


LAKE HANCOCK LAND USE AND MANAGEMENT PLAN

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Southwest Florida
Water Management District

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Lake Hancock Land Use and Management Plan

1.0 Executive Summary

The Southwest Florida Water Management District (District) has initiated a number of projects aimed at improving water quality, flood protection and minimum flows and levels in the Upper Peace River watershed. These projects have included land acquisition around Lake Hancock for the Lake Level Modification, and Lake Hancock Treatment System. These projects are intended to enhance minimum flows; provide aquifer recharge; restore the historic levels of Lake Hancock; enhance the floodplain and wetlands around Lake Hancock; and reduce nitrogen loading, thereby improving water quality in the Peace River and Charlotte Harbor watershed. As a part of these projects, lands have been acquired around Lake Hancock – the total area of lands that will be acquired exceed 7000 acres. The District contracted with Glatting Jackson, Kercher, Anglin Inc. (Glatting Jackson) to prepare a Land Use and Management Plan (Plan) that encompasses the overall objectives for conservation and restoration. The Plan consists of two components; land use (recreation) and land management. As part of that process, input was sought from stakeholders, a recreation needs assessment was conducted, and natural resource priorities were defined which resulted in this plan that combines compatible recreation with long-term goals for resource protection and management.

Conservation priorities were defined through the creation of Natural Resource Context Zones; Desired Future Conditions; and short-term, mid-term, and long-term management objectives. The Natural Resource Context Zones included seven separate areas based on historic alteration, current condition, and surrounding land use. These Zones included:

- Natural systems,
- Forested wetlands,
- Agricultural lands over native soils,
- Mined lakes,
- Treatment wetlands,
- Residential enclaves, and
- Agricultural lands over altered soils.

Desired Future Conditions were established for each of these context zones. They were based on long-term objectives (50 years) that could be affected by funding, lake level restoration timing, natural resource partners, and adaptation to site-wide or regional changes.

The recreation component was developed based upon an analysis of recreation needs in the region, interviews with recreation planners from local governments in the vicinity of Lake Hancock, a demographic analysis, and an assessment of compatibility with the overall objectives of the Lake Hancock Projects. The Plan's vision is consistent with natural resource objectives, and enhances the success of the Lake Hancock projects by allowing appropriate public use. The Plan requires the involvement of partners to implement elements of the plan. The timing and ultimate build-out will depend upon the degree to which resource partners participate, and the availability of funds to implement the program.

Compatible recreation components include

- a multi-use trail around the eastern edge of Lake Hancock,
- facilities and trailheads on the Hampton parcel,
- fishing piers
- primitive camping
- observation boardwalks and interpretive signage
- a blue way and sites for fishing and waterfowl hunting within the Mined Lakes, and
- trailheads associated with Fort Fraser Trail at the control structure for Saddle Creek, and
- a boat launch on the north side, and a canoe launch on the south side of the proposed control structure at Saddle Creek.

Several tracts were identified as being compatible for non-traditional uses such as active recreation (sports fields), or potential surplus. These include a strip of pastureland on the Hampton parcel at the intersection of County Road 540 and Thornhill Road; a tract of land on the Griffin parcel adjacent to U.S. 98, south of the Fort Fraser Trailhead; two tracts on the Old Florida Plantation (OFP) parcel; and portions of the commercial strip south of Old Bartow Road. These areas could be considered for active recreation or potential surplus lands based on regional recreation needs. The recreation component of the plan was designed to occur in phases that are specified in the Plan. Polk County and other partners are expected to play key roles in the implementation and funding of the objectives of the Plan.

2.0 Introduction

Defining land management objectives and appropriate public use can be challenging for any land acquisition. Acquisition projects with long-term ecological restoration goals and sensitive land use issues add to the complexity of management decisions. In addition to these challenges, the lands around Lake Hancock have been extensively altered; both the Lake and its tributaries have been subjected to changes in flow patterns and overall water levels. There is a comprehensive plan in place to enhance flows and improve water quality from Lake Hancock into the Peace River. These enhancements required the systematic acquisition of thousands of acres of land adjacent to and around Lake Hancock. As a part of these efforts, this Plan was developed for land acquired by the Southwest Florida Water Management District (District) in conjunction with the enhancement projects. This Plan was developed to be consistent with water resource restoration objectives, focused on regional resource priorities, was vetted through a series of meetings with stakeholders and summarizes the review of recreation needs, and defines a long-term plan for land use and management.

Lake Hancock Resource Development Projects

Lake Hancock is a 4,500-acre lake in the headwaters of the Peace River watershed that extends 120 miles downriver to Charlotte Harbor. As part of the District's objectives of restoring storage, flows, aquifer recharge, and water quality in the Basin, two extensive water resource enhancement projects will be implemented involving Lake Hancock. These projects include the Lake Hancock *Lake Level Modification Project* and the *Lake Hancock Outfall Treatment System* (http://www.swfwmd.state.fl.us/waterman/lakehancock). While "the Lake Hancock projects are a

critical part of the District's recovery strategy for meeting the minimum flows in the upper Peace River, improving water quality in the Peace River and protecting Charlotte Harbor," they also have the potential to meet recreation needs of Polk County and central Florida residents. District-managed lands typically provide resource-based or passive recreation activities such as bird-watching, boating, paddling, hiking, biking, horse-back riding, fishing and hunting, picnicking and camping. "Potential surplus lands" – those not needed for the projects described above and below – have the potential to also provide both passive and active recreation facilities such as baseball/ softball fields, soccer/ football fields, tennis courts, basketball courts and playgrounds or to be sold pursuant to the process defined in Florida Statutes.

2.1 Lake Level Modification Project

The *Lake Hancock Lake Level Modification Project* will raise the normal operating level of the lake to 100.0 feet. This was the approximate historical level of the lake before the area was mined for phosphate and the channelization (lowering) of the natural lake outlet. The District began acquiring property around Lake Hancock, beginning in 2000, as part of the Upper Peace River Corridor Project to improve linkage to the Green Swamp **(Figure 1)**.

2.2 Lake Hancock Outfall Treatment System

The Lake Hancock Outfall Treatment System involves constructing a treatment system to improve water quality discharged from the lake into Saddle Creek. The poor water quality from Lake Hancock affects the Peace River as far south as the outfall into Charlotte Harbor. A study conducted by the District in the late 1990s investigated the cost and benefits of various options for improving water quality *in* the lake versus improving the water quality of the water *leaving* the lake. Based on benefits to the resource, combined with cost considerations, the most feasible treatment alternative is a wetland treatment system designed to reduce nitrogen loads by approximately 27 percent. This recommendation was approved by the District's Governing Board and the Peace River Basin Board during the February 2006 and April 2006 meeting.

2.3 Project Location

For the purposes of this plan, the "project" is comprised of those lands that have been acquired or will be acquired as a fee simple transaction as indicated by the District. These lands total approximately 7,260 acres and are located in central Polk County in an unincorporated area. Specifically, the project is located in:

- Sections 24, 25, and 36, Township 28 South, Range 24 East
- Sections 19, 20, 29, 30, 31, 32, and 33, Township 29 South, Range 25 East
- Sections 1-3, 11-13, 24, and 25, Township 28 South, Range 24 East, and
- Sections 4-10, 15-22, 28-30, 32, and 33, Township 29 South, Range 25 East.

Collectively, these lands are referred to as the Lake Hancock Conservation Area (LHCA). They are generally bounded by the Polk Parkway (540) and CR 540 to the north, Thornhill Road to the east, US 98 to the west and SR 60 to the south. There are several parcels north of Polk Parkway in the floodplain of Saddle Creek that are also included as a part of this analysis. An aerial photograph of the project site is included as **Figure 2**.

2.4 Project Acquisition History

Acquisition of property around Lake Hancock began in 2000 as part of the Upper Peace River Corridor Project to improve the linkage to the Green Swamp (SWFWMD 2009) (**Figure 1**). At that time, the District and Polk County jointly acquired the Circle B Bar Reserve, consisting of 1,267 acres on the northwest shore of Lake Hancock. The property contains two of the three inflows to Lake Hancock: Saddle Creek and Banana Creek. The Old Florida Plantation (OFP) property, acquired in 2003, is a Development of Regional Impact (DRI) consisting of approximately 3,347 acres located along the southern and eastern shoreline of Lake Hancock. The approved Development Order for OFP authorizes 4,797 residential development units, a mixture of retail commercial, office space and various recreational amenities. At the time the Governing Board approved the purchase of OFP, it also authorized consideration to surplus portions of the approved DRI not needed for the corridor or other proposed projects.

In 2004, the S & M Saddle Creek (a.k.a. the Griffin tract) property was acquired. The property consists of approximately 200 acres located on the east side of Highway 98 and the west side of Saddle Creek directly opposite of the OFP property. The P-11 structure that controls the lake level for Lake Hancock is in the northeast corner of this property.

The Nguyen/Coscia property was acquired in 2005. The property consists of 590 acres located along the eastern shore of Lake Hancock contiguous to the northern boundary of OFP. The property had been approved for a rural mixed use development allowing for 391 lots, a restaurant and a marina. The property may serve a vital role in the restoration of Lake Lena Run that has been altered by mining activities and is one of three major inflows to Lake Hancock.

The Ellsworth Tract, just south of the Griffin parcel, was purchased in June 2008 and is comprised of approximately 125 acres. The majority of this tract was converted to pasture but the historic Saddle Creek channel is still visible within the floodplain of the old flow-way. In 2008, the Hampton parcel which is located north of the Coscia Boundary was acquired. This property totals approximately 1,049 acres, and includes some of the most intact forested uplands of all the lands acquired to date.

2.5 Purpose of this Plan

The District contracted Glatting Jackson to prepare a land use and management plan that considers regional and site-specific conservation measures and resource-based recreation opportunities on District-owned lands around Lake Hancock. The primary tasks associated with the project were:

- Compile data on existing conservation lands in the Lake Hancock Basin,
- Solicit the input of stakeholders involved with natural resource issues and resource-based recreation in the region,
- Conduct an assessment of recreation needs in the region that could be filled on Lake Hancock Project Lands,
- Prepare a plan with a recreation component that is compatible with the objectives of the Lake Hancock Lake Level Modification and Outfall Treatment System,
- Define Desired Future Conditions for Lake Hancock Project Lands,
- Prepare a plan with a land management component that recommends measures to protect and manage natural resources on the project site,

- Identify natural resource management and recreation priorities, including conservation of a wildlife corridor; along with public and private partners that can assist with funding and implementation of the Plan.

3.0 Regional Setting

3.1 Physiographic Setting

Lake Hancock is primarily located within the Polk Upland physiographic region (White 1970) (**Figure 3**). The Polk Upland is bounded by Lake Wales Ridge to the east and the Lakeland and Winter Haven Ridges to the northeast. The remainder of the Polk Upland region is lower in elevation and is defined by the DeSoto Plain to the south, the Gulf Coastal Lowland to the west, and Hillsborough and Withlacoochee River valleys to the north. The Bone Valley formation, an ancient fossil bed that has been a major source for phosphate, underlies most of the Polk Upland. Elevation in the Polk Upland typically ranges between 100 to 130 feet except on the ridges and an escarpment near the DeSoto Plain (White 1970). Lake Hancock is located in the eastern – central portion of the Polk Upland physiographic region and serves as part of the headwaters for the Peace River.

3.2 Historical Regional Alterations

Phosphate mining has occurred in Florida since the late 1800's. The process of phosphate mining has changed over time, but generally the process begins with removing 10-20 feet of soil to expose phosphate ore followed by a process to separate the phosphate from phosphate ore. The phosphate ore matrix may extend 15 to 50 feet below the earth's surface. Excavation of this ore matrix results in the creation of large, often deep ponds (Florida Institute of Phosphate Mining 2004). Phosphate mining around Lake Hancock began as early as 1940 (**Figure 4**), and active mines were visible along the eastern side of Lake Hancock on historical aerials from 1968. Phosphate mining caused a number of changes to the historical conditions around Lake Hancock, including 1) destruction of marshland associated with the eastern side of Lake Hancock, 2) filling isolated wetlands south of Lake Hancock, 3) alteration of the natural soil stratification and placement of phosphate mining byproducts over historic soils, and 4) creation of a series of ponds and a clay settling area.

Native upland communities around Lake Hancock were systematically converted from pine flatwoods and longleaf pine sandhills to improved pasture. Some of the acquired areas continue to be grazed and are subject to long term public leases administered by the District.

Another major historical change in the Lake Hancock basin was the channelization of Saddle Creek. Channelization efforts south of Lake Hancock are evident in the 1940 aerial photograph (**Figure 4**). Further channelization occurred after 1940 at the confluence of Lake Hancock and Saddle Creek. Channelization led to a number of changes which include the elimination of floodplain and wetland habitat, reduction in water quality and drastic changes in the patterns of flow into the Peace River, and degradation of native fish and wildlife habitat. Saddle Creek and Lake Hancock are in the headwaters of the Peace River, and the negative effects of channelization have been compounded downstream. Changes in flow and degradation of water quality have been well documented, and they are the primary reasons for the Lake Hancock Lake Level Modification and Outfall Treatment System.

Future hydrologic changes will result from the Lake Hancock Lake Level Modification project. This project will raise the lake level from 98.5 feet NGVD (National Geodetic Vertical Datum) to 100.0 feet NGVD. This project will modify Control Structure P-11 so that excess water will be stored in Lake Hancock and slowly released into the Peace River in order to improve conditions associated with minimum flows and levels. Lake Hancock will also benefit from the storage of additional water. Benefits to Lake Hancock will include improved wetland function, hydrologic restoration of existing wet prairies, and restoration of existing uplands back to wetlands.

4.0 Stakeholder Meetings

As a part of this study, we met with a number of stakeholders including the City of Lakeland, Polk County, the City of Bartow, the Central Florida Regional Planning Council, the Florida Fish and Wildlife Conservation Commission, Ducks Unlimited, United Waterfowlers, and representative environmental groups including Audubon and the Sierra Club. The goal of these meetings was to obtain input from key stakeholders in the region on existing and potential recreational opportunities, land use trends, and important conservation issues within the watershed. See **Appendix 1** for details associated with these meetings.

4.1 Additional Stakeholder Input

In addition to the stakeholder interviews, we conducted field assessments on conservation lands within the Lake Hancock hydrologic basin and met with natural resource agency personnel in the region. These meetings provided valuable information on the natural resource management objectives on other public lands, the history of public land acquisition, and substantial issues that are still being dealt with in the Basin (e.g. water quality in Saddle Creek). Finally, further input was sought on recreation needs in the region. Numerous parks and recreation planners throughout the region were contacted for their input on recreation opportunities that could be appropriately accommodated on Lake Hancock lands. Details of these meetings and interviews, and their relevance to the Conceptual Recreation Master Plan are defined in **Appendix 1** and **Appendix 4** of this report.

5.0 Existing Natural and Cultural Resources

5.1 Topography

Elevation within the Lake Hancock project site ranges from 93 to 152 feet (**Figure 5**). The lake, mined ponds, and the three major waterways that discharge into the lake (Banana Creek, Saddle Creek, and Lake Lena Run) correspond with the lowest elevations. Generally, the highest areas on-site are the artificially created treatment cells south of Lake Hancock. Relict sandhill communities southeast and northeast of the Lake are the highest natural elevations on the project.

5.2 Soils

Soils data on the Lake Hancock project were reviewed in terms of historical conditions, pre-mining conditions, and current, post-disturbance conditions. Historic soils data was mapped by the United Stated Department of Agriculture (USDA) in association with the Florida State Geological Survey (FSGS) in 1927 (**Figure 6**). Specific information pertaining to the historic

soils types was taken from the Soil Survey of Polk County (FSGS 1927). This text was obtained from Tom Weber, the acting state soil scientist with the USDA Natural Resource Conservation Service (NRCS). The soils map that depicts existing conditions was generated from mapping provided by the USDA NRCS (**Figure 7)**.

Historically, the dominant soil within the project boundary was associated with Lake Hancock's floodplain and wetlands associated with Saddle Creek, Lake Lena Run, and the Banana Creek. This soil type was then designated as Swamp. Leon fine sand, a flat, poorly drained soil, common to flatwoods, was also prevalent. Another dominant soil, Parkwood fine sandy loam deep phase, is common to shallow depressions or intermittent drainage ways in flatwoods. Other upland soil types were associated with scattered flatwoods and sandhills most evident along the far eastern and northeastern boundary of the project.

Currently, thirty-five (35) soils types occur within the project boundary (**Figure 7**). Hydric soils were identified using the Hydric Soils of Florida Handbook (Florida Association of Environmental Soils Scientists 1995), and seventeen (17) soils on-site are shown as hydric. The dominant soils types align with areas of disturbance associated with mining. Arents-Water Complex and Haplaquents Clay soils were created as a result of phosphate mining activities. These soils are the result of phosphate mining bi-product deposition. Phosphate is separated from sand and clay during the mining process, and the leftover sand and clay were deposited south and east of Lake Hancock. The compacted clay does not allow for quick percolation of water but rather water stages in these areas longer than predominately sandy soils. The low nutrient content also limits the naturally-recruited vegetation in these areas to ruderal, opportunistic species. These soils are currently characterized by scattered canopy trees planted during remediation efforts in place at the time, and exotic herbaceous vegetation, particularly cogongrass, smutgrass, and bahiagrass. Together, these two soils types cover approximately 40% of the project.

5.3 Land Use and Vegetative Communities

Historical vegetative communities on the project were mapped using historical aerial photography and soils mapping units and descriptions from the 1927 data described above (**Figure 8**). Vegetative communities were characterized using the Florida Land Use, Forms, and Cover Classification System (FLUCFCS, FDOT 1999).

The historical vegetative communities map provides an approximation of the natural systems around Lake Hancock prior to extensive disturbances associated with mining and alterations of Lake Hancock hydrology, and to a lesser degree, agricultural practices. First, the wetland marshes that dominated the eastern shore of Lake Hancock were expansive, and reflected the dynamic conditions of lake level fluctuations prior to these alterations. Likewise, the marshes associated with Banana Creek were expansive, and fluctuated with water levels in Lake Hancock and the creek. Forested wetlands associated with Saddle Creek and Lake Lena Run were intact, and formed a wide buffer to the flow-ways of the Creek, and an even wider expanse at the confluence with the Lake. Pine flatwoods dominated the areas of uplands just up slope from the Lake, and it is clear that vast areas of live oak hammock were interspersed within the flatwoods. Live oak hammocks were prevalent along the lake berm, and in fire shadows created by herbaceous marshes that pock-marked the entire landscape in the Basin. Finally, there were apparently several hundred acres of longleaf pine/wiregrass sandhills scattered along the highest

ridges all the way around the Lake. These sandhills were prone to frequent fires that would have swept across the landscape and included pine flatwoods and herbaceous wetlands systems on a frequent basis.

Currently, there are over thirty vegetative communities on-site as defined by BCI for the Conceptual Environmental Resource Permit (**Figure 9**). Prominent 'natural' communities include vast clay settling ponds located south of Lake Hancock and numerous mined pits encompassed by pasture. The portion of Saddle Creek that extends south from Lake Hancock was channelized by 1941, but further channelization at the confluence of these two water features has since occurred. Banana Creek, Lake Lena Run, and Saddle Creek are visible but greatly reduced in extent, and much of the historic marsh associated with eastern Lake Hancock has been converted to mined ponds or pasture.

Most of the existing vegetative communities are either the result of or have been impacted by historic mining or agricultural conversion. As previously mentioned, mined soils types account for approximately 40% of the site, and generally these soils underlie highly disturbed vegetative communities. Phosphate mining was pervasive, and these activities impacted the natural soil stratification due to excavation, sedimentation, and on-site retention of mining byproducts.

The Lake Hancock Lake Level Modification Project will restore the hydrology to a large acreage of wetlands. In addition, native species plantings and nuisance species control are proposed as part of an overall strategy for wetland and hydrologic restoration.

5.4 Wildlife

Extensive surveys for wildlife have been conducted on the Lake Hancock project over the past few decades. These have included detailed surveys associated with the OFP DRI review, Audubon field trips on the Circle B Bar Reserve, Audubon Christmas Bird counts along Saddle Creek, and work associated with the Conceptual Environmental Resource Permit for the Lake Level Modification Project. Our field investigations were not intended to be as extensive, or as detailed as some of these surveys, but it did provide a perspective for land management recommendations and likely effects on wildlife caused by certain management actions. These field reviews were conducted on April 23, 24, and August 5, 2008 and June 9, 2009. General wildlife observations are listed in **Table 1**.

Six bald eagle (*Haliaeetus leucocephalus*) nests are located on the project site (**Figure 10**). Bald eagles have been state and federally delisted, but the birds and their nest structures are protected under the Bald and Golden Eagle Protection Act (BGEPA). Eagles typically nest in mature or old-growth trees and will typically re-use the same nest in subsequent years. During the breeding season (between October and May), eagles can be sensitive to human activity during courtship, laying and fledging period; however, some eagles, especially those nesting in urban settings, are able to tolerate substantial levels of human activity. The pine canopy occurring in portions of the site provides suitable nesting habitat for bald eagles, while the nearby lakes provide potential forage habitat.

One of central Florida's largest inland wading bird rookeries occurs on the OFP parcel (FFWCC, 2003) within a shrub island in the middle of one of the Mined Lakes. White ibis (*Eudocimus*

albus), glossy ibis (*Plegadis falcinellus*), great egret (*Ardea alba*), and roseate spoonbill (*Ajaia ajaja*) were observed nesting in the rookery during the June field visit, and wood storks (*Mycteria americana*) have also been documented there in previous surveys. White ibis and roseate spoonbills are state-listed Species of Special Concern, and wood storks are state- and federally- listed as endangered.

A second wading bird rookery has also been identified in the Circle B Bar Reserve's Saddle Creek floodplain at the shoreline of Lake Hancock (FFWCC 1991). Subsequent site visits by representatives of the FFWCC in 1993, 1996, and 1997 documented the continued use of the rookery by four state listed bird species including white ibis, tri-colored heron (*Egretta tricolor*), little blue heron (*E. caerulea*)and snowy egret (*E. thula*). This rookery is on property being managed by Polk County and is subject to management recommendations associated with the approved management plan for that property.

5.5 Cultural and Historical Resources

George Percy from the Division of Historical Resources reviewed Old Florida Plantation as a part of the DRI process to identify historical and archeological resources. Mr. Percy confirmed that no significant archeological or historical sites were present within the DRI in two correspondences dated August 9, 1993 and October 2, 1996. No other data on cultural and historical resources were obtained for this project given the nature of the Management Plan.

5.6 Natural Resource Context Zones

The conditions of the land frequently dictate conservation and management priorities. The context for management is affected by the degree of past disturbance, position in the landscape, current and projected uses, hydrology, and vegetative communities. These factors informed the delineation of Natural Resource Context Zones (**Figure 11**) that include:

- Natural Systems
- Forested Wetlands
- Agricultural Lands over Native Soils
- Mined Lakes
- Clay Settling Area
- Residential Enclaves
- Agricultural Lands over Altered Soils

Natural Systems

Natural systems were mapped to include those areas that encompass relatively functional uplands and wetlands that either exist in their natural state or could be managed through restoration or enhancement practices solely for natural systems. The live oak hammocks, pine flatwoods and wetlands on the Hampton parcel are examples. These areas have been used for cattle grazing, the periodicity of fire has been altered, and the hydrology of wetlands has been altered. Still, a mix of native vegetation prevails, and the ability to introduce fire and restore hydrology appears to be manageable and cost effective.

The entire Circle B Bar Reserve was mapped as a Natural System because there is a plan in place to restore the property to some semblance of its historic condition. The wetland treatment system for Banana Creek reflects a floodplain marsh system that is both beneficial to the Lake Level

Modification project, and representative of the historic conditions of the marsh at the confluence of the Creek and Lake Hancock.

Other small tracts of Natural System are scattered throughout the basin, including a relict forested upland/wetland parcel at OFP. These areas will be difficult to manage independently, but they may also be sustained through continued grazing, and focused exotic plant removal.

Forested Wetlands

Forested wetlands were distinguished as a unique management zone because several tracts of forested wetlands still occur within the Lake Hancock Conservation Area (LHCA) that are relatively functional and independent of other natural systems. The floodplain swamp associated with Saddle Creek, north of Lake Hancock is a good example. These areas may have had substantial changes in hydrology and, potentially some changes in elevation or condition from both siltation and oxidation. Still the management needs of these relict systems are unique, and tied directly to the hydrologic restoration of Lake Hancock.

The narrow strip of bald cypress (*Taxodium distichum),* green ash, and black gum (*Nyssa sylvatica* var. *biflora*) that occurs along the fringes of Lake Hancock is another example of the Forested Wetlands category. These areas have undergone substantial changes in wetland hydrology. They have also been exposed to substantial changes in elevation from the placement of fill from mines and the berms associated with Lake Hancock. Changes in lake levels have also caused extensive soil oxidation in some areas. Even with all these changes in hydrology and soils, the old-age canopy appears to be in good condition. On the other hand, the understory of these areas has a substantial prevalence of Brazilian pepper (*Schinus terebinthifolius*), caesarweed (*Urena lobata),* and numerous other exotics, and does not resemble what would have been the historical understory vegetation.

Forested Wetlands along Lake Lena Run east of the Coscia tract are still in good condition, and they could be protected through range management and removal of exotics. However, Lake Lena Run has been diverted in to the wetlands/mine pits associated with the Coscia tract. The system of berms and canals around Coscia diverts the surface water from the majority of Lake Lena Run through these historic mine pits. The historic mouth of the creek in Lake Hancock has been cut off by berms around the lake. The watershed of the western one-half mile of this creek system has been drastically modified, floodplain wetland hydrology has been changed, and the flow into Lake Hancock has been re-routed. Consequently, this stretch of the creek was mapped as Agricultural Lands over Native Soils.

Much of the impacts from changes in hydrology of this Resource Management Context Area will be restored once the lake levels are restored. Removal of fill dirt from the areas around the historic mines probably is not justified, but removal and control of exotic plants should be considered, particularly in those portions of this Context Area that lie adjacent to Natural Systems.

Agricultural Lands over Native Soils

Agricultural Lands Over Native Soils were distinguished as a separate management zone due to the potential for natural conditions (i.e. soil biota, soil structure, remnant natural vegetation) to

be present that could contribute to success of potential enhancement or restoration activities. Restoration of historic biological communities in these areas is possible, over time, with a sustained effort. The cattle ranches at Hampton, Ellsworth and Griffin, and the inactive citrus groves at Hampton are examples. Native vegetation in these areas is common, though not dominant, though the number and/or diversity of highly invasive plants will create management challenges if absolute restoration becomes a longer-term goal. Short-term management options include sustaining the cattle operations on some of these tracts of land even after lake level restoration, plugging ditches to restore hydrology in isolated wetlands, and burning when vegetation can carry a fire.

Mined Lakes

Phosphate mining completely removed the native communities over hundreds of acres of land within the Context Zone mapped as Mined Lakes. These occur on the Hampton, OFP, and Coscia tracts. These areas are dominated by many species of exotic aquatic and wetland plants. On the other hand, they are fairly stable, provide treatment for surface water runoff, and likely contribute to groundwater recharge from some pits that have been dredged below the aquaclude or confining layer of soils. They may be considered both valuable habitat and long-term management concerns related to exotic species control.

Clay Settling Area

The 1100 acre elevated settling area has both a unique ecological context and a specific use in the Lake Hancock Outfall Treatment System. They were historically used as settling ponds, and they are dominated by a unique mixture of primarily invasive plants, currently underlain by soils described as Haplaquents, clay. This area is of strategic importance to the water quality treatment project, and management objectives are embedded in the objectives for water quality enhancement. The future condition of these areas will be comprised of dense accumulations of primarily herbaceous plants that will provide the biological treatment for highly eutrophic waters from Lake Hancock.

Residential Enclaves

Residential Enclaves were necessary to acquire because of the need to control lands that will be affected by the Lake Level Modification Project. These areas were either individual residential lots, or they are enclaves of natural land surrounded by other residential development that was not required for acquisition. In either case, they are suburban in context and altered by changes in historic vegetation, patterns of fire, hydrology, and soils. For the most part, they can no longer be managed in a landscape that will allow wholesale restoration. The use of prescribed fire is virtually impossible, adjacent lands will continue to expose these parcels to exotic and nuisance plants, and removing fill dirt is not practical. These parcels are primarily isolated from other large tracts under District ownership. While they are essential to the Lake Level Modification Project, they are not essential for biological diversity restoration.

Agricultural Lands over Altered Soils

Agricultural Lands over Altered Soils occur on the OFP and Coscia tracts. These lands were the sites for deposition of spoil materials from the phosphate mining process. These soil types include Hydraquents, clayey; Arents; and Neilhurst sands. As a result of the composition and productivity of these soils, and the fact that they were deposited over native soils, historical

vegetative communities were destroyed. These communities were replaced with plants installed through mine reclamation actions in place at the time. Though there are pockets of native canopy species in these areas, they are primarily dominated by nonnative, exotic plants. A near monoculture of cogongrass (*Imperata cylindrica)* is particularly prevalent over much of the OFP tract, and smutgrass (*Sporobolus* sp.) is dominant on the remainder of OFP, and the Coscia tracts. Cattle are grazed over these tracts, under leases administered by the District, and fire is used to improve palatability for cows, but there has been little growth of native vegetation in the past few decades since the mine has been inactive. In short, these areas are highly altered, and the ability to restore native soil biota, native plant communities, and native wildlife is difficult and costly. As a consequence, management actions should be long-term, and any uses incompatible with natural resource restoration should be considered in this Context Area. Future cattle leases will be considered when consistent with management objectives.

5.7 Desired Future Conditions

Desired future conditions (DFC) provide a reference set of physical, compositional, operational, or visual set of objectives for the LHCA over the long-term (over 50 years). These DFCs provide objectives for which management actions can be formulated. The implementation of management actions will be dependent on funding levels, personnel availability, permitting and design requirements, and specific site conditions. The historical and current maps of natural communities and soils were used to define the DFC for Lake Hancock Conservation Lands as described below.

Natural Lands and Forested Wetlands

1) All non-native (including but not limited to Category 1 and 2 exotics) vegetation is controlled at minimum densities (<10% areal cover) or eradicated.
2) Native communities have biological diversity and structure representative of historical conditions.
3) Herbaceous marshes within Natural Lands have diverse assemblages of native plants.
4) Historical fire return intervals have been established through implementation of a comprehensive fire management plan.
5) Fuel loads and vegetation structure within pyrogenic habitats reflect regular application of prescribed fire in a variety of seasons.
6) Prescribed fires can burn across multiple habitat types and vary in extent based on natural firebreaks.
7) Hydrology of wetland systems associated with Lake Hancock reflects inundation levels, inundation seasonality, and residence time consistent with the Lake Level Modification Program.
8) The hydrology of isolated wetland systems reflect inundation levels, inundation seasonality, and residence time that can be accomplished through the removal of man-made, surface drainage facilities such as ditches.
9) Flow characteristics associated with Lake Lena Run and historical creek systems within the Ellsworth and Griffin parcels are more consistent with historical (pre-alteration) conditions.
10) Populations of listed and non-listed species historically found within habitats represented in the natural lands are stable.
11) Cattle are excluded from Natural Systems and Forested Wetlands.

Agricultural Lands over Native Soils

1) Designated portions of the Agricultural Lands exhibit biological diversity, structure (including canopy coverage), and areal coverage representative of the historical vegetation communities that occurred prior to conversion to improved pasture.
2) All non-native (including but not limited to Category 1 and 2 exotics) vegetation is controlled at minimum densities (<10% areal cover) or eradicated from the site.
3) Herbaceous marsh systems contain a diverse assemblage of native plants.
4) Herbaceous marsh systems reflect inundation levels, inundation seasonality, and residence time that can be accomplished through the removal of man-made, surface drainage facilities such as ditches.
5) Existing oak hammocks exhibit regeneration of canopy species and have been protected from catastrophic fire.
6) Historical fire return intervals within flatwoods and isolated marshes have been established through implementation of a comprehensive fire management plan.
7) Fuel loads and vegetation structure within pyrogenic habitats reflect regular application of prescribed fire in a variety of seasons.
8) The habitats on the site provide foraging and nesting/breeding habitat, structure, and/or appropriate movement linkages for historically representative species of native wildlife.

Mined Lakes

1) The Mined Lakes provide a diversity of stable open water habitats with good water quality.
2) Exotic species within the Mined Lakes do not compromise the habitat value for target species such as native fish, reptiles and amphibians, wading birds, and waterfowl.
3) Desirable canopy species occur around the margins of all Mined Lakes.
4) Desirable littoral vegetation (herbaceous and shrubs) is evident around lake margins.
5) The existing rookery is protected from disturbances that would compromise breeding success.

Clay Settling Area on OFP

1) Actions to meet the goals and objectives of the Lake Level Modification and the Lake Hancock Outfall Treatment System are complete. Treatment wetlands are functioning as designed resulting in enhanced water quality.

Residential Enclaves

1) All non-native (including but not limited to Category 1 and 2 exotics) vegetation is controlled at minimum densities (<10% areal cover) or eradicated from the site.
2) Low-maintenance vegetation dominated by native species occurs within the parcels.
3) The Enclaves provide passive park space for adjacent neighborhood associations or other interested parties that share management responsibilities and/or ownership.

Agricultural Lands over Altered Soils

1) Large-diameter pine and hardwood canopies dominate the Special Protection Area (SPA) portions of the Zone with near complete canopy closure.
2) Category 1 exotic vegetation occur in low densities (<10% areal extent) in the SPA portion of this zone.

3) Category 1 exotic vegetation has been prevented from re-infesting adjacent resource context zones and the SPA.
4) Organics have begun to accumulate in the soils, and a soil environment conducive to native plant diversity exists.
5) Fuel loads and vegetation structure within pyrogenic habitats reflect regular application of prescribed fire in a variety of seasons.
6) Methods have been developed and/or tested as part of management activities within this zone to address cogongrass and smutgrass infestations.
7) Cattle have been excluded from wetland systems within this zone.

5.8 Ecological Linkage

An assessment of potential uses on the LHCA created the need to define those areas that were critical to the enhancement of wildlife habitat across the site and connected to other natural lands in the Basin and beyond. Consequently we defined an Ecological Linkage based upon site conditions, adjacent land uses, and information gleaned from the scientific literature on wildlife corridors (**Figure 12**). This Ecological Linkage is a part of the wildlife species action plan for the site. Specific management techniques, such as timber management, may be allowed within this Ecological Linkage as long as these actions result in improved habitat or structure conditions within the Ecological Linkage (i.e. timber growth excludes cogongrass and then is thinned to provide uneven-aged stands). **Appendix 2** provides documentation of the approach and size requirements for this Ecological Linkage.

The proposed linkage within the Lake Hancock property begins where Saddle Creek empties into the northern edge of Lake Hancock runs south along the eastern side of Lake Hancock and terminates where Saddle Creek drains out of the southern side of Lake Hancock (**Figure 12**). Regionally, this linkage will be part of a larger corridor that incorporates a number of conservation lands along Saddle Creek, including Tenoroc Fish Management Area and Saddle Creek County Park. Locally, this corridor will buffer the eastern half of Lake Hancock, and will provide habitat in addition to water quality treatment. Water treatment is not only important for the buffer but will also further the goals defined for the water treatment cells on the southern end of Lake Hancock.

Some of the linkage will include highly altered upland and wetland habitats, which provide limited wildlife habitat for value for native species in its current condition. However, this linkage will be protected in perpetuity, so land managers can take a long-term approach to improving the habitat.

In summary, the goals for the proposed linkage are as follows:

- Preserve a variety of vegetative communities; potential for restoration in disturbed habitats,
- Protect both upland and wetland habitat,
- Protect a contiguous linkage around eastern Lake Hancock, prevent or minimize the number and width of breaks in the linkage,
- Provide habitat for a variety of wildlife species and promote other ecological processes such as water treatment,
- Prioritize restoration of natural systems in the Ecological Linkage.

6.0 Threatened & Endangered Species

Because of the special management requirements required by management guidelines produced by the US Fish and Wildlife Service (USFWS) and/or the Florida Fish and Wildlife Conservation Commission (FFWCC) for bald eagles and wood stork rookeries, the nests and rookery locations of these two species have been identified as Special Protection Areas. The following is a brief description of the management requirements for these species for the purposes of this plan:

- The USFWS Bald Eagle Management Guidelines mandates the maintenance of a buffer with a radius that is 330- to 660-foot wide around each nest. The width of the protection zone varies according to the visibility and opaqueness of the existing buffer, type of proposed construction activity, and whether comparable activities occur within one mile of the nest. For this Plan, we recommend a buffer with a 660 foot wide radius for each nest. No construction activities are proposed during the nesting season within 660 feet of the nests (**Figure 13**). If new bald eagle nests are established during coming years, a similar buffer will be established on the new nest and proposed activities within the new buffer will be evaluated for compatibility with nest protection. If the plan changes, and unavoidable impacts must occur around a nest, then the impacts must be permitted with both the USFWS and FFWCC.
- The USFWS's Habitat Management Guidelines for the Wood Stork in the Southeast Region provides guidelines for wood stork rookeries based on primary and secondary zones around each rookery. These zones are defined on a case-by-case basis based upon the density and height of vegetation around the colony, extent of open water, and nearest human activity. The maximums identified for each zone in the guidelines are a radius of 1500 feet for the primary zone and a radius of 2500 feet for the secondary zone, although either zone width can sometimes be reduced if there is a visual screen, deep open water, or if it is removed from human activity. Breeding wading birds, including wood storks, have been observed in rookies scattered throughout the Brazilian pepper islands in the mined lakes east of Lake Hancock. The string of wading bird rookeries has made it difficult to establish precise protection zones. Therefore, protection areas for wading bird rookeries in general, and wood stork rookeries in specific should be defined prior to finalizing any plans that would require construction, or disturbances that could impact nest success. In general, the recreation plan is believed to be compatible with the wading bird rookeries identified on **Figure 13**.

  No active recreational or construction activities are proposed to occur in close proximity to the known nesting areas, and other management activities (i.e. fire) should be conducted outside of the breeding season and/or consistent with the Guidelines. If the plan changes, and unavoidable impacts must occur around the rookery, then the impacts must be permitted with both the USFWS and FFWCC.

7.0 Natural Resource Management Plan

Achieving the DFCs for each Resource Context Zone will require implementation in a phased approach appropriate to funding, personnel availability, and adaptive responses to dynamic

conditions on site on and adjacent to the property. The strategies identified below provide conceptual guidance on tasks and timeframes for using various management tools to meet the conditions expressed in the DFCs. Strategies and management actions that are frequent and routine or already completed for the property will be listed in an annual work plan. The overall Natural Resource Management Objectives derived from these strategies and management actions are summarized in **Figure 13**. Management Tools are described in **Appendix 3**. For the purposes of this management plan, the strategies are divided into four categories: Short Term (1 to 10 years), Mid-Term (11-25 years), and Long-Term (26-50 years) and Ongoing.

7.1 Short Term

Short term implementation strategies consist of one-time actions, steps needed to identify or plan later implementation strategies, or steps needed to kick-off a recurring action or event. It is anticipated that these strategies will be implemented over the next 10 years (2010 to 2020).

General

1. Identify security issues and responsible parties to address security breaches.
2. Post signage identifying District ownership as appropriate.
3. Identify cultural/historical resources and develop protection strategies for identified sites.
4. Evaluate infrastructure for future use and, if no use, schedule for demolition.
5. Implement an exotic species control program that prioritizes control efforts by Resource Context Zones in the following order: 1) Forested Wetlands, 2) Natural Lands, 3) Agricultural Lands over Native Soils, 4) Mined Lakes, 5) Agricultural Lands over Altered Soils within the Ecological Linkage, 6) Residential Enclaves, 7) Treatment Wetlands, and 8) Agricultural Lands over Altered Soils outside of the Ecological Linkage.
6. Establish and maintain perimeter fire lines.
7. Identify partner(s) for implementation of the recreation plan for the site.
8. Coordinate with Polk County Mosquito Control to develop an Arthropod Control plan for the property.
9. Coordinate with DOF to establish a protocol for wildfire control methods consistent with the conservation goals of the property.
10. Establish permanent monitoring stations within representative habitats following District guidelines for monitoring.
11. Identify a management partner for feral hog removal and implement a feral hog monitoring and trapping plan.
12. Identify and map buffer zones for bald eagle nests on the property.

Natural Systems

1. Inventory and map exotic plant species infestations and initiate control efforts for exotic plant species within the wetland systems targeted for enhancement.
2. Remove interior fencing not being utilized in a current grazing program.
3. Identify specific requirements (i.e. ditch plug size, control structure configuration and location, etc.) and phasing plan to enhance wetlands that are not fully restored by to the Lake Level Modification Project.
4. Identify burn units, develop burn plans, and establish individual burn unit firelines using natural firebreaks where feasible.

5. Evaluate fuel loads for conditions that require winter hazard reduction fires or mechanical fuel reduction methods prior to an initial prescribed fire.
6. Conduct an initial prescribed burn in all burn units.
7. Identify canopy reduction methods for habitats where existing canopy coverage is inconsistent with historical conditions shown on **Figure 8**.
8. Coordinate with Polk County, DOF, FDOT, and the Turnpike Authority to develop a smoke monitoring and traffic notification program for roadways adjacent to the property.

Forested Wetlands

1. Determine whether hydrologic enhancement is necessary beyond the restoration provided by the Lake Level Modification Program.
2. Inventory and map exotic plant species infestations and initiate control efforts for exotic plant species with the most potential for spread.
3. Establish interim fencing along perimeters bordering agricultural lands still under cattle leases to exclude cattle.

Agricultural Lands over Native Soils

1. Identify and map exotic plant species infestations and develop an approach for control.
2. Assess and implement cattle management practices for wetlands.
3. Identify a fence removal process for internal fences within upland areas consistent with existing cattle leases, especially within the portion of this context zone within the Ecological Linkage.
4. Identify specific requirements (i.e. ditch plug size, control structure configuration and location, etc.) and phasing plan for implementing enhancement efforts in wetlands not restored by the Lake Level Modification Plan.
5. Develop a habitat enhancement plan for areas within the Ecological Linkage.
6. Coordinate with existing cattle lessees to establish a mowing/bushhogging regime sufficient to limit shrub growth within the pastures.
7. Establish a protocol for renewing cattle leases that accounts for appropriate phased removal of cattle from areas undergoing passive or active restoration/enhancement activities.
8. Construct an initial parking area for public access.
9. Update the District's recreation guide to denote public uses available on the property.

Mined Lakes

1. Identify existing problems with erosion, and develop an appropriate erosion control and repair plan for potentially erodible soils. Implement repair plan.
2. Identify and map areas in and adjacent to the Mined Lakes for which control efforts for terrestrial (non-floating) exotic species could be conducted without impacting the use and functions of the wading bird rookeries on the site.
3. Develop a plan for controlling floating exotic species within the lakes.
4. With the Florida Fish and Wildlife Conservation Commission, and other partners, evaluate management actions, schedules and logistics to implement a waterfowl hunting program within the context of the overall Lake Level Modification Plan. Identify, map, and demarcate in the field (if necessary) the limits of a no-entry buffer for the wading bird rookeries on the site.

5. Identify a partner for monitoring the species diversity and nesting quantity/success for the wading bird rookeries on the site.
6. Remove internal fencing from portions of the Mined Lakes within the Ecological Linkage.

Clay Settling Area

1. Actions to meet the goals and objectives of the Lake Level Modification and the Lake Hancock Outfall Treatment System have been initiated. Maintenance activities to ensure continued functionality of outfall treatment system.

Residential Enclaves

1. Complete demolition of existing buildings and remove all residential infrastructure from the site.
2. Establish interim fencing consistent with District policy and security requirements.
3. Identify maintenance requirements and schedule for implementation of maintenance for each parcel.
4. Identify and approach potential partners for long-term management of Residential Enclave parcels.
5. Coordinate with potential partners to identify resource-compatible uses and security requirements for these parcels.
6. Identify and map exotic plant species populations and initiate exotic species control efforts for noxious plant species with the greatest potential to spread.
7. Evaluate parcels for native vegetation recruitment and adjust maintenance approach to allow native vegetation, especially canopy species, to become established.
8. Develop a plan for low maintenance landscaping in coordination with local residents.
9. Provide appropriate access for identified partners to implement appropriate maintenance within the parcels and use the sites for resource-compatible uses.

Agricultural Lands over Altered Soils

1. Identify and map exotic plant species infestations and develop an approach for control.
2. Inventory and maintain fencing outside the Ecological Linkage consistent with existing cattle leases.
3. Develop a plan for planting pines, oaks, and wetland canopy species to control exotic understory species, and provide wildlife habitat within the Ecological Linkage.
4. Evaluate opportunities to plant pines trees within areas outside of the Ecological Linkage to control exotic species control.
5. Evaluate the potential for designation as a Timber Management Zone.
6. Identify burn units, develop burn plans, and establish individual burn unit firelines using natural firebreaks where feasible.
7. Conduct an initial prescribed burn in the Ecological Linkage.
8. Assess and implement cattle management practices for wetlands.
9. Identify specific requirements (i.e. ditch plug size, control structure configuration and location, etc.) and phasing plan for implementing wetland enhancement for wetlands not restored by the Lake Level Modification Plan.
10. Coordinate with existing cattle lessees to establish a mowing/bushhogging regime sufficient to limit shrub growth and cogongrass flowering within the pastures.

11. Establish a protocol for renewing cattle leases that accounts for appropriate phased removal of cattle from areas undergoing passive or active restoration/enhancement activities or recreational uses.

7.2 Ongoing

General

1. Continue to evaluate security needs and contracts.
2. Continue to maintain perimeter firelines.
3. Continue to implement protection strategies for cultural/historical resources identified on the site.
4. Continue an exotic species control program that prioritizes control efforts within the broader property by resource context zones in the following order: 1) Forested Wetlands, 2) Natural Lands, 3) Agricultural Lands over Native Soils, 4) Mined Lakes, 5) Agricultural Lands over Altered Soils within the Ecological Linkage, 6) Residential Enclaves, 7) Treatment Wetlands, and 8) Agricultural Lands over Altered Soils outside of the Ecological Linkage.
5. Continue feral hog monitoring and trapping plan to sustain populations at or below desired maintenance level.
6. Periodically evaluate the condition of fencing, posted signs, parking facilities, and other infrastructure for maintenance needs and update/repair as feasible.

7.3 Mid-Term

Mid-term implementation strategies consist of actions needed to initiate steps planned or identified as part of short-term strategies and/or actions needed to continue previously initiated actions. It is anticipated that these strategies will be implemented over the next 25 years.

General

1. Periodically evaluate the condition of fencing, posted signs, parking facilities, and other infrastructure for maintenance needs and update/repair as feasible.
2. Coordinate with identified partner(s) to implement Phase 1 of the recreation plan for the site.
3. Monitor the established permanent stations within representative habitats following District guidelines for monitoring.

Natural Lands

1. Monitor populations of species designated as Category 1 or 2 by the Florida Exotic Pest Plant Council (FLEPPC) and implement maintenance efforts to control at levels sufficient to limit their spread and/or to effectively eradicate these species.
2. Maintain exterior fencing as needed in conjunction with cattle leases on adjacent Agricultural Lands and remove if cattle leases expire.
3. Periodically evaluate habitat for suitability for potentially occurring listed wildlife species and document listed species occurrences when observed.
4. Implement the wetland enhancement phasing plan such that 75% of the wetlands requiring enhancement have been addressed.
5. Coordinate placement of recreation trails along existing hard firelines or evaluate the use of recreation trails to define burn units.

6. Conduct a prescribed burn program so that all burn units within sandhill and flatwood historical communities have gone through at least 5 burn cycles and at least 50% of these burn cycles have occurred within the growing season.
7. Thin canopy coverage using identified canopy reduction methods for habitats existing canopy coverage inconsistent with historical conditions shown on **Figure 8**.

Forested Wetlands

1. Manage hydrology of forested wetlands consistent with the Lake Level Modification Program.
2. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread and/or to effectively eradicate these species.
3. Maintain exterior fencing as needed in conjunction with cattle leases on adjacent Agricultural Lands and remove if cattle leases expire.
4. Seek opportunities to allow fires from the adjacent natural systems to safely burn into the margins of these systems.

Agricultural Lands over Native Soils

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC within adjacent context zones and implement maintenance efforts to control at levels sufficient to limit their spread.
2. Allow cattle leases to expire within Ecological Linkage portions of this resource context zone and remove interior fences upon expiration.
3. Maintain interior and exterior fencing in non-Ecological Linkage portions of this zone consistent with cattle leases existing at that time and remove if leases expire on adjacent lands.
4. Identify burn units, develop burn plans, establish individual burn unit firelines using natural firebreaks where feasible, and conduct an initial burn within all burn units within the Ecological Linkage.
5. Evaluate management practices and/or supplementation requirements to allow recruitment of native canopy and herbaceous species or to re-introduce native vegetation diversity through seeding or plugs.
6. Coordinate with existing cattle lessees to establish a mowing/bushhogging regime sufficient to limit shrub growth within the pastures.
7. Implement the protocol for renewing cattle leases that accounts for appropriate phased removal of cattle from areas undergoing passive or active restoration/enhancement activities.
8. Implement the wetland enhancement phasing plan such that 75% of the wetlands requiring enhancement have been addressed.

Mined Lakes

1. Monitor potential erosion areas and continue implementation of the identified erosion control and repair plan where needed.
2. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread within areas that will not affect the use and functions of the wading bird rookery(ies) on the site.

3. Coordinate with identified partners to assess management actions, physical improvements (i.e. culverts, control structures), and operation requirements needed to maximize the waterfowl resting, roosting, and foraging capacity of the lakes.
4. Obtain monitoring reports from identified partner for monitoring the species diversity and nesting quantity/success for the wading bird rookery(ies) on the site.

Clay Settling Area

1. Maintenance activities to ensure continued functionality of outfall treatment system.

Residential Enclaves

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC within adjacent context zones and implement maintenance efforts to control at levels sufficient to limit their spread.
2. Adaptively change management and maintenance requirements to facilitate growth of recruited native vegetation.

Agricultural Lands over Altered Soils

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread and/or to effectively eradicate these species from Ecological Linkage portions of this context zone.
2. Maintain and upgrade fencing within non-Ecological Linkage portions of this zone consistent with existing cattle leases.
3. Establish pine plantations where feasible to provide habitat structure and a renewable resource that could be employed to offset management costs and designate these areas as Timber Management Zones.
4. Conduct an prescribed burn program so that all burn units within the Ecological Linkage have gone through at least 3 burn cycles and at least 50% of these burn cycles have occurred within the growing season.
5. Implement the wetland enhancement phasing plan such that 50% of the wetlands requiring enhancement have been addressed.
6. Coordinate with existing cattle lessees to establish a mowing/bushhogging regime sufficient to limit shrub growth and cogongrass flowering within the pastures.
7. Implement a protocol for renewing cattle leases that accounts for appropriate phased removal of cattle from areas undergoing passive or active restoration/enhancement activities or recreational uses.

7.4 Long-Term

Plan review will occur every 10 years resulting in appropriate revisions and long term modifications which may be significant.

General

1. Coordinate with identified partner(s) to implement the remaining portions of the recreation plan for the site and assess recreation demand to identify if additional access points and amenities are needed.
2. Monitor recreation uses for potential secondary impacts to natural resources and develop and implement a protocol to modify recreation uses to reverse secondary impacts.
3. Continue monitoring efforts within all established permanent monitoring stations within representative habitats following District guidelines for monitoring stations.
4. Continue feral hog trapping efforts following periodic monitoring efforts to sustain populations at or below desired maintenance level.

Natural Lands

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread and/or to effectively eradicate these species from this context zone
2. Periodically evaluate habitat for suitability for potentially occurring listed wildlife species and document listed species occurrences when observed.
3. Implement the wetland enhancement phasing plan such that 100% of the wetlands within this context zone requiring enhancement have been addressed.
4. Conduct a prescribed burn program so that all burn units within sandhill and flatwood historical communities have gone through multiple burn cycles consistent with fire return intervals for those communities and the majority of these burn cycles have occurred within the growing season.

Forested Wetlands

1. Manage hydrology of forested wetlands consistent with the Lake Level Modification Program.
2. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread and/or to effectively eradicate these species from this context zone
3. Maintain exterior fencing as needed in conjunction with cattle leases on adjacent Agricultural Lands and remove if cattle leases expire.
4. Seek opportunities to allow fires from the adjacent natural systems to safely burn into the margins of these systems.

Agricultural Lands over Native Soils

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread or eradicate these species from this zone.
2. Remove cattle grazing from the property unless determined to be necessary as a management tool.
3. Remove interior fencing in non-Ecological Linkage portions of this zone except those required to control cattle.
4. Implement management practices and/or restoration/enhancement actions to allow recruitment of native canopy and herbaceous species or to re-introduce native vegetation diversity through seeding or plugs.

5. Conduct a prescribed burn program so that all burn units within sandhill and flatwood historical communities have gone through multiple burn cycles consistent with fire return intervals for those communities and the majority of these burn cycles have occurred within the growing season.
6. Implement the wetland enhancement phasing plan such that 100% of the wetlands within this context zone requiring enhancement have been addressed.

Mined Lakes

1. Implement management practices and/or restoration/enhancement actions to allow recruitment of native canopy and herbaceous species or to re-introduce native vegetation diversity through seeding or plugs in potential erosion areas.
2. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread within areas that will not affect the use and functions of the wading bird rookery(ies) on the site.

Clay Settling Area

1. Maintenance activities to ensure the continued functionality of the outfall treatment project.

Residential Enclaves

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread or eradicate these species from this zone.
2. Adaptively change management and maintenance requirements to facilitate growth of recruited native vegetation.

Agricultural Lands over Altered Soils

1. Monitor populations of species designated as Category 1 or 2 by FLEPPC and implement maintenance efforts to control at levels sufficient to limit their spread.
2. Inventory and remove interior fences within the Ecological Linkage.
3. Maintain and upgrade fencing within non-Ecological Linkage portions of this zone consistent with existing cattle leases.
4. Manage pine plantations to provide habitat structure and a renewable resource that could be employed to offset management costs and designate these areas as Timber Management Zones.
5. Conduct an prescribed burn program so that all burn units within the Ecological Linkage have gone through multiple burn cycles and the majority of these burn cycles have occurred within the growing season.
6. Implement the wetland enhancement phasing plan such that 100% of the wetlands within this context zone requiring enhancement have been addressed.

7.5 Monitoring

Monitoring land management activities allows the opportunity to evaluate management methods, adaptively change management approaches, determine success of restoration actions, and evaluate the responses of plants and wildlife from habitat modifications. Monitoring can be expensive, time intensive, and all too frequently planned, but not implemented. Monitoring is probably most effective when there are options that allow quick, cost effective strategies that are

implemented frequently, and more detailed options that can be implemented when time and budget allow. Specific monitoring approaches at LHCA will be determined when long-term management and monitoring budgets can be better defined and when specific monitoring goals have been identified based on implemented actions. Options potentially available for monitoring efforts on the LHCA range from quick and qualitative methods to detailed and quantitative methods. Potential approaches to monitoring include the following:

Qualitative Monitoring Strategies

- Aerial Photo-interpretation
- Permanent Photo-monitoring Stations
- "Walk-through" Surveys of Heavily-used Sites and Sensitive Areas
- User Surveys

Quantitative Monitoring Strategies

- Permanently-Designated Vegetation Monitoring Transects
- Listed Species Censuses
- Repeatable Non-Listed Wildlife Censuses
- Water Quality Sampling

Monitoring plans should include both baseline and long-term monitoring efforts. Baseline monitoring, under any scenario, is important to track and verify the effects of management on the site. Although detailed quantitative baseline monitoring is very helpful, even qualitative strategies such as photo-monitoring stations can be useful to document conditions prior to management actions. A baseline monitoring plan should be developed for areas prior to implementing prescribed fire, exotic species control, or ecological restoration. Long-term monitoring plans should be developed during planning for or immediately following the implementation of prescribed fire, exotic species control, or ecological restoration. These long-term plans should include the monitoring strategies mentioned above, and define timeframes (after burns, before burns, every 1, 3, 5 years, after restoration occurs, etc.) in which the monitoring efforts could be repeated. Some monitoring approaches, such as non-listed wildlife surveys, could be coordinated with neighborhood groups or other interested non-profit entities that conduct regular field trips.

7.6 Access & Resource Protection

Public access occurring under conditions compatible with this management plan provides the framework for public enjoyment as well as resource protection of the LHCA. Fencing and security are two elements of access and resource protection that implement this framework.

Fencing

The various properties that were aggregated to form the LHCA included miles of fencing that occurred in two forms: 1) along perimeters of the property to demarcate boundaries and limit unauthorized access points and 2) internal to the parcels to provide grazing units for cattle use or to limit access to sensitive resources. Consistent with District policy, a perimeter fence should be installed or existing perimeter fences should be maintained for all or portions of the property to identify the boundary of the LHCA and to identify and define appropriate access points to the parcel. Fences should not be installed along the Lake Hancock edge unless significant access issues (i.e. illegal airboat access) are identified and cannot be addressed in other ways. Although

interim fencing should be placed along Residential Enclave portions of the ownership, a strategy to address access and fencing should be reviewed as partnerships are formed with adjacent neighborhood associations or similar community groups.

Existing fencing occurs throughout the property to define specific pasture lands to allow for cattle rotation and/or to protect sensitive resources (i.e. buildings, wells, etc.). Fence lines can serve as impediments to movement for some wildlife species and can also serve as introduction spots for exotic invasive species due to the resting locations afforded by the fences to seed eating wildlife species (especially birds). Areas identified for natural system protection and wildlife corridors should ideally operate most effectively with no internal fencing, where possible. However, as long as cattle are used as a management tool on the site, fencing to define grazing units and to protect natural resources may be needed. The fencing plan should be evaluated periodically to determine when fencing is still required and to identify locations for which fences can be removed. The removal of the fences could then occur as personnel and budget become available.

Security

Security concerns on the property include unauthorized ATV and airboat access and illegal hunting activities. The perimeter fence will require periodic monitoring for illegal access points and repair if needed. If serious breaches of security associated with these activities or other unauthorized activities increase in severity, the District or its partners may consider entering into a contractual agreement with professional security services to maintain additional patrols on the property. Contracting with a security officer, or even the frequent presence of cattle lessees would help with surveillance of the property. Other methods, such as additional fencing or camera surveillance, may also be evaluated as necessary to remediate significant security concerns.

7.7 Partnerships

Implementing the Natural Resource Management and Recreation Plan cannot be accomplished without cooperation from a number of partners. Polk County and the District have already teamed for the acquisition and management of the Circle B Bar Reserve, and the results have been remarkable. Natural resource management has restored the wetland marsh adjacent to the historic flow-way of Banana Creek, and there is a long-term plan in place to restore upland communities that have been drastically altered in the past decades. Finally, the Environmental Education Center, and passive recreation components of the Reserve have been designed and constructed, and these efforts have reached thousands of visitors who have seen progress in ecological restoration, and appropriate use by the public. Polk County is a key partner in the implementation of the plans outlined in this report, and they have been stakeholders in the discussion of land management priorities, and recreation opportunities.

Other partners will be counted on during one or more phases of the Plan. Stakeholders that will undoubtedly key to implementation include: the Florida Department of Environmental Protection; the cities of Bartow, Lakeland, Auburndale and Winter Haven; the Florida Fish and Wildlife Conservation Commission; the US Fish and Wildlife Service; and the USDA Natural Resources Conservation Service. Nonprofit organizations have also provided input into this Plan, and will be instrumental in a number of ways as the project moves forward. These include:

Ducks Unlimited; United Waterfowlers; Florida, and local Audubon Societies; Sierra Club; and local equestrian, hiking and bicycle clubs.

7.8 Mitigation

The District will generate mitigation credit from wetland restoration associated with the Lake Level Modification Project. Mitigation assessments conducted in association with the Conceptual Environmental Resource Permit (CERP) reveal that a net gain of 228.6 credits will be generated by raising lake levels resulting in more natural water level fluctuations and historic seasonal high water levels around the lake. In addition, the District and Polk County are working to implement a reforestation project on the Ellsworth/Griffin parcels that will restore native canopy on 110.7 acres adjacent to the restored wetlands on these parcels. Other projects that are being considered by the District that may generate excess mitigation credit include the restoration of the historic flow pattern of Lake Lena Run on the Hampton parcel and the berm removal and restoration of wetlands on the Shea parcel.

In accordance with the Memorandum of Agreement between Polk County and the District executed on August 9, 2006, the District agreed to assist the County in identifying potential wetland mitigation projects on District-owned lands. In addition to the potential mitigation projects identified above, this Conceptual Natural Resource Management Plan defines resource management priorities in areas that may also generate mitigation credit. The priority natural resource management areas (outside of the areas restored by the Lake Level Modification Project) include:

1. All lands within the Natural Systems Resource Context Zone (462.88 acres, not including Circle B Bar Reserve)
2. Areas within the Ecological Linkage, including:
    a. Agricultural Lands over Native Soils (655.10 acres)
    b. Agricultural Lands over Altered Soils (1,196.95 acres)

Mitigation credit may also be generated from additional restoration, over time, within the Agricultural Areas over Native Soils that lie outside the Ecological Linkage.

Within the Natural Systems Resource Context Zone, the mitigation vision includes the following:

- identification and control of exotic plant populations,
- removal/prevention of cattle and interior fencing,
- enhance wetlands that are not fully restored by the Lake Level Modification Project,
- re-introduction of fire on a regular return interval, and
- the reduction of canopy in habitats where existing coverage is inconsistent with historical conditions.

Within the Ecological Linkage of Agricultural Lands over Native Soils Context Zone, the mitigation vision includes the following:

- identification and control of exotic plant populations,
- removal/prevention of cattle and interior fencing in the long-term management scenario,
- enhance wetlands that are not fully restored by the Lake Level Modification Project, and
- develop and implement a habitat enhancement plan that includes the restoration of canopy.

Within the Ecological Linkage of Agricultural Lands over Altered Soils Context Zone, the mitigation vision includes the following:

- identification and control of exotic plant populations,
- removal/prevention of cattle and interior fencing in the long-term management scenario,
- enhance wetlands that are not fully restored by the Lake Level Modification Project,
- develop a plan to re-establish native canopy comprised of pines, oaks, and wetland canopy species to control exotic understory species, and provide wildlife habitat, and
- re-introduction of fire on a regular return interval.

8.0 Recreation Management Plan

8.1 Recreation Needs Assessment

The District's goal is to accommodate appropriate recreation on the LHCA. The primary objective for recreation on District-owned lands is to provide natural resource-based opportunities that are compatible with the goals for both the Lake Level Restoration and the Outfall Treatment System including provisions for long-term land management. The expectation is that these recreation activities will supplement existing opportunities on public lands such as Circle B Bar Reserve, Saddle Creek Park, Tenoroc Fish Management Area, and Fort Fraser Trail. Since the LHCA was acquired for the specific purpose of restoring lake levels and improving water quality in Lake Hancock, and the Peace River Basin, these objectives cannot be compromised by recreation. On the other hand, the extent of natural lands acquired, and the relatively passive approach to restoration and management should be ideal for natural resource-based recreation.

In order to determine the kinds of recreation that are not currently provided in the region, we conducted an assessment of existing recreation facilities in the vicinity of the LHCA. The purpose of this Recreational Needs Assessment was to determine 1) which recreational activities and facilities, if any, are most needed by area residents and 2) whether they could potentially be provided on any portion of the LHCA. Details of the Needs Assessment Methodology are included in **Appendix 4**.

The findings from the four (4) needs assessment techniques were fairly consistent in identifying recreation needs in the Lake Hancock area. It appears that the top priority needs in the area are (in order of priority):

Resource-based:

1. Trails – hiking, biking, equestrian
2. Water access – fishing, boat ramps, canoe/ kayak access
3. Camp sites

Facility-based:

1. Sports fields – baseball, softball, football, soccer, multi-purpose
2. Volleyball and basketball courts, playgrounds

The resource-based needs are consistent with the types of recreation facilities typically provided by the District, and should be able to be accommodated fairly easily on the Lake Hancock site. The facility-based needs may be able to be satisfied on some of the "non-traditional use" lands (those not necessary for resource protection and/or flow restoration), assuming that a local partner such as the County, municipality and/or homeowners association is interested in participating in the funding of both capital improvements and long term operations and maintenance.

8.2 Recreation Vision

The Recreation Vision for the Lake Hancock Conservation Area (LHCA) is based on 1) the analysis of existing site conditions; 2) Desired Future Conditions; and 3) recreation needs and priorities of surrounding residents and visitors. The resulting Vision is of a natural "oasis" - in the midst of an urbanizing area - where natural systems are managed in accordance with long-term objectives, and residents can participate in a wide variety of resource-based recreation activities. Recreation facilities and amenities are kept to a minimum to re-enforce the natural character of the site and to minimize both capital and operating costs – but any facilities provided are well-designed and maintained to preserve an "old Florida" character.

This Vision was based on the Needs Assessment described above and it was developed through close coordination with Natural Resource objectives. The Vision is consistent with these objectives, and it enhances success by allowing appropriate public use, thereby increasing public support for conservation/recreation projects. This Vision requires the involvement of partners to implement portions of the Plan. The timing and ultimate build-out of the Vision will depend on the degree to which resource partners participate, and the availability of funds to implement the program.

Land Use Objectives

The following objectives, based on input from interested stakeholders, District staff and local recreation providers, outline the desired framework for the proposed Vision:

1. Provide opportunities for resource-based recreation including:
    - Hiking
    - Horseback riding
    - Boating
    - Canoeing and kayaking
    - Bicycling
    - Picnicking
    - Fishing (pier/shoreline)
    - Nature study
    - Wildlife observation
    - Camping (primitive, tent)
2. Evaluate opportunities for limited and controlled waterfowl hunting
3. Seek opportunities to provide public access to the recreational opportunities on the property
4. Pursue public/private partnership for development of site as part of Polk County's Natural Lands Program and the District's day-use recreation areas while realizing opportunity for reuse of existing facilities within the LHCA boundary

5. Provide environmental education opportunities
6. Partner with Polk County's Circle-B-Bar Preserve to provide environmental education programs
7. Pursue partnerships with local recreation providers to provide additional opportunities that would be considered non-traditional uses for the District
8. Serve the passive, resource-based recreation needs of Polk County residents and visitors (as defined by the needs assessment)
9. Manage the site for passive, resource-based recreation
10. Minimize development, maintenance and staffing needs and costs
11. Maintain access to the site for local residents
12. Promote the resource protection work of District through site signs and exhibits
13. "Officially" open the property for public use by fall 2011 with minimal facilities.
14. Shift the responsibility for management of Residential Enclaves to an appropriate partner.

Land Use Component

The Land Use Component Map (**Figure 14**) illustrates the Vision as described above. The diversity of conditions in the LHCA influences the type of visitor experience that can be achieved in different areas. The experiences can be grouped into two types: the natural Florida experience and the day use recreation experience.

The day use experience allows the visitor to enjoy the views and natural systems associated with the LHCA, while having access to more developed recreation amenities. Two day-use areas are proposed. The main day-use area will be located in the northeast area of the LHCA, while a second and smaller day-use area is proposed along the southwest shoreline of Lake Hancock. A new Orientation Center at the main area will serve as the gateway to the LHCA. Visitors will be provided a basic understanding of the natural and cultural resources on-site, and identify available activities. Once oriented, visitors can easily access the site and recreation opportunities including bicycling, rollerblading or hiking the multi-use paved trails, picnicking at one of the pavilions scattered throughout the property, shoreline or pier fishing, canoeing along the blueway trail, riding the horse trails, or launching a boat into Lake Hancock for the day.

The natural Florida experience brings the visitor into close contact with the most wild and scenic portions of the LHCA. The experience includes hiking, off-road bicycling, or horseback riding the unpaved multi-use trails, and canoeing or kayaking the winding blueway trail. A multi-purpose trail built on the existing lake edge berm will allow visitors to view the environmental diversity of Lake Hancock and the surrounding natural communities. Campers can hike or bicycle to various primitive camping locations in the oak hammock on the Hampton parcel.

Following is a more detailed description of proposed facilities:

- ***The Lake Hancock Trail*** – A contiguous trail, designed for multiple uses is proposed around Lake Hancock to connect to Fort Fraser trail. The Lake Hancock Trail will be designed to provide access to a variety of activity types and natural communities. The trail will be field-located to avoid impacts to sensitive natural resources, wildlife movements, or activities associated with ecological restoration. The Trail must also be

compatible with adjacent uses – including potential uses such as waterfowl hunting and camping. In the current Conceptual layout, the Trail was located on the existing berm around the lake, though the path of the trail and the condition of the berm before and after lake restoration projects will be thoroughly reviewed prior to construction. For budgeting purposes, it was assumed that the trail would initially be constructed out of crushed shell, but it would eventually be paved. The Trail will connect the LHCA with the existing Fort Fraser Trail located along U.S. 98 west of Lake Hancock. The northern connection to the Fort Fraser Trail will connect through City of Lakeland property to Polk County's Circle-B-Bar Reserve. From the Reserve, the Trail is designed to ultimately connect to the developed recreation area on the Hampton parcel. Under the current design, it is assumed that the trail will be partially constructed on the existing berm along the shore of Lake Hancock and eventually connect to the Fort Fraser Trail across Saddle Creek at the control structure for the Lake Level Modification Project. Sections of the Lake Hancock Trail may need to be constructed on bridges or boardwalks to minimize impacts to existing and proposed wetlands or the lake edge. Shade pavilions and picnic tables will be provided at intervals along the Trail.

Figure 14 depicts a boardwalk across Saddle Creek between the Hampton Parcel and Circle Bar Reserve. Because of the uncertainties of costs for this boardwalk, cost estimates for a paved, multi-purpose trail along SR 540 are included in Appendix 5. For this section of the trail, it was assumed that a 6,000 LF paved trail would be constructed in the right-of-way of SR 540. When the details of this phase of the project are more definitive, a comparison of the benefits and costs of a boardwalk versus a paved trail along the road right-of-way through Saddle Creek can be evaluated.

During public meetings, comments were received that suggested that the impacts of the Trail could be reduced if the trail were placed on the eastern edge of the conservation lands around Lake Hancock. This concern reflects the debate as to whether the experience associated with the placement of the trail along the edge of the lake is justified, if there are additional impacts to natural resources (including landscape-scale impacts to regional connectivity). The intent of the Trail is that it provides public access to lands acquired for conservation without compromising the resource value of those lands, or long-term management objectives outlined in other sections of this report. The current conceptual alignment assumes that the benefits of exposing more people to the unique vistas and experiences of a trail along the lake would off-set any potential impacts. The ultimate assessment of benefits and impacts will be conducted during the period of final design of the Trail.

- ***Unpaved, multi-use trails*** – A series of unpaved trails will be provided throughout the LHCA to accommodate a variety of users. Portions of trails may be closed or re-routed in order to protect sensitive natural resources. Trails will be available for hiking, off-road bicycling and horseback riding. Portions of these trails should be designed to potentially accommodate all-terrain type wheelchairs. The trails will be field-located and boardwalks will be used when necessary to protect resources. Shade pavilions and picnic tables will be provided at intervals along the trail.

- ***Equestrian Trailhead*** – This will be located in the northeast day use area on the Hampton parcel. Accommodations could include horse trailer parking, small corrals for resting horses, water, picnic tables, grills, pavilions, a composting restroom, and stabilized, unpaved parking.

- ***Trailheads*** - Each of the day use areas will also be used as trailheads for the trail system throughout the LHCA. Vehicle parking, picnic pavilions, grills, and a composting restroom are to be provided. Users of the Fort Fraser Trail will have access to a trailhead and parking in the southwest day use area.

- ***Observation Boardwalks/ Scenic Viewing Areas*** – The LHCA provides excellent opportunities for bird watching and wildlife observation. There is potential for overlooks and observation platforms at various locations along the entire trail system and at intervals along the shore of Lake Hancock. Overlooks should consist of a raised or on-grade platform/deck or boardwalk (height and size may vary depending on location) with interpretive signs. Some overlooks and platforms should be designed to meet American with Disabilities Act (ADA) standards. The overlooks should be limited to pedestrians only, with bike and equestrian use prohibited from these areas. These observation boardwalks and viewing areas are not included within the cost estimate in Appendix 5.

- ***Primitive camping areas*** – A series of primitive camping sites are planned within the oak hammock on the Hampton parcel. Each designated site will accommodate one or two tents, a fire ring, a picnic table and one composting restroom. Specific locations for the camping areas will be field located to ensure that additional impacts are not created in sensitive areas within the oak hammock. Users will be required to park a short distance from their camps sites and carry their supplies in and out of the camping area. Two small unpaved, stabilized parking areas for ten cars each will support ten camp sites within the hammock.

- ***Boat ramp*** – A two-lane boat ramp and a separate canoe launch are planned along the southwest shoreline near the lake's control structure. Parking areas will be provided to accommodate boat trailers and canoe access. Parking will be shared by bikers and hikers using the paved multi-use trail system. The details of the ramp and how it is integrated with the connection to Fort Fraser Trail and the maintenance access to the control structure will need further planning and close coordination between the District, Polk County, and the Florida Department of Transportation.

- ***Fishing Piers*** – According to Florida's State Comprehensive Outdoor Recreation Program (SCORP), the area has a current shortage of both shore and pier fishing in freshwater bodies. A fishing pier is proposed for the Hampton in the northeast of Lake Hancock. It is located near other day use areas in order to share parking, restrooms and other facilities.

- ***Blueway Trail*** – The Mined Lakes Resource Context Zone provides unique canoeing and kayaking opportunities. Separated from the main lake by berms and control structures, the blueway will allow paddlers to experience a series of aquatic habitats without interference from power boats. These areas may be managed for duck hunting in

partnership with the Florida Fish and Wildlife Conservation Commission, and waterfowl organizations. The Blueway Trail will also provide non-motorized access for fishing throughout the Mined Lakes.

- ***Canoe and Kayak Launch on the Blueway*** – Three canoe or kayak launch areas have been designated to provide canoers and kayakers access to the blueway system in the eastern section of the LHCA. The launch areas will consist of a stabilized area, either grass or sand, and parking for four or five cars.

- ***Residential Enclaves*** – The Residential Enclave Resource Context Zones are surrounded by residential neighborhoods, and offer opportunities for the maintenance of neighborhood parks. These areas occur within neighborhoods in Saddlewood, and near Boy Scout and Jacques Lee Lane Roads. Some of the parcels that were acquired by the District have native oak and pine canopies that are already natural features. The District has already stabilized and fenced these areas. In the short-term, these areas will be landscaped with low-maintenance plants where needed. In the long-term, the District will work with local residents and Homeowner Associations and other similar community groups to define objectives, and discuss control and maintenance consistent with Lake Hancock restoration goals.

- ***Non-traditional Use Areas*** – Because the recreation needs assessment indicated that there are some deficiencies in active recreation facilities, we considered appropriate locations for a wide array of these recreation types. The demographic analysis identified the long-term potential need for active recreation in the northeast portion of the LHCA in proximity to existing population centers near Winter Haven. Defining the specific program or layout of active facilities was not a purpose of this project, but we did allocate areas of potential active recreation use at the intersection of Thornhill Road and CR 540, and along the commercial corridor on US 98. Use of these areas as active recreation was not inconsistent with resource protection goals though they are somewhat "non-traditional uses" from the standpoint of the District's typical recreation plan.

- ***Potential surplus lands*** –The District evaluated the potential for surplusing lands that were not needed for resource protection and recreation. Our analysis of Lake Level Projects, priority restoration areas, the Ecological Linkage, and recreation opportunities left several parcels of land that have the potential for surplusing without compromising these objectives. The majority of the area of potential surplus lands occurs on Agricultural Lands over Altered Soils on the OFP tract (833 acres). Another 54 acres occurs within the narrow strip of land between Old Bartow Road and SR 17. The 74 acres of non-traditional use lands on the Griffin tract adjacent to US 98 could also be considered as potential surplus.

- ***Education and Interpretive Signing*** – The LHCA offers an excellent opportunity to provide educational information on the Lake Hancock restoration projects and the natural resources protected by acquisition of conservation lands around the Lake. Based on funding, these signs can be placed at numerous locations of public access and areas of highest expected use.

- ***Hampton entry from Thornhill Road*** – This entry is intended to supplement the activities managed by Polk County on the Circle B Bar Reserve. Ideally, it would be managed by the County as a part of the natural resource and educational activities ongoing at Circle B Bar Reserve. A paved entry road with kiosk or pavilion, guard house, and park gate is proposed. The paved road will provide access to camping areas, boat ramps, equestrian and paved trail trailheads, canoe and kayak launches and parking. The existing Hampton House is being considered for use by Polk County and could serve as administrative headquarters for the Lake Hancock Trail. Renovations of the house for these purposes are included in the cost estimate in Appendix 5.

- ***Access from Sheffield Road*** – Access from Sheffield Road will be provided to the eastern portion of the property. This access is not proposed to be controlled by staff and would provide limited access to a canoe launch and parking area. This access point may be closed to the public seasonally, or during special events, such as duck hunting.

- ***Ellsworth/Griffin entry from Bartow Road (US 98)*** – The day use area in the southwest area of Lake Hancock will be accessible from a paved entry road from Bartow Road. This entry road will provide access to the boat ramp, fishing pier and the trailhead for the paved multi-use trail. It will also be the primary access for the District for monitoring of the control structure and the Wetland Treatment Project.

Overall Facility Design Principles

The guiding principle of facility development within the LHCA is to provide facilities and access that minimally impact the environment and are site-adaptive to complement the unique natural surroundings. Facilities should act as the bridge between the built and natural environments. Further, the design of the facilities should incorporate vernacular architecture and building styles to capture the local "character" of the LHCA and the surrounding natural setting. Specifically, the following design principles should be integrated into the design process:

- ***Location***
  Disturbance of the natural resources by structures should be minimized through site-sensitive placement. Previously impacted areas should be considered prior to damaging or impacting additional areas.

- ***Facility Size***
  Structures and facilities should maximize space efficiency and minimize impact on the natural setting.

- ***Building Materials***
  Recycled and locally provided building materials should be used whenever possible and when available.

- ***Facility and Infrastructure Construction***
  Trail and walkway design and construction should minimize site disturbance. For example, access improvements and walkways might be elevated where feasible to avoid

damage to sensitive settings. Prefabrication of modular facility components should be considered over traditional on-site construction techniques. The use of heavy equipment on site should be minimized. Alternative and renewable energy sources should be considered in conjunction with site orientation to allow for passive cooling and heating of facilities. Passive water collection systems, such as rainwater catchment systems should be considered where appropriate. Alternative waste treatment systems such as composting toilets should be considered wherever feasible. Water delivery systems, such as utilizing gray water to irrigate landscaping, should also be considered. Energy efficient lighting fixtures should be used wherever possible. Light pollution should be minimized.

- ***Landscaping***
  Native vegetation should be retained and replanted where disturbed. Exotic or nuisance plant species should be a component of any plant palette used on the LHCA. Any landscape plantings should specify native species that complement existing flora. Drought tolerant species should be used wherever possible.

8.3 Cost Estimates and Phasing

Based on the District's land use and management objectives, the following phasing plan was developed for the LHCA. The facilities for Phase I were chosen to provide minimal access to a variety of areas throughout the LHCA. Polk County's existing Circle B Bar Reserve would initially serve as the "gateway" to the LHCA providing detailed resource and recreation information for both the Preserve and the LHCA.

Subsequent development will depend, in part, on public demand for additional facilities, development partnerships and available funding. It is anticipated that funding for the future phases of the LHCA will be from recreation providers other than the District.

The initial phase of development will be undertaken by the District in their effort to have the LHCA opened quickly to the general public. The District will provide minimal facilities in the initial phase. It is anticipated that **Phase I** development will occur on the Hampton parcel and include an unpaved entry drive with signage, approximately 20 parking spaces (stabilized grass or shell), and trails on existing service roads.

Phase II will provide access and amenities from Thornhill Road on the Hampton parcel. A compacted shell trail will connect the initial phase on the Hampton parcel to the Phase III area on the southwest side of Lake Hancock and the boat ramp and ancillary facilities on the Ellsworth/Griffin parcel. Phase II will be developed by a recreation provider in partnership with the District. It is anticipated that **Phase II** development will include:

- Hampton Entry from Thornhill Road, including paved road, guard house, kiosk/pavilion, and gate
- Approximately 40 spaces for car parking (throughout Phase II)
- Approximately 10 picnic shelters
- 1 boat ramp
- 1 boat dock

- 10 spaces for boat trailer and car parking
- SW canoe launch (1)
- Site furnishings
- Signing (regulatory, directional, interpretive)
- Landscaping

Phase III will be developed in the southwest section of the LHCA with access from Bartow Road (U.S. 98). Phase III will be developed by a recreation provider in partnership with the District. It is anticipated that **Phase III** development will include:

- Approximately 10 camp sites
- Approximately 5 spaces for equestrian trailer parking
- Equestrian corrals
- 45,000 linear feet of the Lake Hancock Trail, crushed shell
- 3 trail bridges
- Ellsworth/Griffin Entry Road, 5,000 linear feet, paved
- 25 spaces for car parking
- Sidewalks
- 3 picnic shelters
- Site furnishings
- Landscaping

The total development costs for the LHCA are estimated at approximately $11,646,860.00. This figure includes the entire LHCA, contingencies, design and permitting costs. A detailed breakdown of these anticipated costs is provided in **Appendix 5, Construction Cost Estimates**.

A variety of funding sources are available from the State of Florida, federal government, and regional and local agencies. These funds, available in the form of grants, cover a potentially wide variety of recreation and environmental resource opportunities. A list of potential grants and funding sources is provided below.

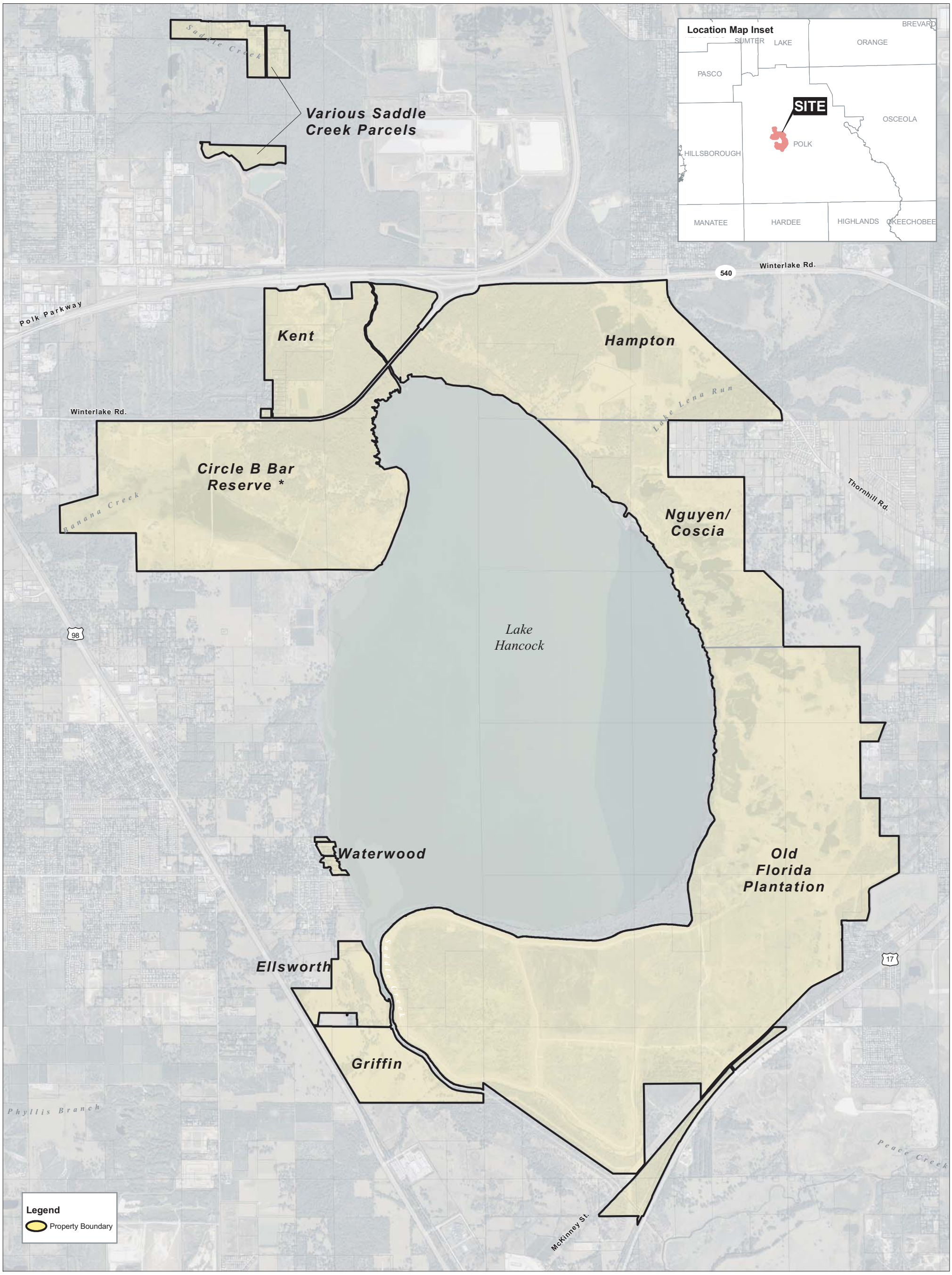
- Florida Recreation Development Assistance Program
- Land and Water Conservation Fund
- Florida Inland Navigational District Waterways Program
- Florida Communities Trust Program
- Florida Greenways and Trails Program
- Ecotourism/Heritage Tourism
- Florida Advisory Council on Environmental Education
- Institutional Conservation Program
- Non-Game Wildlife Contracts Program

- Florida Inland Navigational District Waterways Program
- Florida Communities Trust Program
- Florida Greenways and Trails Program
- Ecotourism/Heritage Tourism
- Florida Advisory Council on Environmental Education
- Institutional Conservation Program
- Non-Game Wildlife Contracts Program

Table 1: Wildlife Observed on the Lake Hancock Project Site, Polk County, FL

Common Name	*Scientific Name*
Reptiles and Amphibians	
American alligator	*Alligator mississippiensis*
bullfrog	*Rana catesbeiana*
cricket frog	*Acris gryllus dorsalis*
skink	*Eumeces* sp.
greenhouse frog	*Eleutherodactylus planirostris*
green treefrog	*Hyla cinerea*
pig frog	*Rana grylio*
pond slider	*Trachemys scripta*
snapping turtle	*Chelydra serpentina osceola*
softshell turtle	*Apalone ferox*
southern toad	*Bufo terrestris*
squirrel treefrog	*Hyla squirella*
striped mud turtle	*Kinosternon baurii*
Birds	
American coot	*Fulica americana*
American white pelican	*Pelecanus erythrorhynchos*
anhinga	*Anhinga anhinga*
bald eagle	*Haliaeetus leucocephalus*
barn swallow	*Hirunda rustica*
barred owl	*Strix varia*
black vulture	*Coragyps atratus*
black-bellied whistling-duck	*Dendrocygna autumnalis*
black-crowned night-heron	*Nycticorax nycticorax*
black-necked stilt	*Himantopus mexicanus*
blue jay	*Cyanocitta cristata*
blue-gray gnatcatcher	*Polioptila caerulea*
boat-tailed grackle	*Quiscalus major*
Carolina wren	*Thryothorus ludovicianus*
cattle egret	*Bubulcus ibis*
common ground dove	*Columbina passerina*
common moorhen	*Gallinula chloropus*
double-crested cormorant	*Phalacrocorax auritus*
downy woodpecker	*Picoides pubescens*
Eastern meadowlark	*Sturnella magna*
fish crow	*Corvus ossifragus*
Florida sandhill crane	*Grus canadensis pratensis*
glossy ibis	*Plegadis falcinellus*
great blue heron	*Ardea herodias*
great egret	*Ardea alba*
great-crested flycatcher	*Myiarchus crinitus*
green heron	*Butorides virescens*
lesser yellowlegs	*Tringa flavipes*

limpkin	*Aramus guarauna*
little blue heron	*Egretta caerulea*
loggerhead shrike	*Lanius ludovicianus*
mallard	*Anas platyrhynchos*
mottled duck	*Anas fulvigula*
mourning dove	*Zenaida macroura*
northern bobwhite	*Colinus virginianus*
northern cardinal	*Cardinalis cardinalis*
northern mockingbird	*Mimus polyglottos*
osprey	*Pandion haliaetus*
pied-billed grebe	*Podilymbus podiceps*
pileated woodpecker	*Dryocopus pileatus*
red-bellied woodpecker	*Melanerpes carolinus*
red-shouldered hawk	*Buteo lineatus*
red-tailed hawk	*Buteo jamaicensis*
red-winged blackbird	*Agelaius phoeniceus*
roseate spoonbill	*Ajaia ajaja*
snowy egret	*Egretta thula*
spotted sandpiper	*Actitis macularia*
tricolored heron	*Egretta tricolor*
tufted titmouse	*Baeolophus bicolor*
turkey vulture	*Cathartes aura*
white ibis	*Eudocimus albus*
white-eyed vireo	*Vireo griseus*
wild turkey	*Meleagris gallopavo*
wood duck	*Aix sponsa*
wood stork	*Mycteria americana*
yellow-crowned night-heron	*Nyctanassa violacea*
yellow-throated vireo	*Vireo flavifrons*
Mammals	
armadillo	*Dasypus novemcinctus*
grey squirrel	*Sciurus carolinensis*
racooon	*Procyon lotor*
river otter	*Lutra canadensis*
white-tailed deer	*Odocoileus virginianus*
wild hog	*Sus scrofa*



Notes:
* Circle B Bar Reserve Included. Property Boundary includes SWFWMD acquired and land proposed for fee simple acquisition, May 2009. Southwest Florida Water Management District 2008 Aerial Photograph.

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Figure 1

Location Map

Lake Hancock Land Use and Management Plan

Southwest Florida Water Managment District's 2008 Aerial Photograph

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009.

0 1,000 2,000 Feet

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Figure 2
2008 Aerial Photograph
Lake Hancock Land Use and Management Plan

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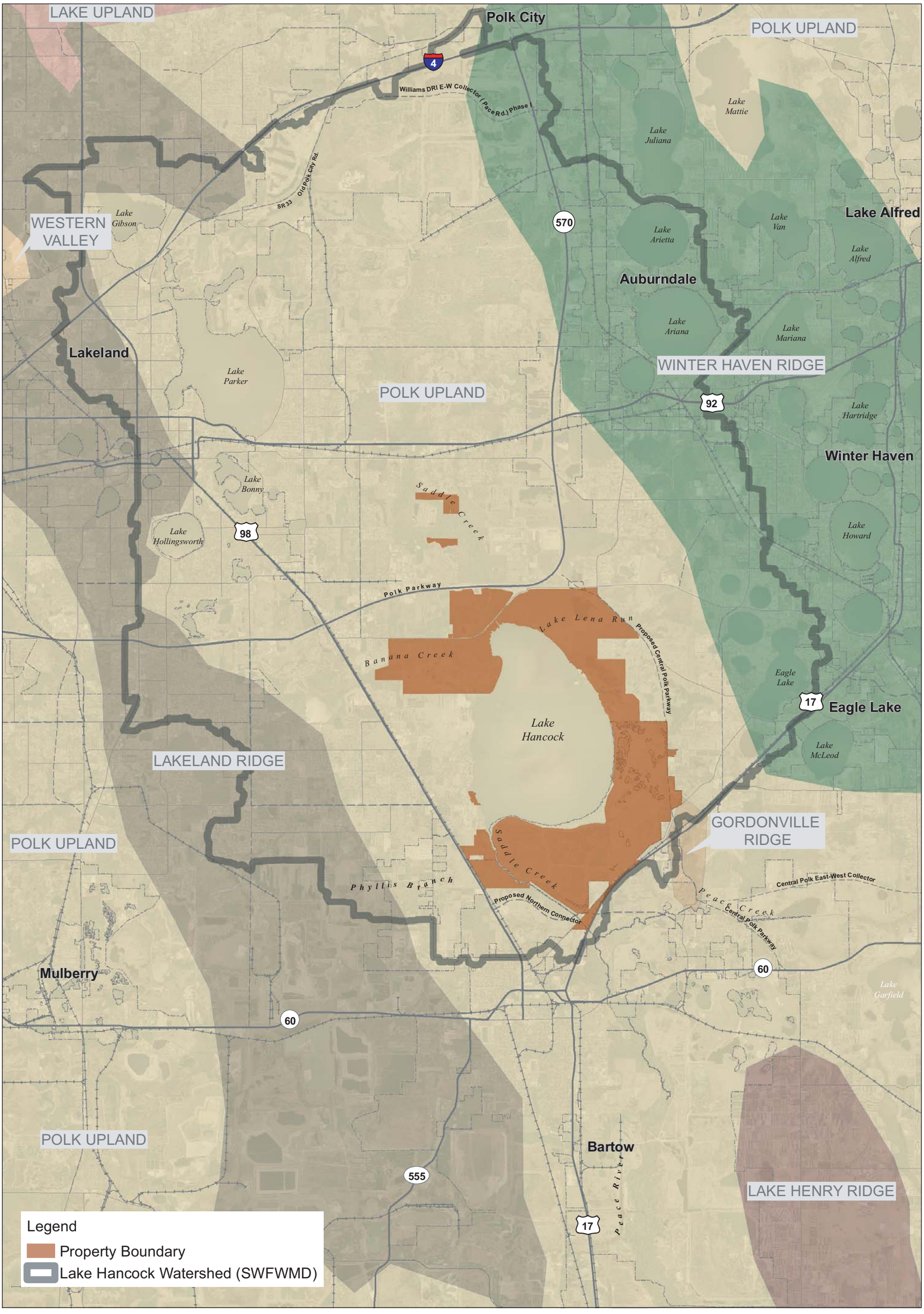

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. SWFWMD is the source for the Physiographic Regions and Watershed data. Aerials Express March 2006 aerial photograph.

0 4,000 8,000 Feet

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Figure 3

Physiographic Regions

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Lake Hancock Land Use and Management Plan

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Notes:
Property Boundary includes SWFWMD acquired land and land proposed fee simple acquisition, May 2009. 1940 Aerial Photograph from BCI Engineers & Scientists Inc.

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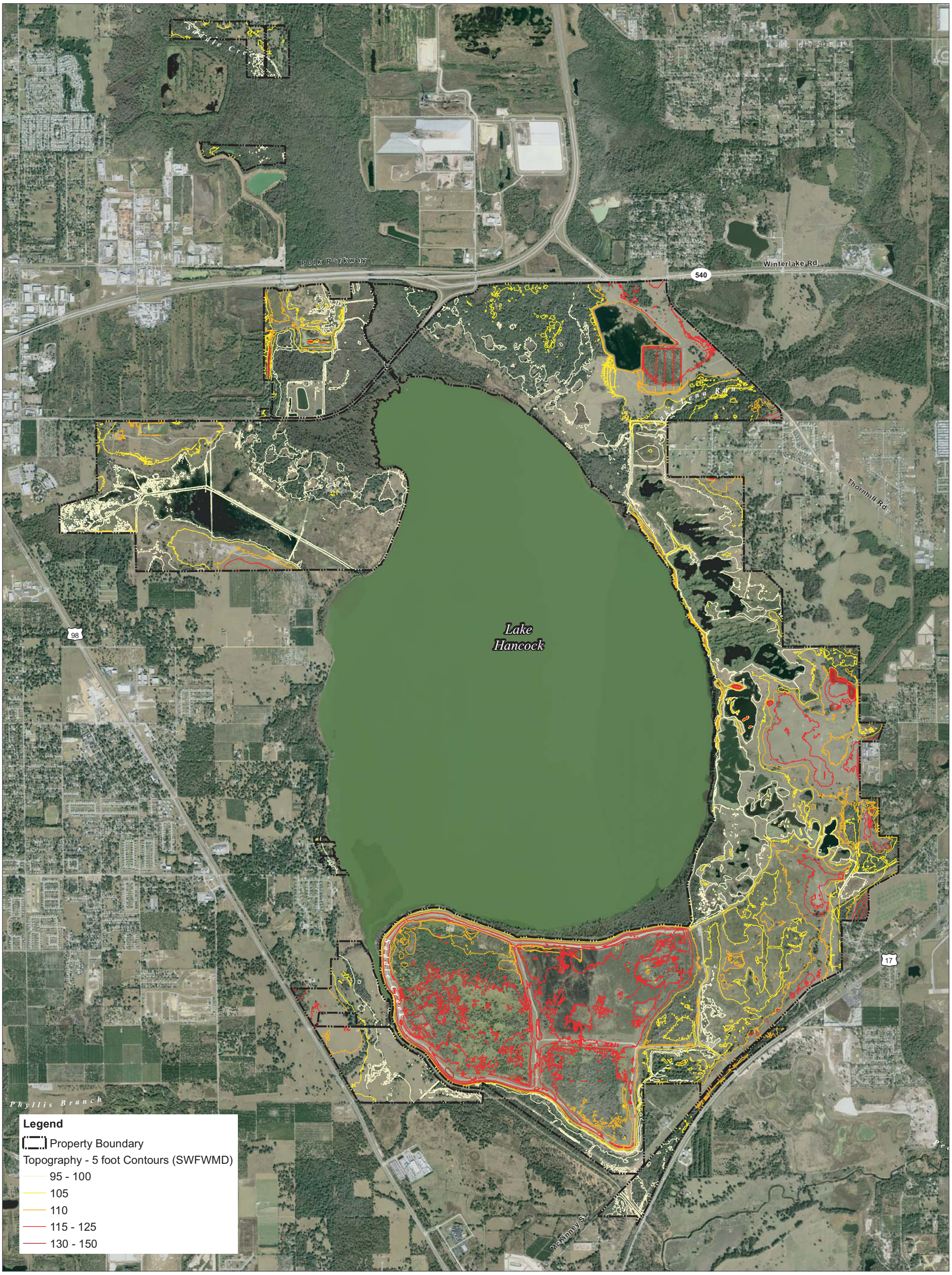
Figure 4

1940 Historical Aerial Photograph

Lake Hancock Land Use and Management Plan



Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. 1940 Aerial Photograph from BCI.

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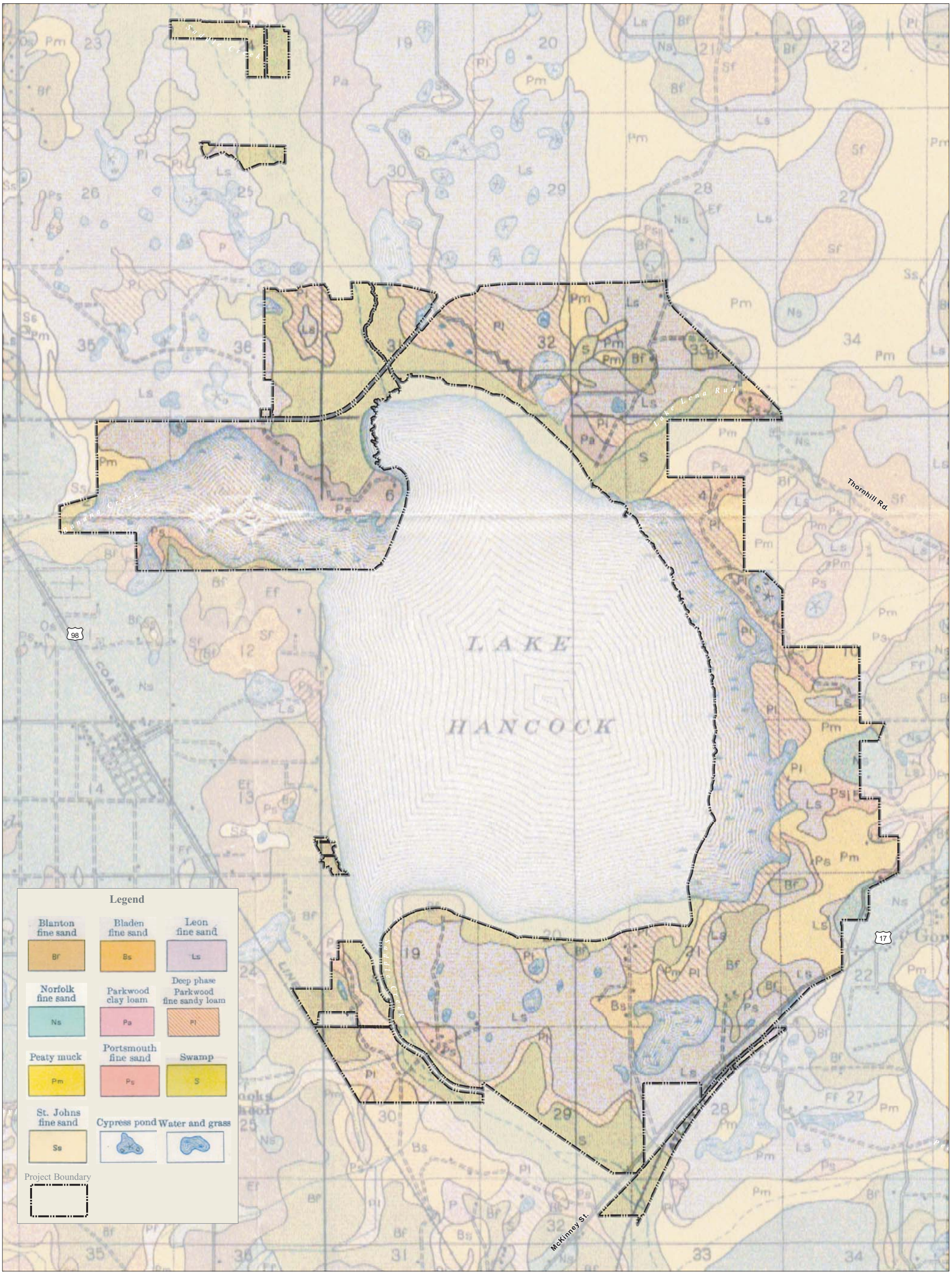
Figure 5

Topography - 5 Foot Contours

Lake Hancock Land Use and Management Plan



Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. The USDA/NRCS is the source for the 1927 soils data.

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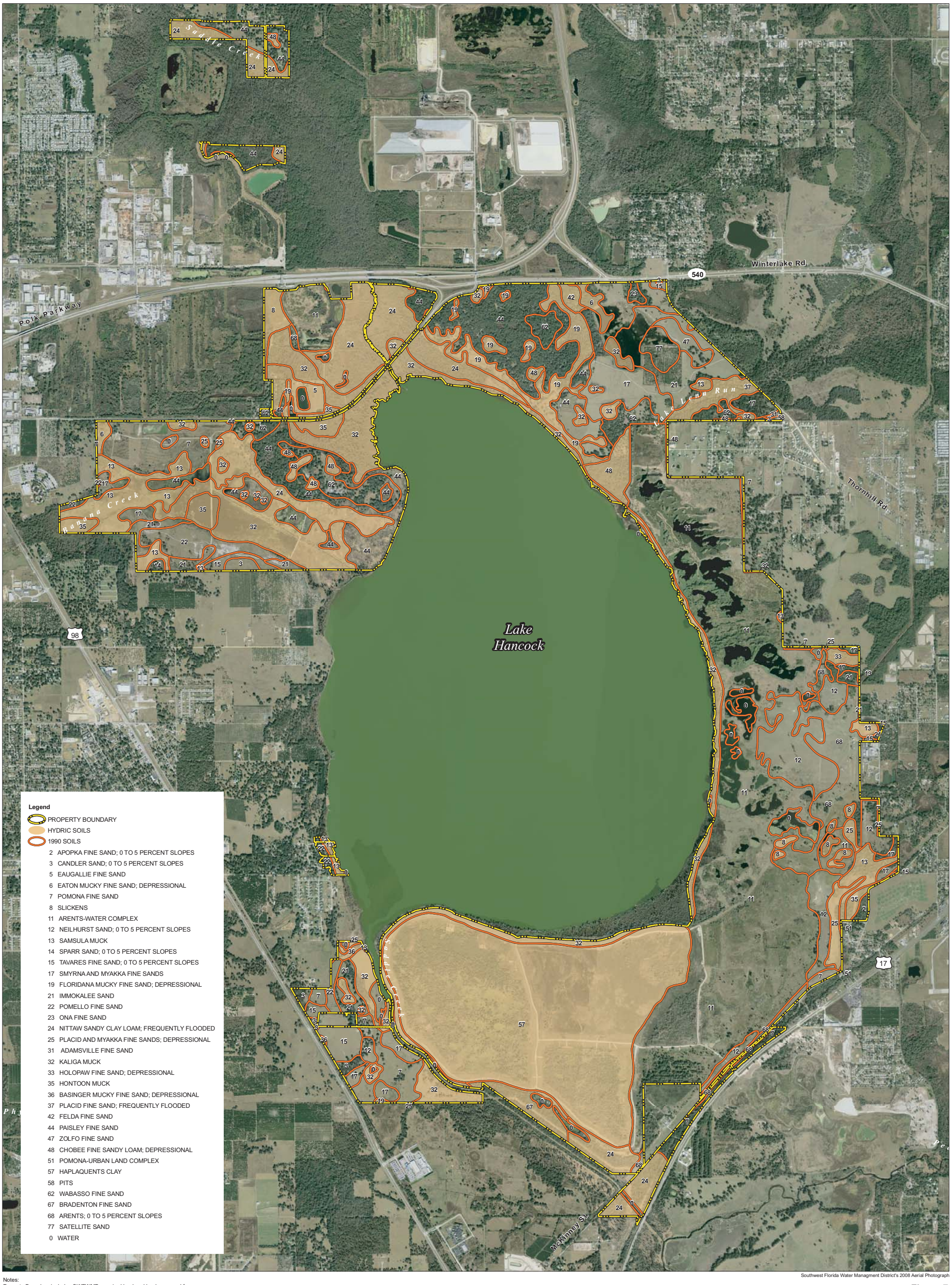
Z:\Projects\20\20820_SWFWMD_Lk_Hancock_LU_Assessment\Work\AVProjects\ResourceMgmtPlanReportFigures_20090731\LH_Fig6_Soils_1927_36x48.mxd (1/8/2010)

Figure 6

1927 Soils Map

Lake Hancock Land Use and Management Plan



Southwest Florida Water Managment District's 2008 Aerial Photograph

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. 1990 soils are represented from the Florida Geograhic Data Library and USDA/NRCS/SSURGO GIS data.

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Figure 7

1990 Soils Map

Lake Hancock Land Use and Management Plan

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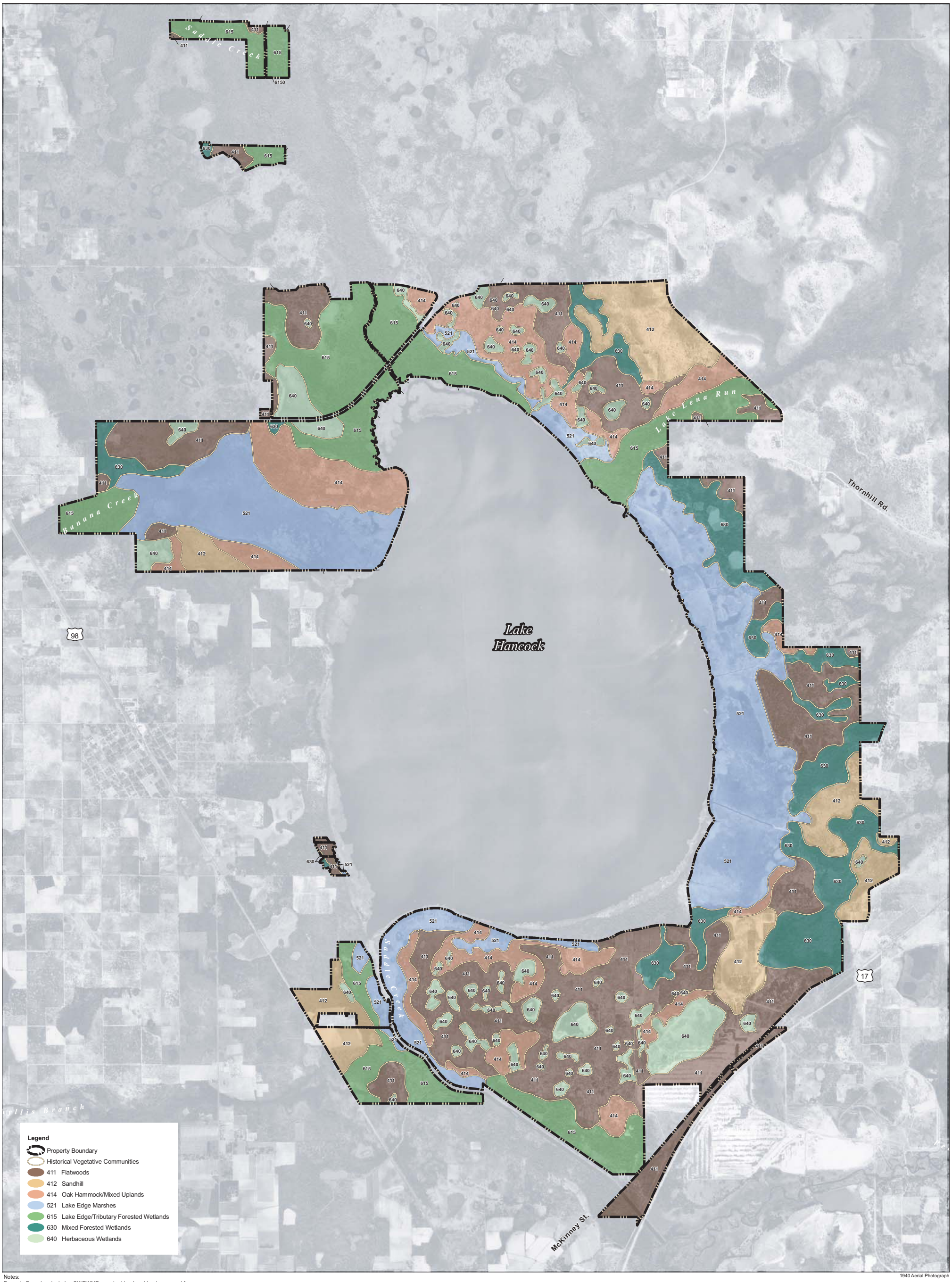

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. Historic Vegetative Communities based on 1927 USCS Soils Mapping Data and a 1940 Aerial Photograph - Glatting Jackson Kercher Anglin Inc.

0 1,000 2,000 Feet

1940 Aerial Photograph

Figure 8

Historical Vegetative Communities

Lake Hancock Land Use and Management Plan

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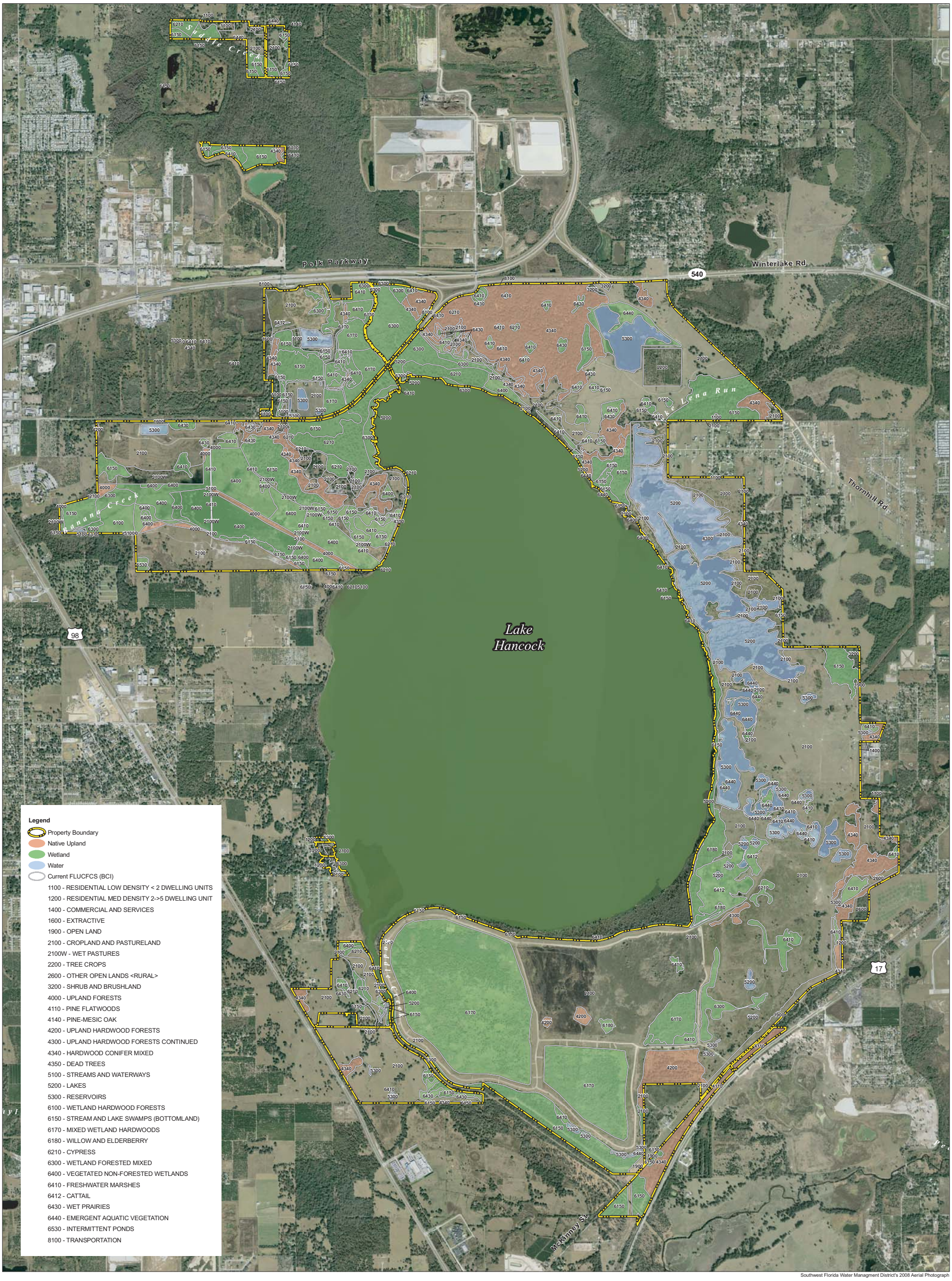

Southwest Florida Water Managment District's 2008 Aerial Photograph

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. BCI is the source of the current vegetation data.

0 1,000 2,000 Feet

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Figure 9

Existing Vegetative Communities

Lake Hancock Land Use and Management Plan

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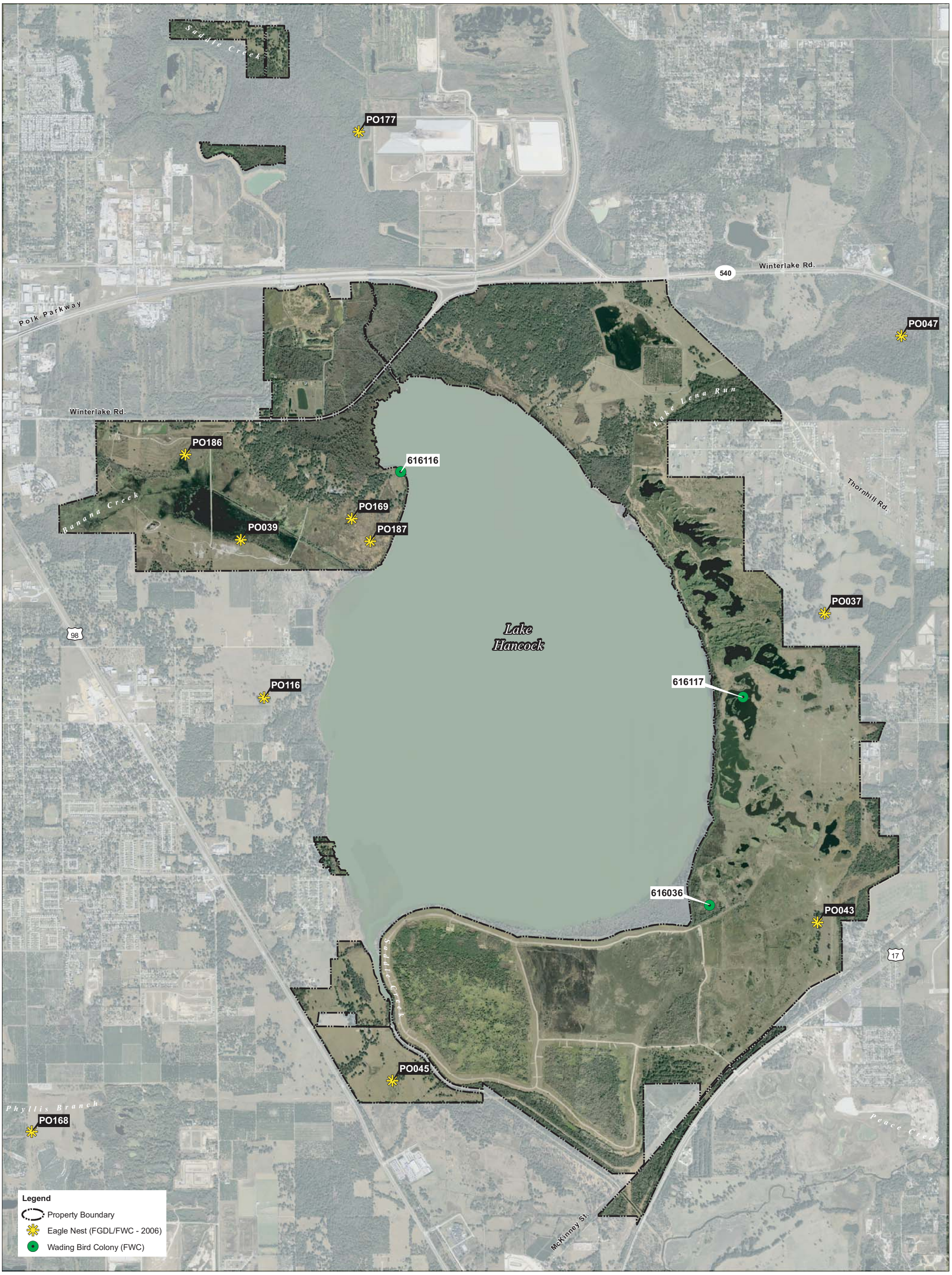

Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. Southwest Florida Water Management District 2008 Aerial Photograph.

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Figure 10

Location of Bald Eagle Nests and Wading Bird Colonies

Lake Hancock Land Use and Management Plan

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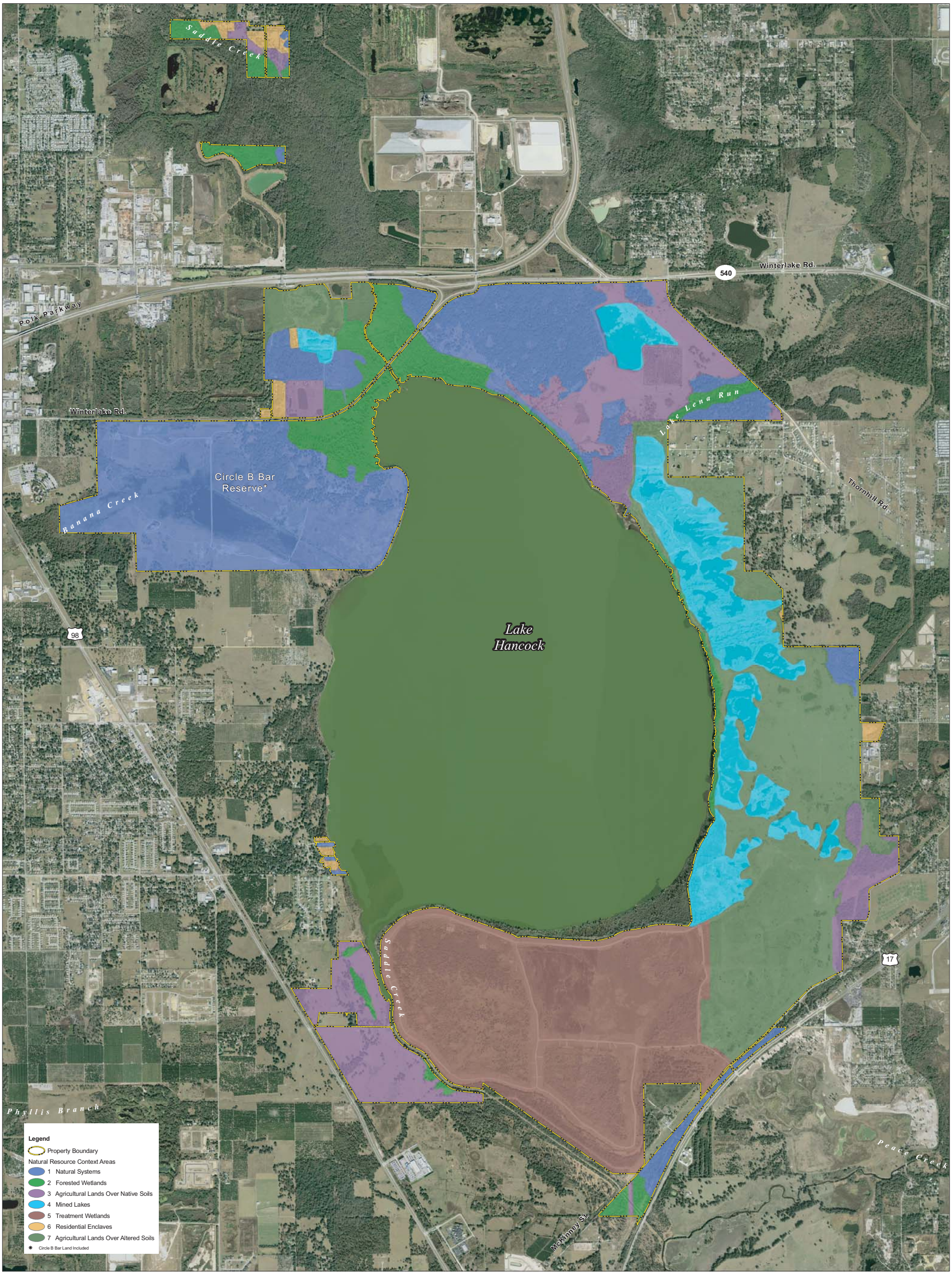

Notes:
* Circle B Bar Reserve Included. Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. Southwest Florida Water Management District 2008 Aerial Photograph.

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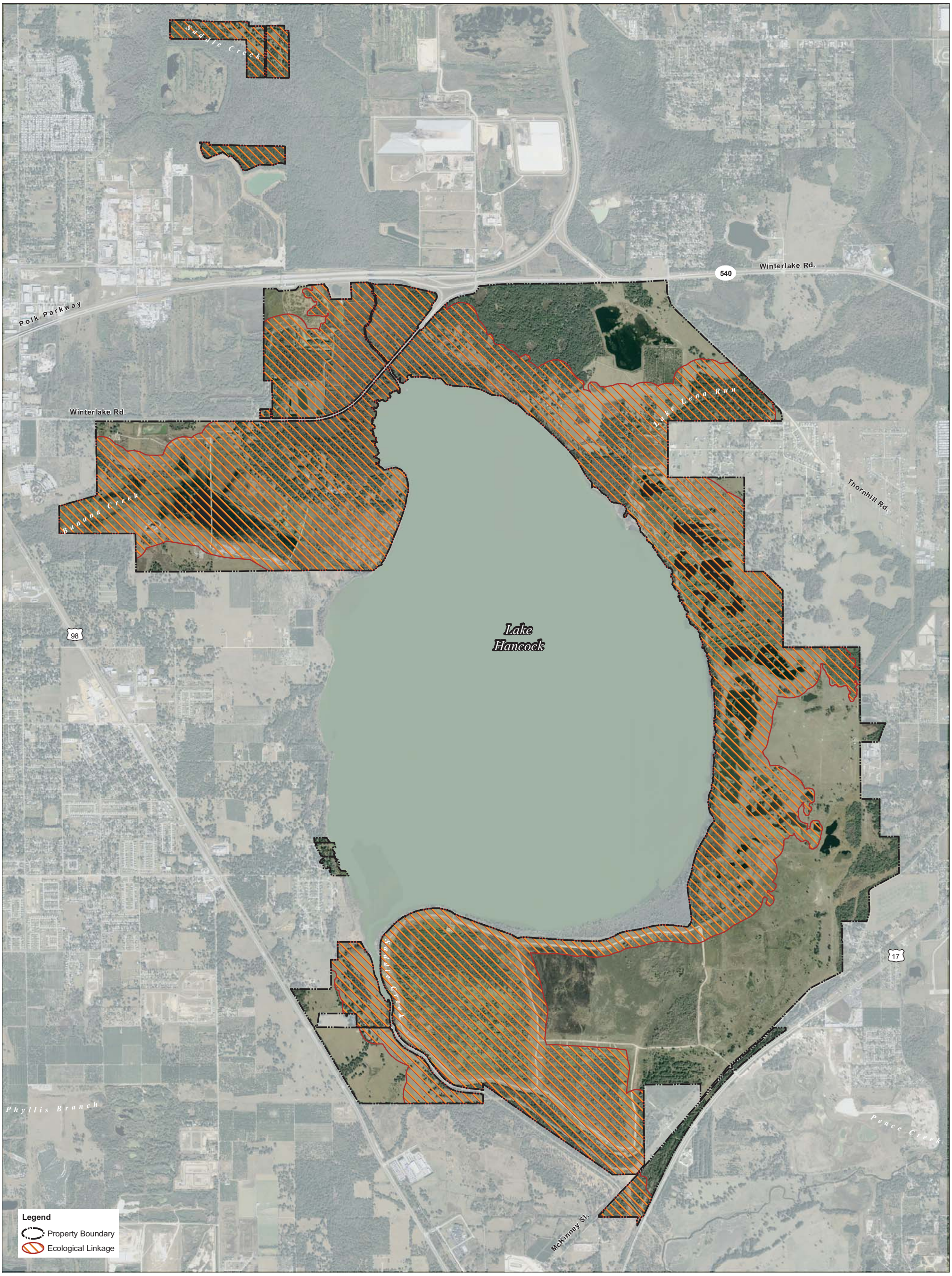
Z:\Projects\20\20820_SWFWMD_Lk_Hancock_LU_Assessment\Work\AVProjects\ResourceMgmtPlanReportFigures_20090731\LH_Fig11_NaturalResourceContextZones_36x48.mxd (1/8/2010)

Figure 11

Natural Resource Context Zones

Lake Hancock Land Use and Management Plan



Notes:
Property Boundary includes SWFWMD acquired land and land proposed for fee simple acquisition, May 2009. Southwest Florida Water Management District 2008 Aerial Photograph.

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Z:\Projects\20\20820_SWFWMD_Lk_Hancock_LU_Assessment\Work\AVProjects\RecreationPlan_Begin_2009_03\ResourceMgmtPlanReportFigures_20090731\LH_Fig12_EcologicalLinkage_36x48.mxd (1/8/2010)

Figure 12

Ecological Linkage

Lake Hancock Land Use and Management Plan

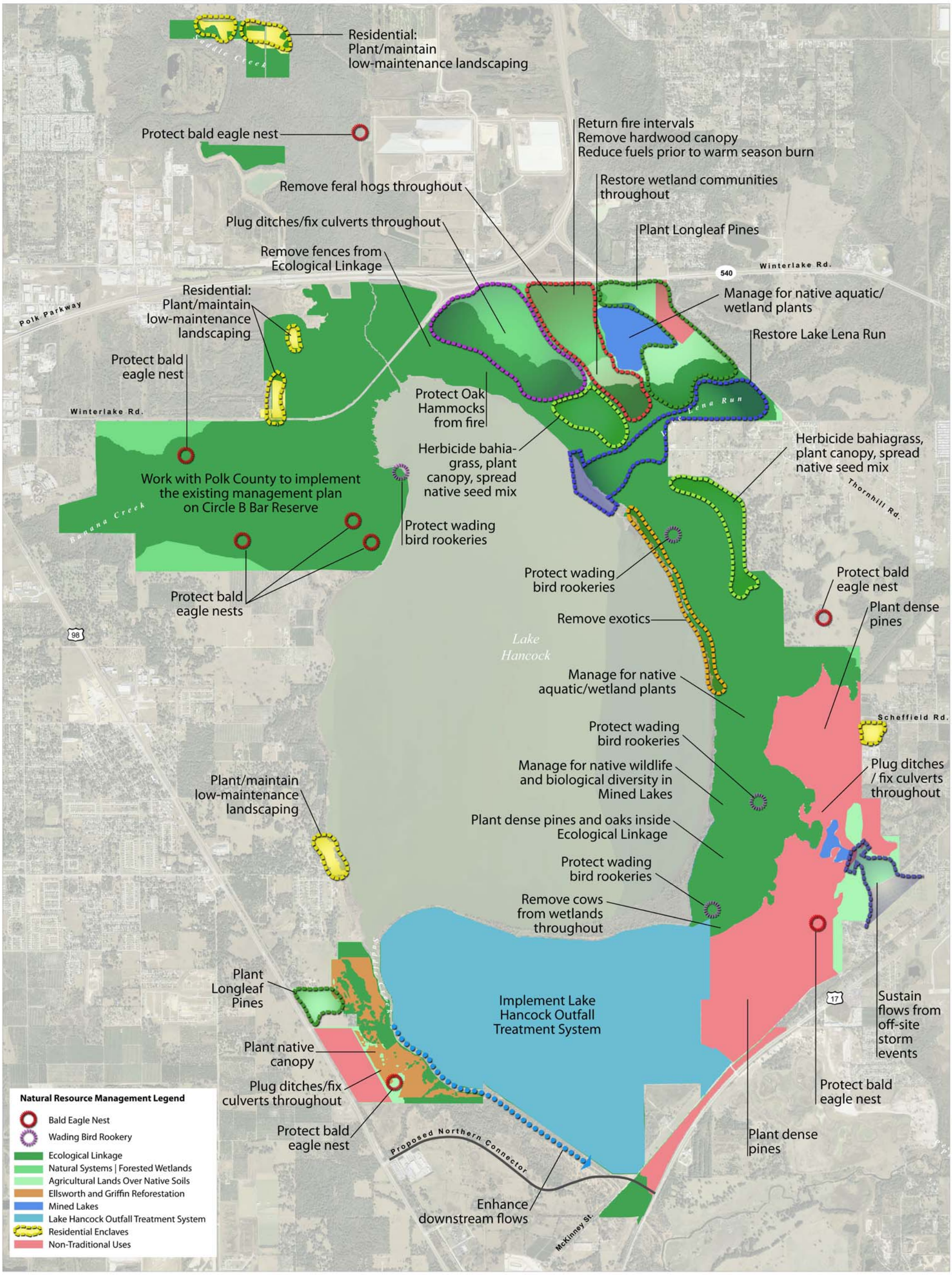

Figure 13

Land Management Component *

Lake Hancock Land Use and Management Plan

*Note: Ilustrative concept. See SWFWMD report dated September 2009 for details.

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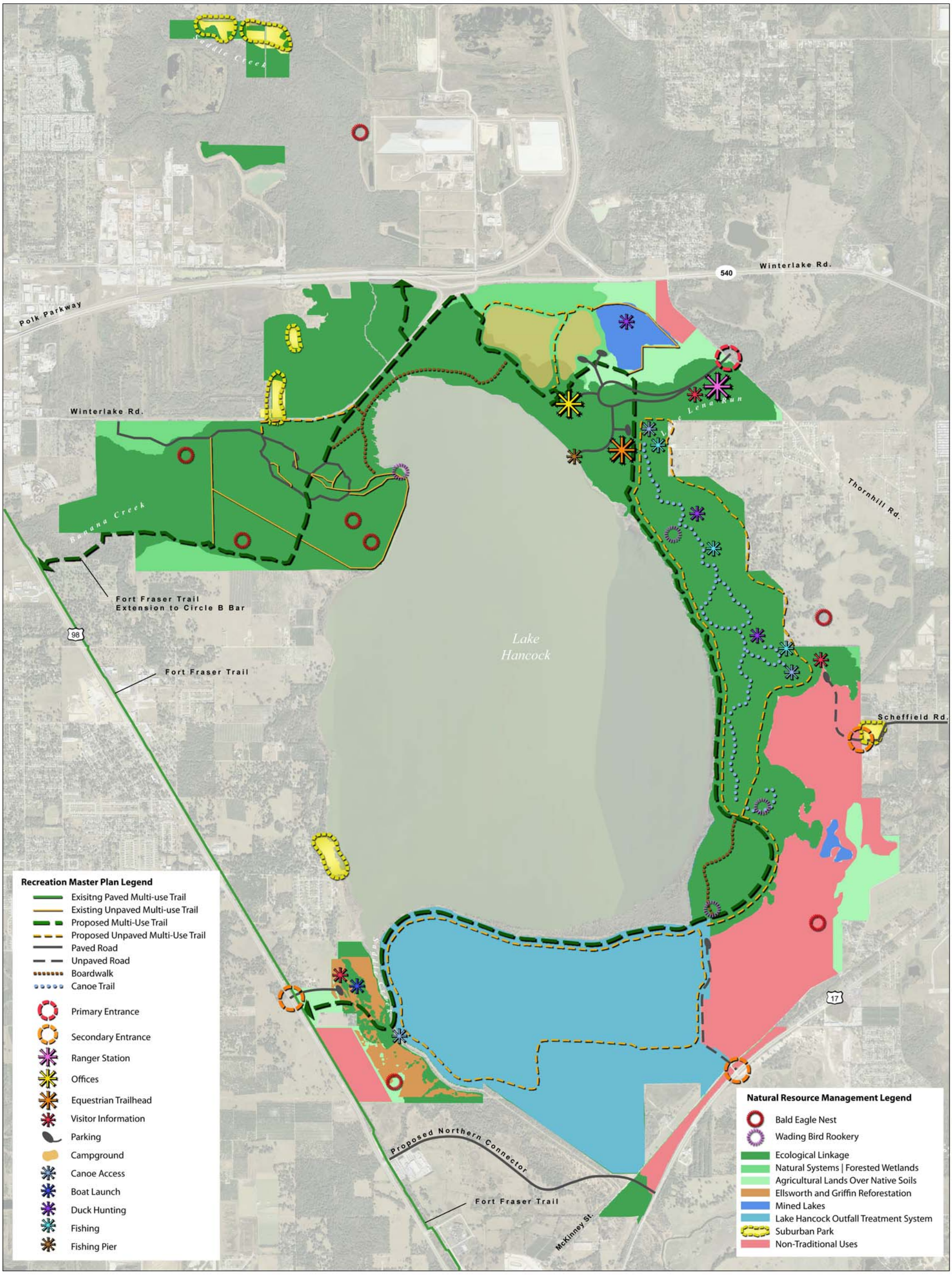

Figure 14
Land Use Component

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Lake Hancock Land Use and Management Plan

Appendix 1
Stakeholder Interview Summary

Polk County

- Polk County staff hoped to see a plan for a boat ramp on Lake Hancock on 1) OFP (within the City of Bartow) 2) Hampton, or 3) Ellsworth. Commercial fisherman should be accommodated with this ramp (air boating/water skiing/some kayaking).
- The Ft. Fraser Trail extension/Lake Hancock loop trail should include consideration of a crossing of Saddle Creek and Lake Lena Run.
- Duck hunters could be accommodated at OFP/Coscia.
- Polk County would like to see added protection of the Saddle Creek/Peace River corridor by filling in the gaps in public ownership to the south and also protection around Lake Lena Run.
- The primary source of nutrients entering Lake Hancock comes from Saddle Creek; a previous study looked at a plan for using the Audubon Saddle Creek Sanctuary tract for improving water quality. County staff asked whether the SWFWMD could help implement this project.
- From the County's perspective, the desired natural resource and recreation plan for Lake Hancock would:
    i. protect the viewshed from the gazebo on Circle B Bar,
    ii. establish a blueway,
    iii. sustain an appropriate wildlife corridor,
    iv. include a boat ramp,
    v. consider hunting,
    vi. make water quality improvements,
    vii. buffer the lake, and
    viii. consist of at least 75% conservation.
- Polk County would not prefer surplusing land along the wetland/flowway adjacent to Saddle Creek as it discharges to the Peace River.
- The County would like the SWFWMD to consider allowing temporary storage of dredged material from the Lake on the Hampton parcel.

City of Lakeland

- Lakeland staff hoped that the Lake Hancock conservation efforts could assist with the establishment of a wildlife corridor along Interstate 4 to maintain the historical ecological connections from Green Swamp to the north.
- Lakeland would like to see a blueway established from the Tenoroc Fish Management Area to the south into Lake Hancock.
- City staff expressed concern about flooding after lake restoration.
- City staff wanted to sustain the master trail system vision including trail connections along the western side of Lake Hancock.

City of Bartow

- Bartow would like to ability to tap into a 20+/-" well on the Old Florida Plantation DRI, but they would not like to see incompatible uses on this portion of the Lake Hancock Conservation Lands.
- The City recognizes the potential for recreation around Lake Hancock, and would prefer that development rights be transferred to lands along the Highway 17 corridor.
- Activities around Lake Hancock should not conflict with the operations of the City's airport.

Audubon and Sierra Club

- Audubon summarized data from 20 years of bird counts on the OFP and highlighted the importance of these areas to migratory birds.
- A priority of Audubon and Sierra was maintaining the value of wetlands adjacent to the lake.
- Audubon and Sierra representatives stated that they understood the rationale for, and wouldn't oppose selling some the development rights from the OFP DRI.
- The Florida Chapter of Audubon owns Saddle Creek Sanctuary. Audubon does not have a lot of interest in maintaining trails on this tract. Audubon is amenable to using the property as a part of a water quality treatment project for Saddle Creek.
- Audubon and Sierra representatives believe that the treatment wetlands would make good habitat for wildlife and, if used for hunting, could take some pressure off hunting on Circle B Bar [that was allowed at the time of the meeting],
- Audubon and Sierra representatives specifically requested that the forested areas along Saddle Creek, downstream of the outfall, remain forested.

Central Florida Regional Planning Council

- Planning Council staff suggested that we meet with the City of Auburndale, and potentially, the Community of Eagle Lake
- Planning Council staff wanted to make sure that the Management Plan accommodates the drainage from Lake Millsett in the southeast of the study area.
- Planning Council staff suggested that we depict post-restoration floodplain and wetlands data layers in our analysis.

Ducks Unlimited, United Waterfowlers, and the Florida Fish and Wildlife Conservation Commission (FWC)

- The Mined Lake on the Hampton parcel has the best potential for use by waterfowl hunters
- None of the Mined Lakes is ideal for waterfowl hunting in its current state; these areas would require management including vegetation removal and planting, and most importantly, hydrologic manipulation
- The FWC would not want to be involved with managing waterfowl hunting that required access off of Fox Hunt Drive into the Coscia tract
- The wading bird rookeries pose a problem for waterfowl hunting given their distribution and location
- The Mined Lakes probably provide better potential for fishery management than waterfowl hunting unless management can be implemented on a fairly wholesale basis

Appendix 2
Ecological Linkages - Corridor Design Approach

Linkages can be described as linear tracts of land that connect two or more patches of natural habitat. Linkages facilitate the movement of numerous species and ecosystem processes (Beier et al. 2008). A number of factors such as ownership or the potential for acquisition, extent of natural habitat, goals for linkage function, and allowable management practices may drive linkage location and configuration. The vegetation and wildlife within a linkage are dictated by its design, and oftentimes it is difficult to make generalizations about linkages due to their inherent variability in configuration.

Linkages support a number of functions. They protect wildlife habitat within the linkage itself and provide a connection between two habitat patches located at either terminus. Different species use linkages for different purposes. They may be used for dispersal, foraging, exploration, and/or migration (Chetkiewicz et al. 2006). Linkages should be comprised of a variety of habitat types because organisms use a spectrum of habitat within the landscape matrix (Chetkiewicz et al. 2006), although continuity of similar habitat is important for some species. It is also important to include a diversity of habitat in order to provide continuity between habitat patches that are comprised of a diverse array of habitats.

The benefits of linkages are not limited to the preservation of contiguous wildlife habitat. Linkages also affect biological diversity, water resources, agriculture and wood production, recreation, community and cultural cohesion, and climate change (Bennett 2003). For example, riparian buffers maintain wildlife communities, but they also improve water quality because they control erosion and sediment, moderate stream temperature and light, and moderate organic debris input (Lee et al 2004).

Large linkages are preferable because vegetative diversity, population size, and species diversity and richness are positively related to size. They are more likely to contain rare or specialized habitats and natural disturbance regimes (Bennett 2003). The composition of the matrix is also important because it can determine the extent of edge, exotic invasion, size of natural habitat, and isolation effects on wildlife (Rodewald 2003). Biologists and managers involved in the design and management of natural areas should carefully consider types of land uses occurring within or adjacent to their boundaries (Rodewald 2003).

It is generally accepted that wider linkages are better, with the benefits of wide linkages being numerous and well-documented. For example, wider linkages will have more habitat that is not impacted by edge effects. The natural habitat adjacent to disturbed habitat has a unique microclimate as a result of this exposed edge, and the edge is often characterized by increased exposure to wind, increased sunlight penetration and temperature, and dense growth of opportunistic vegetation. Edge effects may be biologically significant up to 1000 feet in uplands and 165 feet in wetlands (Beier et al. 2008), and wider linkages will have more habitat that is buffered and not impacted by edge effects. One study demonstrates mammalian nest predators are prevalent in narrow linkages that are predominantly edge and that increased linkage widths decrease avian nest predation by mammals (Sinclair et al. 2005).

Second, wider linkages increase the potential for greater habitat diversity and higher species diversity. Wider linkages are able to accommodate wide-ranging species or species with specialized feeding or habitat requirements (Bennett 2003). Home range sizes and shapes may be used to determine linkage widths (Harrison 1992), and this approach for width determination increases the chance that wide ranging animals will use the linkage. For example, avian forest specialists are more likely to have valuable connections and breeding habitat in wider linkages; narrow buffers are less likely to provide suitable foraging habitat or protection from avian predators (Shirley 2006).

The benefits of linkages are well-documented, but recommended widths vary drastically. The width may be dictated by any number of biological or regulatory factors such as a keystone species' home range, water quality indicators, configuration of unalterated habitat, or land that has or will be acquired for conservation. It is impossible to tease out one definitive width that is suitable for all linkages. Rather, linkage widths should be determined on a case by case basis in lieu of defaulting to one standard number. There are several scenarios in Florida in which regulatory guidance defines a protected buffer width. The Tomoka River and Spruce Creek in Volusia County, the Myakka River in Sarasota County, and the Wekiva River in Orange and Seminole County each have a protected buffer zone, although each one is defined slightly differently.

- *Myakka River* - Sarasota County's Comprehensive Plan protects a "Wild and Scenic Protection Zone" along the Myakka River. This upland protection zone extends 220 feet from the landward edge of the Myakka River, and it protects a 34-mile stretch of this river within Sarasota County. This river's large, flat floodplain often floods, and development near the river has escalated concerns over flooding. New standards address zoning setbacks, wetland buffers, vegetation removal, tree protection, and earthmoving. These standards are in place to promote appropriate development along the river and minimize adverse affects on the natural resources in a manner that is not unduly onerous for landowners within the buffer.

- *Tomoka River and Spruce Creek* - Brown and Orell (1995) conducted a study on the Tomoka River and Spruce Creek in which they made recommendations on what type of buffers should be maintained for these waterways. In this study they recommended that preserved buffers along these waterways 1) extend 550 feet from the water's edge towards the uplands and include at least 50 feet of uplands, 2) extend 322 feet from landward edge of riparian marsh habitat, and c) where there is no channel and/or continuous tree canopy across the river, measure a preserved area of 550 feet that straddles the river. The SJRWMD has defined protected habitat based on this study. SJRWMD has defined four different protection zones that they have assigned to segments of the Tomoka River and Spruce Creek. They are as follows:
    1) wetlands and uplands 50 feet landward of the wetlands,
    2) uplands 275 feet of the stream's edge,
    3) uplands 550 feet landward of stream's edge, and
    4) uplands 320 feet landward of the stream's edge.

- *Wekiva and Econlockhatchee Rivers* - Brown et al. (1990) defined buffer widths between 20 to 550 feet for the Wekiva River, and these widths were based on water

quality, water quantity, and wildlife habitat. SJRWMD has also defined projection zones for the Wekiva and Econlockhatchee River similar to the buffers recommended in this study. The SJRWMD protects uplands within 50 feet of these rivers and some of their tributaries. Additionally, it protects uplands 550 feet landward forested wetlands associated with the streams or the streams' edge in the absence of forested wetlands. The stream edge is defined as the mean annual surface water elevation or the landward extent of herbaceous emergent wetland vegetation when hydrologic data is unavailable.

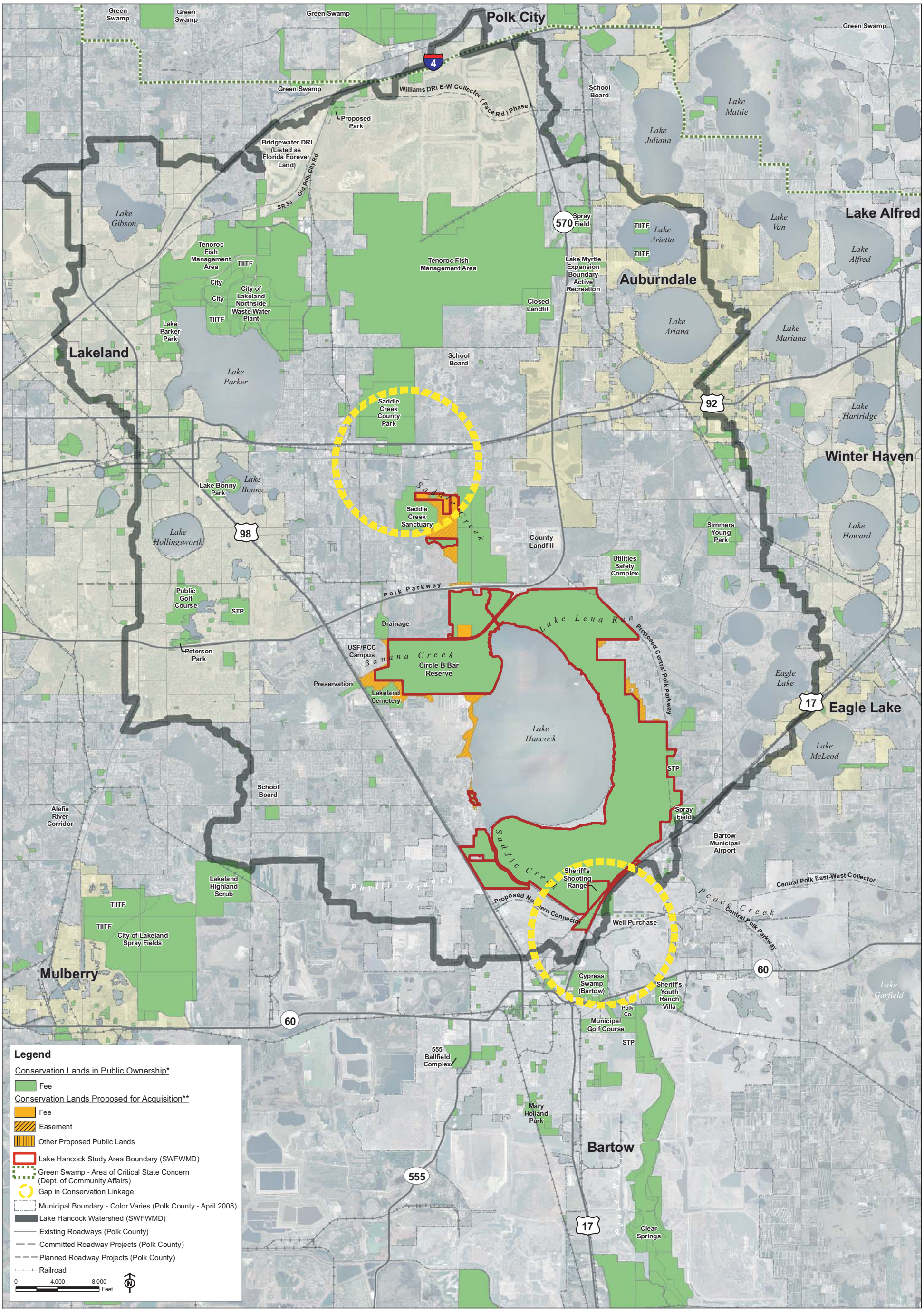
The recommended width of this linkage has been chosen based upon current scientific literature, existing regulations, and the extent of ownership. Existing regulations for other significant Creek/lakes protect up to 550 feet from the edge of the wetland or waterway, which should define the minimum width for the linkage on Lake Hancock. In areas where wetlands associated with Lake Hancock or Saddle Creek extend beyond the 550 foot buffer from the Lake Level Modification Program control elevation of 100.0 NGVD, then the extent of wetland has been included in the linkage along with an additional 50-foot upland buffer from the wetland's edge. As previously mentioned, it is important to include a variety of habitat types within a linkage. It would be beneficial to extend the buffer in some locations to protect additional upland habitat or isolated wetlands. Therefore the 550-foot buffer has been expanded to include 1) wetlands that were partially included in the 550-foot buffer and 2) a 50-foot upland buffer around these wetlands.

Regional connections

The Green Swamp is a regionally-significant waterbody that serves as the headwaters for Hillsborough, Withlacoochee, Ocklawaha, and Peace Rivers and supports other large wetland systems. The hydrologic and environmental significance of this vast swamp has made it a target for acquisition by various agencies and it is formally designated an Area of Critical State Concern established in Chapter 380.05, Florida Statutes, to protect resources and public facilities of major statewide significance. The District has purchased and protects over 116,000 acres of the Green Swamp, and additional conservation lands in the swamp's vicinity have been purchased by local and private organizations. Other acquisitions, including the Tenoroc Fish Management Area, provide potential connections between Lake Hancock and the Green Swamp to the north. A number of conservation areas have been established along the Peace River, which provides potential conservation building blocks between Lake Hancock and Charlotte Harbor (**Figure 2-1**).

Gaps

From a regional perspective, large contiguous tracts of conservation lands exist around Lake Hancock and Lake Parker, and Tenoroc Fish Management Area. However, several gaps are evident in the lands acquired and proposed for acquisition by Florida Forever and the District when contemplating connections north to the Green Swamp and south to the Peace River (**Figure 2-1**). Although existing development limits the potential for acquisition in some areas, these gaps should be considered for future acquisition as appropriate.



Aerials Express March 2006 Aerial Photograph

* Sources of Conservation Lands in Public Ownership: Fee (SWFWMD 5/09), Easement (SWFWMD 5/09), Other Public Lands (FNAI 5/09), Polk County PA 2006, Polk County Future Land Use 2008, Polk County 2008, City of Lakeland 2008)

** Sources of Conservation Lands Proposed for Acquisition: Fee (SWFWMD 5/09), Easement (SWFWMD 5/09), Other Proposed Public Lands (Florida Forever/FNAI 5/09)

Figure 2-1

Regional Conservation Strategy

Lake Hancock Land Use and Management Plan

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Appendix 3
Management Tools

The implementation strategies listed above will require the use of a number of management tools. Although independently described, many of these tools can be implemented together to provide a synergistic response in the managed areas.

Prescribed Fire

Prescribed fire is a critical tool available to Florida land managers for enhancing and sustaining the ecological health of fire-dependent systems. Existing and historical plant communities, including pine flatwoods, sandhills, cypress wetlands, and herbaceous wetlands, are adapted to frequent fires that stimulate growth and reproduction in a variety of plants native to these systems. Historical patterns of fire initiation, primarily consisting of aboriginal and/or lightning-induced fires, are no longer sufficient to maintain many of these fire dependent communities. Instead, fire occurring under prescribed conditions is used to meet the needs of these fire-maintained communities. These prescribed fires reduce fuel loads to protect natural systems and adjacent structures, assist in the control of exotic species, play a significant role in the life history of many plant species, and improve habitat for a wide variety of native wildlife and plant species.

Although fire prescriptions are specific instruments that document conditions under which a given prescribed fire is to occur and are typically more detailed than an overall management plan, the Lake Hancock Conservation Area management plan can address general issues associated with application of fire to the site. The following issues should be considered when fire prescriptions are prepared:

Fire Return Interval

Where possible, fire regimes for prescribed fire should be consistent with historical frequencies for fire-dependent community type where feasible. For the LHCA, these historical frequencies likely ranged from 1 to 10 years for all pyrogenic communities (i.e. pine flatwoods, sandhills, marshes, wet prairies, cypress domes), with "average" return intervals of 3 to 5 years. Fire management efforts within pyrogenic vegetation communities to maintain at least the "average" return interval of fire punctuated by occasional shorter or longer term return intervals can help maintain habitat and species diversity within the system. These fire return intervals should be applicable to all existing pyrogenic natural systems and habitats restored/enhanced on the site. The final fire management return interval for any given burn unit should be determined based on funding and staff availability, wildfire hazard concerns, and climatic conditions consistent with District policy.

The oak hammock zones and forested wetland areas that exhibit regular, long-term inundation likely experienced fire infrequently, if at all, due to moisture conditions within the stands and/or landscape features that limited fire movement into the area (aka "fire shadows"). However, even in these systems, fires that were more catastrophic or stand removing in nature may have occurred on very irregular intervals during extensive drought periods. Because of the aesthetic and habitat values of these areas, measures to protect them from fire such as natural firebreaks, mechanical management of the understory, and hydrological enhancements, especially during drought periods, should be used.

Fire Introduction Concerns

Fire re-introduction on sites that have not been burned for many years typically requires an extensive period of acclimation prior to restoring historic characteristics. During extensive fire-free periods, vegetation types often change (e.g. herbaceous plants to shrubs), duff layers accumulate, and/or ladder fuels or additional coarse fuels increase in abundance. The vegetation changes, ladder fuels, and coarse fuel accumulation can significantly change both the patterns of fire (e.g. speed at which the fire moves through the landscape) and the intensity of fire temperature and height. These changes can result in catastrophic fires, vegetation community changes, and loss of characteristic species that are not adapted to the altered fire conditions.

Duff layers can accumulate around the bases of large pines during fire free periods, often extending several feet up the base of the tree. The pine trees then grow feeder roots into the duff layers to obtain nutrients and water. Fire applied to thick duff layers during drier times of the year can smolder around the base of the pines, effectively girdling the tree and directly killing the tree. The duff fire can secondarily kill the tree by consuming all the duff in which the feeder roots occur, thereby depriving the tree of its ability to obtain water and nutrients. Management approaches that implement a series of initial fuel-reduction fires conducted in cool, wet weather can be used to slowly decrease accumulated duff layers, limit smoldering within duff layers can often increase canopy pine survivability, and allow a gradual transition to fires during the desired season and frequency.

Neighborhood Coordination

Because the LHCA occurs adjacent to homes and major roadways, public awareness of prescribed fire will be a key component to the success of the LHCA fire management program. Coordination with neighborhoods through education materials/kiosks on the site, meetings with neighborhood associations in the vicinity of the LHCA, and/or notification of neighbors prior to a given prescribed fire are effective and important tools that could be used to maintain or increase public awareness of the LHCA fire program.

- Fire education – Educational materials should be developed or adapted from other public education venues to provide information about the benefits, ecological necessity, and goals of the prescribed fire program on the site. These materials could be mailed to adjacent homeowners, provided in brochures and signage within kiosks on the site, or maintained on the District website for the park. These materials should be updated as needed to maintain relevant information about the burn program on the site.
- Neighborhood Association Meetings – District staff should sustain communication with neighborhood associations or groups in the vicinity of the LHCA. This communication could range from letters informing the groups of the status of activities on the LLCA to presentations to the groups about upcoming fires. These meetings could be used to identify park neighbors that require particular notification prior to a fire due to health issues associated with smoke inhalation.
- Neighbor Notification Letter – A standard letter or reverse 911 script should be developed that could be sent to residences adjacent to a future prescribed burn that documents the expected date and conditions of an upcoming burn and provides a reminder that access to the LHCA will be limited during that time. A database of addresses and contact information should be developed and maintained to provide a list of neighbors that should be contacted prior to a given fire.

Partnerships
Enhancing and building upon existing partnerships with the Division of Forestry (DOF), the Polk County fire department, Polk County Natural Lands Program, and/or other agencies could contribute to implementing the fire program on the site. Training activities on the site that expose fire department personnel to site conditions assist in familiarizing these personnel with general wildland fire control as well as provide site familiarity for fire control if wildfires were to occur on the site. The District may consider coordinating with DOF about existing fire breaks, desired management conditions, and ecotonal management zone considerations to minimize potential conflicts in management goals with implementing wildfire control.

Recreation Use Issues
Potential recreational use increases the potential for conflicts between the prescribed burning program and visitors to the LHCA. Informational signage and trail closures for trails affected by prescribed fire will be used to prevent unauthorized recreational use during a burn. Extra caution should be used when conducting prescribed fires on the weekends. Additional advisory notices both in the park and outside of the park (i.e. through radio, television) may be necessary to limit potentially dangerous conditions to the public.

Ecological Restoration
Restoration and enhancement of ecological resources can be accomplished using a variety of techniques that range from low intensity and lower relative cost implementation of natural processes (i.e. return of prescribed fire to a system, plug a ditch with an earthen berm) to intensive (both in cost and time) conversion efforts, such as plantings or large-scale grading. Restoration techniques typically vary between upland and wetland habitats. The following information provides descriptions of general restoration techniques that could be implemented within the LHCA depending on budget, personnel available, and time requirements for implementation.

Upland Restoration
Upland restoration activities for the LHCA could include a wide variety of techniques, ranging from enhancement of existing flatwoods through canopy thinning to exotic species control to native seed/soil reintroductions. Specific restoration techniques will need to be determined as plans for restoration are finalized. For the purposes of this plan, the upland restoration techniques described below are primarily for the restoration or enhancement of herbaceous, shrub, and canopy diversity and structure within improved pastures (both Agricultural Lands over Native Soils and Altered Soils). Other enhancement activities such as exotic species control or canopy thinning are addressed under separate sections of this plan. The following is a brief description of general upland restoration techniques that could be used for the LHCA:

- Herbicide/Seeding – This technique consists of multiple (3 or more) applications of herbicide onto existing pasture grasses each followed by repeated disking events to prepare the seedbed. These herbicide events are typically spaced 6 to 8 weeks apart or other appropriate time period during the growing season (May to September) to allow for growth of plants from the seedbank/rhizome bank following each herbicide/disk event. Seeds for herbaceous species that are typically obtained from natural systems that were burned during the months of

May through July are harvested using a flailvac, hand collection, green silage cutter, or other method in November/December and installed onto the prepared seedbed. Supplemental plantings of seeds or containerized seedlings of shrub and canopy species are typically installed immediately or up to a year following the seed installation. This approach can require several years to see appreciable growth of desired species, can be hampered in clayey or altered soils, and can require a more intensive maintenance approach to address re-growth of pasture grasses, but is typically less expensive to install than other methods.

- Soil Supplementation/Seeding – This technique consists of the removal of the upper 6 to 12 inches of existing soil, which removes seedbanks and rhizome banks of pasture grasses, followed by seeding of native herbaceous species. This technique can be enhanced by using native soils from an impacted natural area to replace the removed pasture soil, but can work with just the removal of the existing soils. To minimize additional site preparation requirements, the soil removal should occur shortly (within a few weeks) before the installation of seed, which would be harvested on the same schedule as noted above. This approach can decrease the long-term maintenance requirements because of the seedbank/rhizome removal and can result in increased growth rates of native species because of more complete seedbed preparation, but is typically more expensive to install than the herbicide/seeding method.
- Containerized Seedlings – This technique consists of the herbicide approach described above for herbicide/seeding followed by the installation of containerized seedlings of desired herbaceous, shrub, and canopy species. This approach often exhibits a rapid increase in cover of native species and lower maintenance requirements than the herbicide/seeding approach because of the native species sizes, but typically exhibits lower species diversity than the seeding methods and is more expensive to install than the herbicide/seeding approach.

Variations on or combinations of each of these approaches may also be available as technologies improve and both seeds and containerized seedlings of native species become more widely available. Soil supplementation or removal may be needed to increase the viability of upland restoration within the Agricultural Lands over Altered Soils, which could increase costs and implementation timeframes.

Wetland Restoration

Wetland restoration activities within the LHCA will primarily be driven by the Lake Level Modification Program, although other wetland enhancement activities may be available as well. The following is a brief description of potential wetland restoration activities within the LHCA:

- Lake Level Modification Project – This project will enhance the largest area of wetlands within the property with minimal amounts of individual site improvements. The project site should be evaluated for berms or other obstructions that could be removed to allow more effective water movement association with the Lake Level Modification project onto the project.
- Ditch Plugs – A number of ditches have been constructed in various parts of the LHCA that drain historically isolated wetlands into Lake Hancock. Installation of ditch plugs (potentially using material from spoil mounds left from the mining

activities) could be used block these ditches, thereby enhancing and re-isolating the subject wetlands. This activity could provide mitigation value for off-site wetland impacts. The final design (size, shape, fill requirements, hydrological model) of the ditch plugs can be determined as budget, personnel, and timeframes become available.

- Plantings/Seeding – The Mined Lakes Context Zone includes large areas of shoreline that could be planted to provide vegetated littoral shelves for these lakes, while other wetland enhancement activities associated with ditch plugs or Lake Level Modification Program enhancements may also benefit from herbaceous or canopy plantings/seeding efforts. The types and species diversity of the plantings/seeding efforts should be determined based on the water fluctuation regime anticipated and/or the aesthetic or habitat structure (for canopy locations) goals consistent with other elements of this management plan. It is anticipated that planting/seeding will be used sparingly within the LHCA and the majority of vegetation diversity/structure enhancement resulting from hydrological enhancements or exotic species control will occur as a result of natural recruitment. However, the design, size, and extent of plantings can be evaluated as budget and personnel become available.
- Culvert installations – Existing culverts under field roads passing over or through wetlands should be evaluated for refurbishment/replacement to allow for free flow of water. A maintenance program should be instituted as personnel and budget become available to monitor existing culverts and replace/maintain these culverts as deficiencies are noted.

Exotic Species

Periodic site visits conducted as part of this management planning effort identified a number of exotic invasive species, including both wildlife and plant species, within the LHCA. Evidence of the invasive wildlife species, feral hogs, was observed throughout the project site. Similarly, invasive exotic plant species were observed in scattered locations throughout the site, with extensive stands of certain exotic species in the Mining Lakes and Agricultural Lands over Altered Soils. A brief description of invasive exotic species observed on the site occurs as follows:

Feral Hogs

Hog damage from rooting behavior can be found in hydric areas such as wet prairies, marshes, forested systems associated with Lake Lena Run and wet pastures. Many of the wetlands on the site exhibited some degree of damage from hogs. Consistent and regular trapping on the property is recommended.

Invasive Exotic Plant Species

The Florida Exotic Plant Pest Council (FLEPPC) defines two categories of invasive exotic species. Category 1 exotic species are those non-native plant species that alter native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives, while Category 2 species are non-native plant species that have increased in abundance while not displacing native species. These definitions rely entirely on documented ecological damage and not on the economic severity or geographic range of the

problem. However, the FLEPPC categories do give guidance on species that should be given priority in exotic species management on the site. A copy of the FLEPPC list of Category 1 and 2 species can be found at http://www.fleppc.org/list/09list.htm.

Exotic species noted on the site are listed below. A total of 15 Category (Cat) 1 and 2 exotic plant species was observed on the site during the site visits, including:

- Air potato (Cat 1)
- Alligatorweed (Cat 2)
- Brazilian pepper (Cat 1)
- Camphor tree (Cat 1)
- Caesarweed (Cat 2)
- Chinese tallow (Cat 1)
- Cogongrass (Cat 1)
- Elephantear (Cat 2)
- Lantana (Cat 1)
- Mimosa (Cat 1)
- Paragrass (Cat 1)
- Primrose willow (Cat 1)
- Torpedograss (Cat 1)
- Tropical soda apple (Cat 1)
- Water hyacinth (Cat 1)

Other invasive and nuisance native and non-native species also occur on the site, including cattails and smutgrass. These exotic and nuisance species are distributed throughout the LHCA with some species forming extremely dense stands in altered portions of the site (Mined Lakes, Agricultural Lands over Altered Soils). The extent of occupation and aggressive nature of many of these species will pose a consistent challenge for management of the LHCA.

Control will likely require a number of different techniques implemented in phases over a long period of time. Where feasible, the exotic species control program should prioritize control efforts by Resource Context Zone in the following order: 1) Forested Wetlands, 2) Natural Lands, 3) Agricultural Lands over Native Soils, 4) Mined Lakes, 5) Agricultural Lands over Altered Soils within the Ecological Linkage, 6) Residential Enclaves, 7) Treatment Wetlands, and 8) Agricultural Lands over Altered Soils outside of the Ecological Linkage. Within these Resource Context Zones, initial management efforts should focus on the reduction and/or control of Category 1 and 2 invasive exotic plant species that pose the most significant threat of expansion and causing reductions in habitat value of the conservation area. Typically, control of invasive exotic plant species consists of herbicide application, physical removal of the plants, or a combination of the two. Alternative methods for controlling exotic species, such as prescribed fire, intensive silviculture, pathogen or predator release, cattle grazing lease management requirements, and/or other methods to be developed in the future, used singly or in combination, will likely be required to control the most extensive populations of some of the species on the site. The site does provide a significant opportunity for research conducted by the District, by entities funded by the District, or in partnership with research institutions requiring study sites into alternative methods for controlling many of these species.

Resource Production

Management actions that integrate resource protection and enhancement with sustainable revenue production can be effective tools for maintaining existing altered sites, providing funding, and/or canopy species to implement long-term restoration goals. Two specific resource production management actions, cattle grazing and timber management currently occur on the site or could be used to meet long-term resource protection requirements.

Cattle Grazing

The grazing of cattle has been an integral part of the LHCA for many years and existing long-term leases for cattle grazing remain on the property and provide a sustainable revenue stream for the District. Cattle have grazed throughout much of the improved pastures and remaining natural systems as part of ranch operations prior to District acquisition. The grazing activity by the cattle along with mowing, bushhogging, and other techniques maintained open pasture conditions favorable not only for cattle, but also wildlife species such as sandhill cranes and white ibis that use open prairie like conditions for foraging. The removal of cattle and the concomitant maintenance activities often results in significant shrub growth that can have adverse affects on structure and foraging habitat for species needing open prairie/savannah conditions, but can provide alternative habitat for other suites of species instead. Similarly, agricultural maintenance can hold certain exotic species in check either through preferential grazing by cattle or through maintenance activities to remove unpalatable species (i.e. tropical soda apple, cogongrass). Removal of the cattle grazing operations can result in significant infestations of these otherwise controlled species. However, cattle grazing can also have negative effects on species composition, through preferential grazing on desirable species or trampling, and nutrient loading of sensitive habitats such as forested and herbaceous wetlands.

Cattle grazing will continue to be an important management tool for the LHCA over the long-term, although the amount of area available for grazing may change over time as other resource management objectives are implemented. Areas that currently consist of improved pastures (including Agricultural Lands over Native Soils and over Altered Soils) would benefit from grazing until restoration/enhancement activities occur. Opportunities to include management requirements for mowing, shrub removal, or exotic species control should be evaluated for new and renewed cattle grazing leases for these areas. Over the long-term, cattle grazing within isolated wetlands should be minimized, although exclusion measures that result in undesirable internal fencing or vegetation growth along fencing should be avoided. Where possible, cattle should be excluded from large wetland systems associated with Lake Hancock and lands included in the Native Systems zone to minimize nutrient loading concerns and to allow for growth/expansion of existing native vegetation.

Timber Management

Tree harvest can play a significant role as a mechanical management tool for existing forested lands as an initial treatment or when conducted in a sustainable manner and as a restoration tool for altered lands. Hydrological enhancements associated with the Lake Level Modification Project may lead to some systems transitioning from forested to herbaceous wetland systems and/or changing in composition from transitional canopy species (water oak, slash pine) to obligate wetland canopy species (cypress, blackgum). An initial timber removal effort to remove canopy species expected to die following hydrological enhancement would be beneficial to

manage the number of dead snags left within the expanded lake edge. Similarly, a one-time timber cut could be used to open the canopy within the flatwoods sections of the Hampton parcel as part of restoration activities for this natural system. In both cases, these cuts may provide some revenue that could be used for other management requirements while providing a potential enhancement to habitat function.

Timber management is also an important tool for managing altered land areas. Pines planted at relatively high densities to achieve rapid crown closure have been evaluated on other regional conservation tracts as a management method for cogongrass. This method should be evaluated as a restoration tool for Agricultural Lands over Altered Soils, especially the portion of this zone within the Ecological Linkage. The preferred planting approach within the Ecological Linkage should consist of pines appropriate for hydrological conditions (i.e. slash pine in hydric soils, longleaf pine in mesic and xeric soils) where possible so that management efforts, including planned thinning harvests, will result in canopy composition similar to historical vegetation community composition. Alternative methods, such as planting slash pine throughout initially followed by longleaf plantings after the first or second thinning harvest when cogongrass has been reduced in coverage, can be evaluated as well based on funding, research needs, and cogongrass management requirements. If possible, partnerships with local universities or research entities to research planting densities, rotation schedule, and pine species used on cogongrass removal should be evaluated.

For all timber harvests on the site, light-track or equivalent low-impact vehicles will be used to harvest and move harvested trees to logging decks. Logging decks may only be located within existing pastures or areas that were pastures prior to pine planting. Initial thinning rotations for pine plantings within the Ecological Linkage may occur consistent with other pine plantation management approaches, although the ultimate goal is to manage the stands within the Ecological Linkage using uneven aged stand management techniques. Pine plantings in the remainder of the Agricultural Lands over Altered Soils outside of the Ecological Linkage may be managed using thinning techniques and clearcut harvests consistent with District policy.

Signage

A wide variety of signs will be allowed and/or needed within LHCA to contribute to management efforts, document restricted and reserved uses, provide wayfinding for recreational users, and provide educational materials for user groups. A comprehensive signage program should be developed for the LHCA that could be implemented in a phased manner as time and resources become available. This program should identify locations for signs, types and content of signs to be added, and structural requirements for each sign. Types of signs likely to be included within the program include interpretive signs, wayfinding signs for trails, demarcations of specific resources (i.e. wood stork rookery buffers), prescribed fire warning signs, boundary signs for the property, and entrance signage. All signs located within areas requiring fire or mechanical management should be designed to be removed prior to or during the management action implementation.

Appendix 4
Recreational Needs Assessment

Methodology
There is no standard methodology or single, authoritative source regarding how to properly conduct a Recreation Needs Assessment. One concept that is particularly useful is the idea of "triangulation", or approaching needs from at least three different vantage points. The top three types of assessment tools typically utilized as part of an triangulation analysis include anecdotal, qualitative, and quantitative techniques. *Anecdotal techniques* are sometimes the most valid assessment tools, but they are also the least quantifiable. Site visits and photographs, phone calls and/or conversations with facility and/or program participants, personal observations, discussions with staff and other types of similar discussions and observations can form the initial component of a Needs Assessment. *Qualitative techniques* involve talking with a wide cross section of community residents and stakeholders in order to identify common themes, needs and interests. Review of existing data and demographics is another qualitative technique.

Quantitative techniques often have the greatest credibility; typical quantitative techniques include measuring park acreages, numbers of recreation facilities and geographic services areas based on national, state or local guidelines.

All three techniques were used for the Lake Hancock Needs Assessment, including:
Anecdotal:

- Telephone interviews with recreation local providers

Qualitative:

- Review of existing data on facilities
- Demographic analysis

Quantitative:

- Level of Service analysis

Following are the findings from each technique.

Findings - Telephone Interviews
Telephone interviews were conducted with local recreation providers, including representatives from:

- Southwest Florida Water Management District
- Polk County Leisure Services Division
- Florida Game and Freshwater Fish Commission
- Polk County Tourist Development Council
- City of Lakeland Parks and Recreation Department
- City of Winter Haven Parks and Recreation Department
- City of Bartow Parks and Recreation Department (pending)

The questions that were asked during the telephone interviews pertained to the existing program or facility deficiencies within their respective agencies; highest priorities for providing programs or facilities; and anticipated future funding.

Interviewees were consistent in terms of recreation needs in the Polk County area. Top priority needs include:

- Hiking trails
- Unpaved bicycle trails
- Equestrian trails with trailer parking
- Sports fields (soccer, football, baseball, softball)

Additional recreation elements were also desired by some of the interviewees. These include:

- Boat ramps with trailer parking
- Duck hunting
- Fishing platforms
- Skate parks

Review of Existing Data

Several existing documents provided insights into recreational needs in the Lake Hancock area. These include the 2002 Recreation and Open Space Element of the Polk County Comprehensive Plan; the 2000 Polk County Parks and Open Space Master Plan; and the 2000 State Comprehensive Outdoor Recreation Plan (SCORP).

2002 Recreation and Open Space Element

The Recreation and Open Space Element does not specify recreation needs in Polk County, but establishes general policies and goals. For example the Element establishes a goal of 6.95 acres of "passive and active recreational land" per 1000 residents, including state-owned conservation lands. Currently there are 2,719 acres of active and passive park land in Polk County that is currently managed by Polk County Leisure Services. This land equates to 7.398 acres per 1000 population based on the projected 2010 population of 367,530 residents. In addition, Polk County's Environmental Lands Program manages more than 19,000 acres of natural lands for passive recreation use.

Currently, the Recreation and Open Space Element has no other level of service standards for the residents of Polk County.

2000 Polk County Parks and Open Space Master Plan

The 2000 Parks and Open Space Master Plan indicates a need for resource-based recreation facilities and activities including camping, canoeing, horseback riding, bicycling, hunting, fishing, hiking and nature trails, and boat ramps, all of which are compatible with District objectives. The Master Plan also indicates a "deficiency" in tennis courts, baseball/ softball fields, football/ soccer fields, swimming pools and volleyball courts,

In addition to recreation facilities, the Plan indicates a need for additional regional, district and community parks. Specifically, a Community Park of at least 20 acres is needed in the Lake Hancock area. Typically a Community Park includes a variety of both active and passive recreational facilities.

The Plan also establishes a policy to "ensure the provision of outdoor recreation facilities within ten miles of every County resident, and outdoor recreation in a natural environment within twenty-five miles of every County resident". This policy has never been approved and adopted by Polk County.

2000 State Comprehensive Outdoor Recreation Plan (SCORP)

The 2000 SCORP indicates a need to "meet demand for bicycle riding and non-boat freshwater fishing" in Central Florida Region 7, which includes Polk County.

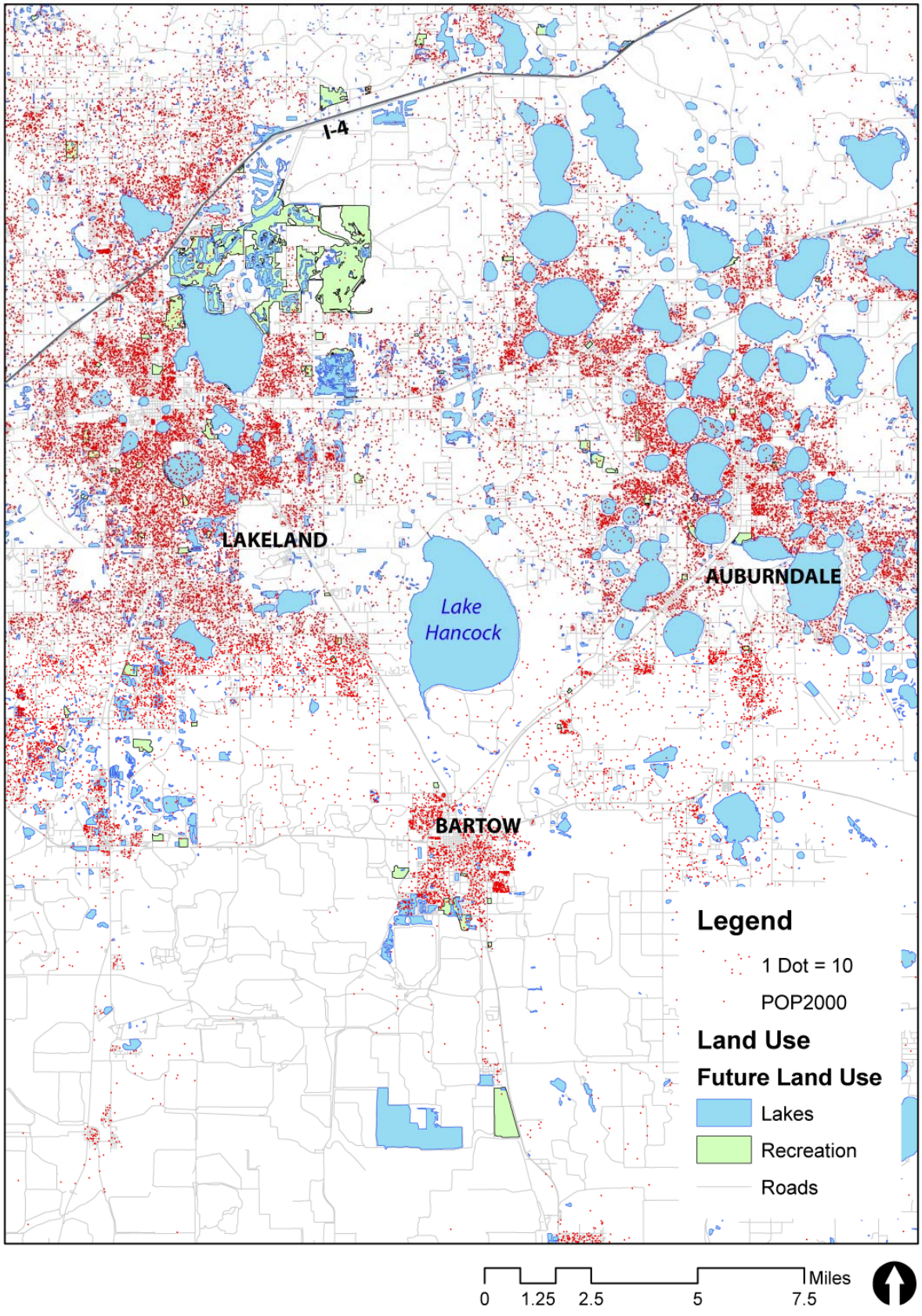
Demographic Analysis

The analysis of existing and projected demographics can be useful in determining potential recreation needs. Young children, for example, need smaller parks with playgrounds near their homes with playgrounds, whereas residents in their twenties and thirties tend to want dog parks, trails, and places for special events. There is also research showing how different ethnic groups have different parks preferences; one study of Chicago residents showed strong evidence that African-Americans tend to prefer parks that are more programmed, whereas Caucasians showed a greater preference for more natural areas (Dwyer, 1994). While it would be unwise to make conclusions based solely on these general trends, it is essential to understand the population that the parks and recreation system is meant to serve, and how that population is expected to shift over time.

Location and Population Distribution

Although Lake Hancock is located in rural Polk County, it lies at the heart of three important population centers: Lakeland, Auburndale, and Bartow. The map on the following page illustrates the distribution of population through a dot-density map, where each red dot equals ten people counted in the 2000 United States Census. It is important to note that each dot is not the exact location of a home, but rather a representation of the population concentration within each Census block. These maps are helpful in illustrating relative population densities. In the case of Lake Hancock, it shows clear clusters of population to the northeast (Auburndale), the south (Bartow), and the northwest (Lakeland). There is a very low population density around the Lake itself.

Population Density

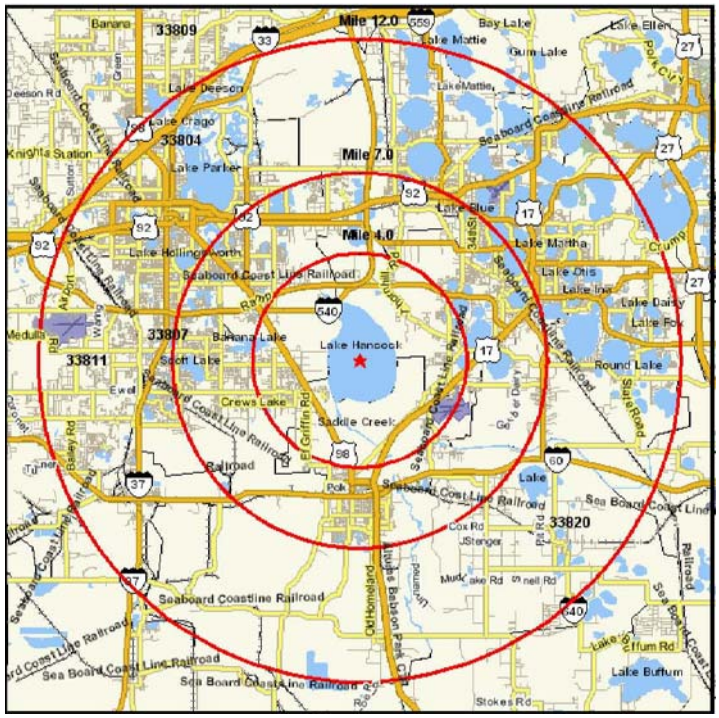


Population Characteristics

Knowing the population densities around the Lake is helpful to understanding the broader planning context of Lake Hancock. However, it is also important to analyze the specific characteristics of the population in the area, and how it may relate to parks and recreation needs.

The following section summarizes the demographic profiles of the primary populations that recreation facilities at Lake Hancock would serve. The populations are broken down geographically into three concentric rings based on a distance from the center of Lake Hancock:

- 0-4 miles
- 4-7 miles
- 7-15 miles



These distances represent different levels of recreation service that could be served at the Lake Hancock property. Those people living within four miles of the Lake's center—the **Local Ring**—may have neighborhood-level recreation needs that can be met at Lake Hancock such as multi-purpose open space, playgrounds, basketball courts, and walking or bicycling trails. Residents that live between four and seven miles away are in the **Community Ring**. These residents should have their neighborhood recreation needs met closer to home, but could have more community-wide needs met at Lake Hancock such as ball fields, hiking trails, and fishing. Those living between seven and fifteen miles from the center of the Lake are considered to be part of the **Regional Ring**. Their local and community recreation needs should be met elsewhere, but Lake Hancock may be an appropriate place to provide this population with regional, resource-based recreation such as camping, hunting, and other more specialized pursuits.

The chart on the following page summarizes basic demographic characteristics of each population group. Unless otherwise stated, all data is from Nielsen Claritas, and is based on the 2000 United States Census.

Summary Demographics for the Lake Hancock Area

	Local	Community	Regional	POLK COUNTY
Radius	**0-4 Miles**	**4-7 Miles**	**7-12 Miles**	
POPULATION				
2014 Projection	21,885	116,938	227,964	666,624
2009 Estimate	19,538	108,293	208,766	596,861
2000 Census	15,787	96,332	180,427	483,924
1900 Census	12,822	88,055	161,879	405,382
Growth 1990-2000	23.12%	9.40%	11.46%	19.37%
RACE				
White Alone	80.70%	79.95%	78.27%	79.58%
Black or African-American	13.85%	12.37%	16.00%	13.54%
Other Race	4.50%	5.77%	3.97%	5.17%
Two or More Races	2.17%	1.91%	1.75%	1.71%
Hispanic or Latino	6.15%	9.60%	7.43%	9.49%
AGE				
% age 0-4	6.94%	6.83%	6.51%	6.44%
% age 5-9	8.20%	7.21%	6.79%	6.86%
% age 10-14	8.64%	7.60%	6.71%	7.00%
% age 15-17	5.02%	4.43%	3.96%	4.13%
% age 18-24	5.24%	9.84%	8.18%	8.25%
% age 25-44	29.64%	27.65%	26.13%	26.43%
% age 44-59	17.98%	17.80%	17.55%	17.55%
% age 60 - 74	11.04%	12.39%	14.23%	14.93%
% over age 75	5.54%	6.24%	9.93%	8.39%
Median Age in Years	36	36	39	39
HOUSEHOLDS				
Growth 1990-2000	24.26%	9.86%	11.56%	20.05%
% Family Households	78.52%	71.28%	66.34%	70.66%
% Households with Children	42.76%	36.74%	31.29%	32.95%
Median Household Income	$43,813	$37,406	$35,825	$36,267
TRANSPORTATION TO WORK				
Drove Alone	85.27%	80.88%	80.78%	79.89%
Car Pooled	10.04%	13.62%	13.01%	14.31%
Public Transportation	0.33%	0.55%	1.06%	0.74%
Walked	0.78%	1.85%	1.46%	1.41%
Bicycled	0.14%	0.45%	0.40%	36.00%
Worked at Home	3.07%	1.79%	2.01%	2.08%
HOUSING				
% Owner Occupied	83.22%	71.50%	67.34%	73.38%
% Renter Occupied	16.78%	28.50%	32.66%	26.62%
Median Owner-Occupied Housing Value	$77,159	$68,785	$72,095	$70,139

Population Profiles

The Local Ring: 0 - 4 Miles from Lake Hancock - Approximately 19,500 people live within a four mile radius of the center of Lake Hancock. This population—the Local Ring—is characterized by a relatively fast growth rate of 23.12% between 1990 and 2000, and is comparable to the County-wide rate of growth. Residents in the Local Ring skew slightly younger, and there is a relatively greater percentage of households with children than in the more outlying rings. The median household income within the Local Ring is the highest amongst all the rings, and is higher than the County's, as is the median housing value of owner-occupied homes. These statistics suggest a more affluent, family-oriented population that lives in newer homes.

The Community Ring: 4 – 7 Miles from Lake Hancock - Approximately 108,300 people live between four and seven miles of Lake Hancock. This ring includes most of the population from the three major cities near the Lake: Auburndale, Bartow, and Lakeland. Because this area encompasses established cities, the growth rate between 1990 and 2000 (9.4%) was markedly slower than the Local Ring. The population, however, exhibits a similar age profile to the Local Ring, but is less affluent with a median household income of $37,406 and a median owner-occupied housing value of $68,785. There are also fewer households with children in the Community Ring (36.75%) than in the Local Ring, but a greater percentage of the population is Latino (9.60%). Additionally, a smaller percentage in the Community Ring drove alone to work, and about 13% carpooled. This data indicates a population that lives in more established communities that are slightly less affluent than those who live closer to the Lake, and is less oriented towards households with children.

The Regional Ring: 7 to 12 Miles from Lake Hancock - The seven- to twelve-mile ring around Lake Hancock extends north of Interstate 4 , east almost to US-27, to five miles south of Bartow, and west to Lakeland Linder Regional Airport. Within this ring, there are approximately 208,800 residents—more than one third of the County's population. The growth rate in Regional Ring between 1990 and 2000 (11. 46%) was slightly higher than the Community Ring, but was still about half that of the County's growth rate. The population is also older than the inner two rings, as indicated by a higher median age (39 years versus 36), a higher percentage of people over the age of 60, and the lowest percentage of households with children (31.29%). The population also appears to be more transient than the other rings, with about 32.6% living in renter-occupied housing as opposed to 28.50% in the Community Ring, and 16.5% in the Local Ring. This is also reflected in a slightly lower level of affluence, shown in the median household income of $35,825. This data suggests an older, less affluent population with greater resident turnover than in the Local and Community Rings.

Summary – Demographic Implications for Recreation Facilities at Lake Hancock

The demographic location of Lake Hancock has important implications for recreation planning. The first is that the size and location of Lake Hancock has prevented Auburndale, Bartow, and Lakeland from merging together through sprawling growth. Thus, these three cities have a sense of place and physical distinction from one another that should continue to be protected through the conservation of Lake Hancock. The second implication is related, but more focused on recreation in particular: Lake Hancock region's central recreation "meeting place" where the

three communities—and others—can come together to enjoy the natural environment of Polk County.

In terms of meeting recreation needs, there are three levels of facilities to consider. The first is local recreation facilities, which are typically multi-purpose green spaces, playgrounds, and picnic areas. The relative affluence of those who live within four miles of the Lake's center point, and the newness of much of this growth, would indicate that most of the residents can probably have their needs met within their new communities or in their backyards. However, residents of this core largely live outside the boundaries of Auburndale, Bartow, and Lakeland, and may need a neighborhood gathering place where their own identity in the region can be formed. Thus, a neighborhood center or place for small-scale special events is likely a need.

The second level of recreation facilities is the community level, which often includes more active recreation needs such as ball fields, swimming pools, and gymnasiums. Because many of the residents within the four- to seven-mile Community Ring are residents of one of three nearby cities, their community recreation may already be met elsewhere. The demographics of this area also indicate a lower percentage of families with children, a group which tends to be the most frequent users of active recreation facilities. It should be kept in mind however, that the younger affluent families within the Local Ring may also be dependent upon Lake Hancock in the future to provide community-level facilities, so there likely is some level of need for baseball fields and soccer fields if other municipalities' facilities are inaccessible due to distance or policy.

The third and final level of recreation facilities is the regional level, which is typically characterized by resource-based recreation such as hiking trails, fishing, and boat ramps. The Regional Ring contains the largest percentage of elderly residents, who tend to need more passive recreation facilities like fishing and boating. Additionally, Lake Hancock should serve the regional recreation needs for those living closer to the lake. An examination of the area topography shows that residents in Auburndale and Lakeland likely have multiple points of lake access for fishing and boating due to their large number of water bodies, but that residents in Bartow likely have far few opportunities.

Level of Service Analysis

A Level of Service (LOS) Analysis measures the geographic areas served by existing parks and recreation facilities, using community-based criteria. For example many communities believe that a playground should be provided with a ½ mile walk of every resident, while a ball field should be provided within a 3 mile drive or bike ride of every resident. The Service Area Analysis shows the areas served by existing facilities, and more importantly any voids or deficiencies in service that could be filled at Lake Hancock.

Service areas were measured for both active and passive recreation facilities, as follows:

Resource-Based ("passive") Recreation Facilities:
Camping facilities – 10 miles
Equestrian centers – 5 miles
Hiking trails – 5 miles
Biking trails – 5 miles

Equestrian trails – 5 miles
Fishing piers – 5 miles
Public boat ramps – 5 miles
Canoe/kayak launches – 5 miles

Facility-Based ("active") Recreation Facilities:
Soccer and football fields – 3 miles
Baseball and softball fields – 3 miles
Basketball courts – 1 mile
Volleyball courts – 1 mile
Playgrounds – 1 mile

Following are findings from each Service Area Analysis technique:

Camping
Camping areas identified in the LOS Analysis include full service campgrounds that provide users with service staff as well as a variety of amenities that include: water hook-ups, electrical hook-ups, picnic shelters, grills, fire rings, group pavilions, etc. Campgrounds meeting this criteria include Saddle Creek Park and Campground, located about 4 miles north of Lake Hancock, as well as Mary Holland Park located about 6 miles south of the Lake Hancock. These two campgrounds provide resident living on the northern, western, and southern areas of Lake Hancock with access to full-service camping experiences. However, a small area located in the north-eastern area of Lake Hancock as well as within the City of Winter Haven does not have access to this type of camping facility.

Equestrian
Equestrian centers identified in the LOS Analysis include those that provide users with an equestrian arena and arena support facilities. The Bartow Ag Center is the only location in Polk County that meets this criteria, located about 5 miles south Lake Hancock. Residents living in northern and eastern Polk County currently do not have access to such a facility.

Biking Trails
Biking trails identified in the LOS Analysis include off-road, paved and unpaved surfaces between 8-12 feet wide. These trails ranged between 0.5 miles to 71 miles in length. Residents living on the west side of Lake Hancock currently have access to a variety of these trails. Fort Fraser trail; a paved 12 foot wide, 7 mile multi-purpose trail and the Teco Trail, also a 12 foot wide, 5 mile multi-purpose trail are the most notable trail segments in the western and northern regions of the Lake respectively. In addition to these two trails, a variety of parks located within the City of Lakeland as well as in western unincorporated Polk County provide residents with access to a variety of different bike trail experiences. The eastern side of Lake Hancock however, has no access to bike trails.

Residents living in the un-incorporated Polk County area just east of the lake, as well as resident living in the Cities of Water Haven, north Bartow, and Eagle Lake do not have access to any bike trails. Providing bike trails within the eastern public lands of Lake Hancock would not only

provide resident with biking opportunities but would also provide a connection to Fort Fraser Trail.

Hiking Trails

Hiking trails identified in the LOS Analysis included those that provide users with an escape from the built urban environment and provide access to undisturbed and protected natural lands through a network of natural surface trails. These trails range between 0.25 miles to 74 miles in length. The only hiking trails that residents living around Lake Hancock currently have access to are located within the Circle B Bar Reserve. This natural area located on the north-western edge of Lake Hancock provide residents living in southern portion of the City of Lakeland and residents in the un-incorporated area located in the north-western edge of Lake Hancock with access to hiking trails.

Residents living in the un-incorporated Polk County area just east of the lake, as well as resident living in the Cities of Water Haven, northern Bartow, and Eagle Lake do not have access to any hiking trails.

Equestrian Trails

Equestrian trails identified in the LOS Analysis include those that provide users with access to undisturbed and protected natural lands through a network of natural surface trails. These trails range between 0.5 miles to over 30 miles in length. The only equestrian trails located in the vicinity of Lake Hancock include those located within Saddle Creek Park and Campground located about 4 miles north of Lake Hancock near the City of Lakeland and IMC Agrico Peace River located about 6 miles south of Lake Hancock near the City of Bartow. Residents living within 5 miles of Lake Hancock in the un-incorporated lands south, east, and west of the Lake as well as within the Cities of Winter Haven and northern Bartow do not have access to equestrian trails.

Fishing Piers

Fishing areas identified in the LOS Analysis include those that provide opportunities to fish along shore lines or fishing piers. With 550 lakes in Polk County, many residents enjoy access to a multitude of fishing opportunities. However, residents living within the vicinity of Lake Hancock do not enjoy these opportunities. Specifically, residents living south-west of Lake Hancock currently do not have access to any fishing areas. Residents living in northern Bartow, located just south of the lake, as well as those living just east of the lake, currently do not have access to fishing areas.

Public Boat Ramps

Public boat ramps identified in the LOS Analysis include paved and unpaved ramps for motorized boats. As mentioned previously, with 550 lakes in Polk County, many residents enjoy access to variety of water bodies. However, similar to fishing areas, residents living within the vicinity of Lake Hancock do not have access to boat ramps. Specifically, residents living south-west of Lake Hancock currently do not have access to any boat ramps within 5 miles. Residents living in northern Bartow, located just south of the lake, as well as those living just east and north of the lake, currently do not have access to boat ramps.

Canoe / Kayak Launches
Canoe / kayak launches identified in the LOS Analysis include those sites that allow launching from sandy beaches and shore lines as well as from the water by the use of docks. Similar to fishing areas and boat ramps, residents living within the vicinity of Lake Hancock do not have access to canoe and kayak launches. Specifically, residents living in northern Bartow, located just south of the lake, as well as those living just east and north of the lake, currently do not have access to canoe and kayak launches.

Soccer + Football Fields
Lake Bonny Park, Loyce Park, and Mary Holland Park provide residents in the areas west and south of Lake Hancock with access to soccer and football fields. However, residents living just north and east of the lake currently do not have access to soccer and football fields. Sertoma Park, located about 4 miles from the lake is the only park west of the lake that contains soccer and football fields. Residents living in the south-eastern area of the lake with northern Bartow, currently do not have access to soccer and football fields.

Baseball + Softball Fields
Residents living in the western and southern areas of Lake Hancock enjoy access to various parks that contain baseball and softball fields. Specifically, Eaton Park, Highland City Park, Christina Park, George Pittas Park, Gordon Heights Park, and Gordonville Park all provide residents living within a 3 mile radius of Lake Hancock with access to baseball and softball fields. Residents living north and north-east of the lake however, currently do not have access to baseball and softball fields.

Basketball and Volleyball Courts
Residents living within a 3 mile radius of Lake Hancock have very little access to basketball and volleyball courts. Gordonville Park and Gordon Heights Park, located about one mile south-east of the lake are the only two parks that provide residents with these activities.

Playgrounds
Similar to basketball and volleyball courts, residents living within a 3 mile radius of Lake Hancock have very little access to playgrounds. Highland City Park and Banana Lake provide limited access to residents living west of the lake and Gordon Heights Park provides residents living south of the lake with access to playgrounds. Residents living just north, south, and east of the lake currently do not have access to playgrounds.

Summary
Based on the Level of Service criteria outlined above, it appears that there is a need for more of the following facilities in the areas surrounding Lake Hancock:

Resource-Based Recreational Facilities:

- Biking Trails
- Hiking Trails
- Equestrian Trails
- Fishing Areas
- Boat Ramps

- Canoe | Kayak Launches

Active Recreational Facilities:

- Soccer and Football Fields
- Baseball and Softball Fields
- Basketball and Volleyball Fields
- Playgrounds

Appendix 5
Construction Cost Estimate

PROJECT NAME: Lake Hancock Land Use and Management Plan
GJ PROJECT NO.: 20820.0
DATE: January 2010
PROJECT PHASE: Land Use Component

ORDER OF MAGNITUDE COST ESTIMATE

Item No.	Item	Quantity	Unit	Price	Subtotal	Description
A.	**Start-Up and Site Work**					
1.	Mobilization and General Conditions	1	LS	$350,000.00	$350,000.00	
2.	Layout	1	LS	$70,000.00	$70,000.00	
3.	Site Clearing & Grading w/on-site balancing	1	allowance	$250,000.00	$250,000.00	
4.	Erosion Control	125,000	LF	$1.75	$218,750.00	silt fence
	Subtotal				**$888,750.00**	
B	**Utilities**					
1.	Water Upgrades and Reconnections	1	allowance	$250,000.00	$250,000.00	water pipes, testing, tap and meters
2.	Electrical Service Supply	1	allowance	$300,000.00	$300,000.00	transformers, supply, conduits, meters
3.	Stormwater System	1	allowance	$300,000.00	$300,000.00	inlets, piping, outfalls, ponds, swales
4.	Lighting - Roadway	20	EA	$5,000.00	$100,000.00	14-16' lamp height
	Subtotal				**$950,000.00**	
C	**Hardscape**					
1.	Lake Hancock Trail	84,000	LF	$24.00	$2,016,000.00	asphalt, 12' wide, 6" compacted base, trail follows SR540 to CircleBBar
2.	Lake Hancock Trail bridges	1,500	SF	$75.00	$112,500.00	three bridges total, 10' wide x 50' length, wood boardwalk
3.	Unpaved, Multi-use trails	120,000	LF	$2.00	$240,000.00	dirt, cleared- for hiking, biking, and equestrain
4.	Trail Boardwalks	24,000	SF	$50.00	$1,200,000.00	allowance for as needed along unpaved trails and Lake Hancock Trail
5.	Equestrian Trailer Parking	5	EA	$1,500.00	$7,500.00	stabilized grass, 15' x 40'
6.	Equestrian Corrals	5	EA	$8,000.00	$40,000.00	fenced areas, 1 acre in size each
7.	Composting Restrooms	3	EA	$50,000.00	$150,000.00	pre-fab, two toilet rooms, storage, slab, plumbing
8.	Site Furnishings	1	allowance	$100,000.00	$100,000.00	benches, trash receptacles, drink fountains, picnis tables
9.	Picnic Shelters	20	EA	$20,000.00	$400,000.00	15' x 15' pre-fab pavilion, concrete slab
10.	Vehicle Parking	80	EA	$800.00	$64,000.00	asphalt, 10' x 20', with access lane
11.	Camp SItes	10	EA	$2,000.00	$20,000.00	primitive, tent pad, fire ring
12.	Boat Ramp	1	LS	$15,000.00	$15,000.00	2-lane, concrete, 60' long
13.	Boat Trailer Parking	10	EA	$3,000.00	$30,000.00	asphalt, 15' x 40'
14.	SW Canoe Launch	1	allowance	$10,000.00	$10,000.00	stablilized grass or sand bank, 20' x 40'
15.	Fishing Pier	250	SF	$75.00	$18,750.00	5' x 50' wooden pier
16.	Blueway Canoe Launch	3	EA	$10,000.00	$30,000.00	stablilized grass or sand bank, 20' x 40'
17.	Signing	1	allowance	$50,000.00	$50,000.00	entry, directional, regulatory, interpretive
18.	Hampton Entry Guard House	1	LS	$40,000.00	$40,000.00	10' x 20', office, restroom, storage, septic
19.	Hampton Entry Road - paved	14,000	LF	$55.00	$770,000.00	asphalt, 22' wide, 12" compacted road base
20.	Hampton Building Renovations	1	allowance	$200,000.00	$200,000.00	renovation to office space
21.	Sheffield Entry Road - unpaved	3,000	LF	$15.00	$45,000.00	compacted shell, 22' wide, 10" compacted depth
22.	Ellsworth/Griffin Entry Road - paved	5,000	LF	$55.00	$275,000.00	asphalt, 22' wide, 12" compacted road base
23.	Fencing and Gates	1	allowance	$50,000.00	$50,000.00	
	Subtotal				**$5,883,750.00**	
E	**Landscape**					
1.	Turf - Bahia sod	10	AC	$8,300.00	$83,000.00	distrubed areas
2.	Landscaping	1	allowance	$150,000.00	$150,000.00	planting per code, buffer areas, parking areas, shade, accents
	Subtotal				**$233,000.00**	
	Totals					
	Subtotal				**$7,955,500.00**	
	Contingency (20%)				$1,591,100.00	
	Design and Permitting (12%)				$1,145,592.00	
	GC Overhead, Fee, and Insurance (10%)				$954,660.00	
	Grand Total				**$11,646,852.00**	

APPENDIX 6 Literature Cited

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Appendix 7

Comments from Public Presentations

The District presented this conceptual plan to various entities at public forums including a public meeting in Bartow, the Bartow City Commission, and the Polk County Board of County Commissioners meetings. Comments and questions received are as follows, District responses are in Blue.

Public Meeting in Bartow, September 22, 2009

Minimize impacts to scrub on Hampton Parcel
No scrub has been located on this parcel, if identified, it will be managed to maintain the natural system.
Concerns on effect of Lake Level Modification Project on commercial fishing. Concerned commercial fishing is excluded from land use plan.
Resources are managed for all users, and potential boat ramps have been identified to provide access.
Will there be access to the property off Thornhill Road?
Yes, initial access will be approximately one half mile south of CR 540 on Thornhill Road.
Will equestrian and pedestrian trails and use be separate?
Yes, as currently proposed, trails will be separate.
Would like to see potential surplus lands in public ownership.
Currently the Governing Board is maintaining its ability to surplus lands that are not needed for the project or greenway.
Trail should be located adjacent to development, east side of property, not along lake.
This is a conceptual plan, final routing will be determined in the future.
Potential surplus properties could be used for equestrian trails.
Currently the Governing Board is maintaining its ability to surplus lands that are not needed for the project or greenway.
Potential surplus lands along Hwy 98 should be kept for special events and parking.
District will consider this option as it evaluates lands not needed for District project or the greenway.
What is happening with Hayes-McKay dredge project?
County has entered into agreement with Hayes-McKay and initial testing and permitting are underway.
How has potential surplus acreage changed?
From 1,073 acres to approximately 980 acres based on current project and DRI configurations.
Outfall treatment area should be considered for waterfowl hunting.
Due to the current design and planting schemes, there will be very limited waterfowling opportunities.
No internal paved trails.
This is a conceptual plan, final routing and particular trail types will be determined in the future.
Emphasize opportunities for waterfowl habitat restoration.
The District will consider so long as it is compatible with other objectives of the plan and District projects.
Consider reforestation of surplus lands on the SE of lake and lease to DOF.
Currently the Governing Board is maintaining its ability to surplus lands that are not needed for the project or greenway.

Unpaved trail close to lake with paved trail more removed.
This is a conceptual plan, final routing will be determined in the future.

Proposed surplus lands should be used for future active recreation.
Currently the Governing Board is maintaining its ability to surplus lands that are not needed for the project or greenway. The District has evaluated both resource based and facilities based recreational needs. The passive resource based uses can be sited on the natural areas while the facilities based recreational needs may be better sited on the non-traditional use lands, assuming that a local partner such as the county, municipality, or homeowners association is interested in funding improvements, operations and maintenance.
Attendees were appreciative of the chance to provide input.

City of Bartow City Commission meeting, October 5, 2009

What are the proposed uses for the Griffin Parcel?
Boat ramp and trail interconnection and also for mitigation and reforestation.
Is County missing an opportunity to restore the upper river for recreation?
District is not aware of any lost opportunities.
Has the District considered leases for citrus grove on Hampton?
Grove is no longer viable due to disease and Citrus Mutual has asked that it be removed.
Ensure that wildlife corridor is considered in DRI.
The land use plan examined a functional corridor which will be utilized in any surplus of the DRI. The wildlife corridor identified in the plan will be the same in the DRI.

Polk County Board of County Commissioners meeting, November 4, 2009

Board had general questions regarding the surplus area, which presenting staff addressed to the Board's satisfaction.