WETLAND MITIGATION PLAN
FOR THE
PROGRESS ENERGY
LEVY NUCLEAR PLANT and
ASSOCIATED TRANSMISSION LINES

Prepared for

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1.0 INTRODUCTION AND OVERVIEW

Progress Energy Florida (PEF) has applied for approvals to construct and operate a nuclear power plant facility (Plant) in Levy County, Florida. The Levy Nuclear Plant (LNP) site lies just east of US 19 and north of the Cross Florida Barge Canal. It is generally bounded by Goethe State Forest (GSF) on the north and County Road 40 on the south (Exhibit 1-1). In this document, references to the LNP Site include all portions of the site to be altered through the proposed activities north of CR 40, including building structures and appurtenances, roadways, and pipelines, but excluding the transmission line corridor extending from the proposed plant site to the southern boundary of the site. In addition to activities at the LNP Site, a series of transmission line corridors are routed in Citrus, Hernando, Hillsborough, Lake, Levy, Marion, Pinellas, Polk and Sumter Counties (Exhibit 1-2), with wetland impacts occurring in all of these counties except Hernando and Lake. Reference to the transmission line corridors includes all of these counties unless stated otherwise, and includes the transmission corridor on the LNP site itself. A blowdown pipeline must be constructed from the Plant to the existing Crystal River Energy Complex in adjacent Citrus County. That portion of the blowdown pipeline north of CR 40 is included as part of the LNP Site, while the segment from CR 40 to the Crystal River Energy Complex is considered separately as "off-site." The transmission line corridors (both on and off of the LNP site, and the blowdown pipeline segment south of CR 40 are referred to collectively referred to as "Lines." Finally, a barge slip and ramp area will be constructed on the northern side of the Cross Florida Barge Canal.

The objective of the mitigation plan described in this document is to offset wetland impacts incurred through the construction and operation of the LNP Site, Lines and barge slip area. This plan provides technical documentation demonstrating compliance with the nonprocedural requirements of the Florida Department of Environmental Protection (FDEP) Environmental Resource Permit (ERP) rules under the Power Plant Siting Act Site Certification process and a U.S. Army Corps of Engineers (USACE) Section 404 Individual Permit for the Plant and the associated Lines. The project site, project description and project need are detailed in the Site Certification Application (SCA) documents and are not reiterated here.

This plan primarily addresses several geographically distinct mitigation parcels that provide the potential for acquisition of mitigation credits. These parcels include the following: (1) portions of the LNP site itself, (2) an adjacent parcel known as the Lybass property, (3) an adjacent parcel known as the Robinson Tract, (4) portions of the adjacent GSF, and (5) two tracts of land totaling 710 acres some distance north of the LNP site, but adjacent to GSF (Exhibit 1-3). A thorough field review has not yet been conducted on parcels 4 and 5, but available information suggests that mitigation potential exists. General descriptions of site characteristics herein apply to all parcels, unless otherwise noted.

Since parcels 2, 3 and 4 above are contiguous with the LNP site and exist in the same geophysical landscape setting, these are referred to hereafter as the "Primary Mitigation Options," however, this does not imply that all of them will necessarily be part of the final, approved mitigation program.

Two mitigation banks that provide, or may soon provide, mitigation credits in portions of the project area were also assessed for applicability to this project.

In deference to Levy County's land use approval ordinance (Special Exception Zoning Approval - SE 2-08, 2 September 2008), the plan will conform to the requirement that:

> "A 100-foot natural vegetative buffer shall be maintained along the property's perimeter where abutting properties are not under the same ownership as the subject property. An access road for agriculture or other low-impact uses may be integrated into the buffer."

A primary value of this mitigation program is an overall increase in ecological function provided across several thousand acres in a regionally significant location. The mitigation approach focuses primarily on enhancing and restoring ecological functions to a very large area of wetland habitat and supporting uplands, relative to the area being impacted. This landscape-level ecosystem benefit substantially augments the value of the local-scale mitigation activities described below.

Biological Research Associates, a Division of ENTRIX, Inc. (BRA) has visited and individually reviewed each wetland on the LNP site and the Robinson Tract. In addition, BRA visited the proposed restoration locations in GSF and reviewed available data (land use, soils and topography maps as well as current and historic aerial photography) related to all other parcels. BRA has been in close communication with other consultants (CH2M Hill and Golder Associates), which have also conducted extensive investigations related to the proposed impacts and mitigation areas. As a result, the mitigation plan reflects the compilation of extensive site-specific data gathering and analysis based upon several thousand hours of site work and desktop preparation.

Information on locations and types of wetland impacts presented in this report and used in determining the appropriate mitigation supersedes information provided in the SCA, based upon minor refinements and more detailed analyses conducted since submittal of the SCA. Likewise, discussion of mitigation approaches or techniques presented here supersedes any analogous information provided in the SCA.

This document does not identify one defined area or set of areas that will comprise the specific mitigation program. It demonstrates the clear availability of more-than-ample mitigation through a variety of options. As the LNP site impacts and transmission corridors become finalized[1], and real estate opportunities and constraints are clarified, PEF will act expeditiously to select an appropriate combination of the options discussed herein and finalize the specific program to offset the project impacts.

A key feature of this plan is that a number of mitigation areas could be combined to create a significant mitigation project. Because the Robinson, Lybass, nor Tracts 391/392 are not currently under contract to PEF, this "menu-based" approach to the mitigation plan has been developed. It is possible to combine the individual components in several ways to achieve more-than-sufficient mitigation for the proposed impacts. Impacts are currently projected at a maximum of 411 functional units. As potential scenarios, the wetland lift available in these combinations yields more than enough mitigation:

[1] Because the exact acreage of impacts will be finalized post-SCA, a conservative approach was used throughout this document relative to impact analysis and discussion. This approach results in the presentation of a worst case scenario showing great than expected wetland impacts from the project.

- LNP site, plus Robinson, Zone 1 (457 lift units)
- LNP site, plus Lybass (520 lift units)
- Goethe State Forest, plus Robinson Zones 1 and 2 (415 lift units)

Other combinations are possible. PEF may also pursue other options for subdividing the various parcels under consideration. Because of the considerable logistical constraints associated with some options, including actual availability and cost of lands not currently controlled by PEF, the ultimate decision of the mitigation components must be made by PEF.

Finally, the great majority of the proposed impacts (by acreage and relative functional loss of impact) are located at or very near the power plant property in the Waccasassa and Withlacoochee watersheds. The mitigation is located in close proximity to those impacts, which will achieve greater offset from a regional watershed perspective and provides much more long-term ecosystem benefit over the on-site alternative. This plan clearly addresses the state's requirements for assuring long term viability and provision of greater ecological value than would a conventional on-site mitigation proposal.

2.0 WETLAND IMPACTS

2.1 Direct Impacts

Wetland impacts can be generally separated into the categories reflected in Table 2-1. Areas of both forested and herbaceous wetlands will be impacted on the LNP Site (Exhibit 2-2). In the impact areas, wet planted pine is treated as a type of forested wetland. The forested classification is consistent with its treatment in the SCA where, in fact, much of this area was presumed to be upland prior to the final approval of the jurisdictional determination. Historically, portions of the areas mapped by BRA as "wet planted pine" were forested wetlands, while others were herbaceous wetlands. In both cases, those wetlands have been severely degraded through the bedding and planting of pines, and the repeated harvesting activities. Impacts within transmission corridors would occur in forested and herbaceous wetlands as well as some areas of open water (see Table 2-1). Attachment 1 provides a listing of individual wetland assessment areas, also indicating the results of the UMAM analysis, as discussed in detail in Section 7.0.

Table 2-1. Area-Based Summary of Wetland Impacts Associated with the Progress Energy Levy Nuclear Plant and Associated Transmission Line Corridors.

Wetland Type	LNP Site (excluding Transmission Corridor)	Transmission Corridors (on- and off-site)	Blowdown Pipe (off-site)	Barge Slip/Ramp	Total
Open Water	0.0	10.8	1.4	1.1	13.3
Forested	346.9	279.1	12.4	0.0	638.4
Herbaceous	21.1	64.7	27.2	0.0	113.0
Total	368.0	354.6	41.0	1.1	764.7

Wetland impacts will occur in three degrees: permanent impacts (e.g., filling of a wetland to allow for construction, thus removing all wetland function), temporary impacts (e.g., disturbance of a wetland adjacent to a construction area or to allow for installation of a buried pipeline), and partial impacts (e.g., clearing of trees from a portion of a forested wetland along a power line corridor, but maintaining non-forested wetland functions). On the LNP site, the area of permanent (fill) impacts represents about 75 percent of the total impact acreage (excluding transmission corridor impacts).

For the purposes of this plan, all three types of impacts have been grouped together for the LNP Site (excluding the transmission corridor) and considered to be permanent impacts. This has been done to ensure that the overall amount of compensation required will be available. By considering all LNP Site impacts as permanent, and basing the necessary mitigation on that determination, there is no need to provide for and manage restoration or enhancement activities within temporarily disturbed areas (many of which will be in close proximity to plant facilities and operations). Furthermore, some, if not all, wetland function will eventually be recovered in the temporarily disturbed and cleared areas, but because the mitigation is based upon a complete elimination of that function, the amount of mitigation provided will compensate for lost wetland function.

Determination of the amount of wetland mitigation required is addressed through the application of the Florida Uniform Mitigation Assessment Methodology (UMAM, contained in Chapter 62-345, Florida Administrative Code). UMAM was used to quantify the degree of functional loss for all areas to be impacted, based on their characteristics. Application of the UMAM process for this project is described in Section 7 of this plan. Table 2-2 provides a summary of the UMAM loss units associated with the same categories of wetland impacts reflected in Table 2-1. As indicated in Table 2-2, a total of -411 loss units will result from the proposed activities. In the case of forested areas to be cleared along the transmission lines, determination of loss units was based on the partial impact to be sustained from removal of the trees.

Table 2-2. Summary of UMAM Functional Units Attributed to Proposed Wetland Impacts for the Progress Energy Levy Nuclear Plant and Associated Transmission Line Corridors.

Wetland Type	LNP Site (excluding Transmission Corridor)	Transmission Corridors (on- and off-site)	Blowdown Pipe (off-site)	Barge Slip/Ramp	Total
Open Water	0.00	-8.5	-1.1	-0.6	-10.2
Forested	-173.5	-137.8	-9.9	0.0	-321.2
Herbaceous	-9.9	-47.8	-21.8	0.0	-79.5
Total	-183.4	-194.1	-32.8	-0.6	-410.9

Exhibit 2-1 illustrates the UMAM scores associated with each wetland within the impact area on the LNP site. The wetland impacts resulting from the construction of the new transmission lines is an estimate since the final rights of way have not been selected. The estimates are based on a reasonable worst case scenario of the proposed rights of way impacts. The UMAM scores being used were prepared by BRA in cooperation with Golder Associates based on the conceptual rights of way.

2.2 Secondary Impacts

The proposed construction and mitigation plans adhere to the ERP secondary buffer requirements and in most cases far exceed the 25 feet average and 15 feet minimum requirements. Safety considerations are paramount at a nuclear facility therefore buffers, fencing and reduced public access will be an integral part of the construction practices, as will the use of containment protocols during construction. The need for the electricity resulting from the project is definitively established by the Florida Public Service Commission and the Nuclear Regulatory Commission. There is no causally connected development resulting from the project the existing and projected demand is well established and there is no speculative or future development that is generated by the project.

2.3 Cumulative Impacts

The proposed mitigation plan proposes regionally significant ecological mitigation and as such is likewise entitled to preferred consideration under the applicable Basis of Review. The LNP site impacts occur in the Wacassassa and Withlacoochee basins and those impacts will be offset in those basins. With respect to the linear construction impacts, they are specifically acknowledged by Florida law as

ecologically enhanced areas within the watershed. The disconnected and numerous small linear impacts are proposed primarily to expand and widen existing right of way impacts. Mitigating in close proximity to the linear improvements would result in a far inferior ecological result. The postage stamp and unsustainable mitigation resulting from such an effort is discouraged and anathetical to watershed restoration.

3.0 PLAN COMPONENTS

As noted above, the proposed impacts occur to a variety of wetland community types, within several watersheds and counties. This plan is designed to provide acceptable mitigation across this spectrum and includes consideration of a variety of options. In large part, the mitigation described in this plan will result in the restoration and rehabilitation of wetlands in a former Florida flatwoods habitat mosaic and will more than offset the loss of wetlands incurred by the project. Most or all of the mitigation can be provided in a group of areas on and adjacent to the LNP site, as depicted on Exhibit 3-1, with wetlands shaded according to their current UMAM scores. Exhibit 3-2 reflects the target UMAM scores for the same set of areas. Exhibit 3-3 reflects the forested and herbaceous character of wetlands in the Primary Mitigation Option areas, based on their treatment in the UMAM evaluation (see Section 7).

The LNP Site is owned by PEF. The GSF project is on state-owned land and no acquisition would need to occur. The Robinson, Lybass and other offsite properties may be available for purchase, or could otherwise come under the control of PEF for the purposes of providing mitigation. Table 3-1 contains a summary of the potential mitigation opportunities. These are addressed more fully below the table, and UMAM values are presented in detail in Section 7.

Table 3-12. Potential Mitigation Components for the Levy Nuclear Plant Site and Transmission Corridors.

Option	Location	Action	Acreage	Available UMAM Lift
1	LNP Site	Rehabilitation (Enhancement)[2] /Preservation	2,261 ac.	325 Credits*
2	Lybass Property	Rehabilitation/ Preservation	1,956 ac.	195 Credits
3	Robinson Property	Rehabilitation /Preservation	5,752 ac.	608 Credits
4	Goethe State Forest	Re-establishment /Rehabilitation	464 ac.	33 Credits
5	Other Off-site Land	Rehabilitation/ Preservation	710 ac.	31 Credits
6	Tampa Bay MB	Mitigation Credits	N/A	0 Freshwater Credits
7	Upper Coastal MB	Mitigation Credits	N/A	40 State Credits

* Based on lift gained from wetlands only

[2] From the Corps' and EPA's rules on wetland mitigation: § 332.2/ 230.2 Definitions. Establishment (creation) means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions. Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions. Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area. Under FDEP's and the water management district's rules "Establishment" equals "Creation" and "Rehabilitation" equals "Enhancement."

The majority of the proposed impacts on the LNP site will be to wet planted pine and wetlands that have been disturbed by silviculture and silviculture-related activities such as bedding, fire suppression, ditching, and road building and maintenance. Many of the cypress and hardwood wetlands have been recently logged. Functions that would be lost due to the development of disturbed on-site wetlands would be primarily to water quality and quantity, wildlife habitat, and flood storage capacity currently provided by the areas to be impacted.

Some combination of the efforts discussed herein will comprise the mitigation program and are designed to restore the pre-pine plantation/historical wetland communities. Specifically, they provide for the restoration[3] of a mosaic of natural wetland communities. The proposed ecological goals for fulfilling the mission on these lands are fourfold:

1. Rehabilitate the landscape mosaic to generally reflect what appears on 1940's-era aerial photographs. The 1940's landscape was that which existed prior to pine plantation conversion activities.
2. Re-establish the species composition and structure of the 1940's wetland plant communities associated native upland habitat analogs. The communities will resemble representative communities in the area on similar soils and at similar elevations above sea level with respect to species abundance and distribution, as well as vertical stratification, and overall habitat heterogeneity.
3. Within the practical limits of future management requirements, rehabilitation efforts will return natural patterns of surface run-off by filling ditches and erosion areas, eliminating roads, installing equalizer culverts under and creating hardened low water crossings in permanent roads, and will implement a "natural" prescribed fire regime at the site.
4. Conservation easements will be recorded upon establishment of the mitigation area (except where the mitigation will occur on state-owned lands) and this, combined with long-term management, will ensure that the mitigation areas are preserved in perpetuity.

3.1 LNP Site Components

The potential mitigation on the LNP site is in four spatially distinct areas: East, North, South, and Southwest. Each area can provide functional lift from land preservation and thinning of pines. The Southwest and Northern areas have additional functional lift potential through hydrologic restoration, targeted native species plantings and the establishment of a prescribed fire regime. The northern area abuts GSF and the Robinson Tract on its northern and eastern sides. The eastern side of the property provides for an important corridor connection from GSF to the Withlacoochee River floodplain and associated public conservation lands.

3.2 Lybass Property

This is a 1956-acre parcel lying immediately east of the LNP site which could possibly be acquired or otherwise controlled by PEF to help fulfill mitigation needs. Functional lift may be derived from preservation, thinning of pines, hydrologic restoration, targeted plantings and prescribed fire activities. If a corridor along the eastern edge of the LNP property is established, it would provide ecological

[3] From the Corps' and EPA's rules on wetland mitigation: § 332.2/ 230.2.

connections among GSF, Lybass and the Withlacoochee River floodplain. This potential corridor, given the proposed restoration and rehabilitation efforts on the Lybass property, would provide regionally-significant benefits to the overall ecosystem.

3.3 Robinson Property

This is a 5,752-acre parcel lying immediately east of the LNP site which could possibly be acquired by PEF to help fulfill mitigation needs. For planning purposes, the tract was separated into five zones by BRA (Exhibit 3-4) to facilitate the determination of potentially available mitigation. Functional lift may be derived from preservation, thinning of pines, hydrologic restoration, targeted plantings and prescribed fire activities. GSF abuts the Robinson property along the northern boundary, simplifying the use of prescribed fire and increasing the zone of potential hydrologic restoration in this part of the property.

The implementation of restoration activities on the Robinson Tract will have the added benefit of establishing a continuous, manageable, and preserved corridor that connects the GSF with the Withlacoochee River floodplain. Restoration activities on this property will provide functional lift and better opportunities for implementing management of adjacent tracts, especially prescribed fire.

3.4 Goethe State Forest

The Division of Forestry (DOF) identified a series of locations in the Daniels Island Tract of the GSF that would benefit from hydrologic restoration activities. Upon review by BRA, some of these activities were simply repairs to road crossings which would result in no hydroperiod changes or other ecological improvement; but several others were identified as potentially useful for mitigation purposes. BRA ecologists visited these sites and determined that several projects, if implemented, would generate hydrologic enhancement and could serve as mitigation (Exhibit 1-8). These projects are not in the current State Forest funding program, and there is no DOF timeline for their completion.

3.5 Other Off-site Options

In a search of properties listed for sale in the project vicinity, eight properties were identified. Review of the sites' characteristics found that two parcels adjacent to GSF are potentially suitable as mitigation (Exhibit 3-2). They occur in the Waccasassa watershed and are located on the west side of the GSF approximately ten miles north of the LNP site. BRA has not visited these sites on the ground; our assessment is based on GIS data, aerial photos analysis and general assumptions about how much lift could be achieved. There would likely be a 30:70 to 50:50 mix of uplands and wetlands on these sites.

3.6 Mitigation Banks

Where available and appropriate for the types of impacts, mitigation banks can provide compensation for project impacts. There are two existing banks with service areas that include at least portions of the Plant site and Lines routes. Note that, during the local government approval process, PEF committed to working with Levy County to maximize compensation for Levy County wetland impacts within the County itself.

3.6.1 Upper Coastal Mitigation Bank (UCMB)

Credits from the UCMB could offset impacts from transmission line impacts in the Upper Coastal (Crystal/Pithlachascotee River) watershed. This bank was permitted by the Southwest Florida Water Management District (SWFWMD) in March 2007; the federal bank permit is pending. This bank was assessed using UMAM. The total number of state-authorized credits is 47.63, of which 40 are available now. It appears the USACE will authorize minimal preservation-related credits and none for upland preservation; the ultimate availability is expected to be 17.5 credits. The federal credits should be available by spring or summer 2009, although the timing cannot be guaranteed.

3.6.2 Tampa Bay Mitigation Bank (TBMB)

Credits from the TBMB could potentially offset impacts in the Tampa Bay Watershed. This bank was permitted by SWFWMD in 2001 and is only recently, and partially, available for credit purchases. The total number of state-authorized credits is approximately 112 and the federal credits total approximately 103. About 31 of the state credits are for saltwater impacts, at least some of which should be available by January 2009. Freshwater credits may not be available for a few years. Functional credit units available from this bank were determined using the Wetland Rapid Assessment Procedure (WRAP), so if credits are negotiated with TBMB, the impacts would need to be re-assessed using WRAP to allow for proper balancing of impacts and mitigation.

3.7 Plan Synopsis

The mitigation proposed here is designed to be regionally-significant and sustainable, focused on the enhancement and restoration of wetland and ecosystem functions across a large landscape area, and in association with existing public lands. By consolidating the mitigation for the entire project, both for the LNP site and the transmission corridors, the consolidated mitigation provides substantially greater benefits to the ecosystem than if the mitigation were diffusely distributed across the overall project area. The great majority of the proposed impacts (by acreage and relative functional loss of impact) are located at or very near the power plant property in the Waccasassa and Withlacoochee watersheds. The mitigation is located in close proximity to those impacts, which will achieve greater offset from a regional watershed perspective and provide much more ecosystem benefit over the long term. This plan clearly addresses the state's requirements for assuring long term viability and provision of greater ecological value than would a conventional on-site mitigation proposal.

3.8 USACE Considerations

The USACE has recently updated its mitigation rules and clarified its preferences and priorities for mitigation, indicating that compensation should be provided on a watershed basis wherever feasible. The USACE also emphasizes reliance on best available science and consideration of ecological performance standards. The approach described in this document results in the vast majority of the compensation occurring within the same watersheds as the impacts (the Withlacoochee and Waccasassa basins). The remaining impacts are associated with transmission corridors and therefore represent essentially diffused localized impacts (i.e., transmission towers) spanning several other watersheds with small, isolated footprints of actual permanent impacts. Combining the compensation for transmission corridor impacts with that for the LNP site will allow for a larger overall ecosystem improvement, while facilitating the management of the mitigation area and providing a higher likelihood for long-term

success of the restored areas. Spreading the mitigation out along the transmission line routes would clearly provide significantly less contribution to watershed functioning than the plan proposed within this document.

4.0 EXISTING CONDITIONS – LNP AND SURROUNDING AREAS

This Section outlines conditions in the areas offering potential mitigation credits. Existing conditions of the impact sites within the LNP parcel are similar to those described below, but details specific to the impact areas were addressed in the SCA.

4.1 Landscape Setting

The Primary Mitigation Options (LNP Site, Lybass Property, Robinson Tract, and GSF) are adjacent to one another. They are located in the southern portion of Levy County, northeast of the city of Inglis, and within Sections 5 and 6, Township 17 South, Range 17 East, and Sections 7, 17-20, and 29-32, Township 16 South, Range 17 East. The sites are approximately eight miles east of the Gulf of Mexico and one mile north of the Withlacoochee River and Lake Rousseau. More specifically, the sites are bordered by U.S 19 to the west, S.R. 40 to the south and C.R. 339 to the east and north.

Although there are some areas of the LNP site available for mitigation, there are portions which are unavailable for mitigation, including the development footprint. Only those areas available for mitigation within the LNP site are addressed by the mitigation plan. Additionally, only a few select areas of GSF are being reviewed for mitigation (see Exhibit 3-2) and are described in detail below; however, the larger portion of GSF that encompasses these areas is reflected in the landscape settings, topography, and overall descriptions. The areas designated as potential mitigation within GSF are located along the northeastern edge of GSF, along C.R. 339.

The adjacency of these four sites allows for the creation/maintenance/preservation of large corridors of natural and restored habitats. These habitats would support wildlife movement between GSF to the north and the Withlacoochee River to the south, which drains to the Gulf of Mexico.

The majority of the LNP, Lybass and Robinson sites have been converted to silvicultural land uses where most upland and significant wetland acreage have been bedded and planted with slash pine. In the proposed mitigation areas, wet planted pine is treated as a type of herbaceous wetland. The herbaceous classification reflects the proposed restoration of these areas to a primarily herbaceous ecotone, which is consistent with the conversations between the PEF team and DEP. Historically, portions of the areas mapped by BRA as “wet planted pine” were forested wetlands, while others were herbaceous. In both cases, the wetlands have been severely degraded through the bedding and planting of pines, and the repeated harvesting activities.

The plantations range in age from seedlings to 15 years. About 75 percent of the plantations are 6-inch DBH and 20-feet in height with the remaining 25 percent unmerchantable. GSF was previously a private pine plantation, but has been in state ownership for some time and its management has shifted to a less dense, uneven-aged stand forestry approach.

4.2 Topography and Hydrology

Topographic relief grades from 75 ft. NGVD in the easternmost areas of GSF and Robinson Tract down to 23 ft. NGVD in the southwestern corner of the LNP site. There is a small north-south oriented rise in elevation on the western portion of the Robinson and GSF sites resulting in much of the drainage for these areas flowing to the north then west. The western portion of Robinson and Lybass and all of LNP drains to the southwest portion of LNP. Reviewed at a larger scale, the site sits at the base of a ridge of high lands to the east. This project area is gently sloping flat land, with general relief grading from higher lands in the east to lower lands in the north and west.

The silvicultural practices which encompass the majority of the LNP, Lybass and Robinson sites have altered the natural hydrology of these sites. The bedding of planted pine along with the high density of stems per acre contribute to the degradation of natural hydrologic flow into wetlands by altering drainage patterns, increasing evapotranspiration from the site, and decreasing water yield for the wetlands.

Fortunately, there is not an extensive ditch network within the silvicultural areas, which should allow for a more simplified plan for hydrologic restoration. No significant ditch blocking or re-grading of ditches will be required to restore historic hydrologic regimes. Once the timber has been removed from the site, the natural grade will be restored and evapotranspiration and water interception will decrease which will, in turn, assist in the restoration of natural hydrologic patterns in the wetlands.

4.3 Soils

According to the Natural Resources Conservation Service (NRCS) soil survey for Levy County, Florida (USDA 1996) twenty-one soil units are present on the property (Table 4-1). Locations of soil units are depicted on Exhibits 4-1 through 4-5.

Approximately 32 percent of the soils of the overall mitigation areas meet hydric soil criteria. The majority of the hydric soils on the mitigation areas is Placid and Samsula Soils, Depressional (011), which supports a natural vegetative community of cypress (*Taxodium distichum*), red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), and sweetgum (*Liquidambar styraciflua*) in the overstory with pickerelweed (*Pontederia cordata*), lizard's tail (*Saururus cernuus*), water iris (*Iris* spp.) and scattered cabbage palm (*Sabal palmetto*) in the understory.

The two soil types which support the majority of the upland planted pines, Smyrna Fine Sand (008) and Pomona Fine Sand (009), both support a natural vegetative coverage of a slash (*Pinus elliottii*), longleaf (*Pinus palustris*), and loblolly pine *(Pinus taed*a) overstory with a saw palmetto (*Serenoa repen*s), bluestem (*Andropogon* spp.), wax myrtle (*Myrica cerifera*), and gallberry (*Ilex glabra*) understory. These species are characteristic of a pine flatwoods community based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) and mesic flatwoods community type according to Florida Natural Areas Inventory (FNAI), which historically occurred on the sites prior to conversion to silviculture. Restoration to these community types should be simplified by the presence of supporting soil types.

Table 4-1. USDA NRCS Soil Types within the Primary Mitigation Options

Soil Number	Soil Type	Hydric*
2	Tavares Fine Sand	No
8	Smyrna Fine Sand	No
9	Pomona Fine Sand	No
10	Placid Fine Sand	Yes
11	Placid and Samsula Soils, Depressional	Yes
13	Wekiva Fine Sand	Yes
16	Chobee-Gator Complex, Frequently Flooded	Yes
17	Adamsville Fine Sand; 0 – 5 Percent Slopes	No
18	Wauchula Fine Sand	No
19	Sparr Fine Sand	No
21	Pompano Fine Sand	Yes
23	Zolfo Sand	No
24	Terra Ceia Muck, depressional	Yes
27	Placid and Popoash Soils, Depressional	Yes
34	Cassia-Pomello Complex	No
35	Pineda Fine Sane, Limestone Substratum	Yes
38	Myakka Sand	No
58	Placid Fine Sand, Depressional	Yes
61	Pomona Sand	No
69	Tavares Sand, 0 – 5 Percent Slopes	No
74	Arents, 0 – 5 Percent Slopes	No
99	Water, < 40 acres	Yes

*included on the USDA Hydric Soils List

4.4 Vegetation Associations

Vegetation Associations for wetland and upland areas within the great majority of the sites were mapped according to FLUCFCS as depicted in Table 4-2. A total of 55 percent of the Primary Mitigation Option sites consist of wetlands. More specifically, approximately 64 percent of the LNP mitigation areas, 23 percent of Lybass, and 48 percent of Robinson is comprised by wetlands. With the exception of the GSF site, these areas are managed for the production of slash, loblolly, and sand pine (*Pinus clausa*) trees. The majority of the pine plantations have been bedded and planted with dense stands of pine trees. As a result, there is low density and diversity of understory vegetation. The vegetative cover types present in the mitigation areas are detailed below and representative photos of each land use type can be found in Attachment 2. The land use coverage and acreages were quantified using field delineated wetland boundaries and were merged with upland areas according to FLUCFCS. .

Fire suppression has resulted in the prolific overgrowth of saw palmetto and other shrub species in the understory of the planted pine areas. In many areas the palmetto has formed a dense thicket six feet or more in height. This factor, combined with the mechanical alteration of the ground surface, has resulted in a habitat that is both a physical impediment to the movement of many species of wetland dependent wildlife and unsuitable for use as foraging or breeding habitat. In many of these areas, herbaceous plant cover has been suppressed or eliminated by the combination of shading and competition. The demise of

herbaceous vegetation was intensified by shade and organic litter accumulation contributed by planted pines and shrub debris. Water cover, depth, and flow direction across the site have been affected by activities related to silviculture including construction of ditches and logging roads, bedding and furrowing, and skidder trails. In addition, dense pine plantings and shrub cover have undoubtedly increased evapotranspiration. Below is a brief description of each FLUCFCS category found within the Primary Mitigation Options.

Table 4-2. Existing Land use within Primary Mitigation Options

Cover type	LNP Site	Robinson	Goethe*	Lybass	Total Acres
100 – Residential	0.0	0.0	0.0	2.7	**2.7**
260 – Other Open Lands	22.4	0.0	0.0	5.2	**27.6**
320 - Shrub and brushland	7.2	12.6	0.0	2.4	**22.2**
434 - Hardwood conifer mixed	36.0	0.0	0.0	20.7	**56.7**
440 – Pine Tree plantations	704.2	2991.1	0.0	1494.4	**5189.7**
511 – Ditches	0.9	0.0	0.0	0.0	**0.9**
520 - Lakes	0.0	0.0	0.0	2.9	**2.9**
615 - Stream and lake swamps	0.0	43.3	0.0	17.7	**61.0**
616 – Inland Ponds and Sloughs	0.4	4.4	0.0	0.0	**4.8**
617 – Mixed Wetland Hardwoods	364.4	563.3	0.0	0.0	**927.7**
621 - Cypress	689.9	957.2	463.82	291.2	**2402.12**
625 – Hydric Pine Flatwoods	0.0	79.2	0.0	0.0	**79.2**
629 – Wet Planted Pine	177.9	28.9	0.0	0.0	**206.8**
630 - Wetland forested mixed	135.3	91.0	0.0	12.8	**239.1**
641 - Freshwater marshes	15.0	875.0	0.0	95.5	**985.5**
643 - Wet prairies	41.5	105.8	0.0	0.0	**147.3**
644 – Emergent Aquatic Vegetation	0.0	0.0	0.0	10.5	**10.5**
646 – Treeless Hydric savanna	63.0	0.4	0.0	0.0	**63.4**
830 - Utilities	2.9	0.0	0.0	0.0	**2.9**
TOTAL	**2261.0**	**5752.2**	**463.82**	**1956**	**10433.02**

*Only cypress wetland areas identified for potential hydrologic enhancement are considered here.

4.4.1 Residential (FLUCFCS Code 120)

This land use type is located only on the Lybass property. Individual home sites, associated structures and lawns are typical of this land use category

4.4.2 Other Open Lands (FLUCFCS Code 260)

These areas consist of lands that have been cleared of native vegetation and/or previously logged for timber. This land use is located on the LNP and Lybass sites, mainly along the southeastern portion. The vegetation in these areas consists of an early successional assemblage of broom sedge, scattered palmetto and other ruderal species.

4.4.3 Shrub and Brushland (FLUCFCS Code 320)

These are very minor portions of the Primary Mitigation Option properties that consist of a monoculture of saw palmetto lacking trees or significant cover by any other shrubs or herbaceous species.

4.4.4 Hardwood Conifer Mixed (FLUCFCS Code 434)

This is a very minor component of the Primary Mitigation Options. Canopy cover in these areas consists of an even distribution of mature hardwood species including live oak and laurel oak *(Quercus laurifolia)* as well as mature conifer species including slash pine and loblolly pine. Cabbage palm and eastern red cedar (*Juniperus virginiana)* are also common in these communities. The subcanopy is predominantly composed of cabbage palm and the shrub layer is dominated by saw palmetto. Herbs are prevalent if sufficient light reaches the ground and consist of ferns (*Thelypteris* spp.), torpedo grass (*Panicum repens*), and slender woodoats (*Chasmanthium laxum)*. Density of palmetto and grassy forbs varies within each forested area. Common vines include saw greenbrier *(Smilax bona-nox)* and muscadine grape (*Vitis rotundifolia*). Hardwood-conifer mixed forests may all be transitional communities derived from the conversion of native plant communities that have been subjected to land use practices, such as timber harvest, fire suppression, and drainage.

4.4.5 Tree Plantation (FLUCFCS Code 440)

This FLUCFCS classification was used to indicate areas of planted slash, loblolly and sand pines, which cover the majority of uplands within the Primary Mitigation Options. The canopy is primarily planted slash pine that ranges in age from about 5 to 20 years old. Pine rows were bedded to facilitate site drainage and ensure a dry upper soil stratum for pine growth. The mesic pine plantations generally support facultative to upland species as the dominant species in the understory/shrub and ground cover stratums. Fire suppression has resulted in a thick almost impenetrable thicket in many of these areas with no significant cover of other herbaceous or shrub species other than saw palmetto which exceeds 6 feet in height in many areas.

4.4.6 Lakes (FLCUFCS 520)

This land use type is found only on the Lybass property and covers only 3 acres of the site. Lakes can be either naturally occurring or man-made (such as a cattle watering pond). Lakes generally contain minimal to no vegetation.

4.4.7 Stream and Lake Swamps/ Mixed Wetland Hardwoods/ Inland Ponds and Slough/Wetland Forested Mixed (FLUCFCS Code 615/616/617/630)

These are forested wetland areas which have not been recently logged. The majority of these community types are located on the LNP site but can also be found on the Lybass and Robinson sites. The canopy stratum consists of a mixture hardwood and some conifer species. The most common species present are blackgum (*Nyssa sylvatica*), red maple, and cypress. Other species dominant in some areas include laurel oak, sweetgum, popash (*Fraxinus caroliniana*) and slash pine.

The shrub stratum in many of these areas can be very dense likely as a result of fire suppression. The dominant species is fetterbush (*Lyonia lucida*) with lesser amounts of buttonbush *(Cephalanthus occidentalis)* in the deeper areas and wax myrtle on the shallower areas. Shrub cover ranges up to nearly 100 percent cover in some of these areas severely limiting access to large mammals and

excluding herbaceous species via competition for rooting space and shading. Laurelleaf catbriar (*Smilax laurifolia*), a heavily armed vine, is often found growing in combination with the fetterbush further hampering access to the interiors of these systems. Consequently groundcover in these areas is sparse to non-existent.

4.4.8 Cypress Swamp (FLUCFCS Code 621)

This habitat type occurs on all four sites, and is the only land use within the GSF mitigation areas. This land use type is dominated by pond cypress *(Taxodium ascendens)* or pond cypress (*Taxodium ascendens*) in the canopy with lance-leaved arrowhead (*Sagittaria lancifolia*), maidencane (*Panicum hemitomon*), pickerelweed and sawgrass (*Cladium jamaicense*) dominating the understory. Many of these systems suffer from the same condition described above for the mixed hardwood forests in that they have become, as a result of fire suppression, impenetrable thickets of fetterbush. Slightly more than half of the isolated wetlands are dome swamps dominated by pond cypress in various stages of regeneration.

4.4.9 Hydric Pine Flatwoods (FLUCFCS Code 625)

This land use, located on the southwest portion of the Robinson property and northwest portion of the Lybass Property, consists of a sparse canopy of slash pine with a herbaceous layer of saw palmetto along with forbes, grasses, and wiregrasses. Portions of this system appear to have been logged for timber.

4.4.10 Wet Planted Pine (FLUCFCS Code 629)

These areas consisted of a monoculture of planted slash pine and loblolly pine. These are furrowed and the understory consists of very little herbaceous vegetation as a result of the furrowing, shading and pine straw. In some areas shrub cover may be as high as 25 to 40 percent and consists primarily of wax myrtle, saltbush (*Atriplex cristata*) and in some cases fetterbush. The understory of these areas would generally be described as depauperate.

4.4.11 Freshwater Marshes (FLUCFCS Code 641)

Many of the marshes on the Primary Mitigation Options are associated with forested swamps or are embedded within wet planted pines. Freshwater marshes typically are void of or have sparse canopy coverage. The marshes are typically dominated by maidencane and may contain other species such as bluestem (*Andropogon virginicaus*), Iris (*Iris* spp.), yellow- eyed grass, (*Xytis* spp.), and sedges (*Carex* spp.).

4.4.12 Emergent Aquatic Vegetation (FLUCFCS 644)

This land use type is found only on the Lybass property. These wetlands contain plant species that are both floating and/or partially or completely above the surface of the water. Typical species include water lily (*Nymphaeacea* spp.), duck weed (*Lemna* spp.), water hyacinth (*Eichhornia* spp.), spatterdock (*Nuphar* spp.) and water lettuce (*Pistia stratiotes*).

4.4.13 Wet prairies (FLUCFCS Code 643)

These land use types, located on the LNP site and Robinson site, are dominated by low grasses and forbs. Typical ground cover consists of sawgrass, maidencane, and St. Johns wort (*Hypericum* spp.). Within the mitigation sites, these existing systems are typically isolated.

4.4.14 Treeless Hydric Savannah (FLUCFCS 646)

This cover type was applied to a variety of wetland areas where it was apparent that the historic wetland character had been largely obliterated through silviculture activities. Historically, some of these areas were forested and some were herbaceous; they are now generally dominated by herbaceous vegetation and frequent shrubs. At the time of the mapping by BRA, these areas had been harvested and not replanted. Consistent with the original mapping in the SCA, areas mapped with this cover type are included with forested wetlands.

4.4.15 Utilities (FLUCFCS 830)

This land use type is found solely on the LNP site and is a cleared portion of land where transmission lines and a 30-inch natural gas pipeline bisect a portion of the property. The land under the transmission lines is maintained by mowing and herbicide to allow for proper access and safe maintenance of these facilities.

5.0 TARGET CONDITIONS

The mitigation goals are to enhance and protect native wetlands and associated uplands, thereby restoring altered habitats to their historic condition. Habitat management to benefit wildlife, particularly species listed as endangered, threatened or species of special concern by the Florida Fish and Wildlife Conservation Commission (FFWCC) or the U.S. Fish and Wildlife Service (FWS), will be a high priority. Placing the privately-owned mitigation lands into a conservation easement will ensure the protection of these preserved and enhanced habitats in perpetuity. The possibility of establishing a corridor for resident wildlife and migratory birds greatly enhances the mitigation potential of the restored lands.

5.1 Historic Conditions

Based on review of historic aerial photography, assessment of soils and their native habitat affinities, FNAI assessment of the Robinson Property and the GSF draft management plan, an assessment of likely historic conditions was conducted. The historic condition is a flatwoods landscape that grades on its western edge toward low coastal flatwoods and hammocks on the Gulf of Mexico.

5.2 Target Conditions by Vegetation Community

Most of the Primary Mitigation Option areas are mesic to wet flatwoods that have been planted in loblolly and slash pine plantations for an industrial silvicultural operation. The plantations range in age from seedlings to 15+ year old trees. Most of the pine plantation was bedded to improve drainage. Most of the tract has been fire suppressed for numerous years to promote the commercial pine production. Numerous dome swamps are scattered across the landscape. The majority of the remaining natural communities are wetland forests that include bay galls, floodplain swamp and hydric hammock. These communities appear to be in good condition, but some hardwood harvesting has occurred within some of the forested wetlands.

The planned mitigation efforts involve restoring the site to the pre-pine plantation/historical communities. The proposed future conditions are described below. To the extent possible, the rehabilitated mitigation area will contain the indigenous vascular plant and wildlife species that are characteristic of these communities as they occur throughout the coastal counties of the region on similar soils and at similar elevations above sea level. To attain success, the rehabilitated communities will resemble representative communities with respect to life form distribution, vertical stratification, overall plant size, species abundance, and patterns of dominance, and will substantively conform to the descriptions below. The rehabilitation will concentrate on three levels of diversity: (1) landscape mosaic, (2) plant community structure, and (3) plant species composition.

Target community types have been classified by FNAI community types. This was done as a requirement from the USACE. Table 5.1 shows the general conversion from FLUCFCS category to FNAI category.

Table 5.1 FLUCFCS to FNAI Communities

FLUCFCS	*FNAI*
100 – Residential	Mesic Flatwoods
260 – Cropland and Pastureland	Mesic Flatwoods
320 – Shrub and Brushland	Mesic Flatwoods
434 – Hardwood – Conifer Mixed	Upland Mixed Forest
440 – Tree Plantations	Mesic Flatwoods
511 – Ditches	N/A
520 - Lakes	N/A
615 – Stream and Lake Swamps	Floodplain Forest
616 – Inland Ponds and Sloughs	Slough
617 - Mixed Wetland Hardwoods	Bottomland Forest
621 – Cypress	Dome Swamp
625 – Hydric Pine Flatwoods	Wet Flatwoods
629 – Wet Planted Pine	Depression Marsh
630 – Wetland Forested Mix	Bottomland Forest
641 – Freshwater Marshes	Depression Marsh
643 – Wet Prairies	Wet Prairie
644 – Emergent Aquatic Vegetation	Depression Marsh
646 – Treeless Hydric Savanna	Wet Prairie
830 – Utilities	N/A

A total of nine (9) community types classified by FNAI have been targeted as a goal for proposed restoration activities including wet flatwoods, basin/dome swamps, bottomland forests, floodplain forest, depression marshes, mesic flatwoods, wet prairie, upland hardwood forests/upland mixed forests, and sloughs. The specific acreage of each post-restoration type is less important than achieving a healthy, integrated mosaic of communities with approximately these percentages of component communities, as described below. It is anticipated that the majority of the slash pine plantation wetland acreage will be returned to a herbaceous system, either wet prairie or depressional marsh. The majority of the pine plantations located on upland soils will be restored to longleaf pine flatwoods. Below is a description of the vegetative community targets.

5.2.1 Wet Flatwoods

Species Composition

Wet flatwoods have a relatively open canopy of scattered pine trees and cabbage palm with a thick shrubby understory (30-50percent), and dense ground cover of hydrophytic herbs. They occur on fairly flat, poorly drained terrain where the hardpan substantially reduces the percolation of water. Canopy trees consist of combination of slash-loblolly-longleaf pine where the longleaf pine is within the ecotone transitioning to mesic flatwoods. Other canopy trees include sweetgum, sweetbay, loblolly bay *(Gordonia lasianthus)* and water oak *(Quercus nigra)*. Typical shrub and herbaceous species include gallberry, saw palmetto, titi (*Cyrilla racemiflora*), wax myrtle, white-topped sedge *(Rhynchospora colorata)*, plumegrass (*Saccharum* sp.), yellow butterwort (*Pinguicula lutea*), small butterwort (*Pinguicula pumila*) and hooded pitcher plant (*Sarracenia* spp.).

Processes
The hydrological process in mesic flatwoods is a limiting agent to this fire adapted community, dictating the variation in community structure. Wet flatwoods can be inundated for several months out of the year, making it difficult to burn through. Fires are important on a three to seven year recurrence and typically burn through the mid and understory because of the small amount of grassy fuels. Species like wax myrtle, titi, fetterbush and gallberry spread fire through the community during wet conditions, however it is likely to burn in a fingering mosaic making it difficult to suppress hardwood succession. Fire will carry best when live and dead fuels are both available for these shrubs, limiting how extensive short rotation fires will be. Wet flatwoods can also draw down during times of drought, burning through embedded wetlands and suppressing the hardwoods. Without fire, mesic flatwoods can become hardwood dominated.

5.2.2 Basin and Dome Swamps

Species Composition
Basin swamps are large, forested, irregularly shaped depressions that are not associated with rivers. Small basin swamps can be difficult to distinguish from dome swamps. They are vegetated with hydrophytic trees and shrubs and can withstand an extensive hydroperiod. The soils are generally acidic, nutrient poor peats over an impervious soil layer. They are typically dominated by red maple and dahoon holly *(Ilex cassine)* with occasional slash pine and wax myrtle. Shrub cover exists mainly around the edges of the swamp and on the depression marsh/ basin swamp ecotone. Shrub species include common buttonbush, titi, Virginia willow (*Itea virginica*), saltbush, and sand blackberry (*Rubus cuneifolius*). Very little herb cover exists in the basin swamps and consists mainly of royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), duck potato (*Sagittaria latifolia*), lizard's tail, smartweed (*Polygonum hydropiperoides*) and sphagnum moss *(Sphagnum* spp.*)*. Species composition in these systems is similar to strand swamps and floodplain swamps.

Processes
Basin swamps have extended hydroperiods; any degradation of the hydrology will drastically change the structure and function of this community. Shortened hydroperiods will permit invasion of mesophytic species and extended hydroperiods will limit tree growth and production. Typical hydroperiod is 200-300 days. Though fire is infrequent in this community (ranging from five years to decades), it plays an important role in suppressing hardwood encroachment and peat accumulation. If burned too frequently, pine will occupy the edges; less frequently, blackgum (*Nyssa sylvatica*) and other hardwoods move in.

5.2.3 Bottomland Forest

Species Composition
This swamp community is dominated by buttressed trees including water tupelo (*Nyssa aquatica*), dahoon holly, large gallberry, possumhaw (*Viburnum nudum*), pond cypress, red maple, slash pine and sweetgum. There is a sparse understory and ground cover made up of a higher diversity of hydrophytic species such as chain fern (*Woodwardia* sp.), duck potato, lizard's tail, various orchids and sedges. The species composition of bottomland forests is frequently similar to strand swamp, dome swamp and basin swamp communities.

Processes
Bottomland forest soils are variable mixtures of sand, organic, and alluvial materials. They are generally saturated most of the year and have channels of flowing water and back swamps of standing water. Floods redistribute detritus accumulations to other portions of the floodplain. These swamps are essential to the functional integrity of river ecosystems and estuaries.

5.2.4 Floodplain Forest
Species Composition
Floodplain Forests are hardwood forests that occur on drier soils at slight elevations within floodplains, such as on levees, ridges and terraces, and are usually flooded for a portion of the growing season. The dominant trees are overcup oak *(Quercus lyrata)*, water hickory *(Carya aquatica)*, laurel oak and swamp chestnut oak *(Quercus michauxii)*. Other typical plants include bluestem palmetto *(Sabal minor)*, willow oak *(Quercus phellos)*, green ash *(Fraxinus pennsylvanica)*, Florida elm *(Ulmus* spp.*)*, sweetgum, hackberry *(Celtis laevigata)*, water oak, American hornbeam *(Carpinus caroliniana)*, tulip poplar *(Liriodendron tulipifera)*, coastal plain willow (*Salix caroliniana*) , black willow *(Salix nigra)*, eastern cottonwood *(Populus deltoids)* swamp cottonwood *(Populus heterophylla)*, river birch *(Betula nigra)*, red maple, silver maple *(Acer saccharinum)*, box elder *(Acer negundo)*, American sycamore *(Platanus occidentalis)*, catalpa (*Catalpa bignonioides*), sweetbay magnolia *(Magnolia virginiana)*, hawthorn (*Crataegus* sp.), swamp azalea, (*Rhododendron viscosum*), pink azalea (*Rhododendron* spp.) gulf sebastiana (*Sebastiania fruticosa*), lanceleaf greenbrier (*Smilax smallii*), poison ivy *(Toxicodendron radicans)*, peppervine *(Ampelopsis arborea)*, rattanvine *(Brechemia scandens)*, indigo bush *(Indigofera colutea)*, white grass *(Leersia virginica)*, plume grass *(Saccharum* sp.*)*, redtop panicum (*Panicum rigidulum*), caric sedges *(Caric* spp.*)*, silverbells *(Halesia* spp.*)*, crossvine *(Bignonia capreolata)*, American wisteria (*Wisteria frutescens*) and wood grass *(Chasmanthium laxum)*.

Processes
Soils of Floodplain Forests are mixtures of sand, organics, and alluvials, which are often layered. Hydroperiod is the primary physical feature of Floodplain Forests, which are inundated by flood waters nearly every year for 2 to 50percent of the growing season. The organic material accumulating on the floodplain forest floor is picked up during floods and redistributed in the floodplain or is washed downriver to provide a critical source of minerals and nutrients for downstream ecosystems, in particular estuarine systems. These floods also replenish soil minerals through deposition on the floodplain. Floodplain Forests usually do not have standing water in the dry season.

5.2.5 Depressional Marsh
Species Composition
The desired future condition of this community is a mosaic of seasonally inundated and semi-permanent ponds interspersed with marshes and wet prairies, the latter characterized as a treeless plain with woody shrubs and a dense groundcover of grasses and herbs. Depressional Marsh is characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. Typical plants include St. John's wort, spikerush *(Eleocharis* sp.*)*, yellow-eyed grass, chain fern *(Woodwardia virginica)*, willows, maidencane, wax myrtle, swamp primrose *(Ludwigia* spp.*)*, bloodroot *(Sanguinaria canadensis)*, buttonbush *(Cephalanthus occidentalis)*, fire flag, *(Thalia geniculata)*

pickerelweed *(Pontederia cordata)*, arrowheads *(Sagittaria australis)*, and bladderwort *(Utricularia* sp.*)*.

Processes
Depression marshes are typical of karst regions where sand has slumped around or over a sinkhole creating a conical depression filled by direct rain fall, runoff, or seepage from surrounding uplands. Hydrological conditions vary, with many drying up in most years. Fire is very important on a two to three year recurrence in maintaining this community by restricting the succession of shrubs and hardwoods. Fire frequency is greatest around the ponds edge when water levels are high; however, it is important to burn through the pond to reduce peat build up when it is dry since it is a source of fuel load.

5.2.6 Mesic Flatwoods
Species Composition
Mesic flatwoods are variable depending on the geographical location, climate, fire history, human disturbance and edaphic conditions. Mesic flatwoods are relatively flat and have moderately to poorly drained soils, and are generally acidic overlying an organic hardpan or clay subsoil. As a result of the hardpan, vegetation is under stress of saturation and drought; periodically inundated during the rainy season, and competing for water in drought conditions.

North Central Florida Flatwoods are characterized by an open canopy of widely scattered longleaf and slash pines with a generally higher density than sandhill because of more fertile soils. Basal area of pine can range from 30-90 ft^2/acre, with three age classes, and a higher density of larger older trees.

Midstory trees with a sparse distribution include red maple, sweetgum, dahoon holly, loblolly bay, and water oak. The understory shrub layer includes saw palmetto, gallberry, fetterbush, staggerbush (*Lyonia mariana*), dwarf huckleberry (*Gaylussacia dumosa*), wax myrtle, runner oak (*Quercus margarettiae*), tar flower (*Befaria racemosa*) and dwarf live oak (*Quercus minima*). The shrub layer varies from sparse to dense depending on fire, growth patterns of the canopy, and slight topographical changes, creating mosaics and having a distinct stratified appearance.

Grasses and forbs are abundant and dense where the tree canopy and shrub layers are open, receding to a sparse, but diversified mosaic where the canopy and shrub layers are more dense but discontinuous. Preferred species are native grasses and herbs adapted to frequent fire such as wiregrass *(Aristida stricta*), lopsided Indian grass (*Sorghastrum secundum*), blazing star (*Liatris ohlingerae*), white-topped aster (*Sericocarpus tortifolius*), black root *(Pterocaulon pycnostachyum)*, yellow-eyed grass, gopher apple (*Licania michauxii*), manyflower grasspink (*Calopogon multiflorus*), yellow fringed orchid (*Platanthera ciliaris*), Michaux's milkweed (*Asclepias michauxii*) and hooded pitcher plant. Palmetto and gallberry are common but do not dominate the landscape. Palmetto occurs in varying densities and is often found in clumps of various sizes. Gallberry is found on the wetter sites within the flatwoods and is kept to a height of no more than six feet due to recurring fire.

Processes
Evidence of functional hydroperiods is apparent due to flooding of wetlands. Ongoing biological processes such as insect-plant interactions are evidenced by occasional dead trees, which become snags

for use by wildlife. Most mesic flatwoods plants are dependent on fire for their existence making fire the most important physical factor influencing the structure and composition of this system. Fires occur every one to eight years with a low to moderate intensity. There is variation in fire intensity and return interval due to changing water availability, location of ponds and other embedded communities and season of burn. This variation creates a diverse mosaic of vegetative responses.

5.2.7 Wet Prairie

Species Composition

Wet Prairie is characterized as a treeless plain with a sparse to dense ground cover of grasses and herbs, including wiregrass, toothache grass (*Ctenium aromaticum)*, maidencane, spikerush (*Eleocharis* sp.) and beakrush (*Rhynchospora* sp.*)*. Other typical plants include hatpins (*Syngonanthus flavidulus)*, marsh pinks *(Sabatia* spp.*)*, crownbeard *(Verbesina virginica),* sundews (*Drosera* sp.*)*, black-eyed Susan *(Rudbeckia hirta),* stargrass *(Hypoxis* sp.*)*, white-top sedge, meadowbeauty *(Rhexia* sp.*)*, yellow-eyed grass, sneezeweed *(Helenium)*, sunflower *(Helianthus)*, wax myrtle, pitcher plants, tickseed *(Coreopsis major)*, St. John's wort and panicums.

Processes

Wet Prairie occurs on low, relatively flat, poorly drained terrain of the coastal plain. Soils typically consist of sands often with a substantial clay or organic component. The most important physical factors are hydrology and fire. Wet Prairie is seasonally inundated or saturated for 50 to 100 days each year and burns every two to four years. Wax myrtle quickly invades and will dominate Wet Prairies with longer fire intervals. Generally, Wet Prairies have a much shorter hydroperiod than other herbaceous wetlands and are subject to regular and prolonged desiccation during the dry season due to their flat topography.

5.2.8 Upland Mixed Forest

Species Composition

Upland Mixed Forests are characterized as well-developed, closed canopy forests of upland hardwoods on rolling hills. This community contains many species, including southern magnolia *(Magnolia grandiflora)*, pignut hickory *(Carya glabra)*, sweetgum *(Liquidambar styraciflua)*, Florida maple *(Acer saccharum subsp. floridanum)*, devil's walking stick (*Aralia spinosa*), American hornbeam, redbud *(Cercis canadensis)*, flowering dogwood *(Cornus florida)*, Carolina holly *(Ilex ambigua)*, American holly *(Ilex opaca)*, eastern hophornbeam *(Ostrya virginiana)*, spruce pine *(Pinus glabra)*, loblolly pine, live oak, and swamp chestnut oak *(Quercus michauxii)*, among others.

Other typical plants include gum bumelia *(Sideroxylon lanuginosum)*, hackberry *(Celtis laevigata)*, persimmon *(Diospyros virginiana)*, red cedar *(Juniperus virginiana)*, red mulberry *(Morus rubra)*, wild olive *(Osmanthus americanus)*, redbay *(Persea borbonia)*, laurel cherry *(Prunus caroliniana)*, black cherry *(Prunus serotina)*, bluff oak *(Quercus sinuata)*, water oak, cabbage palm, basswood *(Tilia americana var. heterophylla)*, winged elm *(Ulmus alata)*, Florida elm, sparkleberry *(Vaccinium arboreum)*, Hercules' club *(Zanthoxylum clava-herculis)*, slippery elm *(Ulmus rubra)*, beautyberry *(Callicarpa americana)*, partridgeberry *(Mitchella repens)*, sarsaparilla vine *(Smilax pumila)*, greenbrier *(Smilax auriculata)* , trilliums *(Trillium maculatum)*, beech drops *(Epifagus virginiana)*, passion flower *(Passiflora viridiflora)*, bedstraw *(Galium circaezans)*, strawberry bush *(Euonymus americanus)*,

silverbell *(Halesia sp.)*, caric sedges, fringe tree *(Chionanthus virginicus)*, horse sugar *(Symplocos tinctoria)*, white oak *(Quercus alba)*, and blackgum *(Nyssa sylvatica var. biflora)*.

Processes
Upland Mixed Forests occur on rolling hills that often have limestone or phosphatic rock near the surface and occasionally as outcrops. Soils are generally sandy-clays or clayey sands with substantial organic and often calcareous components. The topography and clayey soils increase surface water runoff, although this is counterbalanced by the moisture retention properties of clays and by the often thick layer of leaf mulch which helps conserve soil moisture and create decidedly mesic conditions. Furthermore, the canopy is densely closed, except during winter in areas where deciduous trees predominate. Thus, air movement and light penetration are generally low, making the humidity high and relatively constant, and fire is rare. Because of these conditions Upland Hardwood and Mixed Forests rarely burn. Upland Mixed Forests are climax communities.

5.2.9 Slough
Species Composition
Sloughs are characterized as broad shallow channels, inundated with flowing water except during extreme droughts that are the deepest drainageways within Strand Swamps and Swale systems. The vegetation structure of Sloughs is variable but characterized, in general, by Carolina (pop) ash *(Fraxinus caroliniana)*, fragrant waterlily *(Nymphaea* sp.*)*, large emergent herbs, and floating aquatic plants. Typical plants include water elm, *(Planera aquatica)* ogeechee tupelo *(Nyssa ogeche),* fire flag, water lettuce, golden canna *(Canna flaccida)*, giant cutgrass *(Zizaniopsis miliacea)*, frog's bit *(Phyla nodiflora)*, duckweed *(Lemna sp.),* buttonbush, coastal plain willow, pickerelweed, arrowhead, and lizard's tail.

Processes
Sloughs are often aligned with the lowest part of linear depressions in the underlying limestone bedrock. The soils are peat, unless they have been destroyed by catastrophic fires that can occur during droughts, and frequent fire recurrence is required to maintain healthy sloughs The normal hydroperiod is at least 250 days per year. Sloughs are generally abundant throughout Florida. Sloughs are extremely vulnerable to hydrologic disturbance and must have a reliable, quality water source to persist. Peat mining and clearcutting are additional threats to this natural community.

6.0 RESTORATION IMPLEMENTATION

6.1 Plan Implementation

Restoration of the LNP, Lybass and Robinson sites generally entails converting the plantations through appropriate tree removal and restoring the primary abiotic processes (hydrology and fire) that mold this type of landscape. Short-term activities will focus on hydrologic restoration and re-establishment of wetland communities. Restoration of a natural fire regime[4] will help in restoring the vegetation and habitat dynamics of the site. Long-term management activities will continue to enhance the health and viability of the restored wetlands and to maintain the high ecological value of the restored ecosystem.

To ensure that the mitigation goals are met, an adaptive management approach will be an integral part of project implementation. If the mitigation project is not meeting its goals, PEF will develop and implement corrective actions, in coordination with the appropriate regulatory agencies. The principal mitigation activities include the following:

- Harvesting and thinning of planted pines to approximate densities that would occur naturally and planting native pines where appropriate.
- Assessment of bedded areas to determine if bed removal would be beneficial; removal if there will be a net improvement.
- Nuisance species control for invasive plants and damaging wildlife.
- Planting of appropriate native species if natural recruitment is not occurring.
- Prevention of further silviculture impacts through establishment of a conservation easement.
- Protection of wildlife through habitat enhancement and preservation of wildlife corridors.
- Placement of low water crossings, replacement culverts, and road segment removals to restore natural surface water flow.
- Partial ditch plug filling along roadside ditches to eliminate drainage from existing wetlands and to restore natural sheet flow patterns.
- Implementation of a monitoring program to document mitigation success.

Exotics
Please note that for all target community types, minimal occurrences of exotic species have been documented. Observed exotic species include patches of cogongrass *(Imperata cylindrical)* as well as single occurrences of mimosa *(Albizia julibrissin),* chinaberry *(Melia asedarach)*, camphor *(Cinnamomum camphora)* and Chinese tallow. Removal of exotics and follow up monitoring and maintenance of all target community types for exotic species will occur as part of the restoration implementation process.

[4] Should mitigation be conducted on the LNP site, prescribed fire will be used as a management tool except in exclusion areas near the operating plant.

6.1.1 Wet Flatwoods

Prescribed Fire

One to two years after thinning, burning will be resumed. Fire should be re-introduced prior to planting any longleaf pine (if necessary). Burning will be on a two to four-year cycle, with no fire for two years after installment of longleaf pine. Back-burning may be necessary while longleaf pines are small. If necessary, additional seeding will be performed if the groundcover plants do not achieve recolonization after controlled burns.

Hydrology

BMPs are a concern in this area. Timber sales will proceed only when both the forester and biologist have agreed that it is dry enough to commence. Careful attention must be paid to the lower sites throughout the wet flatwoods that have large hooded pitcher plant occurrences. Removing the pines will increase hydrology through removal of evapotranspiration from the trees and removal of the beds from silviculture.

Monitoring

Monitoring should be yearly, focusing on areas that have received prescribed fire regularly and where pine plantations have been removed from the rim of the wetland.

6.1.2 Basin and Dome Swamps

Prescribed Fire

No firelines should be made to prevent fire from going into domes or swamps unless experiencing drought conditions or there is concern with smoke management. When a fireline is necessary, heavy equipment can be used only to mow or "lay down" vegetation by driving equipment over the area of concern, with attention to avoiding wet, mucky areas. If the previous two methods are unsatisfactory and the situation is considered a serious threat, careful planning and consideration for a lightly harrowed line as determined by staff is acceptable.

Hydrology

If a suppression line has crossed, bordered, or is in the vicinity (75-100') of a cypress dome, restoration of that line will follow within six months of its creation. Restoration may occur naturally (will be monitored). Hydrology will be improved with removal of pine plantations and any ditch blocks that will be installed as appropriate.

Monitoring

Monitoring should be yearly, focusing on areas that have received prescribed fire regularly and where pine plantations have been removed from the rim of the wetland.

6.1.3 Bottomland Forest

Prescribed Fire

Bottomland forests will not be protected from fire with fire breaks, instead fire will be allowed to creep into the edges.

Hydrology
Logging planted pine for restoration will proceed only when both the forester and biologist have agreed that it is dry enough to commence. Careful attention must be paid to the low-lying ecotones throughout so as not to disturb sensitive species. Some ditch blocks may be installed to improve hydrology. Removing pines will increase hydroperiod, through less evapotranspiration.

Monitoring
Monitoring should be yearly to assess hydrologic conditions and vegetative composition.

6.1.4 Floodplain Forest
Prescribed Fire
Floodplain forests will not be protected from fire with fire breaks, instead fire will be allowed to creep into the edges.

Hydrology
Logging planted pine for restoration will proceed only when both the forester and biologist have agreed that it is dry enough to commence. Careful attention must be paid to the low-lying ecotones throughout so as not to disturb sensitive species. Ditch blocks may be installed to improve hydrology. Removing pines will increase hydroperiod, through less evapotranspiration.

Monitoring
Monitoring should be yearly to assess hydrologic conditions and vegetative composition.

6.1.5 Depressional Marsh
Prescribed Fire
Prescribed fire will be periodically introduced into the wetlands to maintain wetland vegetation and to keep woody vegetation from encroaching. Fire will be more frequent at the margins than in the center of the ponds. The areas of wet prairie will be burned with a frequency of two to four years, with a low to moderate intensity in the growing season. Periodic burning should be sufficient to maintain native groundcover. Fire lines and heavy machinery will be kept out of wetlands. Invasion of shrubs and trees and the formation of peat are restricted by prescribed fire, which occurs primarily during the lightning season, when water levels are high and plants are growing.

Hydrology
An important need for this community mosaic is to assess whether some ditch blocking within the Primary Mitigation Option areas may assist in restoring natural sheet flow to the wetlands. Removing planted pines and their associated beds will also improve hydrology.

Monitoring
Should be implemented when pines are removed from the edges and continued annually or every other year, focusing on areas that have received prescribed fire regularly.

6.1.6 Mesic Flatwoods

Prescribed Fire

The primary management actions for mesic flatwoods are the reintroduction of fire and removal of silviculture. Prescribed fire will be implemented on a 2 to 4 year fuel reduction burn cycle. When fuels are reduced to a safe level, transition to growing season burns will proceed. Stands having not yet been burned or have not been burned in a consistent rotation should be added annually and eventually include adjacent stands that are in cycle. This may require some stands that are out of rotation to be burned in consecutive years or out of cycle. With the amount of acreage required to burn annually, aerial ignition may become a primary technique. Burn priority will be decided by the following criteria:

1) Potential for recruitment clusters for Red cockaded woodpeckers
2) Fuel reduction in unburned stands
3) High quality habitat
4) Unburned, un-logged plantations

Groundcover

The reduction of palmetto is needed to create a more diversified and contiguous layer of grasses, herbs, and forbs. As a result of fire suppression and bedding, the saw palmetto density has become almost contiguous, decreasing the health and continuity of the diversified groundcover need to maintain a lower intensity fire. If prescribed fire is not enough to reduce palmetto cover, mulching may be introduced for this purpose, followed six months later with a burn. Mulching (or hydro-axing) followed by fire is an effective method for increasing grasses and herbs.

Hydrology

With numerous wetlands embedded within the mesic flatwoods, careful considerations need to be made when creating new fire lines, logging to remove the slash pine, and other management activities that may impact their ability to be successfully restored within the landscape. If the wetland is greater than two acres, the Division of Forestry's Best Management Practices of a 30-66-foot buffer will be taken into consideration. All timber removal will be performed to minimize disturbance to the ground cover vegetation, native fauna, or ecosystem values. Any fire lines will be restored with a rework harrow and allowed to revegetate.

Silviculture

Timber management on the forest has focused primarily on the installation of slash pine plantations. Longleaf pine will replace the slash pines (following either harvest, mulching or clearing). Retention of old relict pines is particularly important, as well as leaving clumps of large diameter trees for residual/future natural or artificial cavities for red-cockaded woodpeckers that may colonize from neighboring GSF.

6.2 Schedule

A conceptual schedule is provided in Table 6-1. The activities reflected in the table are subject to adjustment within the indicated timeframes based on the specific array of mitigation options selected. Various natural factors such as rainfall amounts and timing, native plant recruitment patterns, etc. may also affect the specific timing of mitigation efforts.

As noted above, to simplify implementation of the restoration activities, the Robinson Tract was divided into five distinct zones (see Exhibit 3-1). The Lybass Property is envisioned as a single mitigation unit at this time, as are the "other" -offsite areas.

Each area will be logged to remove the pine plantations present in wetlands and uplands. Where bedding remains post-logging, bedding will be returned to original grade. Monitoring will ensure that the seedbank allows for re-colonization of desirable native groundcover. If monitoring shows that natural colonization is insufficient for providing enough groundcover to carry fire, additional seed will be collected and seeded on site.

The western zone at Robinson and the Lybass property would serve to connect the GSF, through the LNP site, to the Withlacoochee River. Maintaining the existing connectivity through Phase 1, and restoring the ecological processes to the eastern LNP, Lybass and Robinson Tract is important to the overall health of the ecological community. Logging pine plantations and re-introducing fire to Lybass and the western Robinson zones will enhance wildlife habitat value and movement between GSF and the Withlacoochee.

The west-central zone at Robinson incorporates the large wetland system in the middle of the Robinson Parcel. Work here will include ditch blocking and logging the extensive pine plantations that are mapped as wetlands. Fire will also be re-introduced to the site. This zone provides the most functional gain in UMAM of the five Robinson components.

The east-central Robinson zone is east of the large wetland system located on the Robinson Parcel. This zone will allow for additional logging of planted pines and the re-introduction of fire. The eastern and southern-most zones on Robinson provide the least amount of functional gain in UMAM but will facilitate prescribed fire across the site.

Table 6-1. Schedule for Implementation of Restoration and Monitoring Activities

Activity	Year 1	Year 2	Year 3	Year 4
Removing Pines through logging	Dry Season (November to April)			Monitor following removal and planting of longleaf for performance.
Prescribed Fire for logged areas		6-18 months post logging		Incorporate in typical burn rotation below
Prescribed fire in restoration uplands	Burn 30 percent of uplands in the growing season where no additional work (logging or mulching is needed)	Burn additional upland acres and wetland edges where appropriate. Some may require dormant season fire based on fuel loads.	Burn 30 percent of uplands not previously burned.	Burn 30 percent of uplands not previously burned in the past 2 years.
Monitoring to assess release of groundcover from prescribed burns	Monitor wetlands prior to burning. Monitor uplands where credit is desired prior to burning	Monitor vegetative community for response to fire (increase in groundcover realized).	Monitor vegetative communities burned the previous years for response to fire.	Continue monitoring.
Seed collection if necessary for adding additional diversity to wet prairie fringes that were logged.	Seed areas necessary and provide maintenance as necessary	Monitor vegetation to determine increase in species and cover	Monitor vegetation to determine success of seeding	Monitor as necessary.
Ditch Block and Low Water Crossing Construction	Install these features, unless increased hydroperiod would negatively affect logging	Monitor areas where original features installed to ensure no negative impacts and install remaining features	Continue monitoring hydrology surrounding hydrologic improvements	Monitor as necessary

7.0 UNIFORM MITIGATION ASSESSMENT METHODOLOGY ANALYSIS

7.1 Overview

Wetlands occurring on all potential impact and mitigation sites were given a unique identifier and were evaluated using -UMAM-. This methodology is meant to quantify the functions provided by each Assessment Area to fish and wildlife and their habitat. UMAM is broken down into two parts. Part I is used to describe the area, identify the species of wildlife that would likely use the habitat and identify the types of functions the Assessment Area provides to the fish and wildlife anticipated to use the area under ideal circumstances. Part II of the methodology measures the functions of the Assessment Area relative to the description recorded in Part I.

Part II is composed of three parameters that measure wetland function: Location and Landscape Support, Water Environment, and Community Structure. Each of these parameters is scored based on the level of benefits to fish and wildlife provided by the Assessment Area. Each category is assigned a numeric score ranging from 0 (inadequate conditions to provide wetland functions) to 10 (optimal condition that fully supports wetland functions and wildlife).

The Location and Landscape Support score is determined by the benefits that the specific geography of the assessment area and juxtaposition of surrounding habitats provide to the species of wildlife that are anticipated to utilize the area as identified in Part I. The Water Environment score is determined through an evaluation of water quantity including the timing, frequency, depth and duration of inundation or saturation, flow characteristics, and the quality of that water based on the ability to promote the existence of fish and wildlife. Finally, the Community Structure score is designed to assess the composition and utility of the vegetative structure of the assessment area relative to fish and wildlife support. It measures such aspects as species composition, age distribution and recruitment, and zonation of the assessment area. The community structure component may also consider non-vegetative aspects of structure such as topography, refugia, hummocks and other microtopographical features as well as any other structural components of the assessment area that may affect its value to be used by fish and wildlife.

The methodology used for this project follows the guidelines set forth in 62-345 F.A.C. and was performed by dividing each site into separate Assessment Areas, generally on the basis of FLUCFCS. Unless otherwise noted, each Assessment Area was visited by a team of ecologists to evaluate current conditions. The team was equipped with a sub-meter accuracy Global Positioning System (GPS) unit, a current infrared aerial of the site and standardized data sheets. Data recorded at each site included vegetative cover and composition in all strata, presence and degree of disturbance observed, visible signs of hydrologic stress, soil characteristics, and surrounding land uses.

Upon completion of the field effort, observations were subject to Quality Assurance checks and refinement between teams to maintain consistency over the entire study area. A Microsoft Access database was created for the project and all information included in Part I and Part II of the UMAM analysis was entered. The current condition of each Assessment Area used as a surrogate for the "without project" condition and was compared with that projected under the proposed impact or

mitigation scenarios, or "with project" condition and the Relative Functional Gain was calculated for the project. The Access database was then merged with a Geographic Information System (GIS) database for geographical representation of the data. Below we present the justification for the scores used in the UMAM analysis.

7.2 Proposed Impact Wetland Scoring Summary

PEF is proposing unavoidable wetland impacts to a total of 729.40 acres (including blowdown pipe, 688.40 without) of DEP jurisdictional wetlands. Note that this Figure is subject to refinement, particularly as transmission line rights-of-way are finalized. To mitigate for these impacts, they have proposed a detailed and comprehensive watershed based mitigation program. The acreage and UMAM scores of the various types of proposed impacts and mitigation are summarized in Table 7-1. In accordance with the guidelines set forth in 62-345, F.A.C. all potential mitigation areas were scored under the "without project" scenario and the "with project" scenario. The "without project" scenario assumes that the current land management and silviculture operations will persist, while the "with project" scenario assumes that the impacted areas will be filled completely and permanently. This is a summary of the scoring justification used in the current UMAM analysis and mitigation calculation.

7.2.1 Without Project

Location and Landscape Support

Assessment Areas in the impact area were generally given a Location and Landscape Support score of 4 based on ongoing land management practices, and the limitations that these activities present to utilization of the site by wildlife. The current silvicultural land use restricts wildlife movement across the site and has degraded the habitat value of the uplands upon which many wetland dependent species require for all, or a portion, of their life cycle. According to the criteria set forth in 62-345.500(6)(a), a Location and Landscape Support score of 4 is appropriate for areas that limit the opportunity to perform beneficial functions to 40 percent of the optimal ecological value. The score is based on reasonable scientific judgment and characterized by a predominance of the following:

- The habitat availability outside the Assessment Area fails to provide support for some species of wildlife or provides minimal support for many species listed in Part I of the assessment.
- Wildlife access to and from the Assessment Area is substantially limited by distance or barriers
- Area land uses have significant adverse impacts on wildlife
- Hydrologic impediments limit the Assessment Area from providing benefits downstream

Most LNP Assessment Areas are surrounded by large blocks of pine plantation, which limits the available native vegetation diversity and structure that would provide cover and forage, increases human activity on the site, and generally limits habitat suitability for a number of wildlife species. A lower score is not appropriate because of the large size and rural nature of the site, providing suitable habitat for a number of common species.

Water Environment
Water Environment scores ranged from 2 to 10 based the criteria set forth in 62-345.500(6)(b). The variability in scores was due to differences in land management practices (ditching, bedding, haul roads, etc.) and the effect these practices have on the type of habitat being scored.

Community Structure
Community Structure scores ranged from 2 to 9 based on the criteria set forth in 62-345.500(6)(c). This distinction was based on degree of regeneration/recruitment, cover by desirable species in all strata, vegetative species diversity and the degree of good structural quality available for wildlife. Most wetlands scored in the higher end of the range. The wetlands that received scores on the lower end of the range were generally those with relatively short historic hydroperiods which were bedded and planted with pine.

7.2.2 With Project
All impacts have been conservatively considered to be permanent and direct in nature (i.e. directly filling a wetland as part of construction activities because of uncertainty in the location and/or extent of potential temporary and/or partial impacts). These impacts result in a total loss of wetland function according to UMAM and thus receive a score of zero in all three categories.

7.3 Mitigation Scoring Summary

The areas listed below are considered suitable for potential mitigation through restoration, enhancement or preservation to partially or completely replace the functions and values lost as a result of the project impacts. Based on the results of this analysis, as well as negotiations with agencies and landowners, the acreage or activities may be refined.

7.4 LNP Site

Because much of the LNP site is proposed for development, infrastructure, transmission corridors, security buffers and potential future development, there are few areas available for mitigation. The areas available for enhancement or other mitigation opportunities are graphically depicted on Exhibit 1-1. A summary of the scoring is presented below. Please note that the scoring of wetlands and/or portions of wetlands that are transitional in nature (wetland edges/ecotones or other areas where the natural depth of flooding is low and the length of inundation is short) is specifically discussed in many places of this report because of the distinct scoring and high potential enhancement opportunities these areas provide.

7.4.1 Without Project
Location and Landscape Support
Similar to the LNP impact areas, Location and Landscape Support scores of 4 have generally been assigned to the mitigation Assessment Areas on the LNP site areas based on the ongoing land management practices, and the limitations to wildlife support and movement in the area. According to the criteria set forth in 62-345.500(6)(a), a Location and Landscape Support score of 4 is appropriate for areas that limit the opportunity to perform beneficial functions to 40 percent of the optimal ecological

value. The score is based on reasonable scientific judgment and characterized by a predominance of the following:

- The habitat availability outside the Assessment Area fails to provide support for some species of wildlife or provides minimal support for many species listed in Part I of the assessment.
- Wildlife access to and from the Assessment Area is substantially limited by distance or barriers
- Area land uses have significant adverse impacts on wildlife
- Hydrologic impediments limit the Assessment Area from providing benefits downstream

Most LNP Assessment Areas are surrounded by large blocks of pine plantation, which limits the available native cover, increases human activity on the site, and limits habitat suitability for a number of wildlife species. A lower score is not appropriate because of the large size and rural nature of the site, providing suitable habitat for a number of common species.

Water Environment
Water Environment scores ranged from 4 to 10 based on the criteria set forth in 62-345.500 (6)(b). The variability in scores was generally due to differences in land management practices (ditching, bedding, haul roads, etc.) and the effect these practices have on the type of habitat being scored.

Transitional wetlands that have been planted in pine were generally given a score of 4 because they met the following criteria set forth in 62-345.500(6)(b):

- Water levels and flows are moderately higher or lower than appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- Water level indicators are not distinct and are not consistent with the expected hydrologic conditions for the type of system being evaluated.
- Soil moisture has deviated from what is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. Strong evidence of soil desiccation, oxidation or subsidence is observed.
- Vegetation or benthic community zonation in most strata is inappropriate for the type of system being evaluated, indicating atypical hydrologic conditions.
- Much of the plant community composition consists of species tolerant of and associated with moderate water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.

Community Structure
Community Structure scores on the LNP site ranged from 3 to 10 based on the criteria set forth in 62-345.500 (6)(c). This distinction was based on degree of regeneration/recruitment, cover by desirable species in all strata, vegetative species diversity, and the degree of good structural quality available for wildlife.

Transitional wetlands that have been planted in pine were generally given a score of 4 because they met the following criteria:

- Majority of plant cover is by inappropriate or undesirable plant species in the canopy, shrub, or ground stratum.
- There is minimal evidence of regeneration or natural recruitment.
- Age and size distribution is atypical of the system and indicative of permanent deviation from normal successional pattern, with greater than expected amount of dead or drying vegetation.
- Land management practices have resulted in partial removal or alteration of natural structures or introduction of some artificial features, such as furrows or ditches.
- Reduction in extent of topographic features, such as refugia ponds, creek channels, flats, or hummocks, from what is normal for the area being assessed.

Uplands throughout the LNP Site were given a score of 4 in the "without project" scenario for community structure. This reflects the sub-optimal structural habitat, minimal evidence of normal regeneration and recruitment, and evidence of long-term degradation of the natural community structure through repeated logging, bedding and suppression of fire.

7.4.2 With Project

Location and Landscape Support

Wetlands on the LNP site in the "with project" scenario were generally given a Location and Landscape Support score of 9 based on predicted optimal habitat availability outside the Assessment Area for nearly all wildlife in the enhanced landscape. Also, we expect no adverse effects on wildlife in the assessment area by land management (silviculture) practices in the "with project" scenario landscape based on habitat type and management techniques specified above that are aimed at restoring the uplands to their natural state. Most Assessment Areas are surrounded by larger wetlands or restored uplands, therefore, wildlife access to and from assessment areas will generally not be severely restricted. Based on the plan presented in this document, the wetlands on the LNP site should meet the following criteria:

- Habitats outside the assessment area represent the dull range of habitats needed to fulfill the life history requirements of all wildlife listed in Part I and are available in sufficient quantity to provide optimal support for these wildlife.
- Wildlife access to and from habitats outside the assessment area is nit limited by distance to these habitats and is unobstructed by landscape barriers.
- Land uses outside the assessment area have no adverse impacts on wildlife in the assessment area as listed in Part I.

Water Environment

Wetlands in the "with project" scenario were generally assigned a slightly improved Water Environment score over that which they received in the "without project" scenario. This is because few, if any specific hydrologic enhancement projects have been identified that would measurably change in the water environment, although the restoration of uplands and reduction/elimination of pine beds and high evapotranspiration silviculture uplands would likely improve flow and water quality to some degree. The notable exception to this general rule was in planted pine wetland areas. Because of the drastic reduction in evapotranspiration and physical change in these habitats (reduced ditching, bedding, etc.),

upon cessation of silviculture activities, a score of 9 was assigned based on the reasonable scientific judgment that upon enhancement of these areas they will be characterized by the following:

- Water levels and flows appear appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- Water level indicators are distinct and consistent with expected hydrologic conditions for the type of system being evaluated.
- Soil moisture is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. No evidence of soil desiccation, oxidation or subsidence is observed.
- Evidence of fire history does not indicate atypical fire frequency or severity due to excessive dryness.
- Vegetation or benthic community zonation in all strata are appropriate for the type of system being evaluated and does not indicate atypical hydrologic conditions.
- Presence or evidence of use by animal species with specific hydrologic requirements is consistent with expected hydrologic conditions for the system being evaluated.
- Plant community composition is not characterized by species tolerant of and associated with water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.

Community Structure
Wetland Assessment Areas in the "with project" scenario were assigned the a Community Structure score of 9 because of the elimination of slash pines in the wetlands and natural regeneration of the natural transitional community in all habitats, as well as the cessation of logging and perpetual management. Based on the reasonable scientific prediction that upon enhancement of the areas, they will be characterized by the following:

- All or nearly all of the plant cover is by appropriate and desirable plant species in the canopy, shrub, or ground stratum
- There is strong evidence of normal regeneration and natural recruitment.
- Age and size distribution is typical of the system, with no indication of deviation from normal successional or mortality pattern.
- The density and quality of coarse woody debris, snag, den, and cavity provide optimal structural habitat for that type of system.
- Plants are in good condition, with very little to no evidence of chlorotic or spindly growth or insect damage.
- Land management practices are optimal for long term viability of the plant community.
- Topographic features, such as refugia ponds, creek channels, flats or hummocks, are present and normal for the area being assessed.

Uplands throughout the LNP Site were given a score of 9 in the "with project" scenario. This reflects optimal structural habitat, typical age/size distribution, and strong evidence of normal regeneration and recruitment that can be reasonably expected with the specific management and land protection measures presented above. Uplands will also be populated by appropriate and desirable species.

Time frame from mitigation implementation to maturity was based on the difference between the "without project" community structure score and the "with project" community score for forested wetlands. Wetlands that begin with a low score (≤4) were assigned 15 years to maturity; while those that began with a higher score (≥5) were assigned 5 years to maturity. All herbaceous wetlands and all uplands were assigned 5 years to maturity. Risk factors ranged from a high of 1.5 for planted pine wetlands to a low of 1.25 for other wetlands and all upland Assessment Areas. The adjacent GSF provides assurance that successful implementation of a similar plan will likely result in habitats that resemble those described within this document.

7.5 Robinson Site

7.5.1 Without Project

Location and Landscape Support

Similar to the LNP site, Location and Landscape Support scores of 4 have generally been assigned to the Assessment Areas on the Robinson site based on the ongoing land management practices, and the limitations to wildlife support and movement in the area. According to the criteria set forth in 62-345.500(6)(a), a Location and Landscape Support score of 4 is appropriate for areas that limit the opportunity to perform beneficial functions to 40percent of the optimal ecological value. The score is based on reasonable scientific judgment and characterized by a predominance of the following:

- The habitat availability outside the Assessment Area fails to provide support for some species of wildlife or provides minimal support for many species listed in Part I of the assessment.
- Wildlife access to and from the Assessment Area is substantially limited by distance or barriers
- Area land uses have significant adverse impacts on wildlife
- Hydrologic impediments limit the Assessment Area from providing benefits downstream

Most Robinson site Assessment Areas are surrounded by large blocks of pine plantation, which limits the available native cover, increases human activity on the site, and limits habitat suitability for a number of wildlife species. A lower score is not appropriate because of the large size and rural nature of the site, providing suitable habitat for a number of common species.

Water Environment

Water Environment scores on the Robinson site ranged from 2 to 9 based on the criteria set forth in 62-345.500 (6)(b). The variability in scores was generally due to differences in land management practices (ditching, bedding, haul roads, etc.) and the effect these practices have on the type of habitat being scored.

Transitional wetlands that have been planted in pine were generally given a score of 4 because they met the following criteria set forth in 62-345.500(6)(b)3:

Water levels and flows are moderately higher or lower than appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.

- Water level indicators are not distinct and are not consistent with the expected hydrologic conditions for the type of system being evaluated.
- Soil moisture has deviated from what is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. Strong evidence of soil desiccation, oxidation or subsidence is observed.
- Vegetation or benthic community zonation in most strata is inappropriate for the type of system being evaluated, indicating atypical hydrologic conditions.
- Much of the plant community composition consists of species tolerant of and associated with moderate water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.

Community Structure
Community Structure scores on the Robinson site ranged from 3 to 9 based on the criteria set forth in 62-345.500 (6)(c). This distinction was based on the degree of regeneration/recruitment, cover by desirable species in all strata, vegetative species diversity, and the degree of good structural habitat quality available for wildlife.

Transitional wetlands that have been planted in pine were generally given a score of 4 because they met the following criteria:

- Majority of plant cover is by inappropriate or undesirable plant species in the canopy, shrub, or ground stratum.
- There is minimal evidence of regeneration or natural recruitment.
- Age and size distribution is atypical of the system and indicative of permanent deviation from normal successional pattern, with greater than expected amount of dead or drying vegetation.
- Land management practices have resulted in partial removal or alteration of natural structures or introduction of some artificial features, such as furrows or ditches.
- Reduction in extent of topographic features, such as refugia ponds, creek channels, flats, or hummocks, from what is normal for the area being assessed.

Uplands throughout the Robinson Site were given a score of 4 in the "without project" scenario. This reflects the sub-optimal structural habitat, minimal evidence of normal regeneration and recruitment, and evidence of long-term degradation of the natural community structure through repeated logging, bedding and suppression of fire.

7.5.2 With Project
Location and Landscape Support

Assessment Areas on the Robinson site in the "with project" scenario were generally given Location and Landscape Support score of 9 based on predicted optimal habitat availability outside the Assessment Area for nearly all wildlife in the current and post enhancement landscape. Also, we expect no effects on wildlife in the assessment area by land management (silviculture) practices in the "with project" scenario landscape based on habitat type and management techniques specified above, that are aimed at restoring the uplands to their natural site. Most Assessment Areas are surrounded by larger wetlands or

restored uplands, therefore, wildlife access to and from assessment areas will generally not be restricted. Based on the plan presented in this document, the wetlands on the Robinson site should meet the following criteria:

- Habitats outside the assessment area represent the dull range of habitats needed to fulfill the life history requirements of all wildlife listed in Part I and are available in sufficient quantity to provide optimal support for these wildlife.
- Wildlife access to and from habitats outside the assessment area is nit limited by distance to these habitats and is unobstructed by landscape barriers.
- Land uses outside the assessment area have no adverse impacts on wildlife in the assessment area as listed in Part I.

Water Environment
Wetlands in the "with project" scenario were generally assigned a slightly improved Water Environment score over that which they received in the "without project" scenario. This is because few, if any specific hydrologic enhancement projects have been identified that would measurably change in the water environment, although the restoration of uplands and reduction/elimination of pine beds and high evapotranspiration silviculture uplands would likely improve flow and water quality to some degree. The notable exception to this general rule was in planted pine wetland areas. Because of the drastic reduction in evapotranspiration and physical change in these habitats (reduced ditching, bedding, etc.), upon cessation of silviculture activities, a score of 9 was assigned based on the reasonable scientific judgment that upon enhancement of these areas they will be characterized by the following:

- Water levels and flows appear appropriate, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects.
- Water level indicators are distinct and consistent with expected hydrologic conditions for the type of system being evaluated.
- Soil moisture is appropriate for the type of system being evaluated, considering seasonal variation, tidal cycle, antecedent weather and other climatic effects. No evidence of soil desiccation, oxidation or subsidence is observed.
- Evidence of fire history does not indicate atypical fire frequency or severity due to excessive dryness.
- Vegetation or benthic community zonation in all strata are appropriate for the type of system being evaluated and does not indicate atypical hydrologic conditions.
- Presence or evidence of use by animal species with specific hydrologic requirements is consistent with expected hydrologic conditions for the system being evaluated.
- Plant community composition is not characterized by species tolerant of and associated with water quality degradation or alterations in frequency, depth, and duration in inundation or saturation.

Community Structure
Wetland Assessment Areas in the "with project" scenario were assigned the a Community Structure score of 9 because of the elimination of slash pines in the wetlands and natural regeneration of the natural transitional community in all habitats, as well as the cessation of logging and perpetual

management. Based on the reasonable scientific prediction that upon enhancement of the areas, they will be characterized by the following:

- All or nearly all of the plant cover is by appropriate and desirable plant species in the canopy, shrub, or ground stratum
- There is strong evidence of normal regeneration and natural recruitment.
- Age and size distribution is typical of the system, with no indication of deviation from normal successional or mortality pattern.
- The density and quality of coarse woody debris, snag, den, and cavity provide optimal structural habitat for that type of system.
- Plants are in good condition, with very little to no evidence of chlorotic or spindly growth or insect damage.
- Land management practices are optimal for long term viability of the plant community.
- Topographic features, such as refugia ponds, creek channels, flats or hummocks, are present and normal for the area being assessed.

Uplands throughout the Robinson Site were given a score of 9 in the "with project" scenario. This reflects the optimal structural habitat, typical age/size distribution, and strong evidence of normal regeneration and recruitment that can be reasonably expected with the specific management and land protection presented above. Uplands were also populated by appropriate and desirable species.

Time frame from mitigation implementation to maturity was based on the difference between the "without project" community structure score and the "with project" community score for forested wetlands. Wetlands that begin with a low score (≤4) were assigned 15 years to maturity; while those that began with a higher score (≥5) were assigned 5 years to maturity. All herbaceous wetlands and all uplands were assigned 5 years to maturity. Risk factors ranged from a high of 1.5 for planted pine wetlands to a low of 1.25 for other wetlands and all upland Assessment Areas. The adjacent GSF provides assurance that successful implementation of a similar plan will likely result in habitats that resemble those described within this document.

7.6 Goethe State Forest

7.6.1 Without Project

Historic ditching appears to have altered the natural successional patterns within portions of the GSF assessment areas. These alterations have resulted in recruitment of facultative vegetation in areas dominated by mature obligate vegetation, and observed atypical recruitment patterns include juvenile pines and wax myrtle (*Myrica cerifera*) occurring in deeper portions of the Assessment Area

7.6.2 With Project

"With project" scores for GSF for Location and Landscape Support are 9, for Water Environment are 9, and for Community Structure are 9.

Reestablishing the historic hydroperiod should stress and eventually eliminate these encroaching plant species that would not naturally occur in these areas. Based on "Without project" scores for GSF for

Location and Landscape Support are 9, for Water Environment are 7, and for Community Structure are 8.

7.7 Lybass and Alternate Sites Overview

To simplify implementation of the restoration activities, the Robinson Tract was divided into five distinct zones (see Exhibit 3-1). The Lybass Property is envisioned as a single mitigation unit at this time, as are Alternate Sites 391 and 392.

Each area will be logged to remove the pine plantations present in wetlands and uplands. Where bedding remains post-logging, bedding will be returned to original grade. Monitoring will ensure that the seedbank allows for re-colonization of desirable native groundcover. If monitoring shows that natural colonization is insufficient for providing enough groundcover to carry fire, additional seed will be collected and seeded on site.

The western zone at Robinson and the Lybass property would serve to connect the GSF, through the LNP site, to the Withlacoochee River. Maintaining the existing connectivity through Phase 1, and restoring the ecological processes to the eastern LNP, Lybass and Robinson Tract is important to the overall health of the ecological community. Logging pine plantations and re-introducing fire to Lybass and the western Robinson zones will enhance wildlife habitat value and movement between GSF and the Withlacoochee.

The west-central zone at Robinson incorporates the large wetland system in the middle of the Robinson Parcel. Work here will include ditch blocking and logging the extensive pine plantations that are mapped as wetlands. Fire will also be re-introduced to the site. This zone provides the most functional gain in UMAM of the five Robinson components.

The east-central Robinson zone is east of the large wetland system located on the Robinson Parcel. This zone will allow for additional logging of planted pines and the re-introduction of fire. The eastern and southern-most zones on Robinson provide the least amount of functional gain in UMAM but will facilitate prescribed fire across the site.

7.7.1 Lybass and Alternate Site Scoring

Location and Landscape Support was assigned a score of 4 in the "without project" scenario and a 9 in the "with project" scenario based on similar logic that provided in Section 7.5 above. Water environment scores ranged from 4 to 6 in the "without project" scenario based on the presence and abundance of unnatural vegetation within the wetlands. This is consistent with the method of scoring presented on the LNP and Robinson sites. The "with project" scenario was assigned scores of 9, which reflects the hydrologic enhancement through the cessation of silviculture. Community Structure scores ranged from 4 to 7 in the "without project" scenario based on silviculture activity and was assigned a 9 in the "with project" scenario based on the cessation of such activity and implementation of land management activities.

7.8 UMAM Conclusions

A summary of the results of the UMAM analysis is presented in Table 7-1 below including acreages and functional loss or lift resulting from the proposed activities within each site.

The proposed project will result in impacts to approximately 764 acres of wetlands. Based on the results of the UMAM analysis, these impacts result in approximately 411 functional loss units. The total functional lift available from all mitigation options considered is approximately 2,860 units; so clearly, PEF need not pursue all potential options. Recommendations related to options that would provide the necessary Functional Gain are noted in Section 9.0 below.

Table 7-1. Acreage and UMAM Summary Table

Area	Herbaceous (including Open Water)		Forested	
	Acres	Functional Loss/Lift	Acres	Functional Loss/Lift
Proposed Impacts				
LNP Site	21.1	-9.9	346.9	-173.5
Transmission Lines	75.5	-56.3	279.1	-137.8
Blowdown Pipe	28.6	-22.9	12.4	-9.9
Barge Slip/Boat Ramp	1.1	-0.6	0.0	-0.0
Total Impacts	**126.3**	**-89.7**	**638.4**	**-321.2**
Potentially Available Mitigation				
LNP Site				
Wetlands	784.3	206.0	703.9	119.4
Uplands	0.0	N/A	683.2	230.3
Total	**784.3**	**206.0**	**1387.1**	**349.7**
Robinson Area 1				
Wetlands	257.5	69.9	310.6	61.7
Uplands	0.0	N/A	1054.6	337.5
Total	**257.5**	**69.9**	**1365.2**	**399.2**
Robinson Area 2				
Wetlands	1094.8	213.1	172.6	38.0
Uplands	0.0	N/A	720.5	230.6
Total	**1094.8**	**213.1**	**893.1**	**268.6**
Robinson Area 3				
Wetlands	136.8	37.2	424.8	99.0
Uplands	0.0	N/A	443.6	141.9
Total	**136.8**	**37.2**	**868.4**	**240.9**
Robinson Area 4				
Wetlands	105.8	28.6	129.2	26.0
Uplands	0.0	N/A	436.3	139.6
Total	**105.8**	**28.6**	**565.4**	**165.7**
Robinson Area 5				

Area	Herbaceous (including Open Water)		Forested	
	Acres	Functional Loss/Lift	Acres	Functional Loss/Lift
Wetlands	71.9	18.0	87.6	16.9
Uplands	0.0	N/A	291.3	93.2
Total	**71.9**	**18.0**	**378.9**	**110.1**
Lybass				
Wetlands	525.7	137.1	321.8	58.2
Uplands	0.0	N/A	1007.4	322.4
Total	**525.7**	**137.1**	**1329.2**	**380.6**
Goethe State Forest				
Wetlands	0.0	N/A	463.9	32.6
Uplands	0.0	N/A	0.0	N/A
Total	**0.0**	**N/A**	**463.9**	**32.6**
Alternate Site 391				
Wetlands	0.0	N/A	113.6	20.2
Uplands	0.0	N/A	353.5	113.1
Total	**0.0**	**N/A**	**467.1**	**133.3**
Alternate Site 392				
Wetlands	4.4	0.9	55.8	10.1
Uplands	0.0	N/A	183.3	58.7
Total	**4.4**	**0.9**	**239.1**	**68.8**

8.0 SUMMARY

This section provides a brief overview of the mitigation options reviewed above. Based on a conservative evaluation of the overall impacts, the mitigation program must yield no less than 410 UMAM lift units to offset the proposed impacts. The various mitigation components under consideration are summarized in tabular form (Table 7-1) and in text below.

It is important to understand, as stated in Section 2, that the wetland impacts are still being refined. In order to ensure that sufficient mitigation is available, the wetland impact assumptions are conservative to identify "worst case" maximum functional losses for all types of impact, including temporary and clearing-related impacts. Since the impacts are still being refined, and there is an array of mitigation opportunities potentially available, PEF commits to providing at least as many UMAM lift units as the final number of actual loss units calculated. Since upland UMAM credit from the extensive upland enhancement efforts is not being directly counted, there will be a substantial additional ecological benefit beyond the simple wetland UMAM balance of loss and lift.

8.1 LNP Site

This property is already under PEF ownership; however, portions of the site perimeter will remain in an undeveloped buffer to meet Nuclear Regulatory Commission requirements. There are four primary mitigation zones on the LNP property: North, East, South and Southwest. The band of available area on the eastern edge of the LNP site does not provide a great deal of UMAM lift, but from a habitat corridor perspective, it makes an important linkage from the Withlacoochee River floodplain to the south, to GSF; as well as connecting to the Robinson and Lybass properties to the east. The southwestern and northern areas of the LNP Site can yield significant UMAM lift from preservation, pine plantation thinning, limited ditch filling, restoration of a natural fire regime, and selected plantings. There may be some operational constraints in portions of these mitigation areas due to the proximity of the project facilities and non-conservation-related land uses to the west and south, which may cause a reduction in potential on-site lift, but the benefits definitely outweigh these possible constraints. The southern zone is the smallest area and, as such, provides some minimal UMAM lift.

8.2 Lybass Property

UMAM lift on the Lybass Property can be obtained in the same ways as on the LNP site, but with a larger contiguous area and fewer adjacent land use constraints. Therefore, the available UMAM lift is proportionally greater there. The site will be easier to manage and access for restoration and management activities can even be maintained separately from the power plant facility.

A key cost consideration is whether there is an alternative to fee simple purchase of this entire tract. PEF may pursue the acquisition of certain rights to use the property for mitigation through a less-than-fee arrangement. This could allow mitigation activities to proceed under a conservation easement, but still allow the existing owners to retain some use of the property. Similarly, it may be feasible to obtain only that portion of the property necessary to provide the required mitigation. PEF may also consider whether to donate the property to GSF or another state agency after the mitigation obligation has been

met. In any event, whether owned and managed by PEF or not, long term management could be coordinated with the land management at GSF to achieve the greatest environmental benefit and reduced long term costs.

Regardless of the alternative pursued, the Lybass Property comprises a potentially key component of a regionally significant mitigation program. We have not done a field assessment of the Lybass Property, and the UMAM lift assessment was made without on-site corroboration, and is therefore an estimate of what may actually be achievable

8.3 The Robinson Property

UMAM lift on the Robinson Tract can be obtained in the same ways as on the LNP site, but with a much larger contiguous area and fewer adjacent land use constraints. Therefore, the available UMAM lift is greater there. The site will be easier to manage and access for restoration and management activities can even be maintained separately from the power plant facility.

A key cost consideration is whether there is an alternative to fee simple purchase of this entire tract. PEF may pursue the acquisition of certain rights to use the property for mitigation through a less-than-fee arrangement. This could allow mitigation activities to proceed under a conservation easement, but still allow the existing owners to retain some use of the property. Similarly, it may be feasible to obtain only that portion of the property necessary to provide the required mitigation. PEF may also consider whether to donate the property to GSF or another state agency after the mitigation obligation has been met. In any event, whether owned and managed by PEF or not, long term management could be coordinated with the land management at GSF to achieve the greatest environmental benefit and reduced long term costs.

Regardless of the alternative pursued, the Robinson Tract can comprise a potentially key component of a regionally significant mitigation program.

8.4 Goethe State Forest

Wetland enhancement can generate some UMAM lift by installing several ditch blocks at GSF. The site is already in state ownership and management so the necessary work should be limited to specific tasks. These tasks are expected to consist mainly of survey and engineering work to determine how and where ditches should be blocked for optimal enhancement, earthmoving to fill the ditches, and a modicum of performance monitoring thereafter. Mitigation at GSF could provide a significant public benefit component to this option because of the additional value to the regional ecosystem and because there are not public funds available for this work in the foreseeable future.

8.5 Other Off-site Options

Two offsite parcels, Tracts 391 and 392, were identified as potential mitigation areas. Together they are about 710 ac. in area and are contiguous with GSF. They have the advantages of (1) being in Levy County, (2) adding land to GSF, and (3) being amenable to a restoration-based mitigation project

through enhancement/restoration of wetlands, silvicultural wetlands and uplands. The disadvantages are that there would be additional land purchase costs and the need for management of additional land areas more remote from the LNP site. In addition, our UMAM lift assessment was made without on-site corroboration, and is therefore an estimate of what may actually be achievable.

8.6 Mitigation Banks

This course of action is generally the first preference of the federal agencies; however, there are no suitable banks in the project area at this time. If available, it would be necessary to buy all of the credit at the two potential banks, which would still not be adequate to offset enough of the impacts. As a result of this absolute constraint, we do not expect to pursue the mitigation banking options at this time.

9.0 CONCLUSION

This document does not point to one defined area or set of areas that will comprise the specific mitigation program. It indicates the clear availability of more-than-ample mitigation availability through a variety of options. As the LNP Site impacts and transmission line rights-of-way become finalized, and real estate opportunities and constraints are clarified, PEF will act expeditiously to select an appropriate combination of the options discussed herein and finalize the specific program to offset the project impacts.

The mitigation proposed here is designed to be regionally-significant and sustainable, focused on the enhancement and restoration of wetland and ecosystem functions across a large landscape area, and in association with existing public lands. A selection of mitigation components can be assembled to clearly offset all functional wetland losses associated with the Plant, the Lines and the barge slip area. By consolidating the mitigation for the entire project (LNP Site and all associated facilities) and focusing on expanding the regional significance of GSF, the consolidated mitigation provides substantially greater benefits to the ecosystem than if the mitigation were diffusely distributed across the overall project area.

A key component to this plan is that a variety of combinations of mitigation areas could be used to create a significant mitigation project. Because neither the Robinson, Lybass nor Tracts 391/392 are under contract, this "menu-based" approach to the mitigation plan has been developed. It is possible to combine the individual components in several ways to achieve more-than-sufficient mitigation for the proposed impacts.

Impacts are currently projected at 411 functional units. As potential scenarios, the wetland lift available in these combinations yields more than enough mitigation:

- LNP site, plus Robinson, Zone 1 (457 lift units)
- LNP site, plus Lybass (520 lift units)
- Goethe State Forest, plus Robinson Zones 1 and 2 (415 lift units)

Other combinations are clearly possible, and can be derived through consideration of the information in Table 7-1. PEF may also pursue other options for subdividing the various parcels under consideration. Because of the considerable logistical constraints associated with some options, including actual availability and cost of lands not currently controlled by PEF, the ultimate decision of the mitigation components must be made by PEF.

Finally, the great majority of the proposed impacts (by acreage and relative functional loss of impact) are located at or very near the power plant property in the Waccasassa and Withlacoochee watersheds. The mitigation is located in close proximity to those impacts, which will achieve greater offset from a regional watershed perspective and provides much more ecosystem benefit over the long term. From a State of Florida perspective, this plan clearly addresses the state's requirements for assuring long term viability and provision of greater ecological value than would a conventional on-site mitigation proposal.

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EXHIBITS

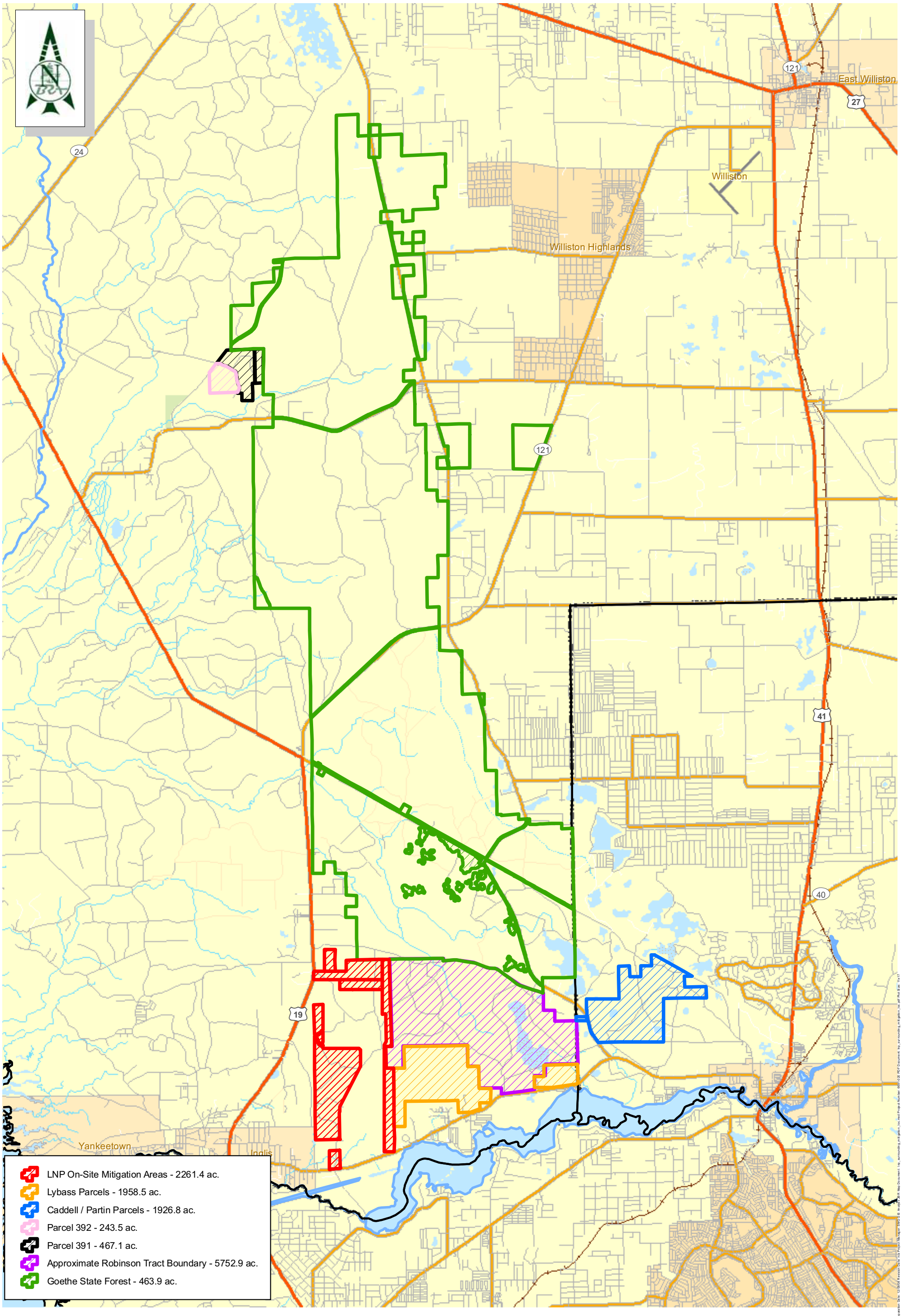

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Exhibit 1-1
Levy Nuclear Plant Site and
Nearby Potential Mitigation Sites
Levy County, FL

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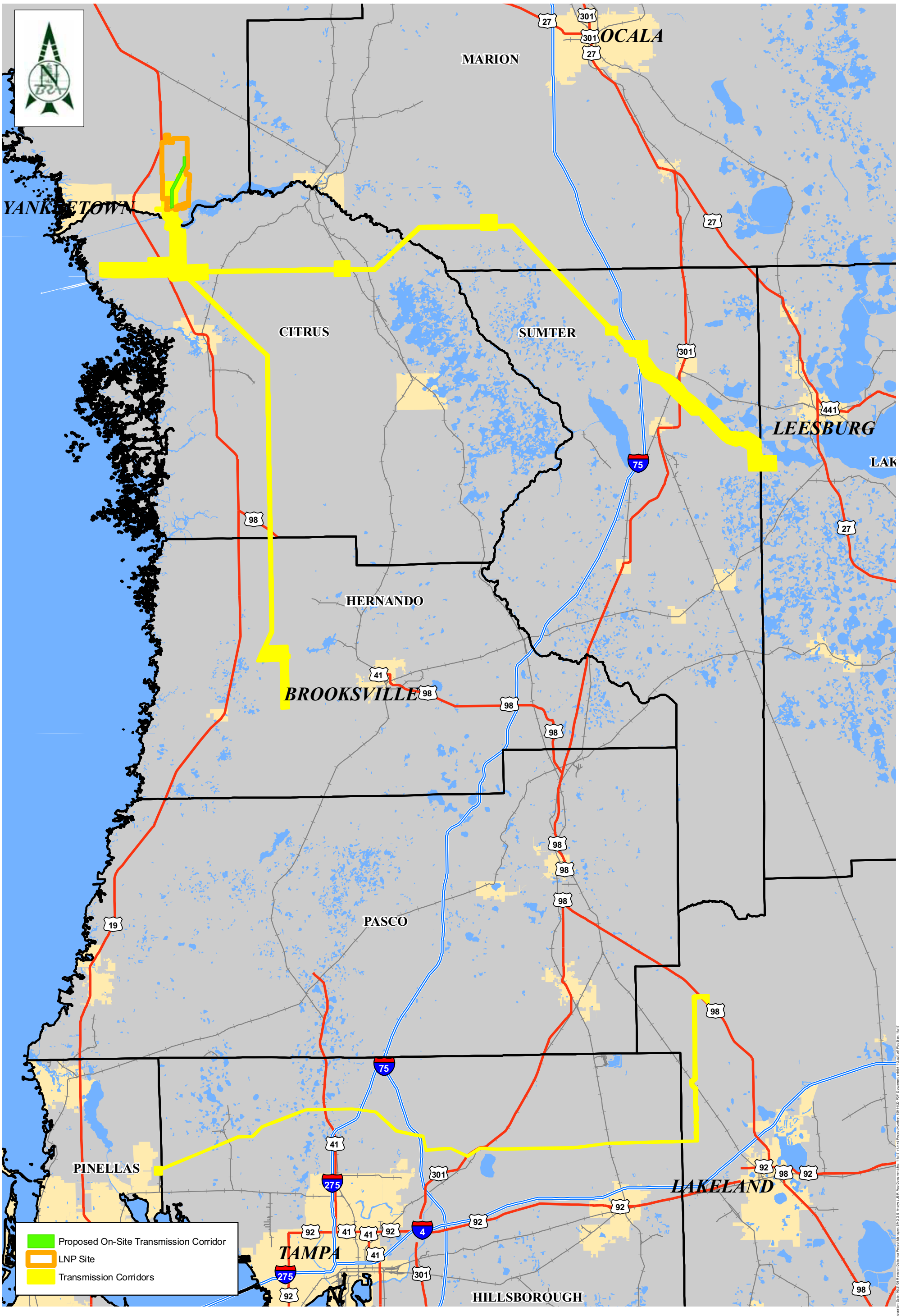

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Image: 2007 Map Scale: 1:380,160

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Exhibit 1-2
Proposed Transmission Line Corridors
Progress Energy
Levy County, FL

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LNP Site

Approximate Project Footprint

Current UMAM Scores

- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8

Feet

0 2000 4000 6000

Image: 2007

Map Scale: 1:24,000

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Exhibit 2-1
Wetland Impact Areas on the LNP Site
Progress Energy
Levy County, FL

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LNP Site

Approximate Project Footprint

Impacted FLUCFCS Type

Forested - 512.5 ac.

Herbaceous - 42.8 ac.

Feet

0 2000 4000 6000

Image: 2007

Map Scale: 1:19,430

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Exhibit 2-2
Wetland Impact Areas on LNP Site by General Cover Type
Progress Energy
Levy County, FL

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LNP On-Site Mitigation
Robinson Tract
Lybass Parcels
Goethe State Forest

Current UMAM Scores

- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8

Feet
0 3200 6400 9600

Image: 2007

Map Scale: 1:38,400

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Exhibit 3-1
Wetlands in Potential Mitigation Areas,
On and Adjacent to the LNP Site
Levy County, FL

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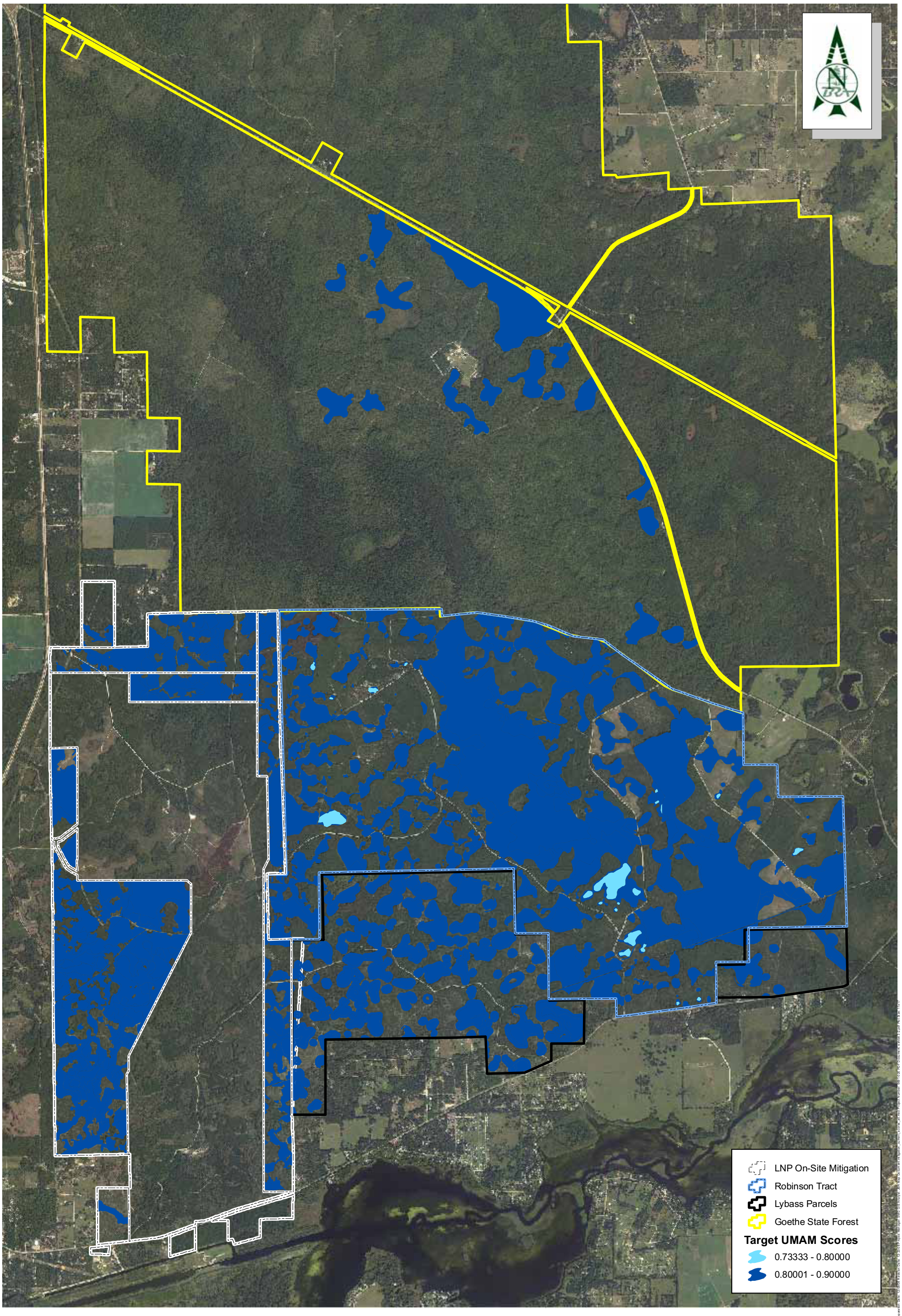

Feet
0 3500 7000 10500

Image: 2007 Map Scale: 1:42,000

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Exhibit 3-2
Target UMAM Scores for Wetlands in Potential Mitigation Areas, On and Adjacent to the LNP Site
Levy County, FL

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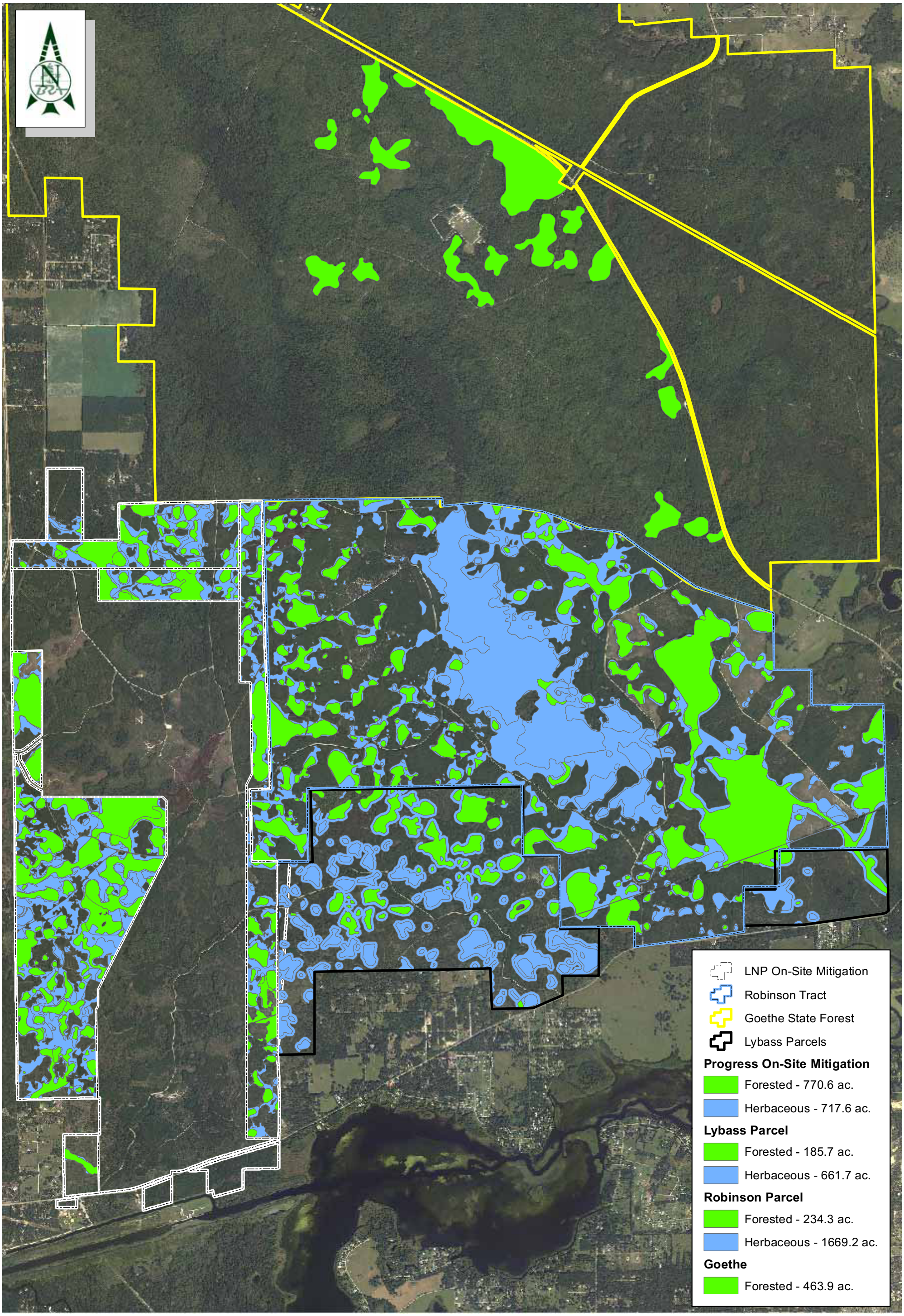

Feet
0 3200 6400 9600

Image: 2007 Map Scale: 1:38,400

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Exhibit 3-3
Wetlands in Primary Mitigation Option Areas
by General Cover Type
Levy County, FL

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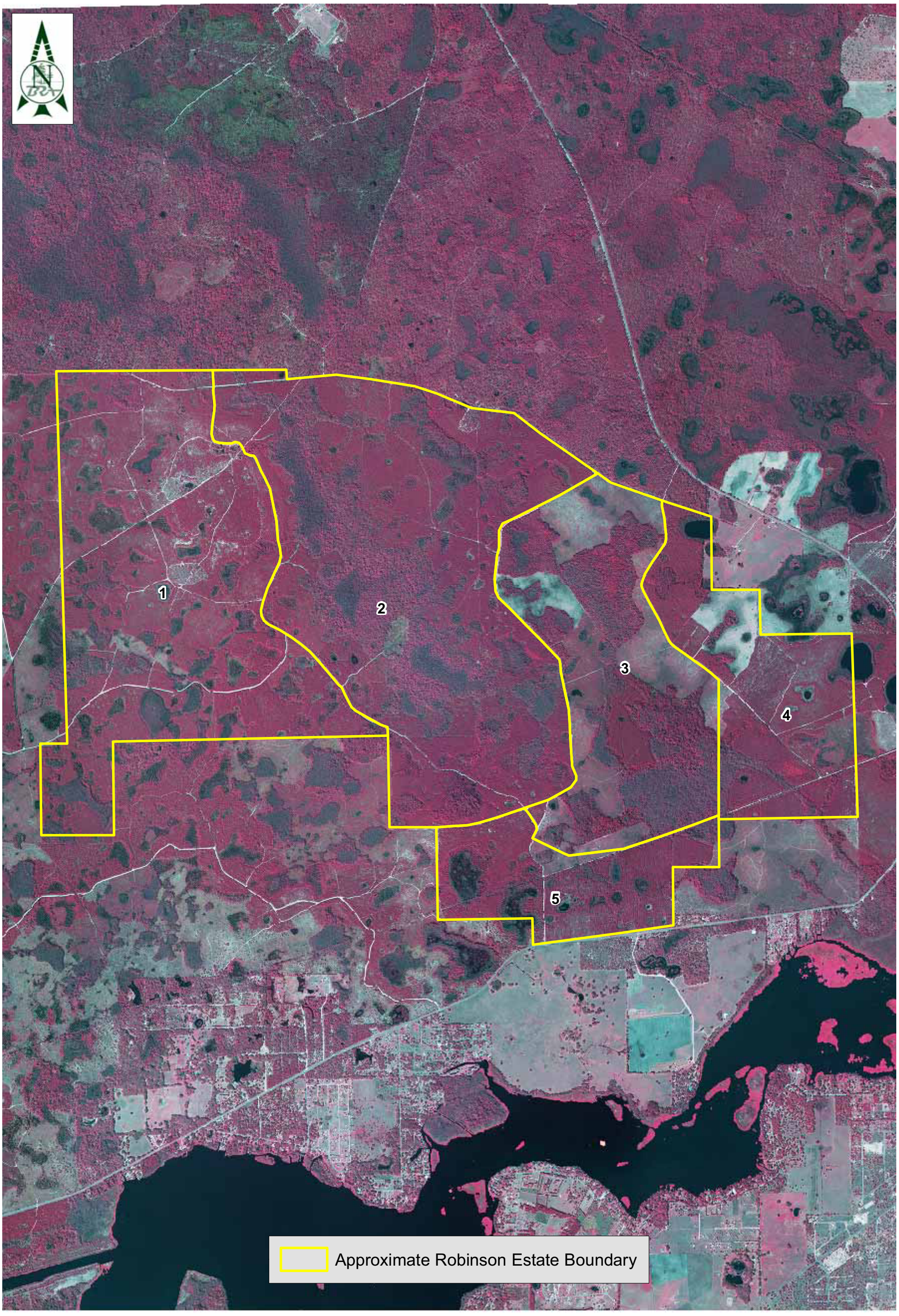

Preparation Date: 12/08/08 Revision Date: 12/18/08 Project Manager: EB GIS Analyst: GDA Map Document: robinson_mitigation_chop.mxd Project Number: 6691-020-T750 PDF Document: exhibit 3-4.pdf Plot Size: 11 x 17

Sec 05 & 06 Twp 17 S Rng 17 E
Sec 07 & 17-20 & 29-32 Twp 16 S Rng 17 E

0 2500 Feet 5000 7500

Image: 2004 IR

Map Scale: 1:30,000

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Exhibit 3-4
Robinson Estates Mitigation Planning Zones
Levy County, FL

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