).

Because Lower Green Swamp Preserve is strategically located within this wildlife corridor (Figure 2), to support further the wildlife corridor, a wildlife undercrossing should be developed and maintained on SR 39. This wildlife undercrossing was requested from the FDOT by the FWC as compensation for impacts to wildlife habitat that will occur because of planned roadway improvements. The undercrossing would allow animals to cross safely under the road, but would not be constructed until the road widening is implemented at a future date, and would depend on future permitting reviews by the FFWCC, a regulatory agency that reviews FDOT permit applications. Installing an underpass was discussed and identified as a need in the Blackwater Creek management plan and the greenways report (Hillsborough River Greenways Task Force 1995) but never implemented (Hillsborough County 1997).

Wildlife surveys on a periodic basis are recommended to determine the presence and monitor the status of the protected species on the preserve. Future surveys should include surveys for the Florida black bear and the Florida panther, both of which have been observed in the near vicinity. Locating and mapping burrows, nests, territories, and listed plant populations using GPS is recommended to aid in managing resident species or important foraging areas. Any element occurrences will be reported to the Florida Natural Areas Inventory on the website format (<http://fnai.org/fieldreportingforms.cfm>).

2.6 Unique Geological Features

None.

3.0 CULTURAL RESOURCES

3.1 Definition of Terminology

There are five widely accepted categories of cultural resources: 1) archeological resources; 2) historic structures; 3) cultural landscapes; 4) ethnographic resources; and 5) museum collections. In the Lower Green Swamp Preserve, only archaeological or historic resources are likely to be present. As defined in the National Historic Preservation Act and its implementing regulations in *36 Code of Federal Regulations (CFR) 800*, historic properties are those buildings, Area of Potential Effects, sites, districts, artifacts, and remains that are related to culturally important places and events, and that are listed in or eligible for inclusion in the National Register of Historic Places. The significance of historic properties is assessed by the property's ability to

meet the following four criteria for inclusion in the National Register of Historic Places (36 CFR 60.4):

- Association with events that made a substantial contribution to the patterns of our history;
- Association with the lives of persons important in our past;
- Sites that embody characteristics of a type, period, or methods of construction or that represent the work of a master, possess high artistic value, or represent a distinguishable entity; or
- Have yielded, or may be likely to yield, information important to prehistory or history.

Properties may be eligible for the National Register of Historic Places for contribution at the national, state, or local level. In order for a structure to be listed in the National Register of Historic Places, it must possess historic integrity of those features necessary to convey its significance, such as location, designs, setting, workmanship, materials, feeling, and association in accordance with National Register guidelines.

3.2 Agency Correspondence

Thomas Weekes, an Environmental Specialist with Hillsborough County, requested information from the Florida Master Site file staff in July 2010. A response was received from Erin Bailey of the Bureau of Historic Preservation, which indicated that there are no recorded sites within the Lower Green Swamp Preserve, although there are a number of recorded sites in the vicinity.

3.3 Management Measures for Cultural Resources

County staff works closely with the local Florida Public Archaeology Network (<http://www.flpublicarchaeology.org/>) to learn more about the protection and interpretation of cultural resources. Although most of the upland areas have been cleared and used intensively for grazing for several decades, archaeological or ethnographic resources, particularly, may still be present. A survey coordinated by the County with a professional cultural resources surveyor should be conducted on the preserve when funding becomes available. Any significant resources would be interpreted appropriately for the public.

4.0 RECREATIONAL RESOURCES

The large size of Lower Green Swamp Preserve provides many options for public use, and brings special challenges in managing those options. The types, amount, intensity, and areas involved in public access are directly related to the funds available to make public access areas safe. This management plan proposes to use revenue-generating options in order to obtain sufficient funds to develop public access opportunities in the future.

4.1 Existing Recreational Facilities

There are no existing recreational facilities.

4.2 Proposed Recreational Facilities

Public recreational access to the Preserve is not provided presently but two gates currently installed along Knights-Griffin Road could be upgraded for public access (Figures 2, 6, and 7). Access from Knights Griffin Road rather than along SR39 is preferable because traffic will avoid the CSX Railroad crossing and difficult turning from SR39 (Figures 8 and 9). Over the next decade (2011 through 2020), about 900 acres of the preserve on the southern side of the preserve are proposed to be made accessible for public access. Itchepakesassa Creek, which is deeply channelized, would be a physical barrier to public access to the northern portions of the preserve (Figure 7). The Lower Green Swamp Preserve has miles of jeep trails that may provide the basis for establishing designated trails through different wooded habitat areas with mature trees and a varied understory, as well as through palmetto prairie and riverine floodplain forest habitats. Proposed recreational uses would be limited to low impact activities such as walking, hiking, trail running, trail biking, and horse trail riding within an area at the southern end of the preserve designated for these uses. Dogs are allowed, but must be on a hand held leash and under constant physical restraint.

Recreational improvements are proposed in 3 phases:

Phase I – 2011-2020: A small, unpaved parking area will be established near each of the two gates, and informational signs including a map will be provided at entry kiosks established in the public access areas. These improvements will be completed within the first 10 years after the management plan is adopted.

Phase II – 2021-2030: Within the second 10-year period, proposed improvements include evaluating the feasibility of opening the northern portion of Section 35 to public access, and evaluating the feasibility of adding an expanded information and education center to the public access areas.

Phase III – 2031-2040: By 2040, with the estimated development the wetland mitigation bank complete in sections 26 and 27, open portions of sections 26 and 27 to public access. Alternatives: the County may re-construct the old bridge that used to cross the Itchepakesassa Creek and extend the public access area to the northern part of Sections 32 and 33 and the southern parts of 29 and 30 (Figure 8); or, the County may decide to implement a captive breeding program on these lands (Figure 9). As feasible, in Phase III, a connection will be developed to the trail to the Alston Tract. The expanded trail system may include in the future the two sections of land adjacent to the ranch on the east (Figure 7).

4.3 Permits Required for Development and Maintenance of the Preserve

Federal (U. S. Army Corps of Engineers mitigation banking agreements), state (FDEP and/or SWFWMD ERP and mitigation banking agreements), and local (EPCHC) permits will be required to conduct the proposed development of the proposed wetland and stream mitigation banks. Various County permits for site preparation, building, and operation and maintenance, etc., may be required.

4.4 Easements, Concessions, and Leases

Existing easements, concessions, or leases are summarized in the following sections. Management activities adopted in the future may require new legal authorizations.

4.4.1 Easements

Several agencies have easements through Lower Green Swamp Preserve, which were negotiated when the property was called Cone Ranch (Appendix A). The County Attorney's Office should examine these documents for continued legal relevancy. Documents listed in the 1988 purchase agreement include:

- a) agreement between Ideal Farms Drainage District and J. L. Cone (1926);
- b) early legal records of the preserve dated October 14, 1936 described the "rights" of Hillsborough County to clean-out, construct, and maintain drainage ways downstream of Polk County (as referenced in the Contract for Sale and Purchase between A.K. Florida Properties and the West Coast Regional Water Supply Authority; WCWSRA January, 1988a). The County is obligated contractually to maintain flow-ways within the main stream systems (see the Contract for Sale and Purchase of the ranch dated January, 1988 (WCRWSA 1988a) (Appendix A -purchase contract);
- c) easement to Florida Power Corporation (1951) for powerlines that run on an east-west orientation through the southern portion of Cone Ranch, just north of Knights-Griffin Road (Figure 2);
- d) easement to Houston Texas (now Florida) Gas and Oil Corporation (1959);
- e) easement to Seaboard Air Line Railroad Company (1962);
- f) easement for a buried gas line to Florida Gas Transmission Company (1965) that runs along the same right-of-way as the Florida Power Corporation powerlines;
- g) easements to Tampa Electric Company (1971, 1974);
- h) Tampa Bay Water retains the contractual right to be the organization that develops the water resources on the property, should such water be permitted to be developed by the SWFWMD (Appendix A, TBW contract). The 1988 deed that transferred ownership of the Cone Ranch property from the West Coast Regional Water Supply Authority to Hillsborough County provides that the Authority reserves "any and all such rights, easements, licenses, and other interests, as are reasonable and necessary for the construction and operation of a public water supply well field pursuant to the 1988 Interlocal Agreement between Hillsborough County and the Authority". This well field was to be a "critical component of the regional drinking water system to meet the potable water demands of the residents of Hillsborough County to the year 2020". Several significant changes have occurred since 1988 that have significantly altered Tampa Bay Water's original plans for the land. First, significant changes to the Water

Use Permitting Rules in 1989 resulted in greatly reduced potential amounts of water that could be taken from the preserve (due largely to the need to protect on-site wetlands). Second, an increased reliance on surface waters from the Hillsborough River for water supply makes it important to maintain flows in the Blackwater Creek system (the second largest tributary to the river), so that a well field on Lower Green Swamp Preserve could adversely affect the surface water flows. Tampa Bay Water's long-term plans include Lower Green Swamp Preserve as a possible future water source, albeit for a relatively small amount of water. Tampa Bay Water continues to hold a general easement over the preserve should it ever decide that public supply wells would be feasible. There are no specific areas of the preserve designated for this purpose. Should Tampa Bay Water ever seek to develop groundwater supplies from the preserve, SWFWMD's Water Use Permitting Rules would prevent adverse impacts to on-site wetlands. The SWFWMD and Tampa Bay Water have agreements with the County to monitor ground water levels on the preserve, doing so through on-site wells (Appendix A).

4.4.2 Concessions

None.

4.4.3 Leases

Existing leases on the preserve include an agricultural lease agreement between Hillsborough County and the Audubon Ranch to graze cattle and farm sod. Audubon Ranch is responsible for placement and maintenance of fencing, cattle watering ponds, and other procedures that help maintain the improved pasture areas in healthy condition, manage for the minimization of invasive exotic plants and animals, and minimize cattle-related impacts to land and water resources (Appendix A).

4.4.4 License Agreements

As part of the Rotary Club's "Preserve Planet Earth" campaign, the Plant City and Tampa East Rotary Clubs obtained a 5-year license on August 7, 1991 from Hillsborough County to reforest parts of Cone Ranch with slash pine seedlings with the intent of establishing a perpetual pine flatwoods natural plant community. The reforestation project, named the "Rotary International Forest", was planned to generate income to the County through selective harvesting of excess timber. The planted trees became the property of Hillsborough County and the proceeds from the timber sales were designated to be used expressly on the Lower Green Swamp Preserve for resource management, park development, and site security per the approved management plan. The Florida Forest Service provides technical assistance to the County in developing the timber management prescription for the managed pine plantation.

4.5 Greenways and Trails

The Greenways and Trails Program has developed a master plan for proposed trails throughout Hillsborough County that incorporates the preserve as an existing natural and recreational corridor in the County's Greenways and Trails network (Figure 7). Additional information on

Hillsborough County's Greenways and Trails Program is available at <http://www.hillsboroughcounty.org/parks/greenways/>.

5.0 RESOURCE MANAGEMENT

5.1 Site Security

The PRCD maintains two residences for site security employees on the preserve to provide security (Figure 2). Additionally, the cattle lease requires the lessee to frequently patrol the site, maintain the fence and signs, and assure that no inappropriate or illegal activities are occurring on leased lands of the Preserve. Should illegal activities or violations occur, the lessee is required to coordinate with the Sheriff's Department and Florida Fish and Wildlife Conservation Commission Wildlife Officers. Security needs are ongoing: many areas of perimeter fencing need to be maintained or re-positioned correctly on the preserve boundary, additional fencing is recommended, and the boundary should be posted with the park ordinance against trespassing and hunting as per state statutes following a new boundary survey. Recent security problems on the preserve include illegal access through cut or damaged fences, illegal hunting and discharging of firearms, unpermitted palmetto berry harvesting, and illegal trash dumping. No public hunting is allowed on the ranch pursuant to ordinance.

5.2 Exotic Species Management

Non-native or exotic" species refer to plants, animals, fungi, or other organisms that have been accidentally or purposefully introduced to an area outside of their origin. Exotic species can come from another continent, another part of a country or even from another watershed. Organisms evolve with other species that moderate their population (for example, plant pests and diseases). When an organism is taken out of its original environment and placed in another, species that help keep it in check may not be a part of this new environment, and may become "invasive" (<http://www.invasivespeciesinfo.gov/unitedstates/fl.shtml>), causing management issues.

5.2.1 Invasive Exotic Plants

Common invasive exotic plants known to occur in the Lower Green Swamp Preserve are cogon grass, Caesar weed, water hyacinth, Brazilian pepper, alligator weed, primrose willow, two-leafed nightshade, tropical soda apple, lantana, Asian sword fern, wild taro, hydrilla, Chinese tallow, camphor tree, skunk vine, Old World climbing fern, and Mexican petunia. Invasive exotic plants should be inventoried and a map of infestations should be developed, since new species or new infestations can occur frequently. The preserve should be surveyed as feasible to prevent new infestations from becoming established. Sites should be treated on an as-needed basis, prioritized by the staff according to available resources. Vulnerable areas in the preserve should be monitored periodically and eruptions of undesirable plants should be controlled in the early stage of development if resources are available. Some assistance may be provided by the Hillsborough County Invasive Species Task Force, a multi-agency partnership that removes invasive plants on public lands and works to educate the public on the existence and harm caused

by invasive plants and animals
(<http://www.hillsboroughcounty.org/parks/conservationservices/invasive.cfm>).

The most effective method for the treatment of exotic plant infestations is prevention. County staff uses the Florida Exotic Pest Plant Council's (FLEPPC) current edition of the list of invasive exotic plant species to determine which species to control. Effective treatment methods for exotic plant species are continually changing as new herbicides and biological controls are developed. There are numerous references available describing the types of chemical herbicide application and biological treatment and the science is changing rapidly. The Conservation Services Team is committed to using the latest technology and the safest methodology available to reduce existing infestations. The University of Florida Center for Aquatic and Invasive Plants (<http://plants.ifas.ufl.edu>) and the inter-agency Florida Exotic Pest Plant Council (<http://www.fleppc.org>) are two sources used to guide weed control.

Mechanical, physical, chemical, or biological methods or combinations of these methods can treat invasive exotic plants. Mechanical treatments include cutting or pulling vegetation and are followed often by chemical spraying. Physical treatments include prescribed fire or water impoundment to kill or at least slow the spread of invasive exotic plants. Chemical treatments using herbicidal sprays, applied from tractor-towed spray rigs or backpack sprayers, are the most widely used and usually most effective method. Biological control involves the introduction of a natural predator or pathogen that destroys the invasive exotic species, and is the slowest method of treatment but, when implemented properly, can be the most effective over the long term. For example, tropical soda apple has been treated occasionally by biological control.

The Audubon Ranch lessee maintains an active control program for FDACS and Hillsborough County-listed undesirable plants that can infest pasture areas, such as tropical soda apple, or cattle watering ponds with aquatic weeds such as water hyacinth. Small areas of periodically treated infestations and the associated treatment costs have been quantified by the lessee and were used in part to develop the estimate of future management costs.

The Green Swamp Cooperative Invasive Species Management Area (CISMA) includes the Lower Green Swamp Preserve area (<http://www.floridainvasives.org/greenswamp/>). The Green Swamp CISMA began as a Lygodium Prevention Partnership in December 2008, to prevent the establishment and spread of Old World climbing fern (OWCF) (scientific name: *Lygodium microphyllum*) into and within the Green Swamp area. The mission is to develop a successful early detection, rapid response effort to treat all infestations of OWCF on all property ownerships within the Green Swamp Area, within two to six months of first detection.

5.2.2 Invasive Exotic Animals

The invasive exotic animals observed on the Preserve to date are feral pigs, European starling, house sparrow, rock dove, nine-banded armadillo, and Cuban anole (S. Emery, personal observations). Conservation Services staff should monitor periodically to determine the presence

of invasive exotic or nuisance species (animals that are native but are presenting a management conflict) so that undesirable animals may be removed before their populations expand on the preserve. Incidental observations should be conducted during routine maintenance events such as mowing, maintaining firebreaks, invasive exotic vegetation maintenance, and periodic monitoring during routine wildlife surveys. Hillsborough County's policy is to remove invasive exotic animals that become problematic to the preservation of native plants and animals on preserve lands (<http://www.hillsboroughcounty.org/parks/conservationservices/invasive.cfm>). Feral hogs are especially destructive to natural areas because they root up the soil when foraging, which may cause erosion problems and can facilitate the introduction of invasive exotic vegetation, and a feral hog control program should be implemented. Additionally, coyotes (*Canis latrans*), indigenous to western North America, have immigrated to Florida from their western range and occur widely in Hillsborough County.

5.3 Prescribed Burns

5.3.1 The Importance of Fire

Prescribed fire is a land management tool used to restore and maintain fire-dependent ecosystems, enhance forest vigor, improve wildlife habitat, and prevent dangerous, uncontrolled wildfire by reducing hazardous fuel buildup and reducing the severity of wildfires (Myers and Ewel 1990). One of the greatest benefits of prescribed fire is that it reduces "fuels" such as the underbrush, branches, pine needles, leaves, and dead plant debris that build up on the forest floor over time. If fuels are not reduced every few years, wildfires can become intense, hot, and destructive, and are more difficult to suppress than areas that are burned regularly (http://www.fs.fed.us/fire/fireuse/rxfire/rx_index.html). Fire promotes healthy ecosystems by clearing out competing vegetation, cycling nutrients into the soil, providing food for wildlife, and stimulating fire-dependent plants to germinate, grow, and produce seeds, which generates fresh seeds, fruits, and native plant growth, providing food for wildlife species. Because of Florida's long history of lightning fires, many of the state's natural systems are adapted to fire and depend on periodic fire to remain healthy. Prescribed burning is a vital tool for managing pine flatwoods, pine sandhills, and sand pine/oak scrub. These natural systems shelter many threatened and endangered plant and animal species that rely on fire to survive, such as Florida

scrub-jay, eastern indigo snake, gopher tortoise, Florida black bear, and scrub holly. When fire is suppressed in these areas, some plant and animal populations decline and eventually are extirpated.



Because natural fires can no longer move across the landscape as they did historically, prescribed fire at appropriate intervals is necessary to maintain these unique natural communities. Many people have expressed concern about the safety of wild animals during prescribed fires. Generally, wild animals move to safety during the relatively slow-moving prescribed fires, by

either taking refuge by moving to unburned or previously burned areas, or seeking shelter under logs, in old trees, and in burrows like those of the gopher tortoise. Few animals are killed by fire, especially during the growing season when it is warm and most animals are active. Mammals are rarely killed, and ground nesting birds build new nests and benefit from increased numbers of insects after the fire (Myers and Ewel 1990).

5.3.2 Management Measures for Fire

Over the past 25 years, prescribed burns were conducted on portions of the preserve, but wildfires have occurred rarely at the Lower Green Swamp Preserve (for example, a lightning strike starting a wildfire was observed in Section 20 (S. Emery, personal observations, 1986-2010). However, the large amount of pasture acreage tends to minimize the intensity of these wildfires because of the cropped, patchy fuel load in grazed pastures and periodic burns conducted by the lessee. In the future, as areas of the preserve are not grazed and develop higher fuel loads because they are being managed for different purposes, wildfires could occur more frequently unless prescribed burning plans are implemented.

Currently, the Florida Forest Service is burning the native range in Section 26 and portions of the pine plantation with assistance by PRCD staff. Prescribed fires are conducted on County lands as resources become available and when climate conditions are appropriate by preparing a burn plan, creating fire lanes, surveying pre-burn site conditions, and notifying adjacent landowners who may be affected by the burn. The Conservation and Regional Parks staff shares some of these responsibilities and some occur with the assistance of the Florida Forest Service, or specialized contractors. Residents near the preserve are advised before prescribed fires are set so they do not become alarmed by drifting smoke created by prescribed fires.

To minimize the effect of prescribed burns on the surrounding rural/suburban environment the pine/palmetto and the palmetto/gallberry areas should be treated if funding is available with roller-chopping, hardwood reduction, and possibly chemical applications to maintain the habitat and reduce the fuel load before a prescribed burn. A prescribed burn program should be conducted on a short burn rotation, and summer burning should be scheduled when possible. The Florida Forest Service recommends that the first burns in the pine plantation should probably be accomplished during the late December to mid-February dormant season for pine trees. To control under brush and exotic plant pests, subsequent burns should be scheduled for March or April every two to three years.

One of the management measures for prescribed burning is to increase public awareness regarding the benefits of prescribed fire to wildlife and to the public. The Conservation Services staff annually participates in the Great American Teach-In in area schools. The County also provides lectures and brochures to public meetings and conferences and staff contributes to websites regarding prescribed burning. Additional information is available to the public on the Parks, Recreation, and Conservation Department website regarding the value of prescribed burns (<http://www.hillsboroughcounty.org/parks/resources/publications/prescribedfireinformation.pdf>) in managing native habitats.

5.4 Maintenance Needs

The Conservation Services staff will conduct the maintenance responsibilities with assistance from Hillsborough County Regional Parks staff and the cattle lessee. A volunteer corps has not been established yet for the preserve, and rotating staff will work with volunteers when time permits. The Audubon Ranch cattle lessee is currently handling many of the maintenance activities on leased lands because they are included in the grazing lease.

Maintenance activities that are required for the upkeep of the preserve include:

- Mowing
- Fence repair
- Posting boundaries
- Road repair
- Removing invasive exotic plants and animals
- Maintaining locks and gates
- Disking fire lanes

Capital improvements include repairs more costly than ordinary maintenance and new construction conducted to improve access, establish property boundaries, and improve site control such as re-fencing areas, large infrastructure repairs such as replacing bridges or culverts, and facility expansion such as adding recreational facilities. Replacing a bridge over the Itchepackessassa Creek has been identified as an immediate capital improvement need. A complete inventory and needs assessment should be conducted when feasible.



**PRCD staff inspecting the Itchepackessassa Creek bridge
(photo: Sheryl Bowman)**

6.0 HABITAT RESTORATION AND MANAGEMENT ACTIONS

Three current revenue-producing activities on Lower Green Swamp Preserve provide the County with a positive economic return: cattle ranching lease, bahia grass sod farming lease, and future revenues from growing plantation pines. Eight other activities have been identified as new initiatives that could produce revenues for the County: wetland mitigation banking, stream mitigation banking, water quality mitigation banking; carbon credit mitigation banking, hardwood tree production, wildflower seed production, native plant species nursery areas, and Florida pollinator, honey bees, or honey production. Proposed time frames for implementing these new management initiatives are summarized in Table 5. Restoration of upland habitats including pine flatwoods, native range, or other habitat types is proposed as an integrated objective with the other habitat restoration and management actions.

6.1 Cattle Ranching

Cattle ranching and sod farming encompass 5,755 acres of improved pasture on the preserve, and cattle ranching is one of the actions expected to provide short and long-term continuous revenue streams to the County. The management plan proposes that about 2,877.5 acres (50%) of the 5,755 acres currently in pasture would be converted to other revenue-producing activities. In 2025, improved pasture will be reduced to 4,705 acres, and in 2040, improved pasture will be reduced to 3,695 acres. Some pasture is overlain by the wetland or stream mitigation banking categories, so these changes in acreage are only for the cattle ranching areas (County land use estimate developed by Ken Bradshaw, PRCD, September 2010). The reduction in pasture is proposed to occur in 2 phases.



**Moving cattle on the Lower Green Swamp Preserve
(photo: Richard Warren)**

Phase I. Maintain most of the current pasture areas as pasture for the next 15 years. Presently, about 2,000-2,500 head of cattle are grazed on approximately 5,755 acres of improved pasture. Pasture would be reduced in several areas between the current condition and the projected condition in 2025 (Figure 8):

- (a) Convert portions of sections 01, 02, 10, 11, 21, 22, 26, 27, and 35 currently in improved pasture as part of the grazing lease or in natural area, to the first phase of wetland and stream mitigation banking;
- (b) Convert areas of linear bands about 50 feet wide, currently part of the grazing lease, along the tributary floodplains of the Blackwater and Itchepackesassa Creeks and along the outer perimeter of the Tiger Creek/Lake restoration area to hardwood management;
- (c) Initiate native plant nursery management in portions of sections 27, 28, 33, and 34;
- (d) Initiate bee and honey management in a portion of section 15.

Phase II. Between 2025 and 2040, increase the acreage involved in wetlands and stream mitigation. Convert some pasture to longleaf or slash pine flatwoods, add some native plant nursery in section 32; and convert some pasture to recreational, research, and educational activities. By the 2040 time frame, the final configuration of Lower Green Swamp Preserve would have cattle pasture on approximately 4,630 acres, portions of which would be overlain by wetland and/or stream mitigation banking and hardwood management.

The rate at which land could be converted from improved pasture will depend on: (1) the rate at which the mitigation banks are selling credits; (2) the ability of the County to plant and manage the gradual conversion of pine plantations to native pine flatwoods; (3) cattle and sod market conditions/prices; (4) market conditions/prices for contracts for honey production, native plant propagation, etc.

6.2 Bahia Grass Sod Harvesting

Bahia grass sod harvesting is one of the three activities that currently provides the County with economic revenues. Under current operations, sod harvesting is contracted as part of the cattle ranching contract. The plan proposes that, over the next 30 to 40 years, approximately 3,000 acres of bahia grass areas will be converted to natural habitats, and sod harvesting could be retained on the areas of the preserve where cattle ranching remains active (Table 5). As sod areas are converted to natural habitats, the sod should be harvested and sold. The cow/calf operation will be run in accordance with the FDACS regulations and BMPs for cattle operations, including BMPs for the sod farming operations.

6.3 Pine Plantation

Local field studies and the predominant soils types on Lower Green Swamp Preserve indicate that pine flatwoods [slash pine (*Pinus elliottii* var. *elliottii*), south Florida slash pine (*Pinus elliottii* var. *densa*), and longleaf pine (*Pinus palustris*)] dominated the pre-development natural habitat on the Preserve and surrounding areas. Over 1 million slash pine trees were planted on

1,299 acres of the Lower Green Swamp Preserve in the 1990s, and the Florida Forest Service through an agreement with Hillsborough County (Figure 2) is managing the plantation currently.

Original and updated timber stand management recommendations for these pine plantation areas are included in Appendix C (Florida Division of Forestry 2007, 2011). In the future, as the existing slash pines are thinned, the prescription recommends planting longleaf pines predominantly to re-establish a better tree stand and a natural pine flatwoods ecosystem. An additional 1,500-2,000 acres of pasture could be converted to mixed pine flatwoods, with the objective to gradually convert the existing pine plantation to natural pine flatwoods in the next 30 to 40 years. Pine straw raking is a possible future revenue source and could be re-contracted in the future (Appendix C). The prescription also provides recommendations for establishing hardwood stands, and restoring an herbaceous and shrub understory to provide additional wildlife benefits. Grant funds may be pursued to assist in this effort.

Long leaf and slash pines are suitable to plant on appropriate soils types of the pasture(s) within portions of sections 01, 02, and 03, 10, and 11, overlain by the wetland and hardwood management prescriptions, and along the border of CFI's restoration areas and SWFWMD's Alston Tract. The timing of these plantings beginning in the 2025 to 2030 period should be coordinated with the wetlands restoration activities that are proposed within these sections of land.

6.4 Wetlands Mitigation Bank

The development and implementation of a wetlands mitigation bank, accompanied by a stream mitigation bank, are two new revenue-generating activities recommended for implementation under this management plan. Wetlands mitigation banking has emerged as an industry in the past 20 years, and several banks exist statewide. Two wetland mitigation banks are permitted presently in Hillsborough County.



**Ditched and de-watered depressional marsh
(photo: Scott Emery)**

The development of a wetlands mitigation bank on Lower Green Swamp Preserve is feasible because it is located within one of the largest, most rapidly urbanizing watersheds in the state, and many acres of degraded ditched and drained wetlands are present on-site that are ideal for restoration (S. Emery, personal observations).

An Environmental Protection Commission of Hillsborough County Pollution Recovery Trust Fund project (Pollution Recovery Fund Agreement #08-03) to restore five drained cypress

wetlands and a large marsh is currently in progress within a portion of section 26 of Lower Green Swamp Preserve (S. Emery, unpublished data). This project will demonstrate an approach to quantifying the acreage that could be restored through similar future wetlands mitigation planning on the preserve.

Lower Green Swamp Preserve also has acreage that can readily be used for actual wetland restoration and enhancement or restoration of upland habitats adjacent to existing and restored wetlands with or without implementing wetland mitigation banking (Lewis 1990). The suggested evaluation approach would be:

1. Conduct a detailed comparison of pre-development wetland acreages with current wetland acreages and conditions. This comparison will quantify the acreage of wetlands that could be restored easily by remediating historic hydrologic alterations.
2. Develop an estimate of pre-restoration wetland conditions using the UMAM evaluation system. This evaluation could be used then to provide the basis for determining mitigation bank restoration credits.
3. Of the candidate areas, select the potential restoration locations to set aside as mitigation bank sites; then determine the categories of wetland restoration and wetland creation.

Wetlands mitigation banking could be implemented in two master phases.

Phase I: immediate short-term - focus approval on Sections 26, 27 and 35. These sections are currently in either pine plantation or native rangeland. Nearly all the wetlands in Section 26 (native rangeland area) are ditched to some degree.

Phase II: between now and 2025, remove portions of Sections 21 and 22 from cattle operations over the next 15 years, and convert them to wetlands and stream mitigation banking.

It may be possible to fence a wide buffer around the streams and wetlands to control overland runoff that could load excess fertilization from cow manure, and continue grazing on surrounding pasture. It is not possible to predict the rate at which wetlands mitigation banking could proceed on Lower Green Swamp Preserve. Consequently, the rate of conversion from pasture to wetlands mitigation areas could be changeable. However, by the year 2040 to 2050, it is anticipated that all or portions of sections 21, 22, 26, 27, 33, 34, 35, 10,11, 01, 02, and 03 will be involved in mitigation banking operations. The overall expected “build-out” of the mitigation bank (wetlands plus streams) is estimated to be at around 3,000 to 5,000 acres. Note that Sections 1, 2, and 3 are all directly within the wildlife corridor area.

The wetlands mitigation bank should be developed and implemented in incremental 5-year phases, as the acreage of wetlands involved in the program is increased, and the satisfactory management of the mitigation bank is reviewed. The project could be conducted in six phases:

Phase 1: 2011 - 2015. The County will develop a RFP for private sector partner to act as the wetlands mitigation bank manager. The RFP will detail the bank manager's (the "banker") operational criteria. After a banker is selected, negotiate performance criteria and the allocation of revenue sharing, because of the costs of the successful development and implementation of the bank.

Phase 2: 2016 - 2020. The County will assess the banker's performance and elect to: (a) retain the agreement as is for another 5 years; (b) modify the agreement to correct performance deficiencies; or (c) modify the agreement to transfer more aspects of the technical responsibilities to the County.

Phase 3: 2021 - 2025. County again re-assesses as in Phase 2, except that in 2025 the County may elect to retain the banker, cancel the agreement with the current banker and either develop a new RFP with a different private partner or assume all responsibilities for banking in-house. This ensures that the original "banker" can at least count upon more than a decade of work, barring some malfeasance on the part of the private banker.

Phase 4: 2026 - 2030. It is recommended the County again re-evaluate the progress and the arrangement with the banker in 2030, and make any modifications that may be needed to allow for continued success.

Phase 5: 2031 - 2035. It is recommended that the County again re-evaluate the progress of the effort, with a second option to cancel the existing arrangement in 2035 (as was described in Phase 3).

Phase 6: 2036 until all mitigation banking is finalized. The County could maintain current private sector partner(s); enter into new partnership(s); or take on all responsibilities in-house.



Ditched netted chain fern marsh with normal pool – 12” pole marker (photo: Scott Emery)

The proposed phasing provides the County with checkpoints when it can decide if it is advantageous to assume additional responsibilities (technical, financial, or both) for the entire program. Providing the private sector partner a decade of assurance allows for the financial outlays to be reimbursed. The County may select the same private mitigation banker for both stream and wetland banks, or contract with more than one firm for the work. Federal and state guidelines discuss the organization and management of a mitigation bank.

Both types of mitigation banking require substantial “up front” outlays of money to restore wetlands before credits could be sold. The two related types of mitigation banks have been described separately in the event the County chooses to spread its risk out to different “bankers”, as opposed to concentrating its financial stake with a single banker for both stream and wetlands mitigation banking.

6.5 Stream Mitigation Bank

The U.S. Army Corps of Engineers (USACE) reviews proposed projects to ensure environmental impacts to aquatic resources in federally jurisdictional waters are avoided or minimized as completely as practicable under the Clean Water Act (Federal Water Pollution Control Act 33 U.S.C. 1251 et seq. 1972). In keeping with the policy of “no net loss” to the nation’s wetland base, a USACE permit may require a property owner to restore, establish, enhance, or preserve other aquatic resources to replace those impacted by a proposed project. A compensatory mitigation action is designed to replace the loss of existing aquatic resource functions and area.

In 2008, the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency published a new rule entitled “Compensatory Mitigation for Losses of Aquatic Resources; Final Rule” (http://www.epa.gov/owow_keep/wetlands/wetlandsmitigation/index.html) to clarify how to provide compensatory mitigation for unavoidable impacts to the nation's wetlands and streams. The regulatory basis is the Clean Water Act. The new rule should have many benefits including, but not limited to: establishing equivalent standards for all forms of mitigation; improved performance of compensatory mitigation projects; setting science-based and results-oriented standards; encouraging watershed-based decisions; and emphasizing the "mitigation sequence" requiring that proposed projects avoid and minimize potential impacts to wetlands and streams before proceeding to compensatory mitigation.



**Green tree frog clinging to Carolina redroot
(photo: Scott Emery)**

Perhaps the most significant change required by the new rule is that compensation projects provided by all three compensation mechanisms (i.e., permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation) must have mitigation plans which include 12 fundamental components: objectives; site selection criteria; site protection instruments (e.g., conservation easements); baseline information (for impact and compensation sites); credit determination methodology; a mitigation work plan; a maintenance plan; ecological performance standards; monitoring requirements; a long-term management plan; an adaptive management plan; and financial assurances.

Mitigation banks are a “performance-based” form of wetland and stream replacement because, unlike in-lieu fee mitigation and permittee-responsible mitigation, the tradable aquatic resource restoration credits generated by banks are tied to demonstrated achievement of project goals. Thus, the rule establishes a preference for the use of credits from mitigation banks when appropriate credits are available. The new rule appears to encourage the use of mitigation banks and in-lieu fee programs over use of permittee-responsible mitigation because mitigation banks and in-lieu fee programs usually provide consolidated compensatory mitigation projects that have less risk and uncertainty.



**Hardwood swamp – potential streambank mitigation site
(photo: Scott Emery)**

The stream mitigation banking (SMB) industry appears to be becoming a major driver of stream restoration, particularly in the Southeast. Like other types of mitigation banking regulated by the Clean Water Act Section 404 program, stream mitigation banking gives developers the option to offset construction impacts by purchasing “credits” representing restoration of a similar resource within the watershed. For-profit companies that restore damaged streams in advance on a speculative basis and are approved by federal regulatory agencies generate these credits. In states such as North Carolina and Georgia, SMB has now eclipsed wetlands banking in terms of number of credits bought and sold (Barry Tierce, KBR, personal communication, September 2010).

SMB is also worth attention because many of the tensions and debates that have been settled in the more established practice of wetlands mitigation banking are still unresolved, and thus potentially open to input from practitioners and scientists. The most important of these are the proper amount and location of compensation, and how stream credits should be certified and measured.

The new federal rule for compensatory mitigation requires in-kind compensation for streams. Contrary to past practices, which considered streams either impractical to compensate for or adequately compensated for using wetlands credits, the new rule requires compensation through the restoration or enhancement of similar streams, which will likely accelerate the already growing demand for SMB. Federal rules, however, do not specify the requirements for establishing a stream mitigation credit market in a given region or district. Instead, the specifics are usually laid out in regional guidance adopted collaboratively by local USACE Districts, EPA branches, and state environmental agencies, often with input from private firms that hope to establish mitigation banks. Once the rules are in place, mitigation banking businesses work on a speculative basis to restore or enhance an area of stream habitat. This generates a “bank” of credits, which developers may buy to fulfill the conditions of their federal or state permit once the restoration projects have been certified for sale as stream credits. The certification is provided by the USACE and other state and federal agencies, which together constitute an Inter-Agency Review Team (IRT). The IRT will generally include state wildlife and water quality agencies as well as the U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service.

North Carolina is a good example of the establishment of a successful stream credit market, as it has one of the most developed SMB programs in the United States. During the mid-1990s, the North Carolina Department of Transportation (NCDOT) experienced project delays because of the lack of available compensation credits. In response, North Carolina developed the Ecosystem Enhancement Program (EEP), a state-administered program to create wetland and stream mitigation credits. The EEP uses projected NCDOT construction activities as a plan from which to develop compensation credits proactively in the geographic areas where impacts are scheduled. Private developers can also use EEP-generated compensation credits if they choose not to purchase credits from private mitigation banks. The state also actively promotes private commercial mitigation banks as providers of mitigation for private sector development, passing a law that prohibits the NCEEP from selling credit to any other impactor other than NCDOT when private credits are available. Thus, within North Carolina the market for stream mitigation credits is made up of trades between private developers and private banks, private developers and the EEP, and the NCDOT and EEP. For a sense of scale, in FY 2005–2006, the EEP restored >95 km of stream and generated approximately \$71 million of stream credits (EEP 2006).

In any market, determining the method for measuring the commodity for sale is a fundamental issue (Salzman and Ruhl 2006). In stream mitigation banking, the commodity is quantified as the “stream mitigation unit”, or SMU. Defining what constitutes an SMU can be complicated, as it necessitates establishing both the quantity and the quality of the commodity to be traded. North Carolina addresses *quantity* simply by measuring credits in linear feet of stream, much as wetlands credits are measured in acres. Defining *quality* has proved more difficult. In contrast to wetlands restoration, where there is national consensus around evaluation in terms of periodic

saturation, soil types, and vegetation communities, in North Carolina and at least some other states, stream restoration evaluation has been reduced to simple geomorphic classifications based on the maintenance of “form, pattern, and profile” (cross-section, planform, and longitudinal gradient) without substantial erosion or deposition over 5 years (USACE 2003, NC DENR 2001).

Preliminary evaluations at Lower Green Swamp Preserve indicate the potential to capitalize on the favorable economics of stream mitigation banking as well as wetlands mitigation banking. The preserve has many miles of restorable stream channels that, if segregated from adjacent wetlands, can potentially be sold for equal or higher prices per acre than if the resource restoration was considered as “wetlands” alone. Preliminary indications from the USACE are that Florida and the Jacksonville District, which regulates the Tampa area, intend to comply with the new federal mitigation rule and require the in-kind compensation of impacted streams and linear surface water features utilizing the restoration of impaired streams such as those found at the Lower Green Swamp Preserve.

By sponsoring a mitigation bank with a strong inventory of stream credits (likely the first in Florida), the County would be taking advantage of a unique and short-lived window where significant income can be realized as a first-mover in the mitigation of this resource. From an environmental perspective, by sponsoring a stream mitigation bank, the County will focus specialized attention and restoration activities to a critical and troubled subset of the restoration opportunities at Lower Green Swamp Preserve.

On the Lower Green Swamp Preserve, both Blackwater and Itchepackesassa Creeks are highly channelized systems (Figure 8). There are miles of channelized stream, including both the main channels of these streams and multiple smaller tributary streams that could be included in a SMB. The large amount of channelized, impacted stream habitat on-site, combined with the new rules, suggests a great potential for ecological improvements to be realized on-site via the development of a stream mitigation bank.

A feasibility study should be conducted, by experts knowledgeable of these major stream systems on the preserve, to provide a report to the County and the “Banker” on the best locations to breach the channelized portions of the streams and create meandering sections, and an evaluation of costs and benefits on or about the year 2015. Following a feasibility study, the stream mitigation bank should be developed and implemented in 5-year phases, with gradual increases in acreages and with reviews of existing agreements between the private and public sectors. The recommended phasing could be:

Phase 1: 2011 - 2015. The County develops an RFP with detailed criteria soliciting a private sector partner to act as the stream mitigation bank manager. The bank manager acts as the “banker”. The County and banker negotiate percentage splits of revenues generated. The County retains the right to terminate the contract due to failure to perform or negligence, etc. However, the banker has primary responsibility for the successful development and implementation of the bank during this period.

Phase 2: 2016 - 2020. The County assesses the overall relationship with the banker. The County may, in 2020, elect to: retain the agreement as is for another 5 years; modify the

agreement as necessary; modify the agreement to transfer more aspects of the technical or financial responsibilities to the County. Note: the County is not precluded in Phases 2-6 from maintaining its original relationship with the private sector mitigation banker, should both parties so desire.

Phase 3: 2021 - 2025. The County again re-assesses as in Phase 2, except that in 2025 the County may elect to: retain the agreement as is for another 5 years; cancel the agreement with the current banker and either develop a new RFP with a different private partner or assume all responsibilities for banking in-house. This ensures that the original “banker” can at least count upon more than a decade of work, barring some malfeasance on the part of the private banker.

Phase 4: 2026 - 2030. It is recommended the County again re-evaluate the progress and the arrangement with the banker in 2030, and make any modifications that may be needed to allow for continued success.

Phase 5: 2031 - 2035. It is recommended that the County again re-evaluate the progress of the effort, with a second option to cancel the existing arrangement in 2035 (as was described in Phase 3).

Phase 6: 2036 until all mitigation banking is finalized. The County may maintain current private sector partner(s); or enter into new partnership(s); or, take on all responsibilities in-house.

The proposed phasing provides the County with periods of time when it can decide if it desires to assume more and more responsibilities (technical, financial, or both) for the entire program. Providing the private sector partner a decade of assurance allows for the financial outlays to be reimbursed. The overall expected “build-out” of the mitigation bank (wetlands plus streams) is estimated to be involve approximately 3,000 acres of the preserve property.

For the stream mitigation banking, it is recommended that the first phase projects concentrate on smaller tributaries to the Itchepackesassa and Blackwater Creeks, leaving the more ambitious possible de-channelizations of the major streams to the post-2025 time frame. Within sections 10 and 11 (on the north side of the Blackwater Creek) are multiple tributary stream systems that have been significantly altered over the past 80 years (Figure 8). These systems are likely candidate sites for Phase 1 mitigation banking operations. A similar situation exists within sections 21 and 22, where several ditched, channelized tributary streams east of the Itchepackesassa provide exceptional restoration potential (Figure 8).

Early in the second 15 year time period (2025-2040) of the stream mitigation banking program, it is recommended to use the areas in sections 33 and 18 (Figure 9). The cattle pasture will be being phased out of these sections around that time, and several ditched/draind systems exist that are excellent mitigation options. Wetland mitigation could also be implemented concurrently in Section 33. The second 15 year period should include wetland and stream mitigation banking in more parts of sections 21 and 22; plus portions of sections 01, 02 and 03 as well (Figure 9).

While these smaller, intermittent streams are developed as part of stream mitigation bank, the County, in conjunction with the stream mitigation banker, should evaluate the heavily channelized portions of the two major creeks to assess: (1) where the original stream channel meanders were; and/or (2) where added water might be most effectively utilized for restoration and re-hydration purposes, both for the streams and for close-by wetlands. From these evaluations, the County can determine the linear extent that the major streams can be de-channelized eventually without affecting upstream off site land uses, including the contractual obligations between the County and upstream parties.

6.6 Carbon Bank

In contrast to the actions described above, the development of a carbon bank on Lower Green Swamp Preserve is proposed to be considered beginning in the 2020 to 2025 time frame. Carbon banking is a novel idea in the United States, but there are recent efforts in Europe to explore the feasibility of carbon banks. The carbon “market” became a possibility after the 1997 international meetings in Kyoto, Japan, when more than 30 nations voluntarily adopted greenhouse gas emissions reduction schedules, and carbon emissions became a liability and carbon reductions became potential assets. It is important to note that one aspect of the Kyoto Protocols involved the use of free market emissions trading. This, in effect, created a commodities market.

Conceptually, there are several different carbon instruments: (1) carbon credits from equipment upgrades; (2) carbon credits from sequestration activities; or (3) carbon credits from clean energy. A carbon bank on Lower Green Swamp Preserve would involve (2) carbon sequestration. This could be accomplished conceptually via planting trees or other plants, then measuring their future growth on site, and from the increase in hydric or organic soils on site, both of which sequester carbon. The value of a carbon credit would need to be established for such a carbon bank to be feasible. It is anticipated that the value of a carbon credit will eventually involve the amount of tax levied on carbon by the government, the penalties levied on failure to meet emission reductions, costs to obtain the reductions, plus the supply vs. demand of the reduction product. According to the International Carbon Bank and Exchange website, Denmark has a carbon tax of \$25 per ton (<http://www.icbe.com>).

The working concept for Lower Green Swamp Preserve would be to use the vegetation and soils as carbon sinks (natural processes that sequester carbon). This management plan recommends that the County undertake the following activities over the next 10 years:

1. Assign one technical staff member (or contract with a private consultant) to develop a database on the status of carbon banking internationally, and to monitor for any development of carbon banks within the United States;
2. Undertake periodic searches (by same staff member or private consultant) of the technical literature to develop metrics on the amounts of carbon sequestered from vegetative growth (woody and herbaceous species of plants) as well as the efficiency of carbon sequestration involved in the rehydration of wetland soils. Note that results of a recently completed study of carbon content in soils of healthy and impacted wetland systems can be

used as a starting point in the County's development of a technical database (Powell and Emery, in press).

In the event that carbon banking within the U.S. emerges as a potentially viable enterprise (something that the data base research by the County will help determine), this management plan recommends the County consider taking a small portion of the revenue from the mitigation banking plus cattle and sod farming activities to fund studies specifically designed to quantify the amount of carbon sequestered in the re-hydration of formerly organic soils, beginning sometime within the 2016 to 2020 time frame. The results of such studies will then provide the metrics for determining the value of local soils restoration in wetlands as a carbon sequestration device. This information can then be used to estimate the amount of carbon sequestered as a result of the wetlands and stream mitigation banking efforts underway. Actions subsequent to the year 2020 will depend upon the efficacy of carbon banking over time. The County has an opportunity to enter this market as one of the first such banks, should the concept develop within the U.S.

6.7 Water Quality Bank

Economists have examined the concept of water quality banking for decades (King 2005). Unlike wetlands mitigation banking, water quality banking has yet to find traction within the United States. In November 2004, the Environmental Protection Agency (EPA) published a *Water Quality Trading Assessment Handbook* (USEPA 2004) to help regional organizations establish "the necessary conditions for successful water quality trading". This EPA guidance is general and focuses on tasks such as developing trading institutions, measuring the equivalency of pollution discharges, establishing rules of exchange, setting baselines, assigning liability, etc. These tasks may be necessary for successful water quality trading. However, to date, none of them appears to provide the buyers and sellers that are really needed for water quality trading programs to succeed. What appears to be needed beyond what is outlined in the EPA guidance are steps that will change the incentives and disincentives facing prospective buyers and sellers in ways that will make them want to trade

While the future of water quality banking and trading is difficult to assess now, it appears a potential for water quality banking or trading exists on Lower Green Swamp Preserve, due to the presence of the Itchepackesassa and Blackwater Creeks, tributary streams to the Hillsborough River. The County should maintain vigilance with respect to future water quality banking/trading opportunities on Lower Green Swamp Preserve. This effort could be made part of any stream mitigation banking contractual arrangement entered into by the County.

6.8 Hardwood Plantation

Broadleaved trees (and cypress) of the southeastern forests are part of a unique ecosystem within the broader landscape. Hardwood forests provide wildlife benefits from food and cover, recreational opportunities, bird watching, hunting, screening, firewood, pulpwood, valuable wood types for the specialty wood market, lumber, water quality protection and water management benefits, aesthetics, and mushrooms. Careful management of the hardwood resources can help generate these values. As with any natural resources, there are always opportunities to manage better for value production.

There are several soil types on the preserve where hardwood trees were the dominant vegetation, but were harvested. These areas could be re-planted, and more hardwoods could be grown. Several of these soil types occur along stream areas, in mesic conditions, rather than in drier upland or wetland conditions. The hardwood plantation element potentially provides additional SMB credits and should be built into the stream mitigation banking request for proposal. This management plan proposes to coordinate the development of hardwood tree plantation areas with the stream mitigation banking program due to the proposed locations for hardwood trees, with a pilot project of hardwood plantings beginning in the 2011 to 2015 time frame (Figure 8). In addition, the County should carefully examine the recently restored cypress marsh system in sections 20 and 29 for soil types that promote the growth of hardwoods (such as Chobee and Eaton soils).

For the purposes of this management plan, the recommendation for hardwood plantation areas may or may not include selective harvesting at a distant future date. Managing hardwood forests is challenging and hardwood management is a long growth cycle, but hardwoods, like pines, can be farmed effectively as plantations to produce any forest product desired. Hardwood management can be profitable in the long-term, and profit can be calculated many ways for many different products, but the overall goal would be to cultivate large, mature individual hardwood trees, most of which would contribute to natural revegetation of the site and would not be harvested. The potential exists to produce revenue-generating products while enjoying the wildlife and other natural resources.

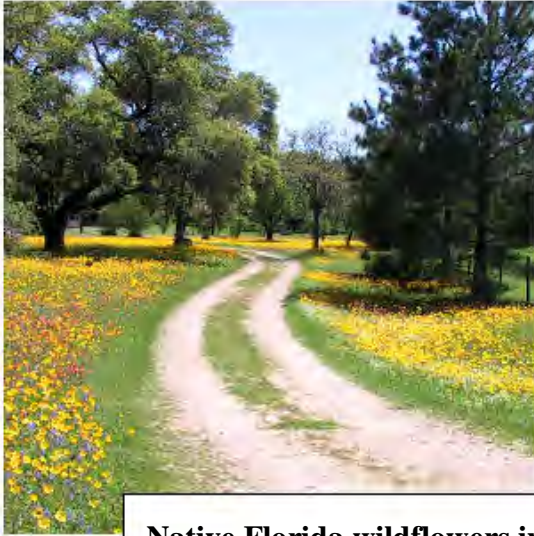
The County should maintain the authority to decide in the future: (a) whether to selectively harvest any hardwoods in the future and, if so, (b) to determine the numbers to be harvested. A certain number could be harvested eventually for high-grade wood products, all as part of an overall timber management plan. Given the growth rates of most desirable hardwoods, initial plantings will take upwards of 50 years before selective harvesting might be implemented. Prior to that time, forestry managers would conduct recommended stand management. This concept does not include the harvesting of cypress (although the County may want to plant cypress, but not for eventual harvesting).

The Florida Forest Service provided a forest management plan, and detailed recommendations for these planting areas (Appendix C). A suggested approach is to develop multiple-species forests with mixed-age stands. High species richness within a hardwood forest system, including the understory, can be part of a management objective. The small, medium, and large-sized trees all play a role in the beauty and use of the hardwood forests. These different kinds of trees can also support portions of the present and future management plans.

An important feature of hardwood forests is that they reproduce from both seeds and from stump and root sprouts. Many times, this means that once a tree becomes established, sprouts can keep that species of tree present for many years. Many hardwood management practices use sprouting to reproduce a hardwood forest of a desired species at a low cost. Another aspect of hardwood forest diversity that can be valuable for producing a number of different products is the number of trees per acre. Depending upon the management objective, perhaps 30-50 crop trees are all that will be ever be harvested. Clearing the rest of the trees is not cost effective and can lead to

damage of the crop trees. Noncrop trees are valuable for their nurse crop role. Many management systems employ natural succession patterns to reach landowner objectives.

6.9 Wildflower Seed Banks, Native Plant Species Nursery Areas, and Florida Pollinators or Honey Production



Native Florida wildflowers in bloom (photo: FDACS)

Currently, wildflower production in Florida falls far short of demand. Seeds for native restoration and large-scale Florida highway beautification projects are often purchased from other wildflower seed producing states. Seed source can affect the growth, flowering, and survival of wildflower species. Plants derived from wildflower populations native to Florida outperform the same species derived from non-Florida sources. Native wildflowers are important for the state's agricultural industry, because they host many of the pollinating insects that also pollinate agricultural crops.

The wildflower seed industry in Florida is an under-developed agricultural commodity with established sales demand (<http://www.floridawildflowers.com/>). Hillsborough County departments including ELAPP and Public Works are potential internal customers that presently purchase wildflower seed and native plants from vendors. Wildflower seed farming can be implemented within two growing seasons using common farm equipment, requires little infrastructure investment, and produces immediate revenues.

Native plant production is an established agricultural industry throughout Florida, with increasing demand as landscape and watering restrictions change the plant palette used for residential and commercial developments, and the community embraces Florida-friendly Yards and green-style landscaping (<http://www.afnn.org>).

Many Florida crops depend on bees for pollination, including some citrus, beans, melons, squash, cucumbers, strawberries and blueberries, and native species perform some of the work, playing a significant role in the state's environment and economy. Honeybee populations in Florida are imperiled by the mysterious condition called colony collapse disorder. With honeybee populations at risk, the University of Florida IFAS is developing a native bee management program to augment honeybees (<http://entnemdept.ufl.edu/honeybee/>). Nationwide, native bees pollinate crops worth an estimated \$3 billion each year. Native bees also pollinate ornamentals and indigenous plants. Managing native bees and honeybees are

possible options at Lower Green Swamp Preserve. Developing a native bee or honeybee management program could assist county farmers by providing an alternate source of pollinators, and developing a county concessionaire for honey production also could be a future revenue source.

Wildflowers can be grown efficiently in pastures or around the “edges” between selected tree-dominated areas and open areas, native plant nursery areas, and honeybees and native bees have mixed layout requirements. One area is proposed for pollinator and/or honey production, and two areas are proposed for wildflower seed and/or native plant nursery production (Figures 8 and 9).

Location 1: In Section 15, a 40-acre open parcel (centered on N28°07.798 W-82°05.853) is proposed to be used continuously for native pollinator, or honeybee, and/or honey production (Figure 8). This area is located in a secluded part of the preserve, surrounded by wooded floodplain, with an existing cattle watering pond for possible irrigation if needed.

Location 2: Select portions of Sections 28, 29, 32, and 33 are proposed to be used for plant and seed production during the second 15-year time period (Figure 6). By 2040, about 350 acres could be used in some combination of wildflower seed banks, pollinator and/or honey production, and native plant nursery. These areas are clustered at the southwest portion of the preserve to provide a buffer to the continued cattle operations to the north, and potentially provide viewing access by the public via accessible trails (Figures 8, 9).

Implementation strategy:

Phase 1: 2015-2018. The County will develop an RFQ to obtain a list of qualified growers with expertise in Florida wildflower cultivation, or native plant cultivation for seed bank purposes, or Florida beekeeping expertise.

Phase 2: 2018-2020. The County will develop an RFP for qualified firms. The RFP could be structured similarly to the mitigation banking RFP.

Phase 3: By 2020, the County will decide the feasibility of implementing these activities. By 2021, the County will assemble the internal and external teams and begin implementation. Areas will be developed in the 2026-2040 time frame, as cattle are removed. Some proceeds from the mitigation banking program may be available by 2020 to assist in this project implementation.

6.10 Captive Breeding of Listed Species.

The preserve is of large enough size to be considered as a possible location for the breeding of such “listed” species as the Florida panther and red wolf, perhaps even black bear. The preserve contains an abundance of prey species such as wild turkey and feral hog. Any such measures will need to be carefully considered, to ensure that the County’s efforts are protected from liability suits. It may be that a portion of the preserve could be fenced and used as a captive breeding area (Figure 9 shows 819 acres in sections 26 and 35 as a possible location in 2040),

with prey animal populations carefully managed, but otherwise free from human involvement. Several of the areas proposed for mitigation banking might be eventually available for such purposes. There has been no time frame placed upon this particular aspect of the preserve management, due to the large number of legal questions that would first need to be addressed. The project is not likely to occur without consent from neighboring landowners.

6.11 Upland Restoration

Lower Green Swamp Preserve was once a vast tract of pine flatwoods and wet prairie. Restoring this ecosystem, as funding and staffing is available, will have a regional impact on a large number of species now imperiled as a result of habitat loss, degradation, and fragmentation. Upland ecosystems in Florida depend on frequent fire to sustain ecosystem function, ecological diversity, and wildlife resources. Uplands in the landscape have unique ecological functions, and provide buffers around the site's wetlands as an integral part of the landscape matrix. Numerous fire dependent wildlife species, and particularly northern bobwhite quail, need early successional plant communities that are maintained by fire. Restoring upland habitat types that occurred historically on the Preserve will be integrated with the overall restoration planning and may present another 'banking' option in the future.

7.0 COMPLIANCE

7.1 ELAPP Policies and Ordinances

On January 7, 1987, the Board of County Commissioners approved an Environmentally Sensitive Land Ordinance (Ordinance No. 87-1) that took effect upon the passage of a referendum on March 3, 1987. The voters of Hillsborough County passed the Environmentally Sensitive Lands Referendum by a three to two margin, providing for a one-quarter mil tax over a four-year period to purchase sensitive land in Hillsborough County. The tax was projected to raise approximately twenty-one million dollars in revenues over a four-year period for the purchase or protection of these lands.

In June 1990, Ordinance No. 90-19 was approved providing for the issuance of general obligation bonds not to exceed \$100 million and the levy of ad valorem taxes not to exceed a quarter of a mill in any one year for a period not to exceed 20 years for the purpose of acquiring, preserving, protecting, managing and restoring environmentally sensitive lands, beaches and beach access, parks and recreational lands.

In 2008, a third referendum was approved by an overwhelming show of support from voters in the County. Almost 80% of all votes cast in the County voted for the extension of the ELAPP program for another thirty years. The referendum, Ordinance No. 08-16, will provide \$200 million for the ELAPP program starting in 2011.

Local Ordinance No. 08-17 provides protection to the park and conservation lands of Hillsborough County. This ordinance and its amendment 10-18 conform to regulations of the state and federal government with respect to public lands.

7.2 Compliance with Comprehensive Plans

The preservation of wildlife habitats and the development of public recreation and environmental conservation activities on the Preserve will help to accomplish or further enhance implementing the goals, objectives, and policies of the Conservation and Aquifer Recharge Element, Future Land Use Element, and Recreation and Open Space Element of the County's Comprehensive Plan. The county's Comprehensive Plan is available online (<http://www.theplanningcommission.org/hillsborough/comprehensiveplan>).

7.3 Compliance with Cone Ranch Environmental Advisory Panel Recommendations

On May 6, 2009, the Hillsborough Board of County Commissioners created the Cone Ranch Environmental Advisory Panel to work with the County staff and with the Florida Conservation and Environmental Group (FCEG) and the Nature Conservancy to develop recommendations for future ownership options for Cone Ranch. The Panel submitted "Final Recommendations to the Board of County Commissioners on the Future of Cone Ranch" on November 16, 2009 (<http://www.hillsboroughcounty.org/coneranch/resources/publications/agendas/recomendations/111609.pdf>). The Panel recommended that: the BOCC authorize ELAPP to update the existing December 1998 'Final Draft Plan for the Use and Management of Cone Ranch' and to pursue a wetlands mitigation bank, conservation bank and carbon credits; allow public access to a portion of the land for passive recreation consistent with protection of the land; and vigorously pursue vacation of the Tampa Bay Water claim to water development rights.

7.4 Proposed Expansion Opportunities

A tract of land on the eastern boundary of the Preserve is approved for acquisition (Figure 3).

7.5 Public Input

This management plan was reviewed by a management subcommittee of professionals (February 23, 2012), in a public meeting (April 7th, 2012), and in a meeting with the Florida Farm Bureau (April 13, 2012). The Hillsborough County Board of County Commissioners is scheduled to review the plan for approval on June 6, 2012. Participants and meeting minutes are in Appendix D.

8.0 SUMMARY OF MANAGEMENT GOALS AND OBJECTIVES

The management actions described in this section have varying time frames for implementation associated with them. It is anticipated that implementation of all of the following actions could be started within a 15 year time frame (Table 5). The completion target of all actions is scheduled for the years 2040 to 2050, while management activities will continue in perpetuity. Planting and selective harvesting of hardwoods will presumably require a longer time frame because of typical tree growth rates. Several of the proposed actions could be conducted in 5-year phases to allow for periodic review of progress and possible adaptive management modifications to future efforts.

Five of the actions proposed for implementation over the next 15 years involve a “revenue generating” component. Three of these (cattle ranching, sod, and timber) are already well established and should be maintained in the short-term without major modifications. The other two (wetland and stream mitigation banking) provide substantial potential to facilitate wetlands and stream restoration while also providing a positive revenue stream early on.

Figures 8 and 9 are intended to be “working” maps that show an overall view of where and when different aspects of the plan may be implemented. These maps will change as the different efforts are implemented over the next several decades. Figure 8 represents a view of what the preserve might look like on or about the year 2025 (mid-way to the eventual anticipated completion). Figure 9 represents an initial conceptualization of where various projects might best be implemented and what they might look like on or about the year 2040.

Two potential access points to the preserve from Knights-Griffin Road are connected by jeep trail within the preserve (Figure 7). This existing connection provides the County with great flexibility in how public access and public facilities may be developed. Initially, limiting public access to the south and west side of the lower portion of the Itchepackesassa Creek provides areas of aesthetic appeal, some easily constructed hiking/jogging/biking trails along the creek and a few of its tributaries, while providing a barrier to public access to the other portions of the preserve (Figure 8). In the long term, the infrastructure component is expected to be improved and expanded in acreage (Figure 9).

Cattle and sod activities are proposed to be based near the SR39 entrance and eastward on both sides of the Itchepackesassa Creek, north to Blackwater Creek, with a portion of the area north of Blackwater Creek to be kept in pasture through 2040 (Figures 8 and 9). Over time, much of the pasture should be slated for native habitat restoration (Figure 8). This area abuts SWFWMD’s Alston Tract and CFI’s restoration area, and is crucial to the establishment of the wildlife corridor from the Green Swamp to the Lower Hillsborough Flood Detention Area (Figure 1). The development of this wildlife corridor is a main priority of the County (HRGTF 1995). However, restoring areas will take time, money, and effort, and should be undertaken in relatively small segments. Until each segment is being restored, maintaining cattle grazing will help keep the pastures in open grasslands, which is preferable habitat for several rare and threatened species.

The Conservation Services section budget derives from Hillsborough County Ordinance (08-16; approved November 4, 2008), which allows bond proceeds to be expended to finance capital projects relating to the acquisition, preservation, protection, management and restoration of environmentally sensitive lands. Annual management is provided by the Parks, Recreation, and Conservation Division as approved, or supplemental funding from revenue-generating sources as approved.

Table 5. Timeline of specific management actions.

Activity	2011-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040
Wildflower seed banks, native plant nursery, honey production		Develop RFP for section 15	Implement section 15	Implement on Sections 28, 29, 32, 33. phased as necessary (to 2040) ----->		
Stream mitigation banking	Develop RFP. Begin work	Retain/modify agreement	Retain/modify end agreement	Retain/modify agreement	Retain/modify end agreement	Retain/modify until banking complete
Wetlands mitigating banking	Develop RFP. Begin work	Retain/modify agreement	Retain/modify end agreement	Retain/modify agreement	Retain/modify end agreement	Retain/modify until banking complete
Cattle ranching	On reduced acreage (to 2040) ----->					
Sod harvesting	On reduced acreage (to 2040) ----->					
Carbon banking	Monitor carbon banking efforts elsewhere (to 2020) ----->		Develop RFP if banking feasible	Implement carbon banking (to 2040) ----->		
Water quality banking	Monitor banking potential within the U.S. (to 2040) ----->					
Pine plantation	Thin, harvest, manage existing plantation areas (to 2025) ----->			Initiate new plantation areas in sections 10 and 1	Manage new plantation (to 2040) ----->	
Hardwood plantations						
Soils management						
Natural Resource Mgmt	Maximize wildlife corridor (to 2040) ----->					
Special Species Mgmt	Maximize listed species protection (to 2040) ----->					
Public access	Develop trails, parking, etc. (to 2020) ----->		Expand facilities (to 2030) ----->		Pursue possible education center (to 2040) ----->	

Additional funds for operation and capital have been secured by earmarking interest revenue from reimbursements received from agencies participating in joint acquisitions. This option is only available for projects that were originally acquired with Ad Valorem proceeds, since reimbursement funds for Bond funded acquisitions must be used to retire the Bonds. Some additional funding for site restoration and maintenance efforts has been secured through grants, and other agencies have entered into restoration partnerships for large-scale habitat restoration projects.

The estimated costs to support the proposed management goals and objectives for the next ten years are listed in Table 6 below.

Table 6. Proposed life of the plan schedule and budget for Lower Green Swamp Preserve.

OBJECTIVE	SCHEDULE	ESTIMATED COST ⁽¹⁾
Restoration	Ongoing	TBD ⁽¹⁾
Habitat maintenance (roller-chopping and/or mowing)	Ongoing	TBD ⁽²⁾
Invasive species control	Ongoing	100,000 ⁽²⁾
Prescribed burns	Ongoing	\$25,000
Maintenance (road, fence repair, walkover, temporary fencing, etc.)	Ongoing	\$50,000
Fence installation	Ongoing	\$50,000
Infrastructure (bridge replacement)	TBD	800,000
Composite survey	2012	7,500
Cultural resource survey	2020	10,000
Ecological studies, including water monitoring	Ongoing	20,000
	Total	\$1,062,500

Notes: (1) restoration costs to be paid for from mitigation banking activities; (2) currently part of cattle lease reimbursable expenses.

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- West Coast Regional Water Supply Authority. 1988c. Interlocal Agreement between Hillsborough County and WCRWSA for Financing and Acquisition of Cone Ranch, February 1988).
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- Emery Ph. D., Scott. Unpublished data. Comparison of land use changes on Lower Green Swamp Preserve 1938 to present, map prepared in 2005.
- Emery Ph. D., Scott. 2010. Unpublished data. Restoration of five wetlands on Cone Ranch. Pollution Recovery Fund Agreement #08-03 funded by the Environmental Protection Commission of Hillsborough County.

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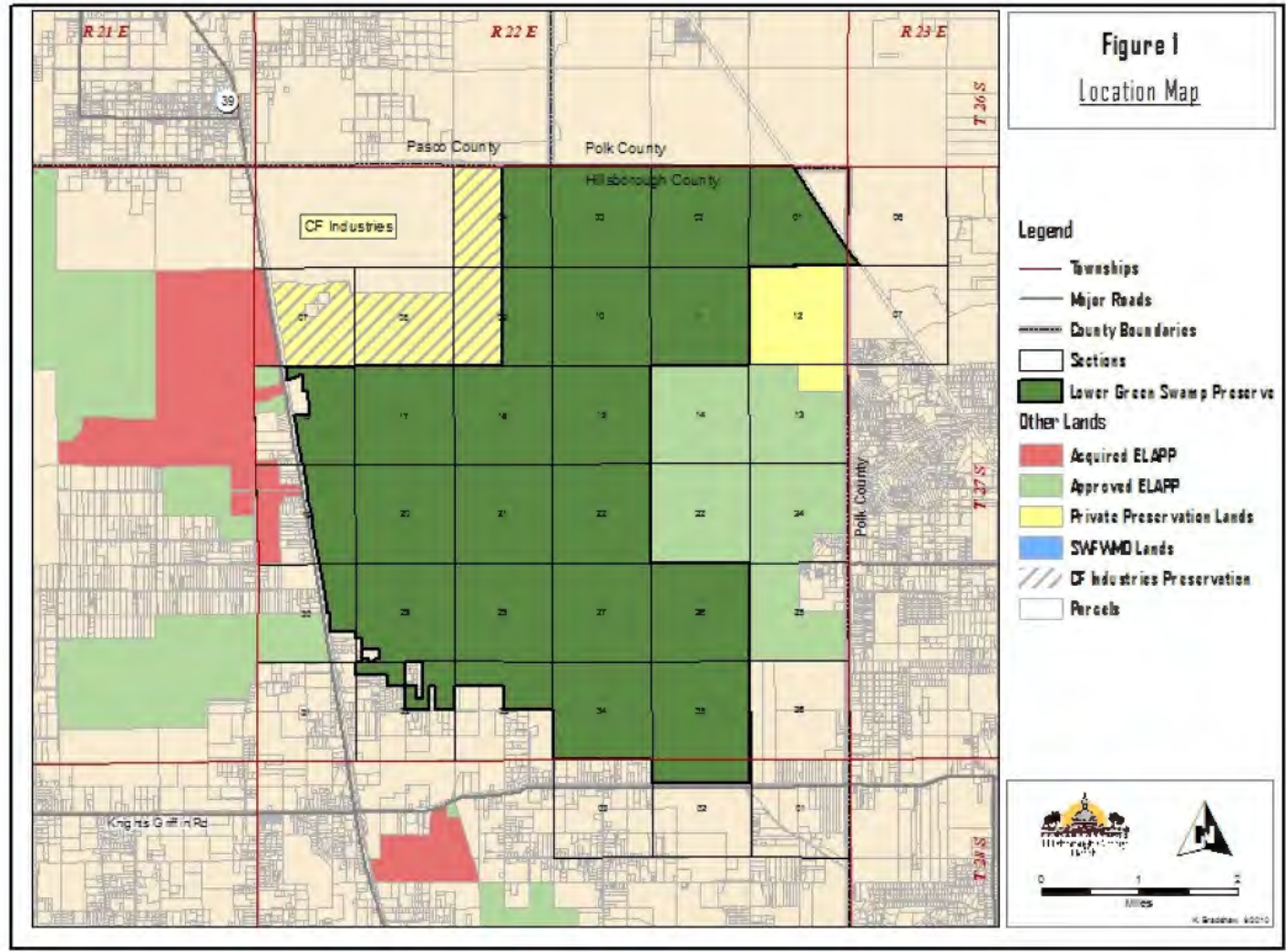


Figure 1. Location of Lower Green Swamp Preserve in northeastern Hillsborough County, Florida.

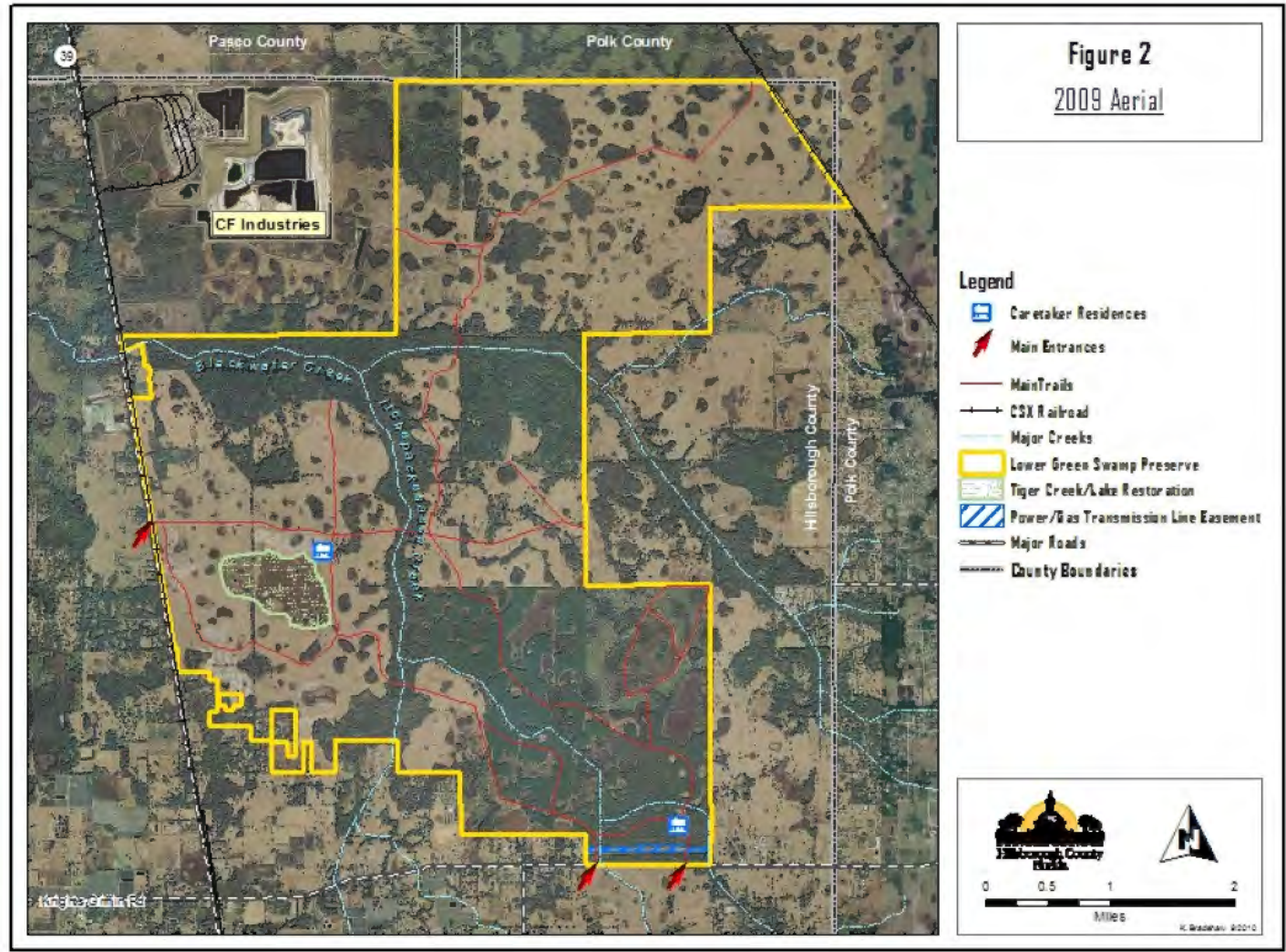


Figure 2. 2009 aerial photograph of Lower Green Swamp Preserve.

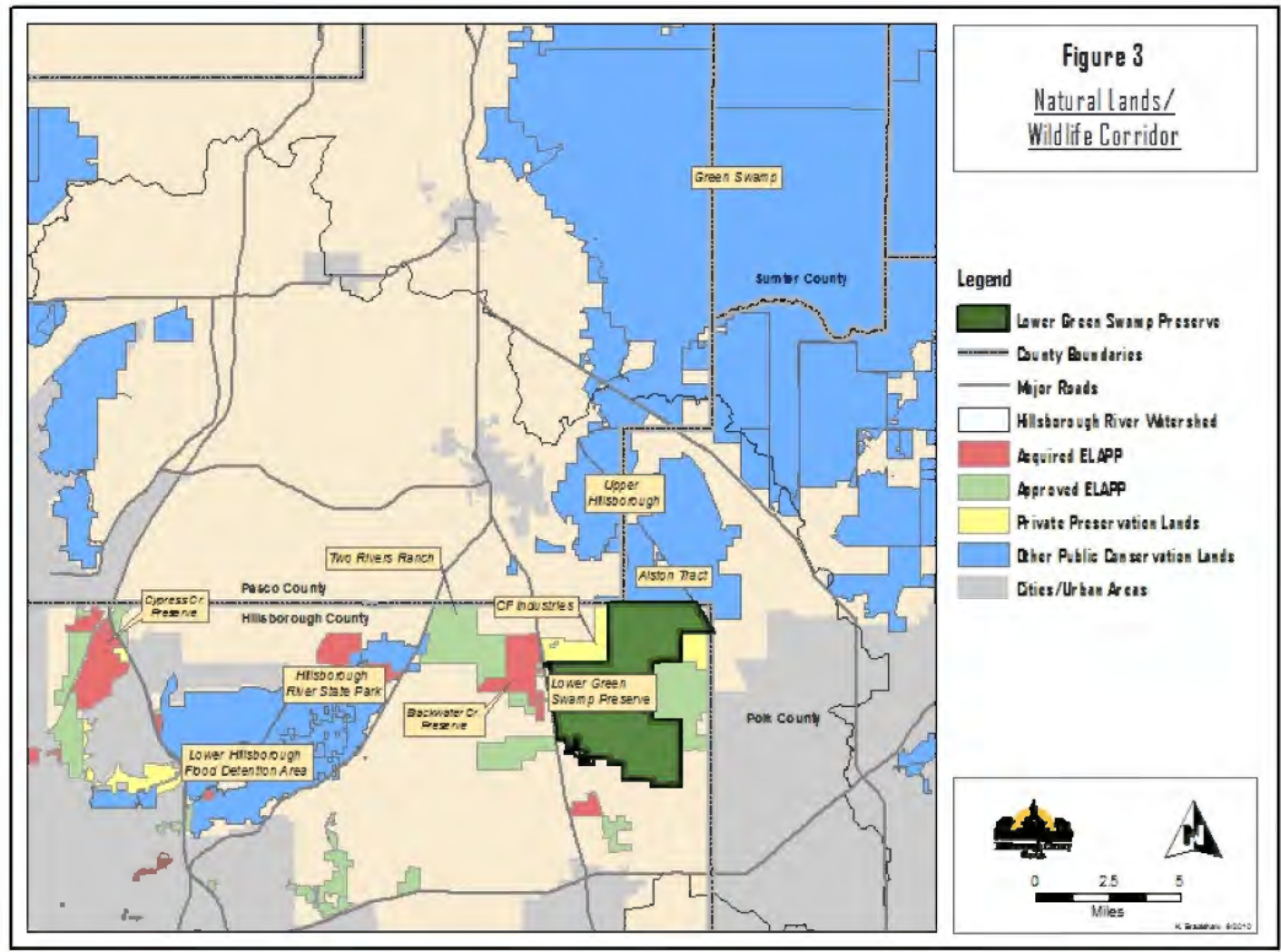


Figure 3. Natural lands and wildlife corridors near Lower Green Swamp Preserve.

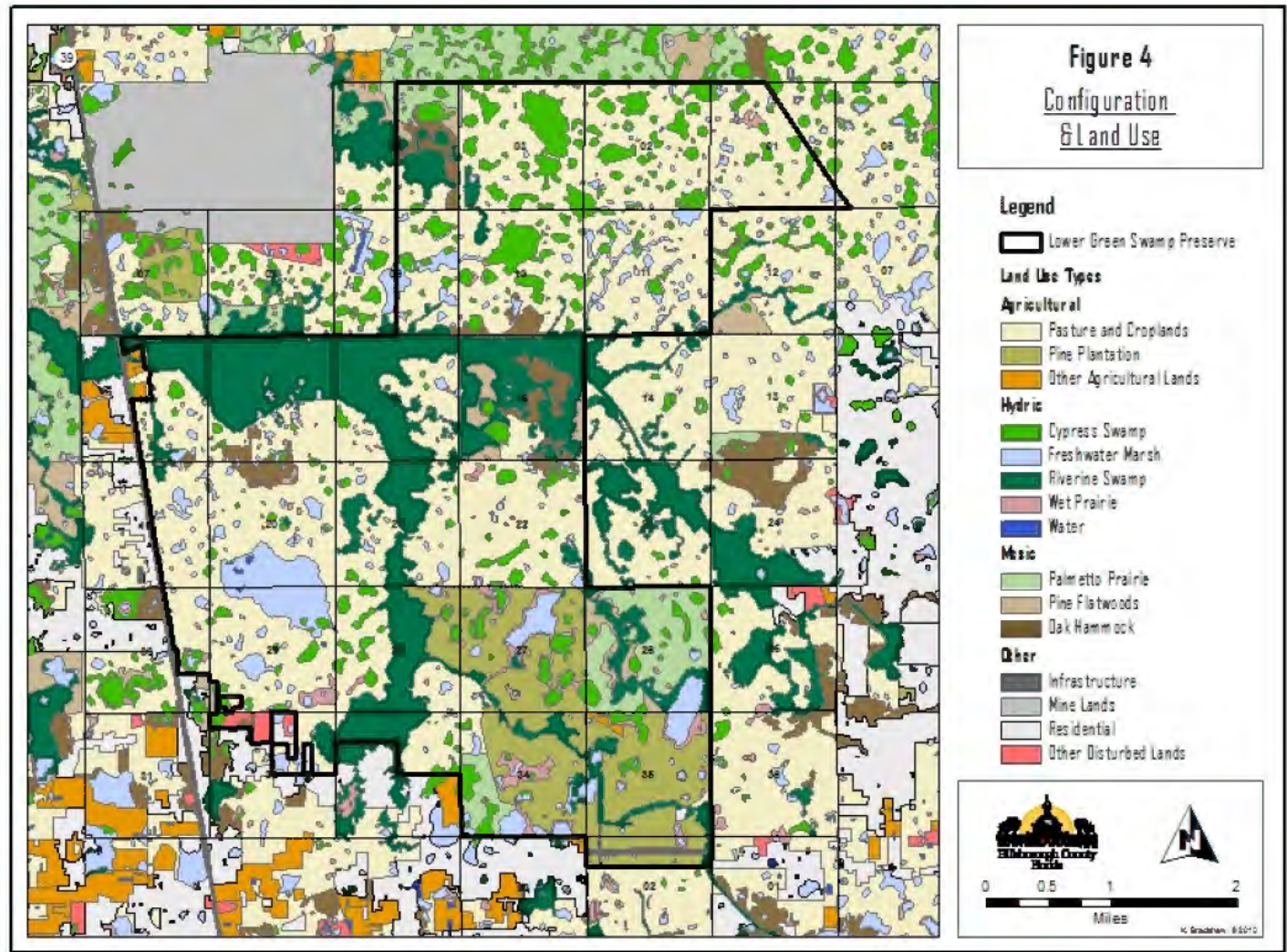


Figure 4. Land use types on Lower Green Swamp Preserve.

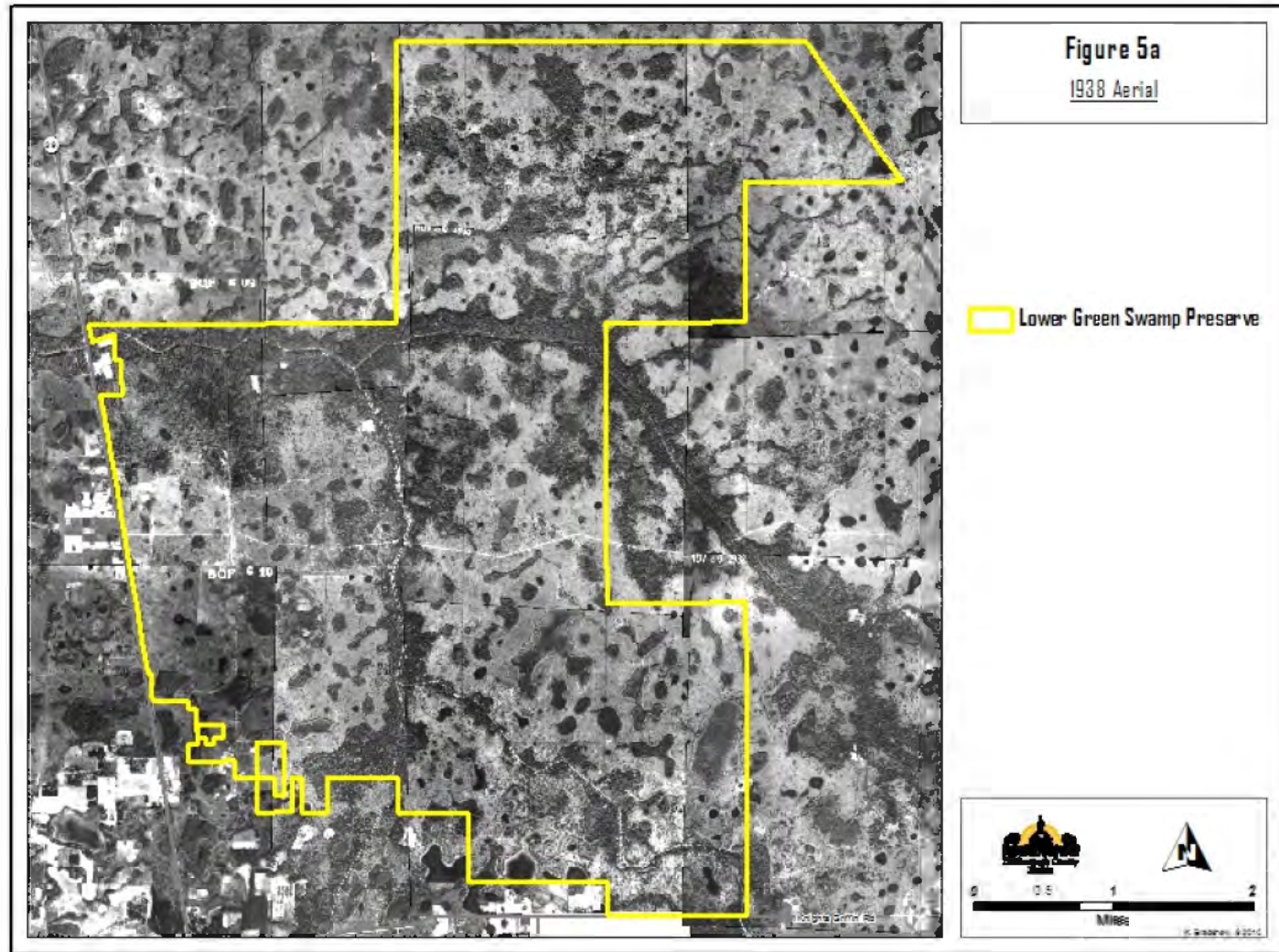


Figure 5a. 1938 aerial photograph of Lower Green Swamp Preserve.

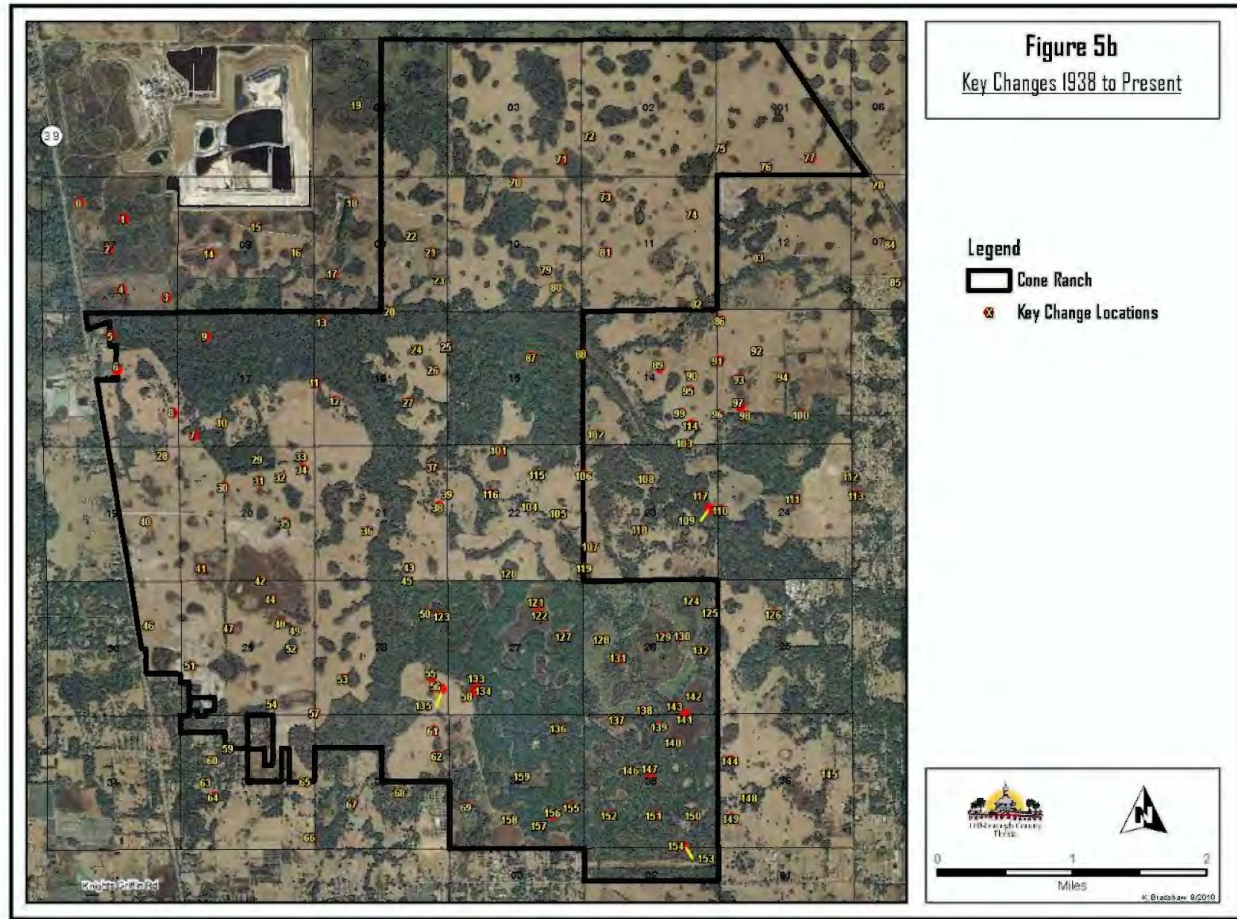


Figure 5b. Key changes in topography and drainage of Lower Green Swamp Preserve from 1938 to 2009.

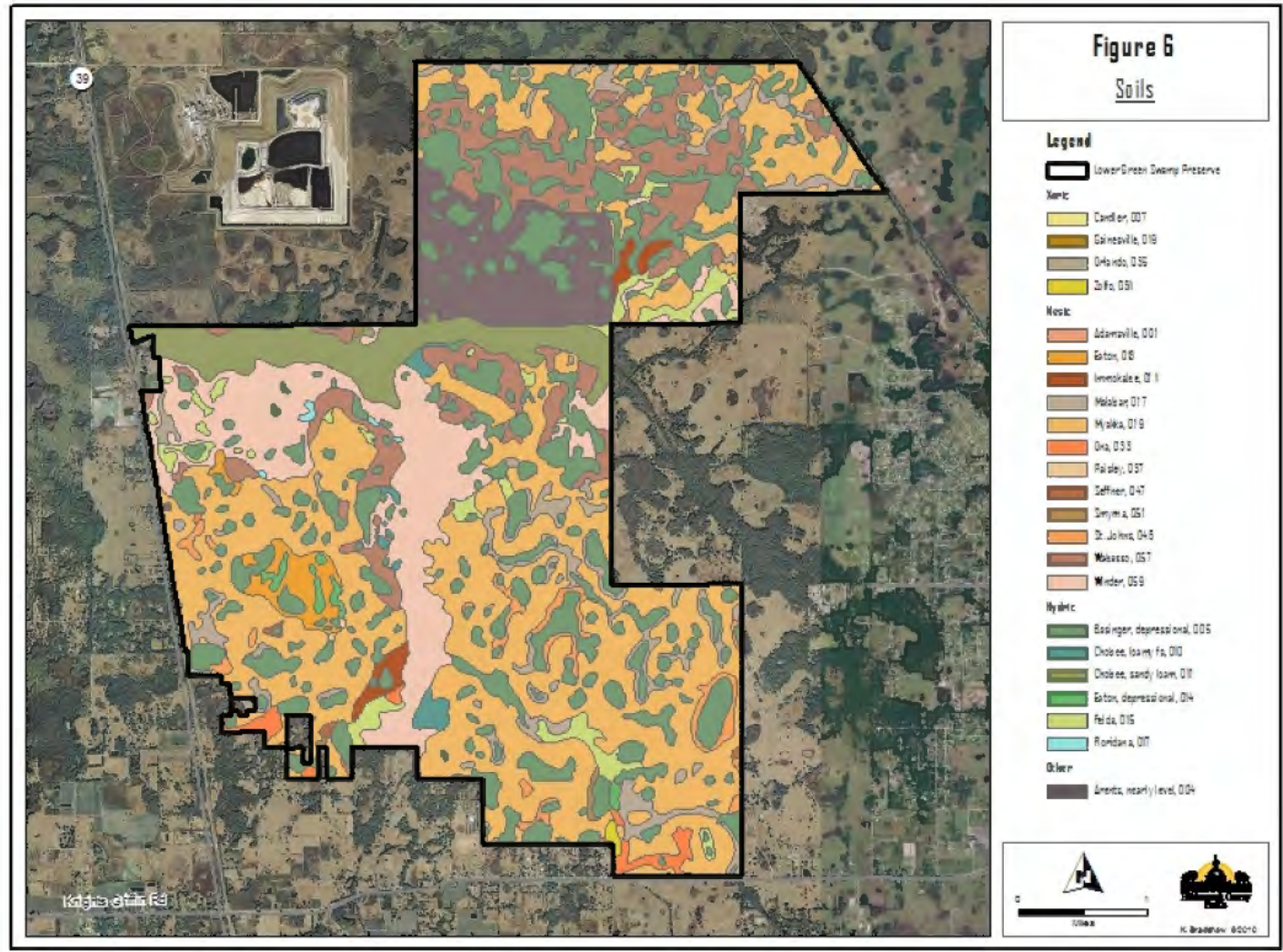


Figure 6. Distribution of soil types on Lower Green Swamp Preserve.

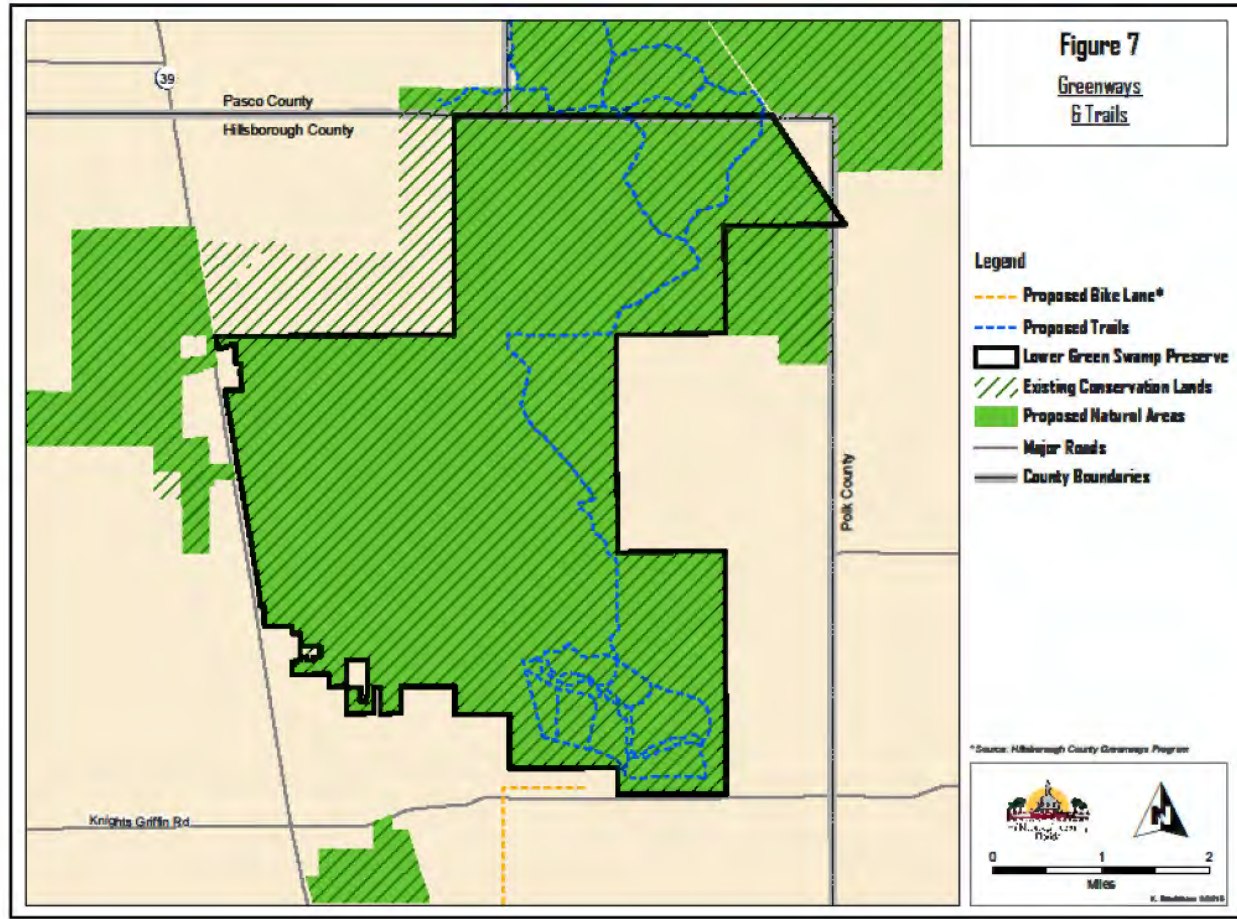


Figure 7. Greenways and trails.

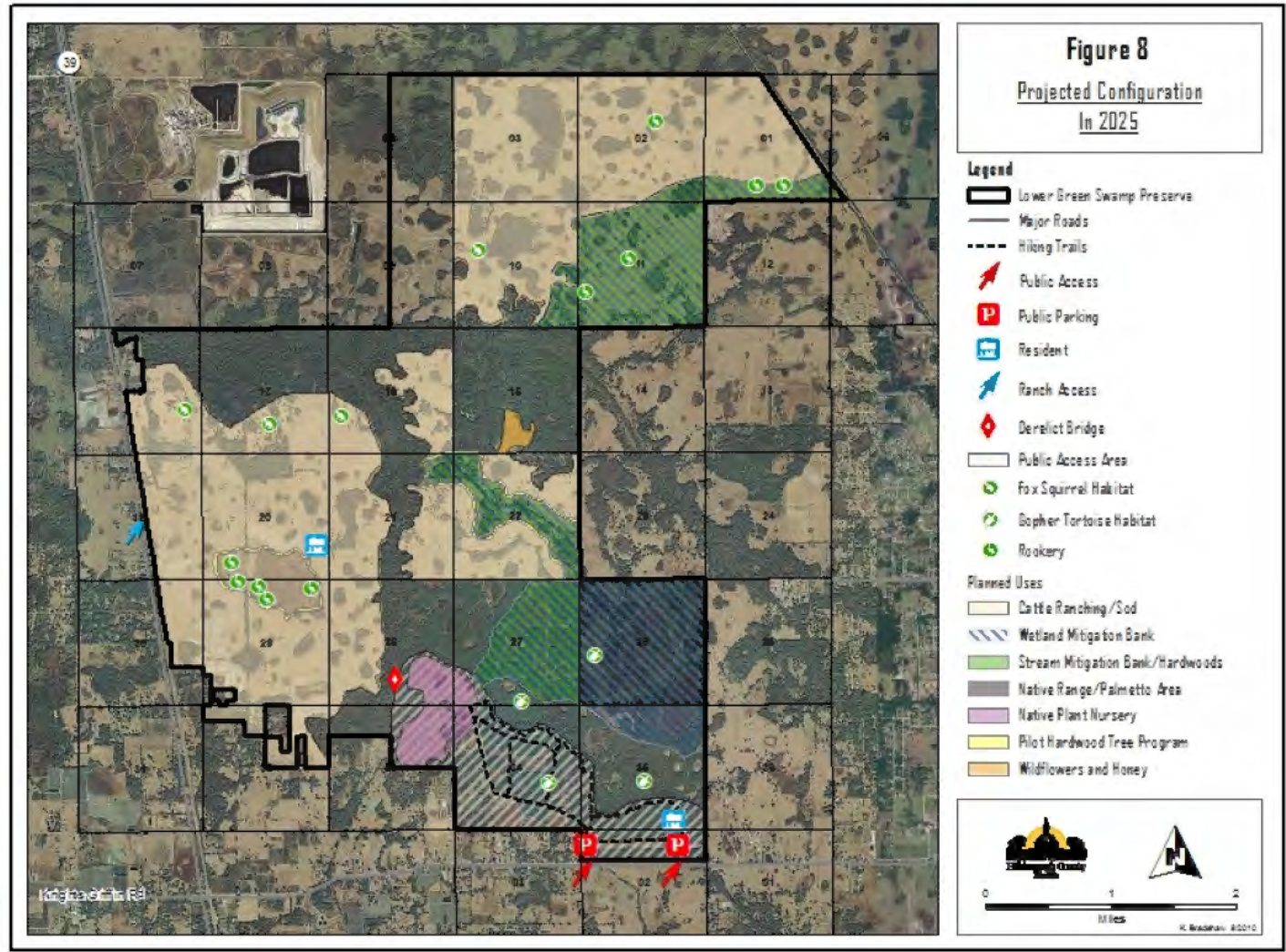


Figure 8. Project configuration in 2025.

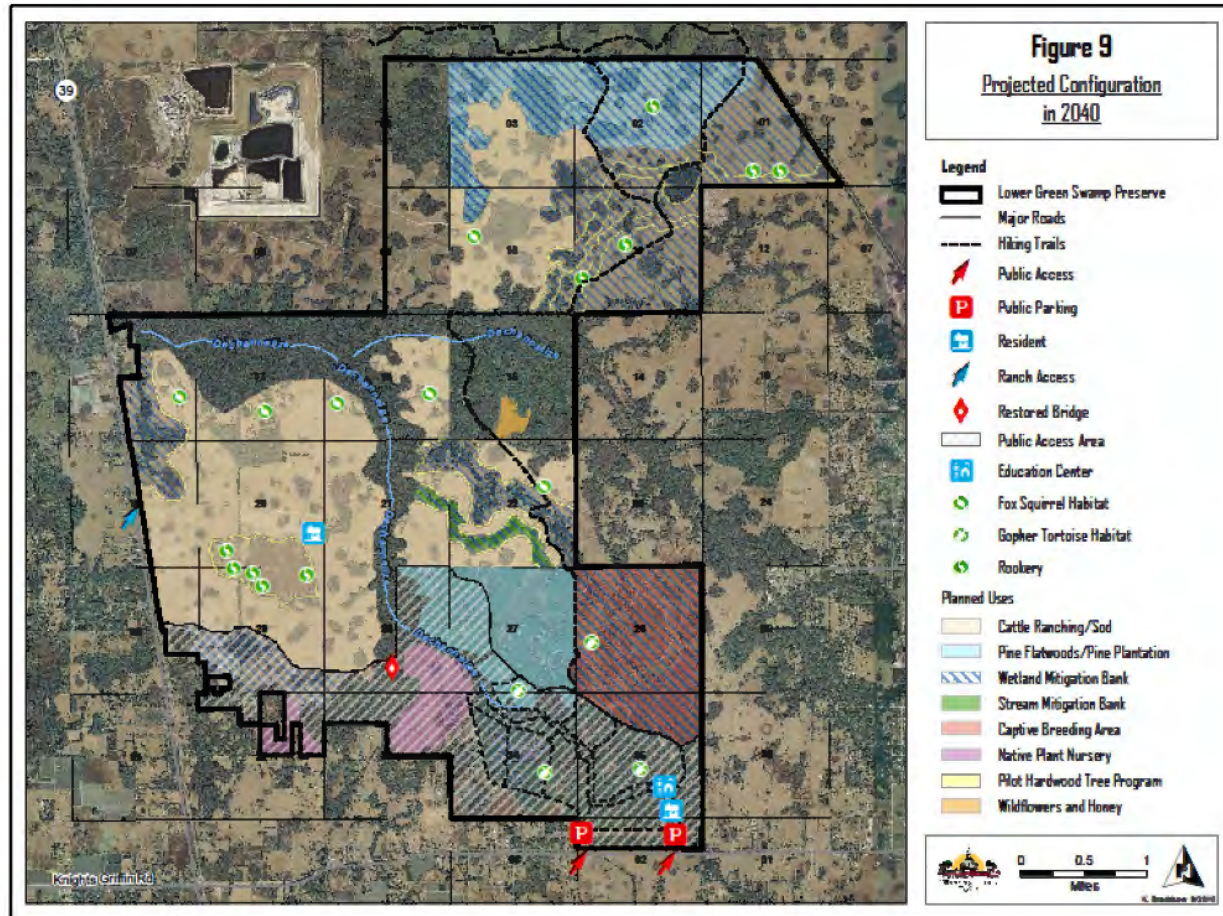


Figure 9. Project configuration in 2040.

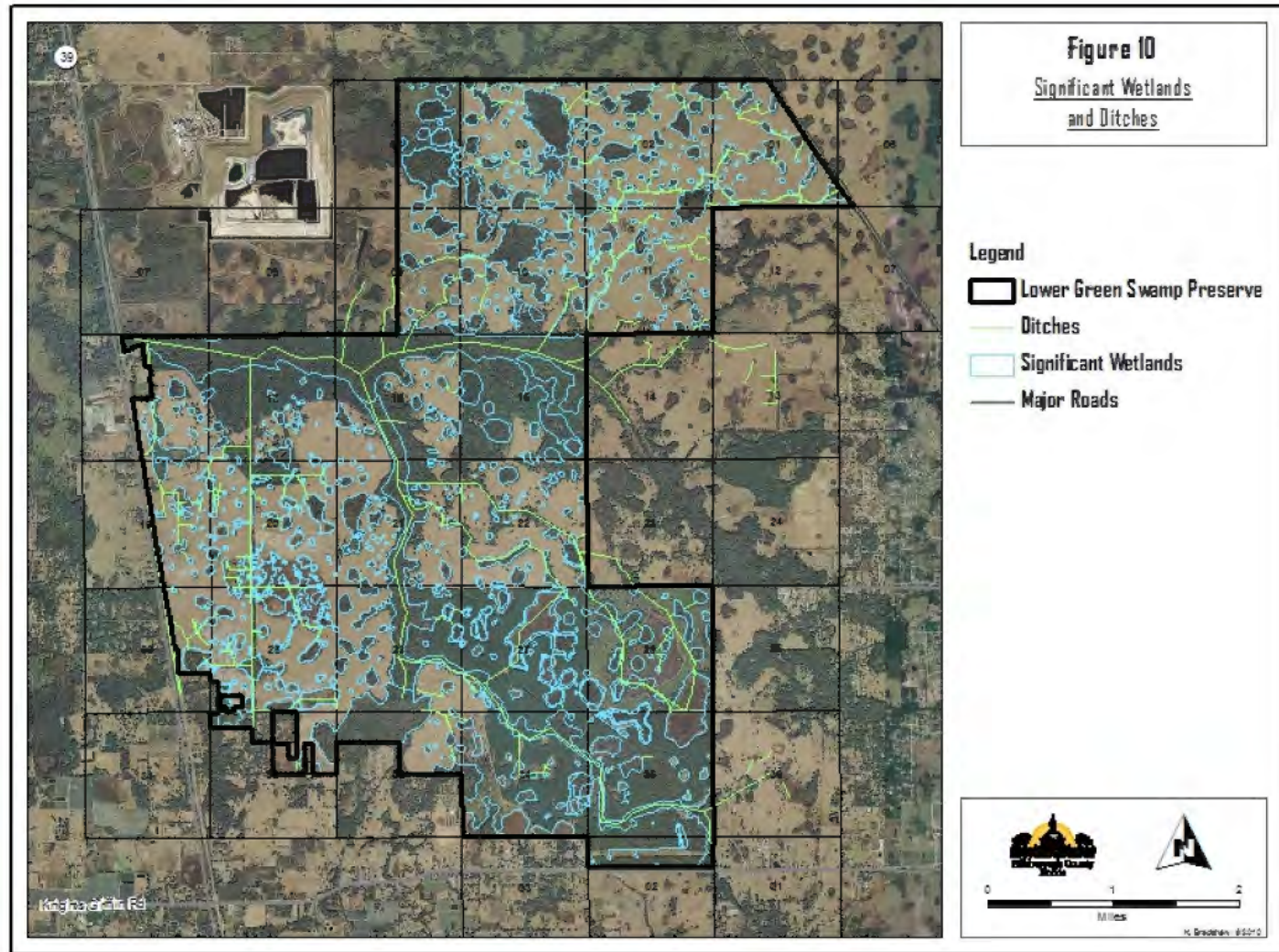


Figure 10. Significant wetlands and ditches.

APPENDIXES

Appendix A. Legal description, easements, and other legal documents.

- A-1. Encumbrances affecting the Cone Ranch.
- A-2. Exhibit A. Interlocal agreement between Hillsborough County and the West Coast Water Supply Authority, related to financing the acquisition of the Cone Ranch. March 9, 1988.
- A-3. Exhibits B-K. Interlocal agreement between Hillsborough County and the West Coast Water Supply Authority; Deed to County. March 31, 1988.
- A-4. Lease agreement between Hillsborough County and Audubon Ranch. August 19, 1992.
- A-5. First Amendment to Audubon Ranch lease. September 6, 1995.
- A-6. Rotary Club ‘Preserve Planet Earth’ agreement for planting slash pines. August 1, 1991.
- A-7. Gopher tortoise relocation agreement between Hillsborough County and Hillsborough County School Board. June 30, 1995.
- A-8. Agreement between the Southwest Florida Water Management District and Hillsborough County for the construction of the Cone Ranch Restoration Project. March 3, 1999.
- A-9. First Amendment to the Agreement between the Southwest Florida Water Management District and Hillsborough County for the construction of the Cone Ranch Restoration Project. December 1, 1999.
- A-10. Florida Conservation and Environmental Group’s Permanent Preservation Plan for Cone Ranch. August 14, 1999.
- A-11. EPCHC Memorandum re feasibility of wetland mitigation banking, authored by Andy Zodrow and Bob Stetler. October 10, 2009.
- A-12. Cone Ranch Environmental Advisory Panel. Report. December 9, 2009.
- A-13. Water Resource Services asset transfer plan. February, 2010.
- A-14. Burn Plan. March 25, 2010.

Appendix B. Lists of observed and/or expected flora and fauna (species of plants, amphibians, reptiles, birds, and mammals).

Appendix B-1. Plants observed on Lower Green Swamp Preserve in 1988 and recently.

Appendix B-2. Reptiles and amphibians observed on Lower Green Swamp Preserve in 1988 and recently.

Appendix B-3. Mammals observed on Lower Green Swamp Preserve in 1988 and recently.

Appendix B-4. Birds observed on Lower Green Swamp Preserve in 1988 and recently.

Source: Florida Ornithological Society. 2010. State List.

Appendix C. Florida Division of Forestry Timber Management Prescriptions, 2007 and 2011

TIMBER MANAGEMENT RECOMMENDATIONS

FOR

LOWER GREEN SWAMP PRESERVE

HILLSBOROUGH COUNTY

BY

BUTCH MALLETT

SENIOR FORESTER, OTHER PUBLIC LANDS

FLORIDA DIVISION OF FORESTRY

SEPTEMBER 2007

HISTORY

This property was initially acquired as a potential well-field by Hillsborough County. Most of the uplands had been converted to improved pastures for cattle operations by the previous owners. Cattle grazing has continued under a lease agreement since the county took title to the land.

In the early to mid 1990's, members of the Plant City Rotary Club coordinated the planting of slash pine trees on the property. Almost 1200 acres of the improved pasture closest to Knights-Griffin Road were planted. The young pines are well adapted to the flatwoods soils of this area and have exhibited rapid height and diameter growth. Once the trees reached crown closure, a pine straw raking contract was negotiated. This generated additional revenue for the county.

Overall, the trees are growing rapidly. However, there is a widespread infestation of pitch canker in the slash pines. This disease weakens and sometimes kills pine trees outright. Considerable breakage of infected tops and limbs occurred during the high winds of Hurricanes Frances and Jeanne. Pine straw operations require a rather clean understory to facilitate raking and bundling. Debris from the hurricanes made raking too labor intensive and no longer profitable for the vendor. They declined to renew the agreement. Weakened, diseased, and over crowded trees are havens for insect infestations. Scattered patches of trees have already been killed from this lethal combination.

INVENTORY

A cruise of the slash pine timber was conducted in the summer of 2006 by foresters and rangers of the Florida Division of Forestry. It is known that the trees were all planted within one to three years of each other and appeared to be growing at about the same rate. However, some areas did exhibit greater pitch canker damage and die out than others.

As a result, the tract was broken up into 11 stands (see attached map). Boundaries were established using natural and artificial breaks such as cypress ponds, streams, roads, and firelanes. Plots were placed in a grid pattern with one plot approximately every five acres. Within each plot, merchantable height and diameter was measured on trees determined to be “in” using a 10 BAF prism. This information was segregated by whether or not the tree was significantly affected by pitch canker. On each of at least three plots per stand, a dominant or co-dominant tree had its total height and diameter measured to calculate the site index and growth potential of the soils.

RESULTS

Volume and number of trees in each stand was calculated using TwoDog software. Results are contained in the attached Estimated Volumes table.

Only Stands 9 & 11, totaling 484 acres had 400 or more trees surviving. With 262 acres, Stands 6 & 8 had close to 300 trees per acre. The rest of the stands averaged well below 200. Diameters mostly ranged from 5 to 10 inched DBH with the majority being between 7 and 9. A few trees had the diameter and height to be classified as chip-n-saw. However, due to the young age of the timber, they would not meet these specs.

GENERAL TIMBER MANAGEMENT THEORY

Seedling pines are intentionally planted close together to allow for some mortality. In addition, tight spacing encourages shading out and shedding of lower limbs before they become large enough to produce large knots in the wood. It is expected that some of the slower growing trees will die out over time and leave the healthier, faster growing trees to produce high value timber products. However, even healthy pine trees, allowed to grow too long under crowded conditions, lose their vigor and become susceptible to disease and insect attacks. Thinning operations are designed to free better quality trees from unproductive competition, thereby maintaining a healthy, vigorous stand. These harvests also capture revenue from trees that would otherwise die and become fuel for wildfires.

The first thinning cut in a pine plantation is scheduled when the length of live crown in dominant and co-dominant trees have been reduced to 40% (no less than 33%) of the tree’s total height. During thinning harvests these largest, most healthy trees with the best form in each stand are left standing to grow to evermore valuable products. In tight plantations, access and maneuvering room for harvest machinery is achieved by removing an entire row of trees at the

time of the first harvest. This is called a “row-thinning” and the clearcut row the “take” row. Weak, diseased, deformed and slow growing trees are cut from the “leave” rows in between “take” rows. Normally in plantation management, the number of the best trees being removed is controlled by spacing of the “take” rows. Third-row thins remove one-third of the best trees, fourth-row cut one-quarter, and fifth-row sacrifice one fifth, and so on.

Where disease such as pitch canker is a problem, sanitation cuts are often performed. By removing infested material from the stand, a major source of inoculation is eliminated. At the same time reducing the number of stems per acre reduces stress on the remaining trees and makes them less susceptible to disease and insect attacks.

After the initial row thin harvest, additional thinnings are performed whenever the tree crowns begin to become overcrowded again. Periodically thinning pine stands in this manner can alleviate the risk of slowed growth and unhealthy stands until the trees become over-mature.

RECOMMENDATIONS

Pitch canker and insect mortality are too widespread within these plantations to even consider not doing sanitation cuts. Many of the Lower Green Swamp Preserve stands are already lower in the number of healthy trees than would usually be desirable at this age. Therefore, thinning should be confined to fourth or fifth-row depending on the harvest equipment capabilities. Any wider spacing of take rows might result in damage to the residual stand by heavy machinery trying to reach stems within the leave rows. Narrower spacing cuts too many future big money trees. Remove all dead, dying, or diseased trees from leave rows along with all stems six inches DBH or smaller.

In patches of mortality, remove all of the diseased and enough healthy trees within and surrounding each patch to make a cleared area of at least one-half acre. These openings should be as small as possible but least two chains wide. This will provide adequate sunlight for future pine seedlings. To guard against reproduction weevil damage, wait at least one summer season after the harvest is complete. Then, holes of one-half acre or more should be planted with longleaf pine seedlings at a rate of about 600 to 700 per acre.

The second table includes estimates of the amount and numbers of trees that would be removed and remain after a typical fifth-row thinning operation. As the table indicates, cutting out every fifth-row thin removes almost 40 percent or more of the trees. However, since the removals are the smallest, weakest trees, less than 30 percent of the volume is removed. These are minimum numbers for removals since larger diameter diseased trees would also be removed. It also does not account for extra trees removed in any openings that might be created.

Phase two of timber harvest should be scheduled once the crowns of remnant trees begin to become crowded again. This time period will vary by stand depending on how much diseased material had to be removed during the first thinning. Dense stands might need thinning again in as little as 5 years. In more open stands, the second cutting might be in 20 years. Ultimately

though, each area might need removals every 10 years or so forever. Each stand should be revisited by a forester at least once a year to assess growth and watch out for problems.

Careful management will ensure healthy trees and a dependable source of income for the taxpayers of Hillsborough County.

NOTE: All timber management conducted on public lands should comply with the recommendations of the latest *Silviculture Best Management Practices* Manual.

ACCESS

Access for the heavy logging equipment and trucks to the southern portion of the tract is not a big problem. Unimproved roads will have to be watched closely for excessive rutting. Logging activities may have to be halted during extremely dry or wet weather. The logger is generally responsible for back-blading roads to level out ruts. But, even in normal weather, some soft spots might need reinforcing materials to allow reasonable access. Approaches to major roads may require limerock or road millings to prevent damage to pavement edges.

PRESCRIBED FIRE

Periodic prescribed fire should be introduced into the plantations within a year or two after the completion of the first phase of harvest activities. Carefully executed burns will help cleanup woody debris from past hurricane damage and harvest activities. The first burns should probably be accomplished during the late December to mid-February dormant season for pine trees. To control under brush and exotic plant pests, subsequent burns should be scheduled for March or April every two to three years.

Firing technique in prescribed burning is extremely important. Excessive heat from hurried burns weakens and even kills valuable pine timber. These stands are very open and accessible. Once a good down-wind black line is established, strip spot fires can be safely lit from an all-terrain vehicle. This method conserves torch fuel and results in less intense flames as compared to solid strip head fires. At the same time, large areas can be burned out very quickly this way.

Good prescribed fire planning means knowing how all the burn components will likely interact under various conditions. For example: it is possible for experienced personnel to plan ahead for “unexpected” wind shifts caused by afternoon sea breezes.

SUMMARY

The pine plantations on the Lower Green Swamp Preserve have the potential to produce a reliable revenue stream for Hillsborough County in perpetuity. At the same time, they can provide wildlife habitat, watershed protection/recharge, and recreational opportunities in an area where these things are rapidly disappearing.

ESTIMATED VOLUMES

CONE TRACT - HILLSBOROUGH COUNTY

BASED ON CRUISE FROM SUMMER 2006 AND TWODOG SOFTWARE

STAND NUMBER	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)									PER ACRE TREES	PER ACRE VOL	TOTAL STAND ACRES	TOTAL STAND TREES	TOTAL STAND VOL
	5	6	7	8	9	10	11	12	13					
1	2	8	29	28	26	8	2			103		60	6180	
1	0	0.6	3.6	4.7	6.1	2.4	0.6				18.1			1086
2	1	9	11	22	11	11				65		37	2405	
2	0	0.7	1.5	3.8	2.4	3					11.4			421.8
3	0	0	5	7	12	12	9	1		46		48	2208	
3			0.5	1	2.4	2.9	2.6	0.3			9.7			465.6
4	6	29	26	25	10	4				100		55	5500	
4	0	2.2	3.3	4.2	2	0.9					12.8			704
5	1	5	9	5	6	4	2			32		10	320	

ESTIMATED VOLUMES

CONE TRACT - HILLSBOROUGH COUNTY

BASED ON CRUISE FROM SUMMER 2006 AND TWODOG SOFTWARE

STAND NUMBER	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)										PER ACRE TREES	PER ACRE VOL	TOTAL STAND ACRES	TOTAL STAND TREES	TOTAL STAND VOL
	5	6	7	8	9	10	11	12		13					
5	0	0.4	1	0.7	1.2	1	0.6					4.9			49
6	23	62	91	88	37	14	3				318		105	33390	
6	1	4.6	10.4	14.4	7.9	4	1.2					43.4			4557
7	10	16	33	25	5	4					93		45	4185	
7	0	1.3	3.9	4.2	1.1	1						11.9			535.5
8	16	41	92	72	48	21	2	1			293		157	46001	
8	1	3.3	11.8	12.4	11	6.1	0.8	0.5				46.5			7300.5
9	45	101	134	119	39	8	3				449		204	91596	
9	2	8.3	18	22.3	9.2	2.2	1					62.7			12791
10	13	31	59	51	13	9					176		76	13376	

ESTIMATED VOLUMES

CONE TRACT - HILLSBOROUGH COUNTY

BASED ON CRUISE FROM SUMMER 2006 AND TWODOG SOFTWARE

STAND NUMBER	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)										PER ACRE TREES	PER ACRE VOL	TOTAL STAND ACRES	TOTAL STAND TREES	TOTAL STAND VOL		
	5	6	7	8	9	10	11	12		13							
10	1	2.4	6.7	9.3	3	2.5						24.4			1854.4		
11	19	75	154	146	77	14	7	2		2	496		280	138880			
11	1	5.8	19.8	26.5	18.4	4.4	2.2	0.9				79.8			22344		
GRAND TOTALS															1077	344041	52109

STAND NUMBER	REMOVALS 5TH ROW THINNING NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)										PER ACRE TREES	PER ACRE VOL	TOTAL STAND ACRES	TOTAL STAND TREES	TOTAL STAND VOL	TOTAL STAND NUMBER
	5	6	7.0	8	9	10	11	12		13						
1	2	8	6	6	5	2	0	0		0	29		60	1716		1
1	0.1	0.6	0.72	0.94	1.22	0.48	0.12	0		0		4.18			250.8	1
2	1	9	2	4	2	2	0	0		0	21		37	777		2
2	0	0.7	0.3	0.76	0.48	0.6	0	0		0		2.84			105.08	2

ESTIMATED VOLUMES

CONE TRACT - HILLSBOROUGH COUNTY

BASED ON CRUISE FROM SUMMER 2006 AND TWODOG SOFTWARE

STAND NUMBER	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)										PER ACRE	PER ACRE	TOTAL STAND	TOTAL STAND	TOTAL STAND
	5	6	7	8	9	10	11	12		13	TREES	VOL	ACRES	TREES	VOL
3	0	0	1	1	2	2	2	0		0	9	48	442		3
3	0	0	0.1	0.2	0.48	0.58	0.52	0.06		0		1.94		93.12	3
4	6	29	5	5	2	1	0	0		0	48	55	2640		4
4	0.2	2.2	0.66	0.84	0.4	0.18	0	0		0		4.48		246.4	4
5	1	5	2	1	1	1	0	0		0	11	10	112		5
5	0	0.4	0.2	0.14	0.24	0.2	0.12	0		0		1.3		13	5
6	23	62	18	18	7	3	1	0		0	132	105	13818		6
6	0.9	4.6	2.08	2.88	1.58	0.8	0.24	0		0		13.08		1373.4	6
7	10	16	7	5	1	1	0	0		0	39	45	1773		7
7	0.4	1.3	0.78	0.84	0.22	0.2	0	0		0		3.74		168.3	7
8	16	41	18	14	10	4	0	0		0	104	157	16359		8

ESTIMATED VOLUMES

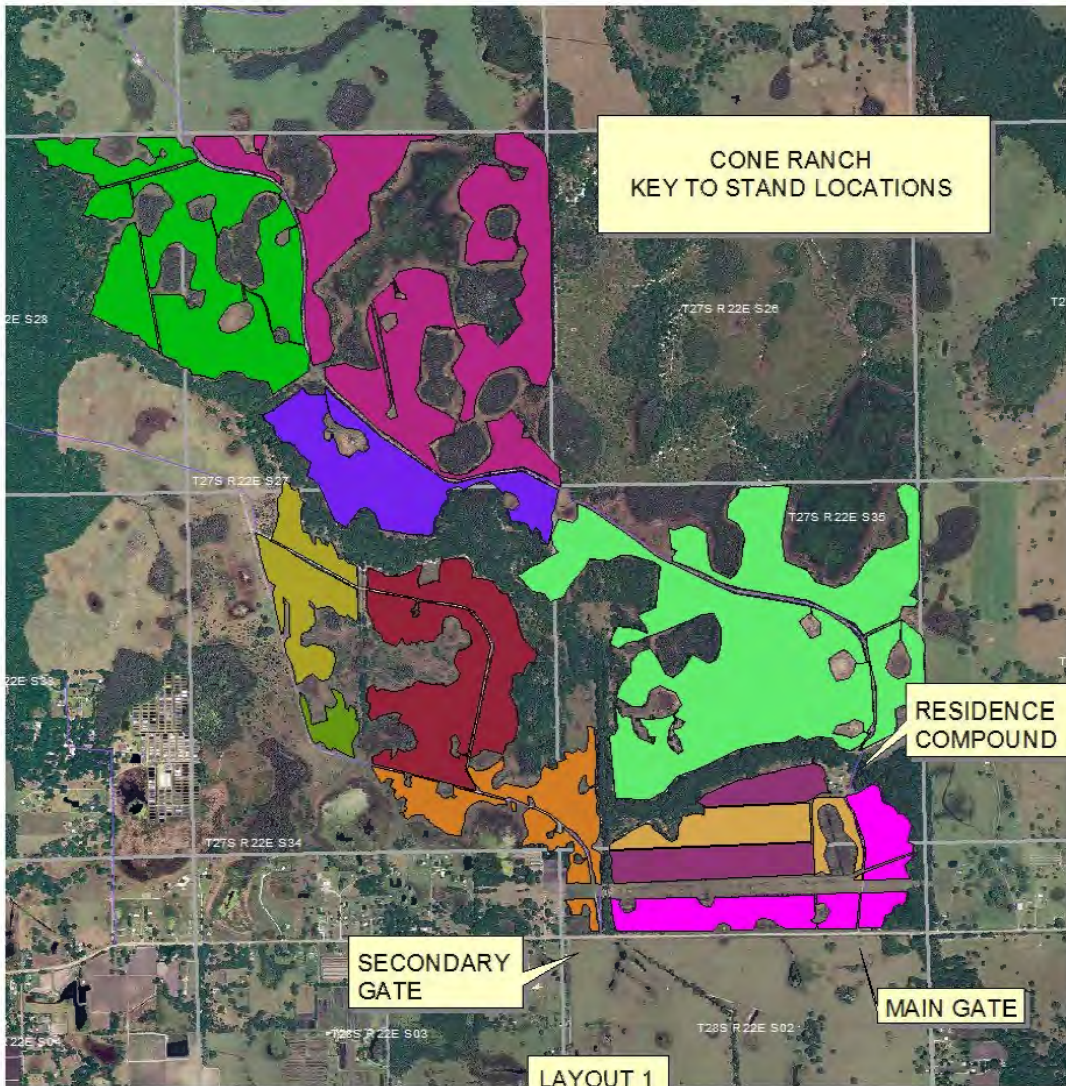
CONE TRACT - HILLSBOROUGH COUNTY

BASED ON CRUISE FROM SUMMER 2006 AND TWODOG SOFTWARE

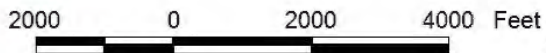
STAND NUMBER	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)										PER ACRE	PER ACRE	TOTAL STAND	TOTAL STAND	TOTAL STAND	
	5	6	7	8	9	10	11	12		13	TREES	VOL	ACRES	TREES	VOL	
8	0.6	3.3	2.36	2.48	2.2	1.22	0.16	0.1	0		12.42			1949.94	8	
9	45	101	27	24	8	2	1	0	0	207	204	42146			9	
9	1.7	8.3	3.6	4.46	1.84	0.44	0.2	0	0		20.54			4190.16	9	
10	13	31	12	10	3	2	0	0	0	70	76	5350			10	
10	0.5	2.4	1.34	1.86	0.6	0.5	0	0	0		7.2			547.2	10	
11	19	75	31	29	15	3	1	0	0	174	280	48832			11	
11	0.7	5.8	3.96	5.3	3.68	0.88	0.44	0.18	0.22		21.16			5924.8	11	
GRAND TOTALS											1077	133966	14862.2			

RESIDUALS 5TH ROW THINNING										PER	PER	TOTAL	TOTAL	TOTAL	
STAND	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)									ACRE	ACRE	STAND	STAND	STAND	STAND
NUMBER	5	6	7.0	8	9	10	11	12	13	TREES	VOL	ACRES	TREES	VOL	NUMBER
1	0	0	23	22	21	6	2	0	0	74		60	4464		1
1	0	0	2.9	4	5	1.92	0.48	0	0		13.92			835.2	1
2	0	0	9	18	9	9	0	0	0	44		37	1628		2
2	0	0	1.2	3	2	2.4	0	0	0		8.56			316.72	2
3	0	0	4	6	10	10	7	1	0	37		48	1766		3
3	0	0	0.4	1	2	2.32	2.08	0.24	0		7.76			372.48	3
4	0	0	21	20	8	3	0	0	0	52		55	2860		4
4	0	0	2.6	3	2	0.72	0	0	0		8.32			457.6	4
5	0	0	7	4	5	3	2	0	0	21		10	208		5
5	0	0	0.8	1	1	0.8	0.48	0	0		3.6			36	5
6	0	0	73	70	30	11	2	0	0	186		105	19572		6
6	0	0	8.3	12	6	3.2	0.96	0	0		30.32			3183.6	6
7	0	0	26	20	4	3	0	0	0	54		45	2412		7
7	0	0	3.1	3	1	0.8	0	0	0		8.16			367.2	7
8	0	0	74	58	38	17	2	1	0	189		157	29642		8

RESIDUALS 5TH ROW THINNING										PER	PER	TOTAL	TOTAL	TOTAL		
STAND	NUMBER/VOLUME (#/TONS) TREES BY DIAMETER CLASS (INCHES)									ACRE	ACRE	STAND	STAND	STAND	STAND	
NUMBER	5	6	7.0	8	9	10	11	12	13	TREES	VOL	ACRES	TREES	VOL	NUMBER	
8	0	0	9.4	10	9	4.88	0.64	0.4	0		34.08			5350.56	8	
9	0	0	107	95	31	6	2	0	0	242		204	49450		9	
9	0	0	14.4	18	7	1.76	0.8	0	0		42.16			8600.64	9	
10	0	0	47	41	10	7	0	0	0	106		76	8026		10	
10	0	0	5.4	7	2	2	0	0	0		17.2			1307.2	10	
11	0	0	123	117	62	11	6	2	2	322		280	90048		11	
11	0	0	15.8	21	15	3.52	1.76	0.72	0.88		58.64			16419.2	11	
GRAND TOTALS												1077	210075	37246.4		



- 60.60AC ST01_352722.shp
- 36.93 AC ST02_352722.shp
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- 9.67 AC ST05_342722.shp
- 155.02 AC ST06_342722.shp
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- Rdsstreets.shp
- SECTION LINES



TIMBER MANAGEMENT RECOMMENDATIONS

FOR

LOWER GREEN SWAMP PRESERVE

HILLSBOROUGH COUNTY

BY

BUTCH MALLET

SENIOR FORESTER, OTHER PUBLIC LANDS

FLORIDA DIVISION OF FORESTRY

REVISED MAY 2011

HISTORY

This property was initially acquired as a potential well-field by Hillsborough County (County). Most of the uplands had been converted to improved pastures for cattle operations by the previous owners. Cattle-grazing has continued under a lease agreement since the County took title to the land. Originally managed by the County's Water Resource Services, management of Lower Green Swamp Preserve has more recently been turned over to the Parks, Recreation, and Conservation Service Department.

In the early to mid 1990's, members of the Plant City Rotary Club coordinated the planting of slash pine trees on the property. Almost 1200 acres of the improved pasture closest to Knights-Griffin Road were planted. Since 2005 the Florida Division of Forestry (DOF soon to be renamed the Florida Forest Service [FFS]) has assisted the County with management of these pine plantations.

The young pines are well adapted to the flatwoods soils of this area and have exhibited rapid height and diameter growth. Once the trees reached crown closure, a pine straw raking contract was negotiated. This generated additional revenue for the County until hurricane damage caused termination of the agreement.

A second attempt to rake pine needles for profit failed due to an exotic plant infestation. Pine straw operators and FFS exotic plant specialist were concerned about an over abundance of Caesar weed in the plantations to be raked. It was feared that using contaminated needles in landscape maintenance might serve to spread this nuisance plant to new areas. After a single lease payment on a three-year agreement, the lessee decided not to renew the agreement.

Otherwise, the slash pines trees were growing rapidly. However, there was a widespread infestation of pitch canker in the slash pines. This disease weakened and killed pine trees outright. Considerable breakage of infected tops and limbs occurred during the high winds of Hurricanes Frances and Jeanne. These broken limbs and tops created a perfect climate for an explosion of various species of pine beetles. As a result of the pine beetle kills, salvage and thinning sales were initiated (see **Treatments Since 2007** section for details). Currently, spread of pine mortality from insect attack appears to have subsided.

GENERAL TIMBER MANAGEMENT THEORY

Seedling pines are intentionally planted close together to allow for some mortality. In addition, tight spacing encourages shading out and shedding of lower limbs before the branches become large enough to produce large knots in the wood. It is expected that some of the slower growing trees will die out over time and leave the healthier, faster growing trees to produce high value timber products. However, even healthy pine trees, allowed to grow too long under crowded conditions, lose their vigor and become susceptible to disease and insect attacks. Thinning operations are designed to free better quality trees from unproductive competition, thereby maintaining a healthy, vigorous stand. These harvests also capture revenue from trees that would otherwise die and become fuel for wildfires.

The first thinning cut in a pine plantation is scheduled when the length of live crown in dominant and co-dominant trees have been reduced to 40% (no less than 33%) of the tree's total height. During thinning harvests the largest, healthiest trees with the best form in each stand are left standing to grow into more valuable products. In tightly planted pine plantations, access and maneuvering room for harvest machinery is achieved by removing an entire row of trees at the time of the first harvest. This is called a "row-thinning" and the clearcut row the "take" row. Weak, diseased, deformed and slow growing trees are cut from the "leave" rows in between "take" rows

Normally in plantation management, the number of the best trees being removed is controlled by spacing of the "take" rows. Third-row thins remove one-third of the best trees, fourth-row cut one-quarter, and fifth-row sacrifice one fifth, and so on. The desire is to remove the least number of future high value trees in early thinning operations, but still give the leave trees enough room to prosper.

Where disease such as pitch canker is a problem, sanitation cuts are often performed. By removing infested material from the stand, a major source of new inoculation is eliminated. Dead and dying trees are also removed during this type of harvest. At the same time, reducing the number of stems per acre removes competition for resources for the remaining trees and makes them less susceptible to disease and insect attacks.

After the initial row thin harvest, additional thinnings are performed whenever the tree crowns begin to become overcrowded again. Periodically thinning pine stands in this manner can alleviate the risk of slowed growth and unhealthy stands until the trees reach maturity.

INVENTORY

A cruise of the slash pine timber was conducted in the summer of 2006 by foresters and rangers of the Florida Division of Forestry. It is known that the trees were all planted within one to three years of each other and appeared to be growing at about the same rate. However, some areas did exhibit greater pitch canker damage and die-out than others. This was likely due to differences in seed source for the seedlings. But, pitch canker occurrence was far greater in the planted pines found on the Ranch than any local, native slash pine stands.

To facilitate the inventory, the tract was broken up into 11 stands (see attached map). Boundaries were established using natural and artificial breaks such as cypress ponds, streams, roads, and firelines. Plots were placed in a grid pattern with one plot approximately every five acres. Within each plot, merchantable height and diameter was measured on trees determined to be “in” using a 10 BAF prism. This information was segregated by whether or not the tree was significantly affected by pitch canker. On each of at least three plots per stand, a dominant or co-dominant tree had its total height and diameter measured to calculate the site index and growth potential of the soils.

RESULTS

Volume and number of trees in each stand was calculated using TwoDog software (refer to the 2007 Management Recommendations for a cruise summary). Of course much has changed since the 2006 inventory. All but 436 acres of the original plantations have already either been thinned for the first time or cut back severely enough to require replanting. Therefore, the original volumes calculated are of little value now. In fact, mortality from beetle kills soon made the original cruise outdated.

Only Stands 8, 9 & 10, remain un-thinned since the original cruise. These stands averaged over 400 or more trees per acre in the 2006 inventory. Diameters mostly ranged from 5 to 10 inches DBH with the majority being between 7 and 9 inches. A few trees had the diameter and height to be classified as chip-n-saw. However, due to the young age of the timber, they would not meet these specs.

TREATMENTS SINCE 2007

Due to pitch canker and wind damage, tops and limbs were breaking out of young trees and many were dying from insect attack. Action had to be taken quickly. It was hoped that thinning the pine plantations would relieve most of the stress on the remaining trees and stop the pine beetle induced mortality. With this in mind, Stands 1 through 7 received fifth-row thinning beginning in early 2009. Unfortunately, black turpentine beetles continued their attack in Stands 1 though 3 forcing a salvage of all but a scattered number of slash pines. The thinning treatment in Stands 4 through 7 did work and the beetle kills appear to have abated.

Stand 11 also received a fifth-row thinning in late 2009. However, beetles attacked these trees after prescribed fire was used to remove logging slash. A salvage sale of dead and insect infested timber left a sparse stocking of approximately 20 to 30 square feet of Basal Area (BA).

After having to salvage the rest of the previously thinned timber from Stands 1 through 3, there was uncertainty about the spread of insect attacks into freshly thinned stands. Therefore, it was decided to give the pine beetle population time to subside. This would also allow the shorter trees in Stands 8 through 10 to grow a little more. As such, a three-year needle raking contract was signed in early 2010. However, the stands were never raked and have had no other management activities. Trees in these stands will need thinning in the near future to maintain vigor.

Revenue to the County since the inception of the FFS agreement has been approximately \$238,000.

RECOMMENDATION FOR EXISTING PINE PLANTATIONS

The seed source for the existing slash pine plantation was of poor quality for this area. As a result, these trees were susceptible to the disease pitch canker. Damage from pitch canker in turn lead to an extensive beetle kill. Therefore, it is not desirable to rely on the current pines to reforest any of the stands. Instead, it is recommended that longleaf pine be the primary species used for the next generation of pine trees. NOTE: There is nothing wrong with using slash pine as a temporary measure to produce shade to control exotic plants and pine needles for future fire continuity. Just be sure that any new seedlings (longleaf included) planted on this tract be from a nearby seed source. Ask a forester knowledgeable in local reforestation issues for seedling ordering advice.

Repeated pine bark beetle attacks have reduced Stands 1 through 3 to no more than 10 square feet of BA. These stands should be replanted with longleaf pine seedlings as soon as possible. Before the new seedlings can be planted, all cogon grass patches should be located and treated. These areas should be excluded from planting until the cogon grass is eliminated. The entire area should be burned to remove downed wood and control hardwood competition. Cogon grass spraying should be timed to take advantage of site-preparation burning. Next, scalp strips no more than 2 to 3 feet wide and 2 to 3 inches deep to create a competition-free root zone for the longleaf seedlings. Space the scalped strips about 12 feet apart. Plant approximately 600 to 700 seedlings per acre by spacing the seedlings approximately 5' to 6' apart in the middle of the scalped row. **Caution: Do not scalp through cogon grass patches.** Wait until the cogon grass is eliminated, then hand plant these openings if desired. Follow up with a growing season burn 2 years after planting.

Stands 4 through 7 will need thinning again in the next 5 to 10 years (depending on crown closure) to maintain vigorous growth. However, if an accelerated rate of conversion to longleaf pine is desirable, a second thinning back to 20 to 40 square feet of BA should be conducted as soon as needed. In this case, a thinning design should be used that opens the stand enough so

that the under-planted longleaf receive ample sunlight, but insures sufficient needle-cast to maintain prescribed fire continuity. Wait at least one growing season after the stand is thinned before attempting to plant any seedlings. Reproduction weevils hatch out of recently cut stumps and will destroy new planted seedlings. The weevils cease to be a problem after the first growing season. To complete the replanting follow the guidelines for Stands 1 through 3 above. **Note: If funding sources are tight, it might be possible to use revenue from thinning one stand to treat cogon grass and plant new seedlings in another stand.**

Stands 8 through 10 should be thinned in the near future. Here there are 2 options. If reintroduction of native longleaf pines will be accomplished in these stands within the next 5 years or so, thin the stands back heavily to 20 to 30 BA. To do this, alternate taking at least 2 rows, then remove enough of the in-between 3 rows to achieve the desired BA. By meandering the take rows, the “plantation look” can be disguised while still providing planting room for the longleaf seedlings.

If, however, planting of longleaf seedlings will not be done within the next 5 years, the stands will still need thinning at least once in the next year or so. In this case the first thinning should include 1 take row between 4 or 5 leave rows. Only suppressed or severely diseased trees should be removed from the leave row on either side of the take row. This will help give the young pines some growing room. But, it will also keep enough shade within the stand to discourage rampant growth of exotic plants. This will allow time to control the weeds in preparation for planting longleaf seedlings.

Again jogging the take row over 1 row and then back in line will help hide the “plantation look” in the future. With 4 to 5 leave rows in the initial thinning, the option to hide the take rows in the second thinning is maintained. A second thinning operation will probably be necessary within another 5 years. Once the stand is thinned down to 20 to 30 sq. ft. BA, follow the site prep, planting, and follow-up guidelines from Stands 1 through 3 above.

Stand 11 currently varies from about 10 to 30 sq. ft. BA. This stand is ready to underplant with longleaf seedlings. Follow the directions for preparation and planting as described under Stands 1 through 3.

In any of these stands, an attempt can be made to try to reintroduce native groundcover species. This can be done at any time once a stand is thinned enough to allow sunlight to reach the ground. With the exception of Stands 8 through 10 which have not been thinned yet, all stands have areas where ground cover restoration (GCR) planting can be done. Again the subject stand should be cogon grass free or at least infested patches should be avoided. Then, the area to be planted should be burned first to remove as much woody debris as possible. Follow this by disking a strip with a reasonably heavy disk. If pine stumps are more than 1 or 2 years old, they will most likely be rotten. Stumps should not be a problem to a heavy disk anyway. But, if any difficulty occurs, drag the disk on either side of a row of stumps. Then, sow the seed and run a packer over it to insure good contact with the soil. A more detailed description of the methods

and equipment used can be obtained through the Forest Management Bureau's OPL Region 2 office.

NOTE: All timber management conducted on public lands should comply with the recommendations of the latest *Silviculture Best Management Practices* Manual.

RECOMMENDATION FOR POTENTIAL HARDWOOD PLANTINGS

Hardwood trees have never been a commercially valuable commodity in this region of Florida. Historically, the poor quality of the wood they produced limited hardwood uses to firewood and a few railroad ties. No one is sure what the future might be. There may be some demand for hardwoods in the bio-fuel industry. The present value of hardwood pulpwood or sawlogs does not justify intensive management. At the current time, economics dictate that hardwood planting only makes sense for habitat restoration, stream bank shading, wildlife, and aesthetic reasons.

Pure hardwood and hardwoods mixed with occasional cypress and slash pines naturally occurred along stream banks in these soil types. Frequent fires, as found in undisturbed flatwoods habitats, killed young hardwoods. Therefore, natural fires cycles generally kept these types of stands confined to low lying/usually wet areas.

Conversion from native groundcover to improved pasture grasses, altered fire patterns, and increased drainage have all changed where and to what extent hardwood stands are presently found. Any hydrological restoration project that might be contemplated should be complete before any hardwood or cypress plantings are made. Changes in hydro-period will primarily determine where plantings should occur.

When considering what and where to plant, the first thing to consider is fire protection. It does not make sense to spend a lot of money to plant trees that will be killed in future prescribed burns. Also, remember that it will not be necessary to plant many pioneering species such as maples, sweet gums, or even laurel, water, and live oaks if there is any seed source within a reasonable distance. Wind will carry maple seeds a very long distance. Birds and squirrels will transport seeds and even plant acorns where other trees have been planted that provide them with perches or cover.

It is recommended that species such as cypress and black gum be planted in wetter sites. On more upland sites, a mixture of winged and Florida elm, hickory, sweet bay, green ash seedlings or small trees will be enough to jumpstart the return of an assortment of native hardwoods. Planting large, root bound trees is a waste of money. The smaller the seedling (bare root seedlings are inexpensive and easy to plant), the less likely it is to be root bound. In moist, rich soils they catch up to larger root bound trees quickly. After 5 to 10 years, re-evaluate the diversity within the new hardwood stands. Inter or under-plant desirable species missing from the system.

HABITAT AND GROUNDCOVER RESTORATION ON NEW SITES

Sometime in the future the County land managers may deem it appropriate to try to restore native habitat on other portions of the Lower Green Swamp Preserve Tract. If so, there are methods available that will accomplish these goals using native pine plantings. These methods have the advantage of producing a revenue stream, but they cost much less to initiate than some currently used techniques. A general description of the pine plantation method of ecosystem restoration is explained in the document *Restoration Recommendations for Pasture and Other Ruderal Lands* dated January 2011. It was submitted to the County's consideration for use on the old dairy farm at Hillsborough River State Park.

ACCESS

Access for the heavy logging equipment and trucks to the southern portion of the tract is not a big problem. Although, unimproved roads will have to be watched closely for excessive rutting. Logging activities may also have to be halted during extremely dry or wet weather. The logger is generally responsible for back-blading roads to level out ruts. But, even in normal weather, some soft spots might need reinforcing materials to allow reasonable access. Approaches to major roads may require limerock or road millings to prevent damage to pavement edges.

Access to the northern stands has been through the Audubon Ranch Road off of State Road 39. This has worked well in the past thanks to FFS's working relationship with the ranch personnel and cooperative timber buyers. However, a second bridge required for access to Stands 8 through 11 has recently been condemned. New bridges or heavy duty culvert systems will have to be installed to facilitate the next phase of operation in almost 700 acres of existing pine plantations. In addition, the culvert under the trail that crosses the creek that splits the southernmost plantations should be replaced. In some places, hard surface crossings may be used as a lower cost alternative to bridges.

PRESCRIBED FIRE

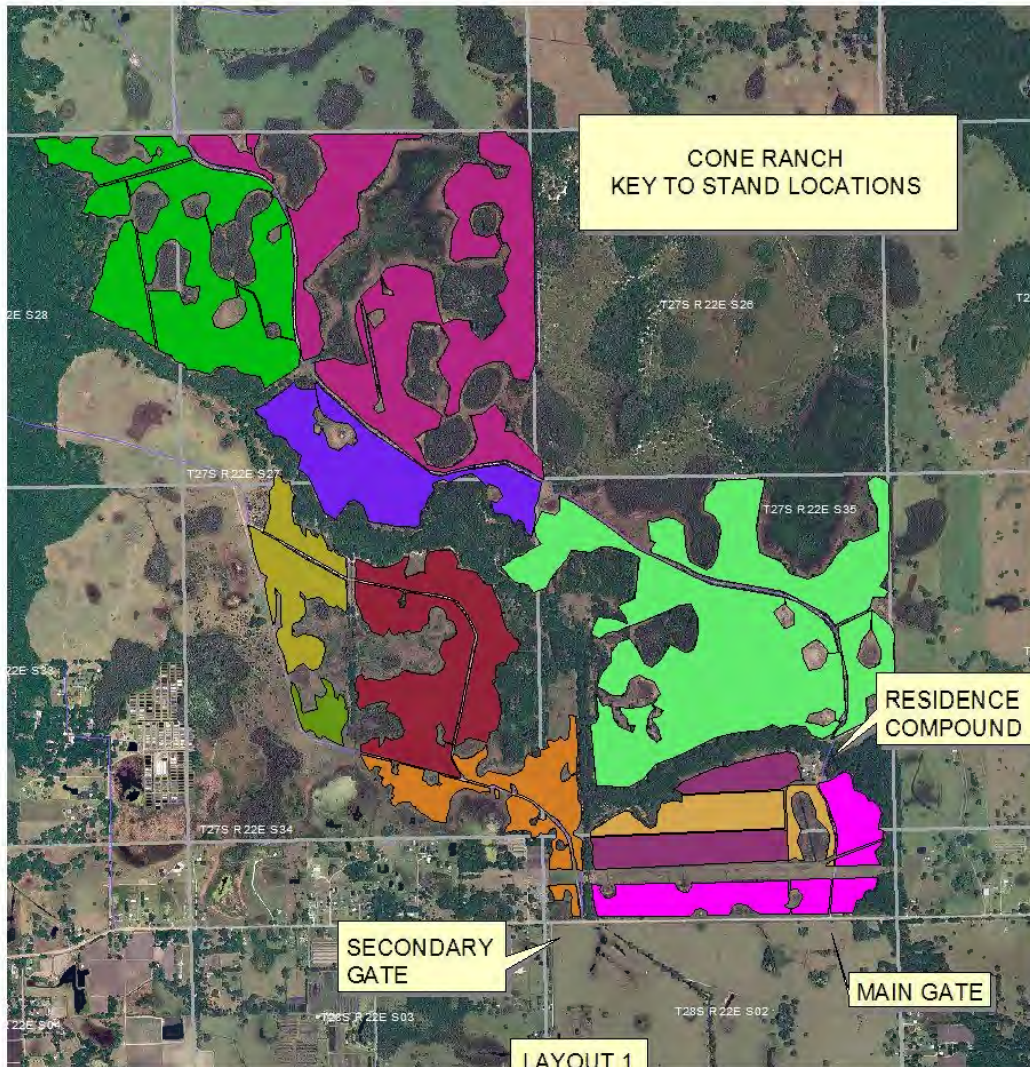
Periodic prescribed fire should be introduced into the plantations within a year or two after the completion of the first phase of harvest activities. Carefully executed burns will help cleanup woody debris from past hurricane damage and harvest activities. The first burns should probably be accomplished during the late December to mid-February dormant season for pine trees. To control under brush and exotic plant pests, subsequent burns should be scheduled for March or April every two to three years.

Firing technique in prescribed burning is extremely important. Excessive heat from hurried burns weakens and even kills valuable pine timber. These stands are very open and accessible. Once a good down-wind black line is established via a backing fire, strip spot fires (used with the wind) or chevron/flanking fires (lit into a steady wind) can be safely lit from an all-terrain vehicle. These methods conserve torch fuel and result in less intense flames as compared to solid strip head fires. At the same time, large areas can be burned out very quickly using either one of these techniques.

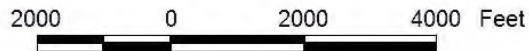
Good prescribed fire planning means knowing how all the burn components will likely interact under various conditions. For example: it is possible for experienced personnel to plan ahead for “unexpected” wind shifts caused by afternoon sea breezes.

SUMMARY

The pine plantations on the Lower Green Swamp Preserve have the potential to produce a reliable revenue stream for Hillsborough County in perpetuity. At the same time, they can provide wildlife habitat, watershed protection/recharge, and recreational opportunities in an area where these amenities are rapidly disappearing.



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- SECTION LINES



Appendix D. Participants and meeting minutes from public review of the plan.

Lower Green Swamp ELAPP Management Subcommittee

Meeting Minutes

February 23, 2012

Ross Dickerson called the meeting to order at 1:05PM. Sheryl Bowman gave a slide show explaining different facets of the management plan, including security, prescribed burning, invasive species control, infrastructure, future land use and public access. The meeting was then opened to questions.

Mr. Alvin Futch requested that the wetland mitigation bank concept be implemented. Forest Turbiville referred him to page 50, which describes these plans.

Mr. Chris Cooley of the Environmental Protection Commission asked whether the mitigation bank would contain public or private section wetland mitigation. Ross Dickerson responded both.

Mr. Gary Zipprer, Florida Forest Service, asked about the long term management of the pine plantation. Ross Dickerson explained that PRC has submitted a grant for replanting the harvested area of the plantation. In response to a question about cogon grass, Forest and Ross detailed that lease and timber revenue are being placed in an index code in which PRC will utilize to treat invasive species. These funds should be available after May 1st. However, not all monies were recouped from the previous department's ownership of the land.

Mr. Rob Northrop, University of Florida Extension Service, asked whether there was any dialog with the USDA Natural Resources Conservation Service regarding stream corridor mitigation – apparently the 'USDA has funding to hire technical specialists. Sheryl responded that NRCS had been invited to comment on the plan.

Mr. Zipprer asked about proposed recreation. Sheryl showed the areas of day use parking and plans for an education center (if funding permits). Mr. Futch recalled that when the Hillsborough County Board of County Commissioners considered selling the property, he and Karen Warren took the commissioners out to see how beautiful the property was.

Mr. Zipprer suggested that PRC consider working with the Wounded Warriors organization for a one-weekend guided hunt each year. The Florida Forest Service does this on the Lake Wales Ridge preserve and it has been very successful – they have been able to find sponsors and generated positive publicity.

Mark Brown, Hillsborough County Public Works, stated that since all lands in the Green Swamp were being converted to Wildlife Management Areas that wildlife needed this preserve as an area to escape.

Dr. Scott Emery invited Jeff Moates, Florida Public Archaeology Network, to visit the preserve to look for archaeological sites. Mr. Moates said there was proposed legislation at this time to extend protection to archaeological sites on local government lands.

Karen Warren, representing Audubon Ranch, asked that PRC notify them when they will be on site so she can get a handle on who is authorized to be out there.

Marcia Curl, Eaglewatch, suggested PRC work with Bok Tower Gardens to relocate rare species to the site. Sheryl explained that PRC is current working with Bok Tower to relocate an endangered species of *Campanula* to the Blackwater Creek Preserve.

The formal portion of the meeting adjourned at approximately 2:20PM.

Respectfully submitted,

Sheryl Bowman, Environmental Scientist

ELAPP MANAGEMENT SUB COMMITTEE MEMBERS

The following parties will be invited and/or asked to provide comments concerning the draft Lower Green Swamp Management Plan as prepared by Environmental and Health Integrated, Inc. with input from Hillsborough County:

1. Colleen Kruk, Southwest Florida Water Management District, Colleen.Kruk@swfwmd.state.fl.us
2. Keith Wiley, Pasco County government, kwiley@pascocountyfl.net
3. Gaye Sharpe, Polk County government, gayesharpe@polk-county.net
4. Doug Keesecker Tampa Bay Water, DKeesecker@TampaBayWater.org
5. Stefan Kataras, CF Industries, SKataras@cfindustries.com and Ron Brunk RBrunk@cfindustries.com.
6. Alvin Futch, local citizen, alvinfutch@gmail.com
7. Jeff Moates, Florida Public Archaeology Network, jmoates@usf.edu
8. Dennis Carlton, Audubon Ranch, DennisCarlton@verizon.net and Karen Warren, AudubonRanchKW@gmail.com
9. Rob Northrop, Extension Forester, University of Florida/Hillsborough County Extension, northroprj@hillsboroughcounty.org
10. Ryan Bose, Conservation Chair, Tampa Bay Sierra Group, ryan.bose@verizon.net
11. Chris Cooley Environmental Protection Commission of Hillsborough County, Cooleyc@epchc.org
12. Judy Ashton, Department of Environmental Protection, Judy.Ashton@dep.state.fl.us
13. Patrick Keogh, Florida Forest Service, Patrick.Keogh@freshfromflorida.com and Butch Mallett, Florida Forest Service, Walter.Mallett@freshfromflorida.com
14. Jennifer Abbey, USDA Natural Resources Conservation Service, jennifer.abbey@fl.usda.gov
15. Forest Turbiville and Ross Dickerson, Hillsborough County Parks, Recreation and Conservation Department, turbivillej@hillsboroughcounty.org, and dickersonr@hillsboroughcounty.org
16. Mark Brown, Hillsborough County Public Works/Specialized Services BrownMM@hillsboroughcounty.org
17. Luis Gonzalez, Florida Fish and Wildlife Conservation Commission, Luis.Gonzalez@MyFWC.com

Lower Green Swamp Management Plan
 ELAPP Management Subcommittee Sign In Sheet
 February 23, 2012

	Name	email	affiliation	phone
1.	ROSS DICKERSON			672-7876 x211
2.	BUTCH MALLET	WALTER.MALLET@ FRESHFROMFLORIDA.COM		352-592-5696
3.	RON BRUNK	RBRUNK@CFINDUSTRIES.COM		813-364-5753
4.	ALVIN FATCH			813 478 0227
5.	KAREN WARREN	AUDUBONRANCHKW@GMAIL.COM		813-918-3369
6.	Mark Brown	brownmm@hillsborough County.org		813-744-5674
7.	Dennis Carlton JR	Dcarltonranch@aol.com		813 927-4669
8.	CARRIE KOTAL	CARRIE.KOTAL@FRESHFROMFLORIDA.COM		863 255
9.	Gary Zippror	David.Zippror@	" " " "	2952 863-701-1273
10.	Jeff Moates	jmoates@usf.edu		813-396-2327
11.	Scott Emery	emery se@epchc.org		813 627-2600
12.	Bernard W Kaiser	kaiser br@hillsboroughcounty.org		672-7876
13.	Chris Cooley	cooley c@epchc.org		627-2600 x1249
14.	Rob Northrop	University Florida Extension		744-5519
15.	Marcia Curl	northrop@ufl.edu Eaglewatch		+54106 813-657-2875
16.				
17.				
18.				
19.				
20.				

HILLSBOROUGH COUNTY NEWS

March 12, 2012

Contact: Sheryl Bowman, Parks, Recreation and Conservation Department, (813) 264-8513

Public Meeting To Discuss Proposed Management Plan For The Lower Green Swamp Preserve

What: Public meeting to discuss proposed management plan for the Lower Green Swamp Preserve

When: Saturday, April 7 at 10 a.m.

Where: Lower Green Swamp Preserve, 3536 East Knights Griffin Road in Plant City. Approximately four miles east of the intersection of Knights Griffin Road and Paul Buchman Parkway.

Hillsborough County will conduct a meeting to receive public comment on the proposed management plan for the Lower Green Swamp Preserve. The public meeting will be held at the Lower Green Swamp Preserve, 3536 East Knights Griffin Road in Plant City, on April 7 at 10 a.m.

The proposed management plan includes management of natural plant communities, wildlife management, habitat restoration, and recreational use. The Environmental Protection Commission of Hillsborough County will present the proposed plan and County staff will be on hand to answer questions.

Attendees should park inside the gate. This public meeting is being held outdoors. Necessary special accommodations will be provided with a 48 hour notice.

For more information, call Sheryl Bowman, Parks, Recreation and Conservation Department,
(813) 264-8513.

Lower Green Swamp

Public Meeting

Saturday, April 7, 2012

Meeting commenced at 10:15AM with Ross Dickerson introducing Dr. Scott Emery, the author of the proposed management plan. Maps were shown which emphasized the location of the property and the link to the Green Swamp. He covered the history of his involvement since 1986 and invited the public to share any stories they may have from living in the area.

Dr. Emery highlighted different plan aspects, including dechannelization of ditches, public access in different phases, continuation of agriculture and the reasons supporting this, native plant nursery, captive wolf breeding program, control of feral animals (pigs, coyotes), establishment of rookeries, listed species management (gopher tortoise, indigo snakes, birds, and rare plants), restoration of Tiger Lake, upland pasture restoration (longleaf pine flatwoods and mesic hardwoods), and banking options (carbon, water quality, mitigation).

Questions/comments from the audience (note: audience members were asked to introduce themselves, in some cases they did – names are included when known):

1. Why was the Cone Ranch name changed to Lower Green Swamp? Response – There have been several ownership changes, the Cone family has not owned the property in years. The name was changed to reflect the wildlife corridor connection to the Green Swamp.
2. Carl Carpenter – asked about cattle revenue. RD responded with figures for cattle; also mentioned timber and sod farming and explained that the revenue is going back into the property.
3. Kristen Bennett – Will the property be managed by the PRC in the future? Response: yes.
4. Joanne (?) – Asked whether there would be volunteer efforts to do replanting? Response: yes, Ross Dickerson is the contact.
5. Carl C. – Felt that hunting should be a management tool; why wasn't it discussed in the plan? Response: The Parks Ordinance does not allow hunting. The Green Swamp property, located a short distance away and managed by SWFWMD, does allow hunting. However, a new feral pig removal contract is going out to bid shortly, so those interested need to keep checking the County's web site.

6. Earl Driggers – Hogs are damaging his property nearby. Is the County doing anything about this? Response: the site is being hunted 5-7 days a week, 3 hours before sunrise and 3 hours after sunset. Fishing will be permitted upon opening to public access.
7. Concerns about flooding after dechannelization of creek. Response (Dr. Emery) – modeling will be extensive; desire is to retain water on site.
8. Dennis Hicks – Will there be equestrian use permitted? Response – not now, but will be considered in the future. Could start by adding walk-through gates.
9. Rick Garrity – Public lands as mitigation banks; there was discussion of recent legislation not permitting developers to do private mitigation on public lands.
10. Corlene Findley – Expressed concerns about equestrian use. Response: Public access will be considered if the site can be staffed for maintenance purposes. Comment: organizations such as Florida Trail and Equestrian Clubs will maintain trails. Response: Day use hiking will be permitted when the site is open. Hillsborough County has 1/6 the state average of staff compared to similar land management entities. The County's desire is to open the site as quickly as possible.
11. James Frankowiak (media) – Wanted to know deadline to submit comments for management plan. Response after discussion – the end of April. Staff email addresses were made available.
12. Mitigation bank– shifting burden of taxes, competition with private mitigation banks?
13. Marcia Spivey – Wants property to the south to be preserved. Currently zoned for industry and housing by the City of Plant City. Concerned about animals.
14. Status of wellfield? Response: Dr. Emery reviewed history of water use regulations, use of water, Tampa Bay Water's involvement.
15. Kristen Bennett – Has Tampa Bay Water been contacted about water rights? Response: yes, discussions are occurring now.
16. Are there any plans to replant the pine plantation? Response: yes, with longleaf pine.
17. Marcia Spivey – Concerns about disease issues in planted pine trees. Response: Because of the recent thinning, it is felt that the pitch canker problem is under control.
18. Concern – some of the older people in the audience would like to see public access in their lifetime. Response: PRC will give tours upon request and will consider a volunteer base in the community to open the site earlier.
19. Suggestion of user fees to help fund staff to open site.

Adjournment to field trips at 11:30AM.

Respectfully Submitted, Sheryl Bowman, Environmental Scientist, April 9, 2012

Lower Green Swamp
 Sign in Sheet Sheet
 April 7th, 2012
 East Knights Griffin Road
 Plant City, FL 33565

Name	Address	email/phone
1. Matt Richard	103 W. MADDONAY	Plant City 659-3268
2. EARL P. DRIGGERS	5016 Turkey Ridge	Plant City 33565 813-340-7709
3. RICHARD + KAREN WARREN	P.O. BOX 981	CHRYSLER SPRING FLA 33524 9183369
4. Cec/Griffin	3012 E Knights Griffin Rd	33565 813 719-8471
5. Jim Frankum	324 E. Williams Rd,	33565
6. Bob + Shirley Fox	5912 Bailey Rd	752-7362 Jim@CPRG-BUSB.COM
7. Conlene Findley	3410 W. Trapnell Rd.	Plant City 33566
8. CARL CARPENTER	4305 E. Knights Griffin	PC 33565
9. KRISTIN Bennett	759 S. Federal Hwy #314	stuart FL 34994 Kristin.Bennett@tetratech.com 772 781 3414
10. Kent Bailey	15012 Hwy 301	Thonotosassa FL 33592 Kent@BaileyAndSon.com
11. Claudia Powell	2512 Knights Griffin Rd	PC 33565
12. Joel Jackson	15006 Albright Dr.,	Tampa, FL 33613
13. Dennis Hicks	236 Alderman Rd.,	Lakeland FL 33810
14. Debbie Hicks	236 Alderman Rd.	Lakeland FL 33810
15. Vernon Cannon	5003 Turkey Ridge Rd.	33565
16. Eddie Lancaster	5011 Turkey Ridge Rd	33565
17. JOY INGRAM	12349 JESS WALDEN ROAD,	Dover, 33527 JOYING1@verizon.net
18. Debbie Butts	4321 Needle Palm Rd.	Plant City 33565 debbutts1@verizon.net
19. Lloyd + Vickie Rogers	2802 E Knights Griffin Rd	33565 lvrogers1212@verizon.net

- 20. Rick Garrity EPC garrityr@epchc.org
- 21. Dave Sumpter Wildlands dsumpta@wildlandsconservation.org
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April 13, 2012 – 10:00 AM

Lower Green Swamp Preserve - Meeting with adjacent landowners and members of the Hillsborough County Farm Bureau

Ross Dickerson was asked by Jemy Hinton with the University of Florida and Florida Department of Agriculture and Consumer Services to meet with some of the adjacent landowners and members of the Hillsborough County Farm Bureau about the Lower Green Swamp Preserve Management Plan. The meeting was held at the Preserve near the Knights Griffin Road gate.

Below is there questions and concerns about the Plan.

James Tew (adjacent landowner)

1. Asked that in the future, adjacent landowners be notified by mail since many of them do not receive the local paper or have social networking accounts. Ross Dickerson said that this could be done.
2. Asked about hunting on the preserve. He does not mind the removal of feral hogs, but he does not want the site opened to recreational hunting.
3. Wanted clarification as to whether adjacent landowners would have to comply with a Compatibility Plan now that the site was preserved. Ross Dickerson explained that a Compatibility Plan would only need to be submitted if they wanted to develop their properties.
4. Wanted to know if we would require the cattle lessee to fence all of the cypress domes and wetlands once they were planted. Ross Dickerson explained that the cypress domes and riparian systems would only be planted once cattle were removed from the area. Cattle may be allowed to return to the area for prescribed grazing, once the newly planted vegetation was established.
5. Asked about the mitigation and if it would cause drainage problems for adjacent landowners. Ross Dickerson explained that modeling would be required for any wetland mitigation projects and if there is a potential of “off-site” impacts, the project would not be permitted.
6. Asked if the site would be posted once open to the public. Ross Dickerson responded, yes.
7. Said he does not like the proposed Red Wolf capture breeding program idea and said that he would strongly oppose it, if it was ever implemented. He said that they already have enough cow/calf loss due to coyotes and bringing in wolves would only increase the problem. Several other people at the meeting agreed.

8. Wants the proposed trail that goes through his property to be removed from the plan. Ross Dickerson said that the trail was no proposed by PRC and it would be removed from the plan.

9. Said he was glad to see the property preserved.

Alvin Futch –

1. Said that the timber needs to be harvested and asked about the status of the new bridges. Ross Dickerson said he is meeting with the geotechnical consultant on Wednesday 4/18/2012 and was told that the bridges could be completed by the end of 2012.

2. Asked if the county had any plans for the timber areas that were clear cut. Ross Dickerson said that the county was planning on planting a mixture of long leaf pine and wiregrass to try and bring back the native long leaf pine ecosystem that once blanketed the property.

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Lower Green Swamp Preserve

4/13/12 - 10 AM

EMBRI