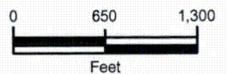


-  Parcel Boundary
-  Mitigation Activity Areas
-  Watershed Basins
-  Mitigation Activity Area 3 Index



Source(s): FDOT Imagery (2014).

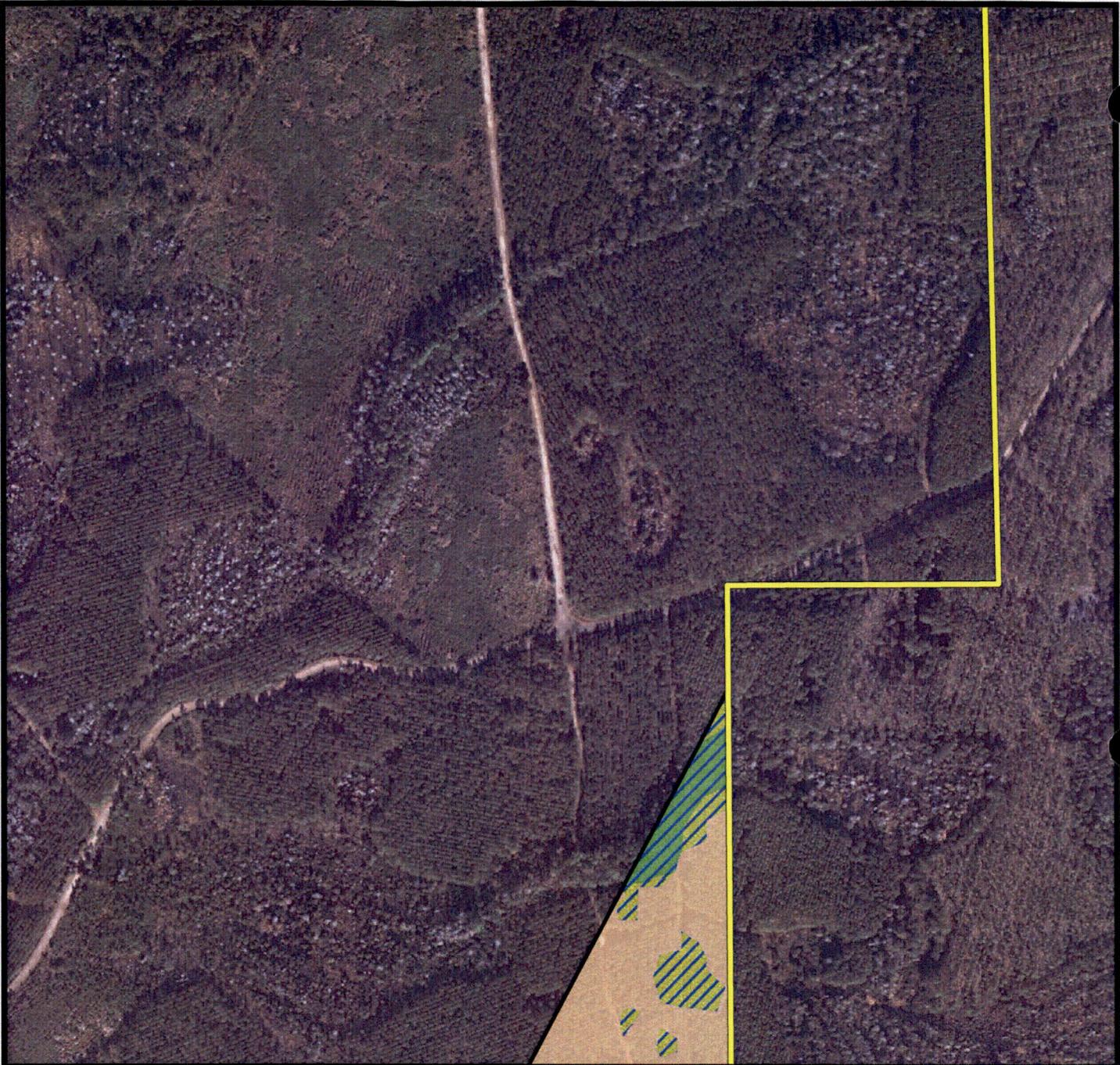
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Mitigation Activity Area 3 - Index
Levy Nuclear Plant Site
Levy County, Florida

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Figure:	3-7c



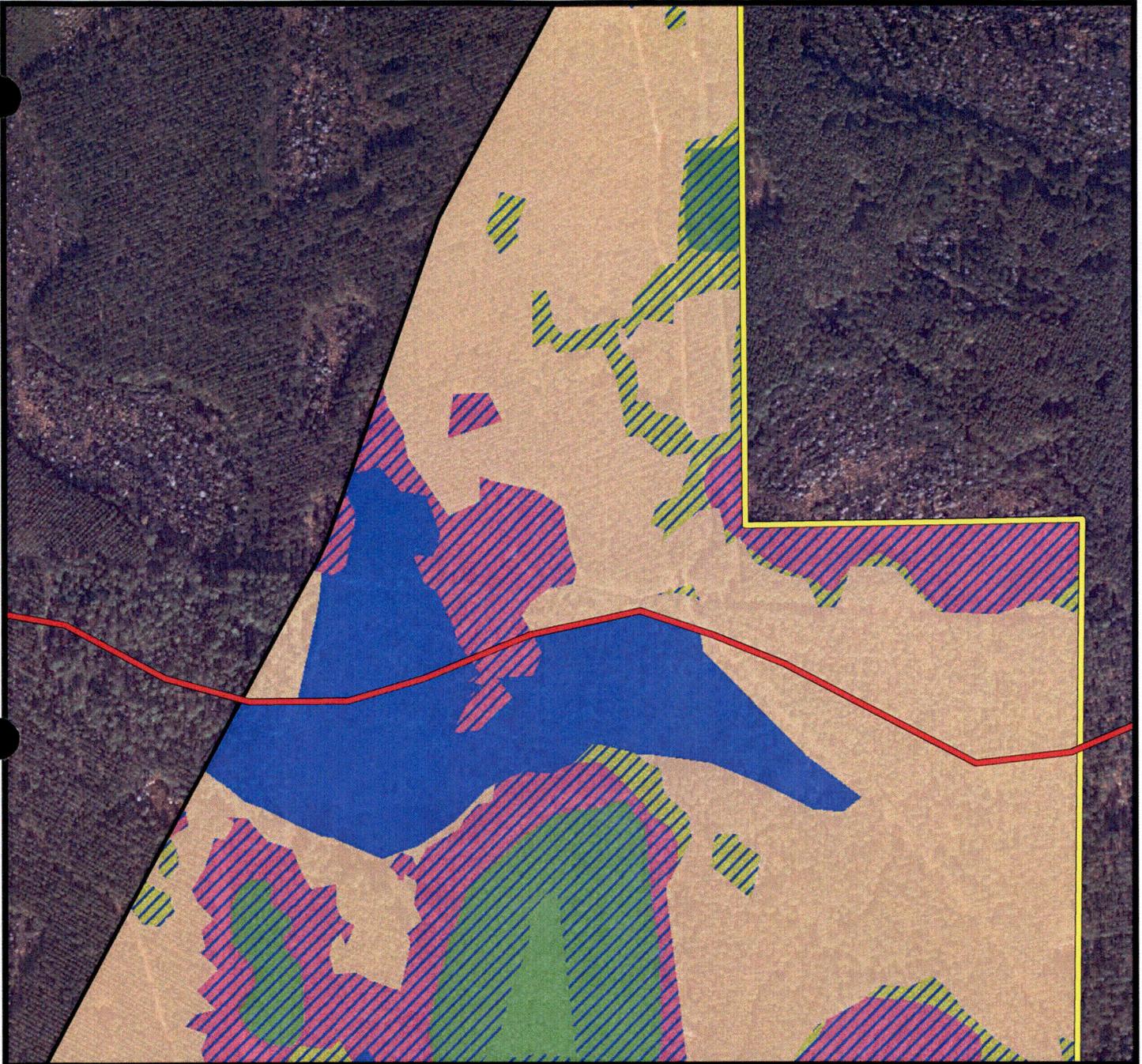
<ul style="list-style-type: none"> Parcel Boundary Mitigation Activity Areas Watershed Basins 	Activity Area 3 (Withlacoochee River Basin)	Activity Area 3 (Waccasassa River Basin)
	<ul style="list-style-type: none"> Wetland Creation (33.1 ac.±) Wetland Preservation (1.5 ac.±) Wetland Burn Enhancement (5.4 ac.±) Herbaceous Wetland Restoration (5.0 ac.±) Upland Preservation/Enhancement (48.5 ac.±) 	<ul style="list-style-type: none"> Wetland Creation (4.1 ac.±) Upland Preservation/Enhancement (36.0 ac.±)
Source(s): FDOT Imagery (2014).	Wetlands within 300' of Protected/Enhanced Uplands	Wetlands within 300' of Protected/Enhanced Uplands
<small>Disclaimer: The information depicted on this figure is for conceptual purposes only, serves to aid a licensed engineer or geologist in rendering professional services, and is subject to review and approval by appropriate regulatory agencies.</small>	<ul style="list-style-type: none"> Wetland Preservation (13.7 ac.±) Wetland Burn Enhancement (32.5 ac.±) Herbaceous Wetland Restoration (12.2 ac.±) 	<ul style="list-style-type: none"> Wetland Preservation (2.0 ac.±) Wetland Burn Enhancement (8.4 ac.±) Herbaceous Wetland Restoration (4.9 ac.±)



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Mitigation Activity Area 3
Levy Nuclear Plant Site
 Levy County, Florida

Project:	EJ11021.05
Date:	Aug. 2015
Drwn/Chkd:	NEE/GKH
Figure:	3-7c-1



	Activity Area 3 (Withlacoochee River Basin) Wetland Creation (33.1 ac.±) Wetland Preservation (1.5 ac.±) Wetland Burn Enhancement (5.4 ac.±) Herbaceous Wetland Restoration (5.0 ac.±) Upland Preservation/Enhancement (48.5 ac.±)	Activity Area 3 (Waccasassa River Basin) Wetland Creation (4.1 ac.±) Upland Preservation/Enhancement (36.0 ac.±)
	Wetlands within 300' of Protected/Enhanced Uplands Wetland Preservation (13.7 ac.±) Wetland Burn Enhancement (32.5 ac.±) Herbaceous Wetland Restoration (12.2 ac.±)	Wetlands within 300' of Protected/Enhanced Uplands Wetland Preservation (2.0 ac.±) Wetland Burn Enhancement (8.4 ac.±) Herbaceous Wetland Restoration (4.9 ac.±)

0 200 400 Feet

Source(s): FDOT Imagery (2014).

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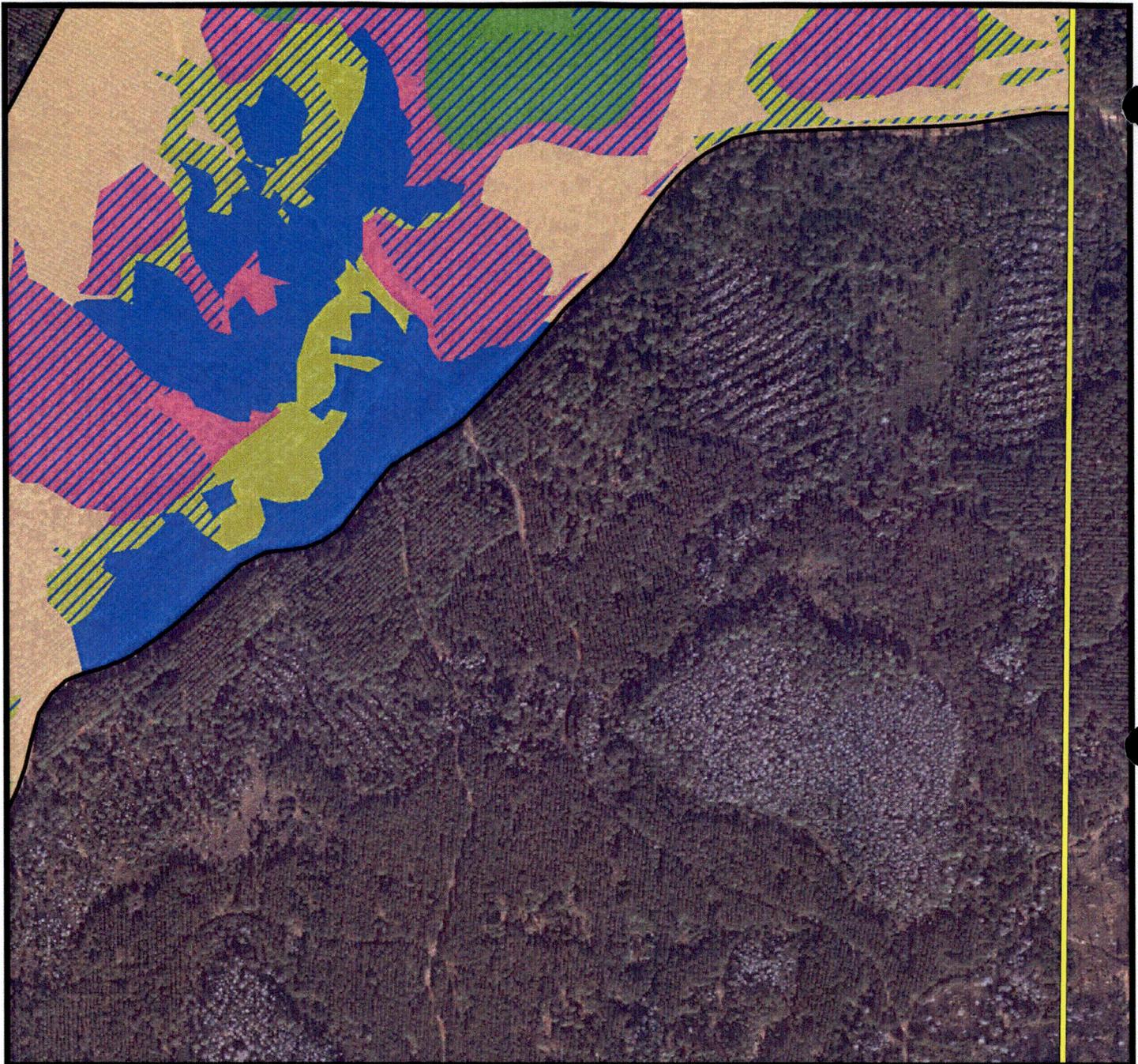
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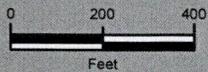
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Mitigation Activity Area 3
Levy Nuclear Plant Site
 Levy County, Florida

Project: EJ11021.05
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 Drwn/Chkd: NEE/GKH
 Figure: **3-7c-2**



- Parcel Boundary
- Mitigation Activity Areas
- Watershed Basins



Source(s): FDOT Imagery (2014).

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Activity Area 3 (Withlacoochee River Basin)

- Wetland Creation (33.1 ac.±)
- Wetland Preservation (1.5 ac.±)
- Wetland Burn Enhancement (5.4 ac.±)
- Herbaceous Wetland Restoration (5.0 ac.±)
- Upland Preservation/Enhancement (48.5 ac.±)

Wetlands within 300' of Protected/Enhanced Uplands

- Wetland Preservation (13.7 ac.±)
- Wetland Burn Enhancement (32.5 ac.±)
- Herbaceous Wetland Restoration (12.2 ac.±)

Activity Area 3 (Waccasassa River Basin)

- Wetland Creation (4.1 ac.±)
- Upland Preservation/Enhancement (36.0 ac.±)

Wetlands within 300' of Protected/Enhanced Uplands

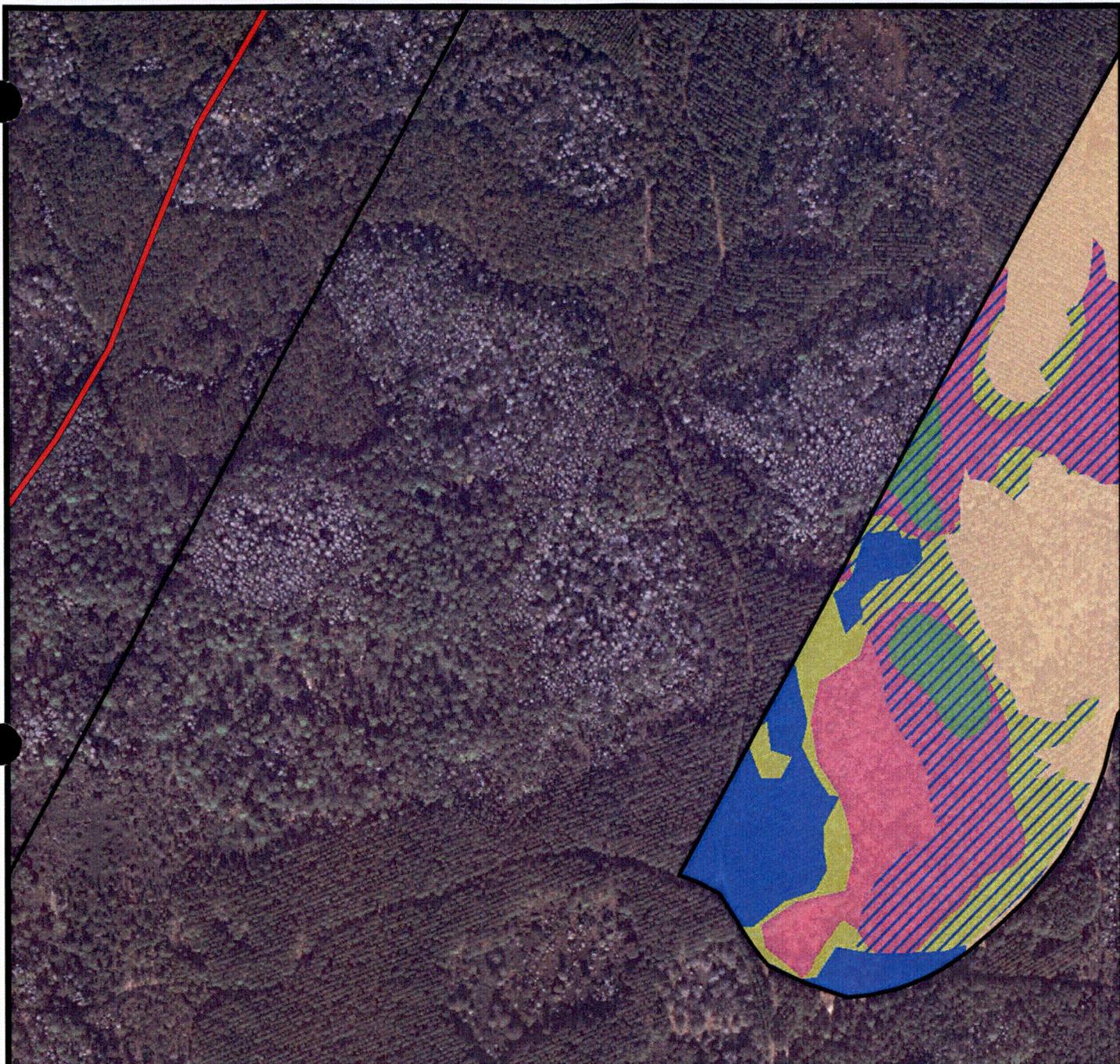
- Wetland Preservation (2.0 ac.±)
- Wetland Burn Enhancement (8.4 ac.±)
- Herbaceous Wetland Restoration (4.9 ac.±)



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Mitigation Activity Area 3
Levy Nuclear Plant Site
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 Date: Aug. 2015
 Drwn/Chkd: NEE/GKH
 Figure: **3-7c-3**



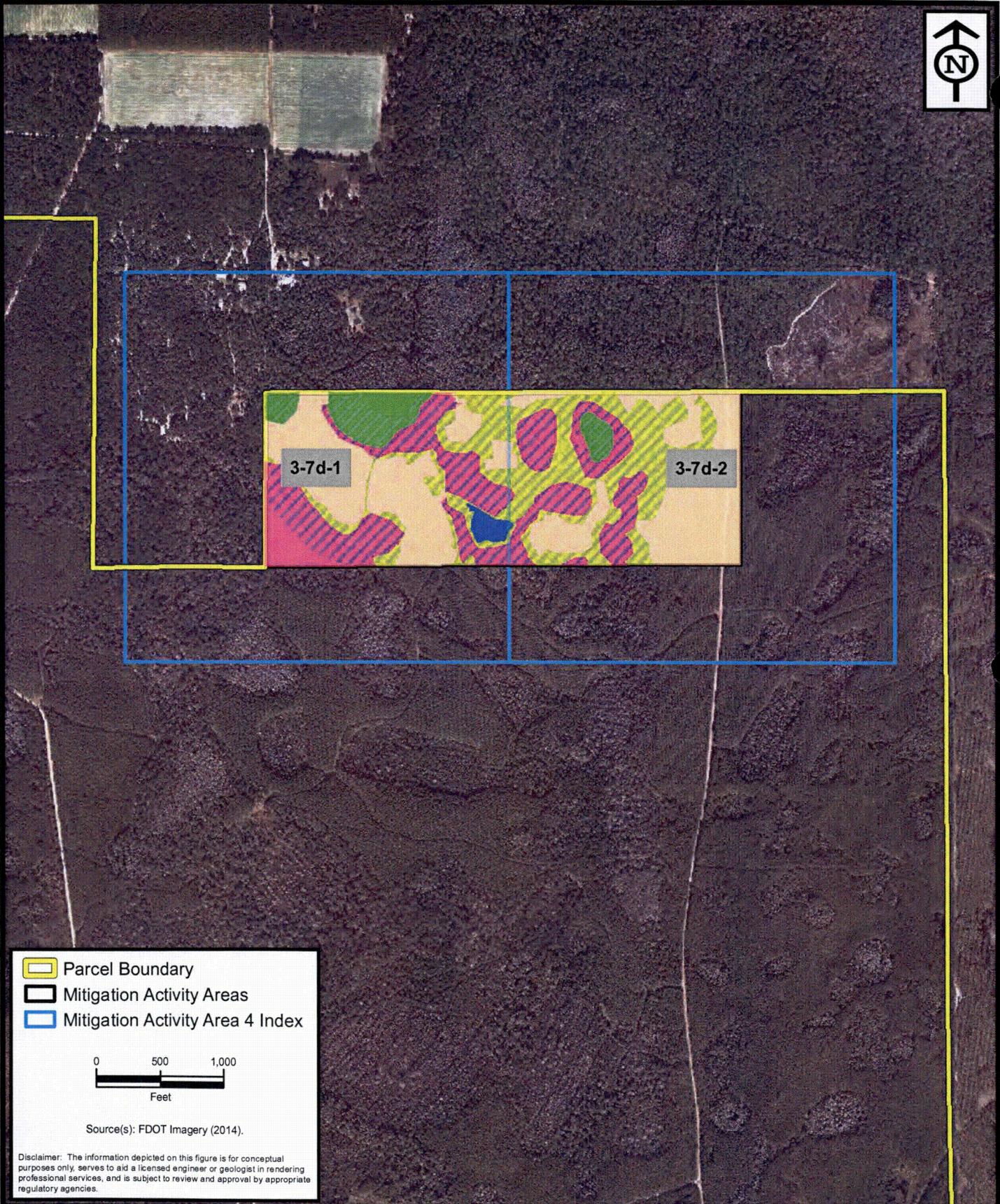
<ul style="list-style-type: none"> Parcel Boundary Mitigation Activity Areas Watershed Basins 	Activity Area 3 (Withlacoochee River Basin)	Activity Area 3 (Waccasassa River Basin)
	<ul style="list-style-type: none"> Wetland Creation (33.1 ac.±) Wetland Preservation (1.5 ac.±) Wetland Burn Enhancement (5.4 ac.±) Herbaceous Wetland Restoration (5.0 ac.±) Upland Preservation/Enhancement (48.5 ac.±) 	<ul style="list-style-type: none"> Wetland Creation (4.1 ac.±) Upland Preservation/Enhancement (36.0 ac.±)
Source(s): FDOT Imagery (2014).	Wetlands within 300' of Protected/Enhanced Uplands	Wetlands within 300' of Protected/Enhanced Uplands
<small>Disclaimer: The information depicted on this figure is for conceptual purposes only, serves to aid a licensed engineer or geologist in rendering professional services, and is subject to review and approval by appropriate regulatory agencies.</small>	<ul style="list-style-type: none"> Wetland Preservation (13.7 ac.±) Wetland Burn Enhancement (32.5 ac.±) Herbaceous Wetland Restoration (12.2 ac.±) 	<ul style="list-style-type: none"> Wetland Preservation (2.0 ac.±) Wetland Burn Enhancement (8.4 ac.±) Herbaceous Wetland Restoration (4.9 ac.±)



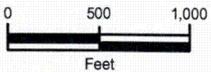
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Mitigation Activity Area 3
Levy Nuclear Plant Site
 Levy County, Florida

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 Drwn/Chkd: NEE/GKH
 Figure: **3-7c-4**



-  Parcel Boundary
-  Mitigation Activity Areas
-  Mitigation Activity Area 4 Index



Source(s): FDOT Imagery (2014).

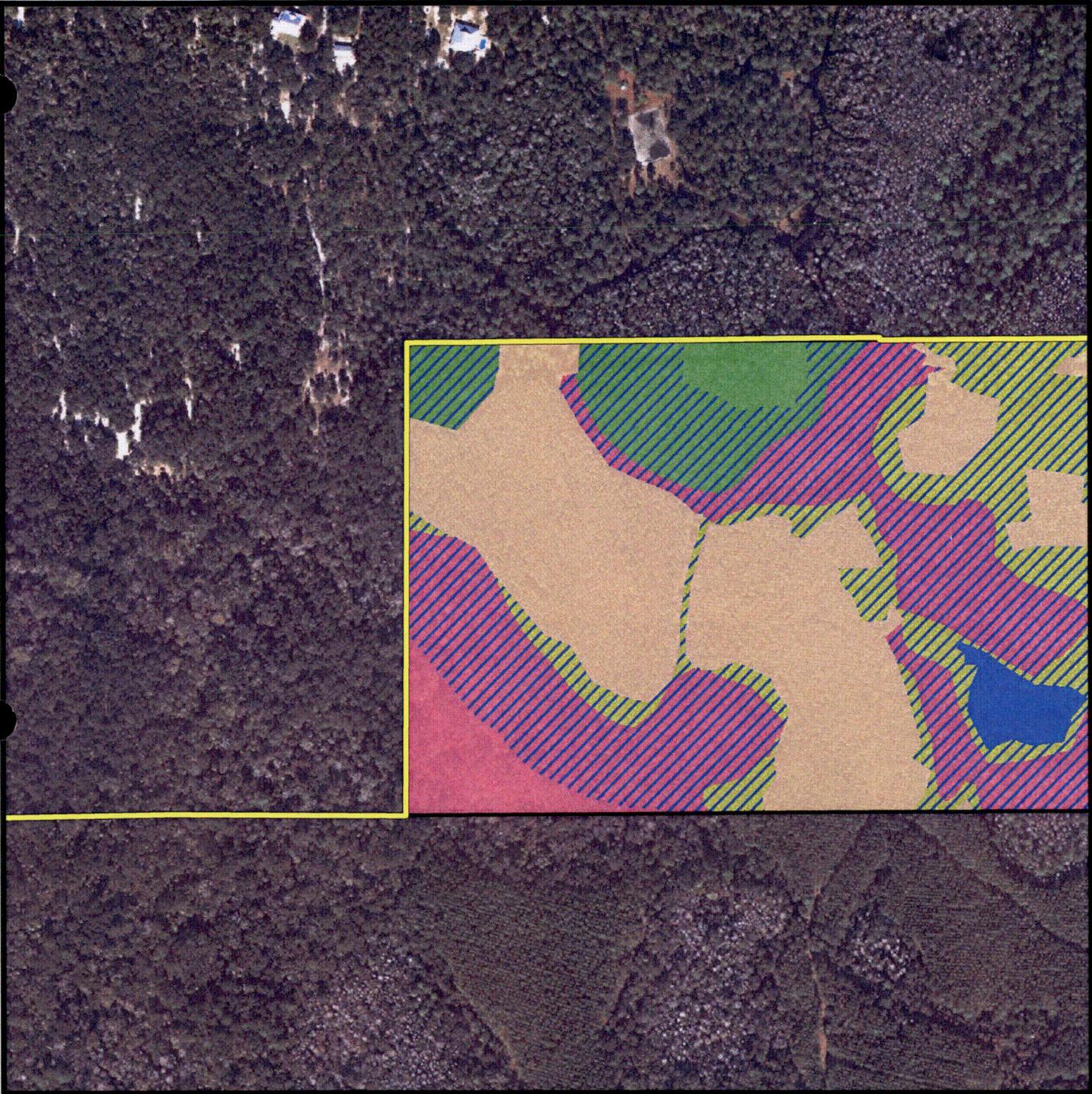
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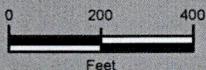
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Mitigation Activity Area 4 - Index
Levy Nuclear Plant Site
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Figure:	3-7d



- Parcel Boundary
- Mitigation Activity Areas



Activity Area 4 (Waccasassa River Basin)

- Wetland Creation (1.4 ac.±)
- Wetland Preservation (1.5 ac.±)
- Wetland Burn Enhancement (3.3 ac.±)
- Herbaceous Wetland Restoration (0.4 ac.±)
- Upland Preservation/Enhancement (41.9 ac.±)

Wetlands within 300' of Protected/Enhanced Uplands

- Wetland Preservation (6.8 ac.±)
- Wetland Burn Enhancement (29.6 ac.±)
- Herbaceous Wetland Restoration (28.0 ac.±)

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Source(s): FDOT Imagery, Levy County (2014).



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 Levy County, Florida

Project: EJ11021.05
 Date: Aug. 2015
 Drwn/Chkd: NEE/GKH
 Figure: **3-7d-1**



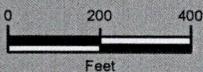
- Parcel Boundary
- Mitigation Activity Areas

Activity Area 4 (Waccasassa River Basin)

- Wetland Creation (1.4 ac.±)
- Wetland Preservation (1.5 ac.±)
- Wetland Burn Enhancement (3.3 ac.±)
- Herbaceous Wetland Restoration (0.4 ac.±)
- Upland Preservation/Enhancement (41.9 ac.±)

Wetlands within 300' of Protected/Enhanced Uplands

- Wetland Preservation (6.8 ac.±)
- Wetland Burn Enhancement (29.6 ac.±)
- Herbaceous Wetland Restoration (28.0 ac.±)



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Date:	Aug. 2015
Drwn/Chkd:	NEE/GKH
Figure:	3-7d-2

1. Upland Preservation/Enhancement. All uplands within the four established mitigation activity areas will be preserved under the protection of a conservation easement. This preservation will allow these communities to continue to grow and mature while eliminating most, if not all, non-natural disturbances. One of the primary benefits of the conservation easements will be the cessation of selected silvicultural activities, including; non-selective broadcast herbicide application, planting in rows, bedding, plowing, disking, and any other intensive management or site disturbing activity. However, beneficial habitat management activities such as prescribed burning and selected thinning will be conducted to ensure continued success of the enhancement activities.

Along with the cessation of selected silvicultural activities, high density pine plantations across the mitigation activity areas will be thinned to levels appropriate for mesic pine flatwoods. Specifically, 77.3 acres within Activity Area 1, 224.3 acres within Activity Area 2, 84.4 acres within Activity Area 3 and 41.9 acres within Activity Area 4 will be thinned using the following method.

The slash pine plantations will be thinned to a density between 50 and 200 trees per acre, depending on the age of the stand. The mature pine stands will be thinned and any substantial debris removed. The thinning will reduce the existing canopy and increase sunlight penetration, which will help facilitate recruitment of target species from seed sources within and along the edges of the stand. In the event that the pine canopy becomes too dense (over ± 90 sq. ft. of basal area per acre) these stands may require additional thinning (to ± 60 sq. ft. of basal area per acre) to maintain their health.

Initially the plan proposes thinning to densities at or below 200 stems per acre, based on existing conditions. Mature mesic pine flatwoods have fewer trees per acre, but have significantly individual larger trees, resulting in comparable basal areas. Thus, the densities proposed are focused on achieving the target basal area. Additionally, these higher densities are designed to create a healthy, sustainable population that is less susceptible to catastrophic mortality due to natural disasters (storms, fires, disease, etc.). Fully mature mesic pine flatwoods will have significantly lower tree densities, but significantly larger basal area trees. This differential is being compensated by cutting the trees to a target basal area (90 sq. ft. per acre) and thinning when necessary. If at any point in the future, the density of the basal area in the flatwood areas exceeds ± 90 sq. ft. per acre, thinning will occur to a density of ± 60 sq. ft. per acre. Therefore, the goal is to achieve the final density through a top-down method of thinning and natural reduction to the target instead of over-thinning or suffering catastrophic mortality and having to rely on new growth.

A total of 428.0 acres of upland preservation/enhancement will be managed with prescribed fire in accordance with the Prescribed Fire Management Plan

(Appendix F). The FNAI target community for the upland preservation/enhancement will be mesic flatwoods. Target species within the mesic flatwoods community are longleaf pine, slash pine, saw palmetto, gallberry, wiregrasses, bracken fern (*Pteridium aquilinum*).

2. Wetland Preservation. All wetlands within the four established mitigation activity areas will be preserved under the protection of a conservation easement. This preservation will allow these communities to continue to grow and mature while eliminating most, if not all, non-natural disturbances. One of the primary benefits of the conservation easements will be the cessation of selected silvicultural activities, including; non-selective broadcast herbicide application, planting in rows, bedding, plowing, disking, and any other intensive management or site disturbing activity. Specifically, 58.3 acres within Activity Area 1, 176.3 acres within Activity Area 2, 17.1 acres within Activity Area 3 and 8.3 acres within Activity Area 4 will be preserved.

The FNAI target community for the wetland preservation areas will be basin swamps. Target species within the basin swamp community are pond cypress, swamp tupelo, slash pine, red maple, myrtle dahoon (*I. cassine* var. *myrtifolia*), wax myrtle, buttonbush, maidencane, and arrowheads.

3. Wetland Burn Enhancement. All wetlands within the four established mitigation activity areas will be preserved under the protection of a conservation easement. This preservation will allow these communities to continue to grow and mature while eliminating most, if not all, non-natural disturbances. One of the primary benefits of the conservation easements will be the cessation of selected silvicultural activities within the forested portions, including; non-selective broadcast herbicide application, planting in rows, bedding, plowing, disking, and any other intensive management or site disturbing activity. However, beneficial habitat management activities such as prescribed burning and selected thinning will be conducted to ensure continued success of the enhancement activities.

A total of 483.2 acres of wetland preservation will be managed with prescribed fire in accordance with the Prescribed Fire Management Plan (Appendix F). The portions of wetland preservation that will be managed with prescribed fire will be referred to as wetland burn enhancement. Specifically, 52.1 acres within Activity Area 1, 351.9 acres within Activity Area 2, 46.3 acres within Activity Area 3 and 32.9 acres within Activity Area 4 will be managed via prescribed fire. The FNAI target community for the wetland burn enhancement areas will be wet flatwoods, wet prairie, and dome swamps. Target species within the wet flatwoods community are longleaf pine, slash pine, pond pine, loblolly bay, wax myrtle, large gallberry (*I. coriacea*), and fetterbush. Target species within the wet prairie community are coastalplain yellow-eyed grass (*Xyris ambigua*), pitcher

plants, sundews (*Drosera* spp.), wiregrass, Savannah meadowbeauty (*Rhexia alifanus*), featherbristle beaksedge (*R. oligantha*), Baldwin's nutrush (*Scleria baldwinii*), and slenderfruit nutrush (*S. georgiana*). Target species within the dome swamp community are pond cypress, red maple, slash pine, loblolly bay, fetterbush, wax myrtle, cinnamon fern, maidencane, and sawgrass. Additionally, the conservation easements will prevent additional development from occurring on the protected areas.

4. Wetland Hydrologic Enhancement. The proposed hydrologic enhancement will take place in all the activity areas through the removal of the planted pine plantation and flattening of the bedding rows. Additional engineered hydrologic enhancement activities are located within Activity Areas 2 and 4. Enhancement activities within Activity Area 2 (large mitigation activity area in the southwestern portion of the project area) will consist of modifying the existing grade of multiple road sections to enhance and restore historic sheet flow during storm events.

Enhancement activities within Activity Area 4 (small mitigation activity area located at the northern extent of the property) will consist of multiple ditch blocks and raised road segments. Both of these activities will be used to restrict the flow of water across sub-basin boundaries where artificial ditching allows the exchange of water during flood events. For details of the proposed hydrologic enhancement, please see Section 3.12 for Engineering Detail Drawings.

5. Wetland Pine Thinning. Along with the cessation of selected silvicultural activities, high density pine plantations across the mitigation activity areas will be thinned to levels appropriate for wet pine flatwoods and hardwood forested and cypress swamp communities. Specifically, 0.06 acre of Activity Area 1 and 0.04 acre of Activity Area 2 will be thinned using the following method.

The slash pine plantations will be thinned to a density between 50 and 200 trees per acre, depending on the age of the stand. During the thinning it will be important to try and remove as much of the bedding rows as possible to enable more natural sheet flow to the restored area. The mature pine stands will be thinned and any substantial debris removed. Desired species of wetland hardwood species, as well as any cypress present, will be avoided during the thinning operation. The thinning will also reduce the existing canopy and increase sunlight penetration, which will help facilitate recruitment of target species from seed sources within and along the edges of the stand. In the event that the pine canopy becomes too dense (over ± 90 sq. ft. of basal area per acre) these stands may require additional thinning (to ± 60 sq. ft. of basal area per acre) to maintain their health.

Initially the plan proposes thinning to densities at or below 200 stems per acre, based on existing conditions. Mature pine flatwoods have fewer trees per acre, but have significantly individual larger trees, resulting in comparable basal areas. Thus, the densities proposed are focused on achieving the target basal area. Additionally, these higher densities are designed to create a healthy, sustainable population that is less susceptible to catastrophic mortality due to natural disasters (storms, fires, disease, etc.). Fully mature wet pine flatwoods will have significantly lower tree densities, but significantly larger basal area trees. This differential is being compensated by cutting the trees to a target basal area (90 sq. ft. per acre) and thinning when necessary. If at any point in the future, the density of the basal area in the flatwood areas exceeds ± 90 sq. ft. per acre, thinning will occur to a density of ± 60 sq. ft. per acre. Therefore, the goal is to achieve the final density through a top-down method of thinning and natural reduction to the target instead of over-thinning or suffering catastrophic mortality and having to rely on new growth.

Additionally, prescribed fire will be utilized to manage the wetland pine thinning areas. These areas will be managed in accordance with the Prescribed Fire Management Plan (Appendix F) in order to help reduce the density of juvenile pines while maintaining the overall target basal area. Prescribed fire will also aid in increasing sub-canopy and groundcover species diversity while restoring the communities to more natural conditions. The FNAI target community for the wetland pine thinning areas is wet flatwoods. Target species within the wet Flatwoods community are Longleaf pine, Slash pine, Pond pine, Loblolly bay, wax myrtle, Large gallberry, and Fetterbush. Target species within the wet prairie community are coastalplain yellow-eyed grass, pitcher plants, sundews, wiregrass, Savannah meadowbeauty, featherbristle beaksedge, Baldwin's nutrush, and slenderfruit nutrush.

6. Herbaceous Wetland Restoration. Along with the cessation of silvicultural activities, high density pine plantations across the mitigation activity areas will be cleared and converted to herbaceous wetland systems. Specifically, 5.9 acres of Activity Area 1, 216.1 acres of Activity Area 2, 22.1 acres of Activity Area 3, and 28.4 acres of Activity Area 4 will be cleared using the following method.

The slash pine plantations will be cleared and removed prior to establishing a herbaceous wetland system. Once the trees have been removed, the land will be re-graded to remove as much of the bedding rows as possible to enable more natural sheet flow to the restored area. The areas will be burned initially after the trees are removed and the bedding rows are flattened. Supplemental planting will then occur in an effort to help expedite the coverage of desirable species. Plantings will include desirable wet prairie species such as beakrush (*Rhynchospora* sp.), star beaksedge (*Rhynchospora colorata*), yellow eyed grass, redroot, St. John's Wort and seaside goldenrod (*Solidago sempervirens*), in

addition to other species that will be determined prior to planting, based upon commercial availability. The species will be bare-root or 2" liner in size (based upon availability) and will be planted on 5 foot offset centers, at a density of 1,742 stems/acre, yielding a total of 474,695 plants.

In addition to the proposed planting, natural recruitment of desirable herbaceous species is expected throughout the herbaceous restoration areas. These areas were selected so that surrounding, established herbaceous communities would provide a significant seed source for the recruitment of desirable species. The goal of this activity is to keep disturbance to a minimum after the clearing operation. The supplemental planting and maintenance and monitoring, along with an adaptive management plan and Prescribed Fire Management Plan (Appendix F), will ensure successful repopulation of desirable herbaceous species.

The herbaceous wetland restoration areas will be managed with prescribed fire in accordance with the Prescribed Fire Management Plan (Appendix F). Prescribed fire will allow for regeneration of natural herbaceous wetland species while removing any slash pine that may continue to recruit after the initial clearing has been completed. The areas will be burned initially in Year 1 upon completion of the pine thinning activities. The exposure to fire will help to both reduce any potential fuel load present and will also help replenish nutrient levels within the soils, which will ultimately aid in the future establishment of the planted and recruited herbaceous species. The FNAI target community for these areas is wet prairie. Target species within the wet prairie community are coastalplain yellow-eyed grass, pitcher plants, sundews, wiregrass, Savannah meadowbeauty, featherbristle beaksedge, Baldwin's nutrush, and slenderfruit nutrush.

7. Wetland Creation. A total of approximately 90.9 acres of wetland creation are proposed to help compensate for the proposed wetland impacts. Specifically, 52.3 acres within Activity Area 2, 37.2 acres within Activity Area 3, and 1.4 acres within Activity Area 4 will be constructed and planted. The creation areas will be designed to be consistent with the natural elevations of the adjacent preservation wetlands. The FNAI target community for the wetland creation areas is dome swamp. Target species within the dome swamp community are pond cypress, red maple, slash pine, loblolly bay, fetterbush, wax myrtle, cinnamon fern, maidencane, and sawgrass.

Siltation curtains and/or hay bales shall be erected between the creation areas and any adjacent wetlands, prior to grading, in order to control/avoid adverse impacts to water quality in the adjacent wetlands. At the completion of grading, a piezometer will be installed in each wetland creation area and monitored for at least 30 days prior to planting to insure that appropriate wetland hydrology has

been established. The piezometer will remain in each creation area following planting for use in the monitoring program.

The wetland creation areas will be planted at a density of 400 stems per acre with appropriate wetland tree species. Trees will be 3-gallon size, i.e., one-half to one-inch caliper and five to six feet in height. Trees will be randomly planted to mimic natural conditions as opposed to planting on measured centers. Species to be utilized will include bald cypress, pond cypress, black gum, ash (*Fraxinus* sp.), red maple, sweetgum, dahoon holly, sweet bay and water oak. The majority of the species to be planted are included in the FNAI target community description; additional species have been added to help increase diversity. Species will be selectively placed within each creation area to mimic their location in the surrounding natural wetlands.

Construction access to most of the wetland creation areas is from existing roads and through other active mitigation areas. However three areas within Area 2 are surrounded by wetland preservation/burn enhancement areas that will require temporary wetland impacts to gain access for the wetland creation construction activities. These temporary impact areas will be kept to a maximum width of 15 feet to allow for necessary access. All areas utilized as access road will have fill placed within them if the elevation is too low and will have mats placed on top of them if the existing elevation is sufficient. After construction activities are completed, all areas impacted for temporary roads will be restored to the existing grade, replanted as described above, and monitored as part of the wetland creation area monitoring program. General restoration of these temporary access areas will include any necessary grading to re-establish the original wetland elevation. Planting will then occur (if necessary) to replace what was destroyed during construction, with the goal of replacing like for like species, based upon the existing conditions. If forested material is impacted, then forested species will be planted and no less than 400 stems/acre; for herbaceous impacts, herbaceous species will be planted at a density of no less than 4,840 stems/acre (specific species will be determined at a later date after the temporary access corridors are defined). The areas will then be monitored for survivorship of planted species, establishment of desirable groundcover, presence of any invasive/exotic species and any remediation activities that have occurred. These data will then be included in the overall annual monitoring report.

Preliminary cross section drawings of the proposed creation areas are provided in Section 3.12, Sheets 23-27 of 27. Please note that these cross sections and associated elevations are preliminary and intended for use on a conceptual level at this time. Final elevations will be determined using more site specific topographic information and may ultimately be adjusted during final construction to ensure the success of the creation areas.

The mitigation areas will be monitored and inspected during and immediately following construction to ensure compliance with the mitigation design and to determine final ground and surface water elevations. Minor modifications may be necessary at the time of construction. The siltation curtains and/or hay bales shall be removed after the soil in the mitigation area has stabilized.

3.5 Hydrology & Hydraulics

3.5.1 Objective

A hydrologic and hydraulic engineering analysis for the LNP watershed was performed to analyze the effects of proposed mitigation modifications - including low water crossings and ditch plugging at several sites within LNP. The analysis was used to demonstrate benefits of the proposed mitigation modifications in terms of rainfall runoff conveyance and flow pattern improvements that correlate more closely with historic, unaltered conditions. To make comparisons between existing conditions and proposed conditions two model scenarios were considered. The LNP site does not currently have the nuclear power plant constructed, however for model comparison purposes it is assumed that the nuclear power plant is fully constructed in the existing condition model.

3.5.2 Model Setup

The ICPR Version 3.10 with service pack 3, 2002, was used to simulate rainfall runoff, conveyance, and flooding conditions in the LNP watershed. The modeled watershed includes more than 4,800 acres – encompassing areas beyond the actual LNP project site boundary.

This section describes the calculation of ICPR input parameters including basin area, time of concentration, curve number, interconnectivity, stage-storage relationships, and boundary forcing conditions.

Sub-basin Area

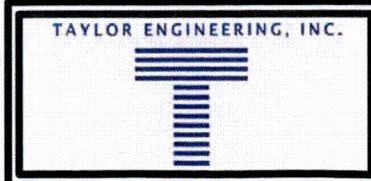
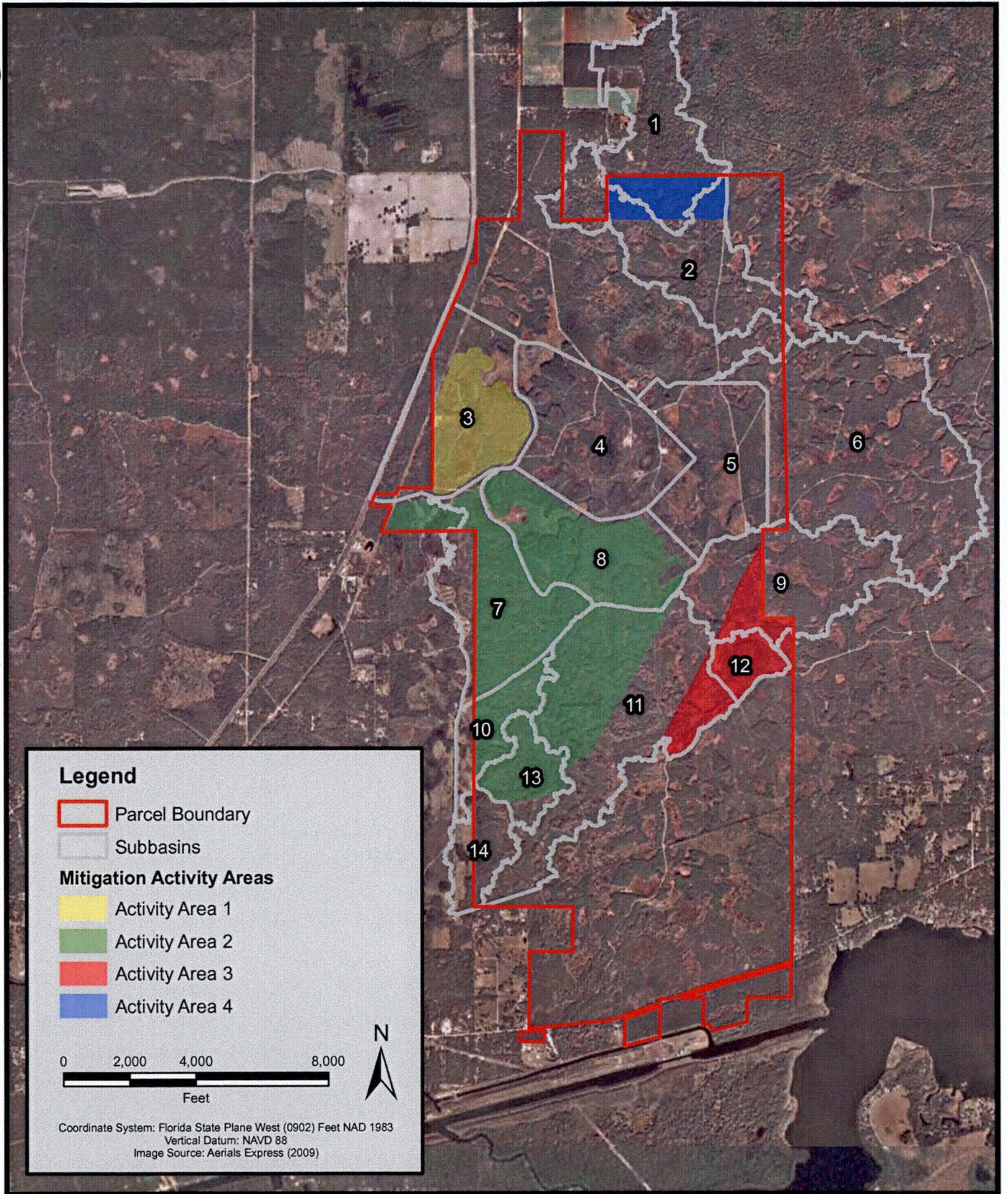
Sub-basin boundaries and areas were defined using a combination of Southwest Florida Water Management District (SWFWMD) GIS basin coverage, USGS DEMs, FDEM LiDAR data (2006) and LNP site plan. The overall watershed included 14 sub-basins as shown in Figure 3-8. Notably, sub-basin boundaries coincide with locations of mitigation sites and LNP infrastructure to facilitate analyses of modifications to improve basin flow.

Curve Number

The U.S. Soil Conservation Service Curve Number (CN) generally represents a sub-basin's rainfall runoff characteristics – its ability to store or shed rainfall – and is a function of the soil properties and land cover/use. GIS tools were applied to SWFWMD digital soil and land use coverages to determine the CNs. CN calculation assumes an antecedent rainfall condition corresponding to SCS Type II – or typical, mean conditions.

Time of Concentration

Time of concentration is a characteristic of the response of a watershed to a rainfall event and represents the time required for a drop of water to travel from the most hydraulically remote location within a sub-basin. It is a function of the sub-basin slope, length, and CN. For each sub-basin, average slope was calculated based on LiDAR and DEM topographic data. Time of concentration was calculated using these properties following the SCS lag method. Table 3-3 summarizes the calculated drainage area, curve number and time of concentration for each sub-basin.



**Hydrologic Subbasins
Levy Nuclear Plant Site
Levy County, Florida**

PROJECT	C2011-025
FIGURE	3-8
DRAWN BY	JK
DATE	JULY 2011

Table 3-3. LNP ICPR Model Hydrologic Input Parameters

Sub-basin	Area (acres)	Curve Number	Time of Concentration (mins.)
1	317	76	623
2	381	83	310
3	400	84	269
4	402	94	287
5	334	90	417
6	810	83	679
7	344	85	326
8	346	87	366
9	388	82	1,023
10	127	81	926
11	654	83	304
12	70	84	138
13	120	83	254
14	119	80	271

Sub-basin Interconnectivity

Sub-basins were linked in the ICPR model to reflect the natural movement of water in the system. Sub-basin linkages included weirs and ditches. Weirs include natural sections such as sub-basin divides and man-made sections such as roadways.

Stage-Storage Relationships

Volumetric capacity of each sub-basin was determined using LiDAR and USGS DEM topographic data. ICPR accounts for this storage capacity by means of a user input stage-area curve for each sub-basin. These stage-area curves allow ICPR to simulate the rate at which each sub-basin will be inundated from rainfall runoff.

Boundary Conditions

Two types of boundary conditions were applied within the model. One boundary condition was applied to the most downstream outlet of the watershed (the outlet of Sub-basin 14). Sub-basin 14 is located far enough downstream from the proposed mitigation sites such that its boundary condition has little influence on upstream stages. The outlet from Sub-basin 14 is defined by a roadway weir section in ICPR. Downstream of this weir a static water level boundary was set based on a limited sensitivity analysis. Table 3-4 summarizes water level results from the limited sensitivity analysis. As shown by the results,

a static water level above 31 ft-NGVD at the boundary begins producing a back-water effect on Sub-basin 14. Therefore, a water level equal to 31 ft-NGVD was determined as the limit to which upstream water levels were affected and a good candidate for the boundary condition.

Table 3-4. Limited Sensitivity Analysis: Water Level at Sub-basin 14

Event	Boundary Condition			
	32 ft. NGVD	31ft. NGVD	30 ft. NGVD	29 ft. NGVD
2.33	32.07	31.28	31.12	31.12
10	32.20	31.83	31.83	31.83
25	32.39	32.24	32.24	32.24
50	32.52	32.44	32.44	32.44
100	32.74	32.72	32.72	32.72

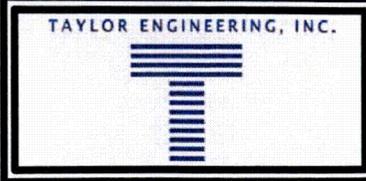
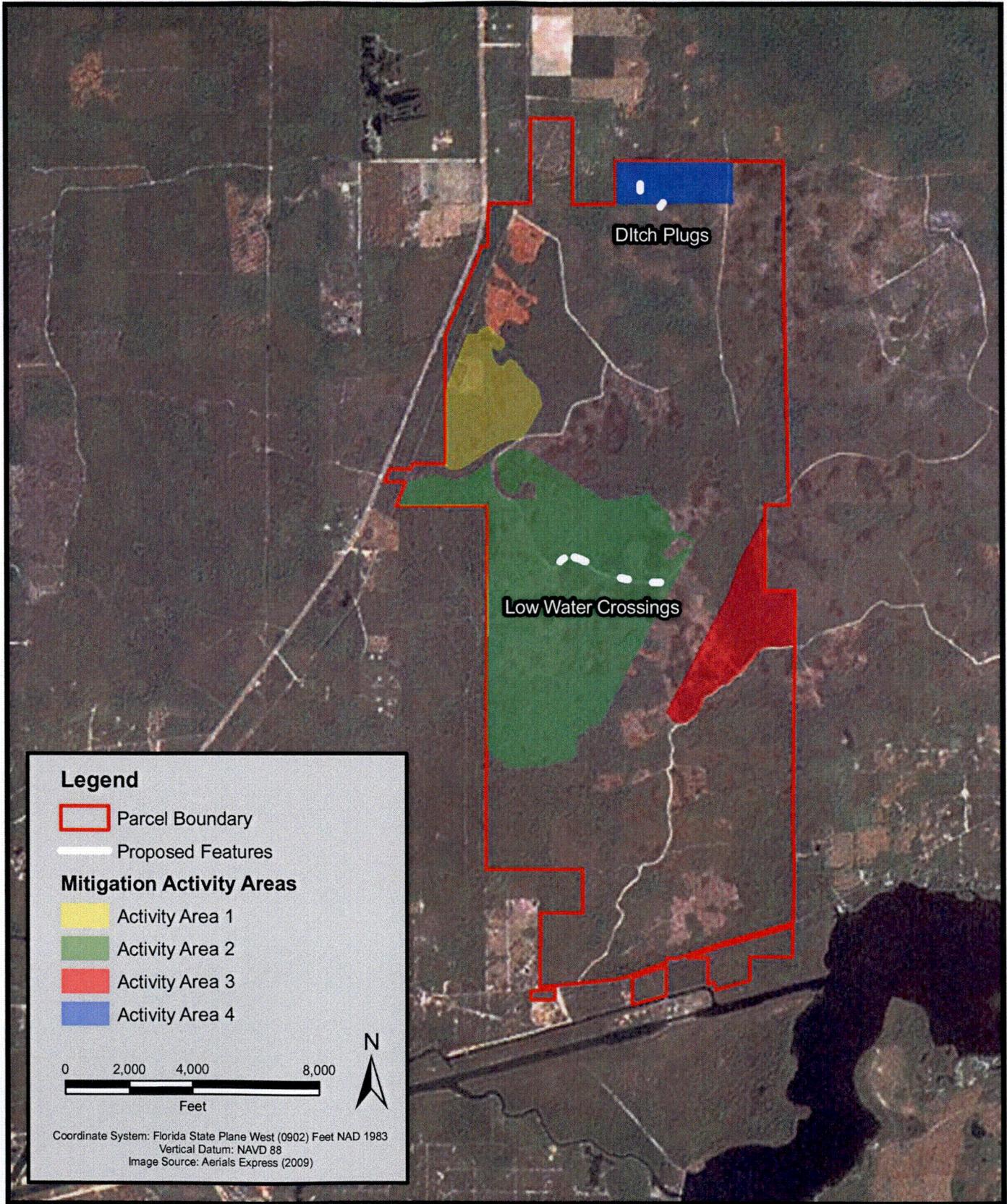
The second boundary condition was rainfall (volume and temporal distribution) applied at each sub-basin. The SCS Type II, Florida Modified, 24-hour distribution was applied with the 24 hour rainfall depths shown in Table 3-5 for the five rainfall events simulated (according to the Southwest Florida Water Management District Environmental Resource Permitting Information Manual - Part D Project Design Aids - July 1996).

Table 3-5. LNP ICPR Model 24-hour Rainfall Depths

Recurrence Interval (years)	Rainfall Depth (inches)
2.33	4.8
10	6.7
25	8.5
50	9.5
100	11.2

3.5.3 Model Application Results

The ICPR model setup described above was applied to the system for five rainfall events representing the 2.33-, 10-, 25-, 50-, and 100-year return periods. The model was applied to existing and proposed conditions. The proposed conditions model includes the mitigation modifications at several candidate sites (shown in Figure 3-9) within the system (more details about the modifications are provided in the civil design section of this report). Comparison between the existing and proposed model results at each site demonstrate the improved flow conveyance gained from the cumulative effect of all modifications. These results are presented in Table 3-6 and described below for each site.



**Proposed Features
Levy Nuclear Plant Site
Levy County, Florida**

PROJECT	C2011-025
FIGURE	3-9
DRAWN BY	JK
DATE	JULY 2011

Table 3-6. Existing and Proposed Peak Flows at LNP Site of Interest

2.33-YR				
(Upstream – Downstream)	Existing Flow (cfs)	Proposed Flow (cfs)	Difference (cfs)	Percent Change
2-1	0	0	0	0%
8-7	136	116	-20	-15%
8-11	37	128	91	244%
13-14	15	15	0	1%

25-YR				
(Upstream – Downstream)	Existing Flow (cfs)	Proposed Flow (cfs)	Difference (cfs)	Percent Change
2-1	4	0	-4	-100%
8-7	416	249	-167	-40%
8-11	77	274	198	257%
13-14	63	59	-3	-5%

50-YR				
(Upstream – Downstream)	Existing Flow (cfs)	Proposed Flow (cfs)	Difference (cfs)	Percent Change
2-1	6	0	-6	-100%
8-7	492	286	-206	-42%
8-11	85	386	301	354%
13-14	80	74	-6	-7%

100-YR				
(Upstream – Downstream)	Existing Flow (cfs)	Proposed Flow (cfs)	Difference (cfs)	Percent Change
2-1	9	0	-9	-100%
8-7	621	350	-271	-44%
8-11	98	386	288	292%
13-14	111	100	-11	-10%

Ditch Plugging

Modifications between Sub-basin 1 and Sub-basin 2 include plugging two drainage ditches that serve as artificial hydrologic connections. Historically a ridge of relatively higher topographic elevations restricted inter-basin flow. The two ditches allow water to flow from Sub-basin 2 into Sub-basin 1 for rainfall events larger than the 2.33 year recurrence interval. Model results show a maximum inter-basin flow of 9 cfs for the 100 year rainfall event for existing conditions and 0 cfs after the proposed ditch plugging – thereby restoring the unaltered hydrologic flow regime.

Low Water Crossings

Sub-basin 8 is confined on its boundary by roads that are built along the naturally higher topographic ridge. Before human influence (road construction), water would flow out of Sub-basin 8 through various topographically low wetland sloughs into Sub-basins 7 and 11. The roads confining Sub-basin 8 are blocking these natural flow paths – causing water levels to rise higher than historic conditions within Sub-basin 8. The model results show that these higher water levels allow for a larger fraction of water to flow from Sub-basin 8 to Sub-basin 7 than historically. Also, model results show that by reopening these natural flow paths the fraction of water flow from Sub-basin 8 to 7 reduces while the fraction of water flowing into Sub-basin 11 increases substantially. By grading the road elevations at the key flow path locations, a more natural hydro-pattern is restored to Sub-basins 7, 8, 10, 11, 13, and 14. A reduction in flow fraction from Sub-basin 8 to 7 to 13 to 14 is shown by model results. By reopening the wetland slough flow paths, a greater flow fraction is conveyed from Sub-basin 8 to 11 to 14 – thereby reducing the total amount of flow into Sub-basin 13. In General, by implementing the flow path openings, flows are increased into Sub-basins 11 and 14 while flows are decreased into Sub-basins 7, 10, and 13.

3.6 UMAM Score

The proposed mitigation plan for the LNP site will provide for a total of 173.6 UMAM units of functional lift for ACOE and 391.9 UMAM units of functional lift for FDEP. This includes 45.3 herbaceous wetland UMAM units, 128.3 forested wetland UMAM units and 218.3 forested upland UMAM units (for FDEP only) to offset the herbaceous and forested impacts within the Waccasassa and Withlacoochee Watersheds (Table 3-7). The balance of the Waccasassa Watershed impacts will be mitigated for at the Goethe site and the Withlacoochee Watershed will be from the Green Swamp Mitigation Bank and Withlacoochee Mitigation Bank. The scoring system utilized during the UMAM process is outlined in the UMAM handbook and its scoring requirements. The UMAM Sheets Part I & II for each mitigation activity are in Appendix C.

WACCASASSA AND WITHLACOOCHEE WATERSHEDS – LEVY NUCLEAR PLANT SITE

Table 3-7. LNP Mitigation Plan Proposed UMAM Score Summary

Area	Location		Water		Community		Acreage	Risk	Time Lag	RFG ¹	FG ²
	Current	With	Current	With	Current	With					
Waccasassa Watershed											
<u>Activity Area 1</u>											
Wetland Preservation (outside 300')	5	7	7	8	7	8	38.2	1	1	0.08	3.1
Wetland Preservation (within 300')	5	8	7	8	7	8	20.2	1	1	0.01	2.0
Wetland Pine Thinning	5	8	6	8	5	9	0.06	1.5	1.1614	0.1722	0.01
Wetland Burn Enhancement (outside 300')	5	7	7	8	6	9	4.1	1.25	1.0696	0.1496	0.6
Wetland Burn Enhancement (inside 300')	5	8	7	8	6	9	47.2	1.25	1.0696	0.1745	8.2
Herbaceous Wetland Restoration (outside 300')	5	7	5	8	6	9	0.5	1.5	1.1614	0.1531	0.1
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	5.3	1.5	1.1614	0.1722	0.9
Upland Preservation/ Enhancement	0	7	0	0	0	8	75.4	1.25	1.25	0.48	36.2
<u>Activity Area 1</u>											
<u>Within Indirect Impact</u>											
Herbaceous Wetland Restoration	5	6	5	8	6	9	0.2	1.5	1.1614	0.1339	0.03
Upland Preservation/ Enhancement	0	6	0	0	0	7	1.9	1.25	1.0696	0.1496	0.7
Wetland Burn Enhancement	5	6	5	8	7	9	0.9	1.25	1.1614	0.1378	0.1

WACCASASSA AND WITHLACOOCHEE WATERSHEDS – LEVY NUCLEAR PLANT SITE

Table 3-7. LNP Mitigation Plan Proposed UMAM Score Summary cont.

Area	Location		Water		Community		Acreage	Risk	Time Lag	RFG ¹	FG ²
	Current	With	Current	With	Current	With					
<u>Activity Area 2</u>											
Wetland Preservation (outside 300')	5	7	7	8	7	8	83.5	1	1	0.10	8.4
Wetland Preservation (within 300')	5	8	7	8	7	8	78.7	1	1	0.08	6.3
Wetland Pine Thinning	5	8	6	8	5	9	0.04	1.5	1.1614	0.1722	0.007
Wetland Burn Enhancement (outside 300')	5	7	7	8	6	9	105.5	1.25	1.0696	0.1745	15.8
Wetland Burn Enhancement (within 300')	5	8	7	8	6	9	227.1	1.25	1.0696	0.1745	39.6
Herbaceous Wetland Restoration (outside 300')	5	7	5	8	6	9	60.3	1.5	1.1614	0.1531	9.2
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	137.1	1.5	1.1614	0.1722	23.6
Wetland Creation	0	8	0	8	0	9	42.4	2	1.5983	0.2607	11.1
Upland Preservation/ Enhancement	0	8	0	0	0	8	217.4	1.25	1.25	0.512	111.3
<u>Activity Area 2</u>											
<u>Within Indirect Impact</u>											
Wetland Preservation	5	6	7	8	7	8	0.4	1	1	0.06	0.03
Herbaceous Wetland Restoration	5	6	5	8	6	7	1.5	1.75	1.1614	0.082	0.1
Wetland Burn Enhancement	5	6	5	8	7	9	3.0	1.25	1.1614	0.1378	0.4

WACCASASSA AND WITHLACOOCHEE WATERSHEDS – LEVY NUCLEAR PLANT SITE

Table 3-7. LNP Mitigation Plan Proposed UMAM Score Summary cont.

Area	Location		Water		Community		Acreage	Risk	Time Lag	RFG ¹	FG ²
	Current	With	Current	With	Current	With					
Upland Preservation	0	6	0	0	0	7	4.4	1	1	0.39	1.7
Activity Area 3											
Wetland Preservation (within 300')	5	8	7	8	7	8	2.0	1	1	0.1	0.2
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	4.9	1.5	1.1614	0.1722	0.8
Wetland Burn Enhancement	5	8	7	8	6	9	8.4	1.25	1.0696	0.1745	1.5
Wetland Creation	0	8	0	8	0	9	4.1	2	1.5983	0.2607	1.1
Upland Preservation/ Enhancement	0	8	0	0	0	8	36.0	1.25	1.25	0.512	18.4
Activity Area 4											
Wetland Preservation (outside 300')	5	7	7	8	7	9	1.5	1	1	0.10	0.1
Wetland Preservation (within 300')	5	8	7	8	7	9	6.8	1	1	0.12	0.8
Wetland Burn Enhancement (outside 300')	5	7	7	8	6	9	3.3	1.25	1.0696	0.1496	0.5
Wetland Burn Enhancement (within 300')	5	8	7	8	6	9	29.6	1.25	1.0696	0.1745	5.2
Herbaceous Wetland Restoration (outside 300')	5	7	5	8	6	9	0.4	1.5	1.1614	0.1531	0.1
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	28.0	1.5	1.1614	0.1722	4.8

WACCASASSA AND WITHLACOOCHEE WATERSHEDS – LEVY NUCLEAR PLANT SITE

Table 3-7. LNP Mitigation Plan Proposed UMAM Score Summary cont.

Area	Location		Water		Community		Acreage	Risk	Time Lag	RFG ¹	FG ²	
	Current	With	Current	With	Current	With						
Wetland Creation	0	8	0	8	0	9	1.4	2	1.5983	0.2607	0.4	
Upland Preservation/ Enhancement	0	8	0	0	0	8	41.8	1.25	1.25	0.512	21.4	
Subtotal	Herbaceous						238.3					39.7
Subtotal	Forested - Wetlands						708.4					105.3
Subtotal	Forested - Uplands						376.9					189.7
Waccasassa Totals							1323.6					334.7
Withlacoochee Watershed												
<u>Activity Area 2</u>												
Wetland Preservation (outside 300')	5	7	7	8	7	8	9.5	1	1	0.08	0.8	
Wetland Preservation (within 300')	5	8	7	8	7	8	4.2	1	1	0.10	0.4	
Wetland Burn Enhancement (outside 300')	5	7	7	8	6	9	12.0	1.25	1.0696	0.1496	1.8	
Wetland Burn Enhancement (within 300')	5	8	7	8	6	9	4.2	1.25	1.0696	0.1745	0.7	
Herbaceous Wetland Restoration (outside 300')	5	7	5	8	6	9	11.7	1.5	1.1614	0.1531	1.8	
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	5.5	1.5	1.1614	0.1722	0.9	
Wetland Creation	0	8	0	8	0	9	10.2	2	1.5983	0.2607	2.7	

WACCASASSA AND WITHLACOOCHEE WATERSHEDS – LEVY NUCLEAR PLANT SITE

Table 3-7. LNP Mitigation Plan Proposed UMAM Score Summary cont.

Area	Location		Water		Community		Acreage	Risk	Time Lag	RFG ¹	FG ²
	Current	With	Current	With	Current	With					
Upland Preservation/ Enhancement	0	8	0	0	0	8	2.2	1.25	1.25	0.512	1.1
Activity Area 3											
Wetland Preservation (outside 300')	5	7	7	8	7	8	1.5	1	1	0.08	0.1
Wetland Preservation (within 300')	5	8	7	8	7	8	13.7	1	1	0.10	1.4
Wetland Burn Enhancement (outside 300')	5	7	7	8	6	9	5.4	1.25	1.0696	0.1496	0.8
Wetland Burn Enhancement (within 300')	5	8	7	8	6	9	32.5	1.25	1.0696	0.1745	5.7
Herbaceous Wetland Restoration (outside 300')	5	7	5	8	6	9	5.0	1.5	1.1614	0.1531	0.8
Herbaceous Wetland Restoration (within 300')	5	8	5	8	6	9	12.2	1.5	1.1614	0.1722	2.1
Wetland Creation	0	8	0	8	0	9	33.1	2	1.5983	0.2607	8.6
Upland Preservation/ Enhancement	0	8	0	0	0	8	48.5	1.25	1.25	0.5120	24.8
Subtotal	Herbaceous						34.4				5.6
Subtotal	Forested - Wetlands						126.2				23.0
Subtotal	Forested - Uplands						50.7				28.6
Withlacoochee Totals							211.3				57.2
LNP Total							1534.9				391.9

¹Relative Functional Gain

²Functional Gain

Scores for existing communities that were assessed ranged from 5 to 7, pursuant to the UMAM process described above. Target UMAM scores presented in Table 3-7 ranged from 6 to 9 in accordance with the UMAM scoring parameters based on the target results of each of the mitigation activities outlined in this plan. No points of lift were assigned to upland areas under the “Water Environment” category, as they will not receive any water related enhancement.

Location and Landscape

For Location and Landscape Support, the proposed scores were determined to be 7 for any area further than 300 feet from a protective upland buffer and 8 for any area within 300 feet of a protective upland buffer. The only deviation from these scores is within the mitigation activities located within the Indirect Impact areas of MAA1 and MAA2, where the proposed Location and Landscape score is 6 to compensate for the potential loss of benefits from the indirect impacts of the adjacent roads and plant development on the LNP site.

Location and Landscape is defined in 62-345.500(6)(a) (F.A.C.) as an evaluation of an assessment area as it relates to its relationship with surrounding areas. Specific criteria to be reviewed include: Diversity of habitats in the surrounding areas, proximity of invasive or exotic species, wildlife access to surrounding habitats, surrounding land use, hydrologic benefit of the assessment area to downstream habitats, and reliance of downstream habitats on the assessment area.

The scores of 7 and 8 were assigned after reviewing the UMAM scoring requirements and the description of each scoring tier where a 7 is defined as having appropriate habitat diversity, but not a high overall diversity and still may contain some invasive/exotic species; provides some support for fish and wildlife, but is not quite optimal and there is a generally effective land management plan in place. In this case, the score of 7 was used for the mitigation activity areas that are not located within 300 feet of a protective buffer of enhanced on-site uplands. For Activity Areas 1 and 2 the wetland assessment area for Indirect Impacts is 100 foot wide because these mitigation areas are adjacent to the proposed access roads to the plant site. A score of 8 was assigned to similar areas that were within 300 feet of an upland enhancement area. It was determined that these adjacent, managed uplands would provide slightly higher habitat diversity than the areas that were scored as a 7.

Water Environment

For the Water category, proposed scores for hydrologic enhancement were determined to be an 8 for all wetland assessment areas.

Water Environment is defined in 62-345.500(6)(b) (F.A.C.) as the presence and intensity of water within the assessment area and the quality of that water. Specific criteria to be reviewed include: water level and flow, hydrologic indicators, soil moisture, soil erosion, appropriate vegetation, use by water dependent fauna, and presence of standing water.

A score of 8 represents that the assessment area will provide adequate habitat for both aquatic vegetation and wildlife, will aid in the hydroperiod of the area and assist in storage capacity and attenuation, will increase water flow through the area resulting in better water quality and that the area will remain inundated under normal circumstances so that the other improvements will function as designed. In addition, the proposed mitigation project directly to the north of the LNP site (Goethe State Forest) will restore natural hydrology to Ten Mile Creek and associated wetlands and significantly increase water flow through that system. The DEF plan has incorporated the details of that project into its project design and will provide the same benefits as it relates to the water community.

Community Structure

For Community Structure, the scores go from 8 to 9 in areas where the existing wetlands are being preserved in their current state to areas where the wetlands are being enhanced, restored, or created.

Community Structure is defined in 62-345.500(6)(c) (F.A.C.) as the presence, abundance, health, condition, appropriateness, and distribution of plant communities in surface waters, wetlands, and uplands. Specific criteria to be reviewed include: plant cover, appropriateness of species, presence and abundance of exotics, regeneration and recruitment, age distribution, land management, and topographic features.

The Community Structure score within the wetland preservation areas goes from 7 to 8 and based on the protective value of the conservation easement and the presumed, long-term growth and maturation of the forested areas. The wetland enhancement scores are proposed to go from 5 to 9, representing the significant reduction in pine density related to historic silviculture practices. The wetland restoration scores are proposed to go from 6 to 9 once the pine trees are removed from the silviculture area and the appropriate species are planted to create a viable herbaceous wetland system. The wetland enhancement scores associated with the prescribed fire regime are proposed to go from 6 to 9 as the community is dynamically altered by the introduction and maintenance of a regular burn cycle. Currently, the community is dominated by a heavy layer of subcanopy growth and excess hardwood trees. Once a burn rotation has been instituted, the more natural, fire-maintained communities will be allowed to thrive and mature. The wetland creation areas are proposed to go from 0 to 9 to represent the alteration of upland (non-water dependent) systems to appropriate species for a

wetland system. The DEF plan will provide for additional habitat for aquatic vegetation and wildlife and will represent significant improvement over existing conditions.

Time Lag

Time Lag is defined in 62-345.600(1)(a) (F.A.C.) as the temporal loss between the time that the mitigation plan is implemented and when the approved “with project” score is achieved. The wetland preservation areas have no assigned time lag (1.00) due to the immediate benefit of the protective conservation easement; the wetland enhancement associated with the prescribed fire plan have a time lag of 5 years (1.0696) as measured by the amount of time it will take to complete one full burn cycle and realize the benefit within the community; the wetland enhancement and wetland restoration areas have a time lag of 10 years (1.1614) to represent the amount of time it will take for the communities to fully recover from the beneficial disturbance caused by the planting activities; and the wetland creation areas have a time lag of 30 years (1.5983) to offset the time it will take for a newly planted community of hydrophytic vegetation to fully establish and mature.

Risk Factor

Risk Factor is defined in 62-345.500(2) (F.A.C.) as the presumed risk involved with the proposed mitigation activities based on uncertainty of success. The wetland preservation areas have no risk factor assigned to them (1.00); the wetland enhancement associated with the prescribed fire plan has a risk factor of 1.25 assigned to it, representing a small risk of non-appropriate vegetation or catastrophic fires; the wetland enhancement and wetland restoration areas have a risk factor of 1.50 assigned, due to the increased threat of invasive/exotics and failure of establishing an optimal community; and the wetland creation areas have a risk factor of 2.00 assigned, based on the inherent risk of creating wetland within a historically upland area.

Preservation Adjustment Factor

Preservation Adjustment Factor is defined in 62-345.500(3)(a) (F.A.C.) as an adjustment to compensate for the presumed long term value of the preservation land if the mitigation project is not implemented. Specific criteria to be reviewed are: quality of the proposed management plan, relation of the wetlands to the surrounding uplands, scarcity of the preserved habitat, proximity of the preserved area to significant natural resources, and the threat of loss of the habitat. After evaluating these factors, we have determined that the on-site wetland preservation areas, and the proposed plans associated with them, reflect a score of 0.6 based on a high quality management plan, protected uplands in the surrounding area, and proximity to significant natural resources (e.g. Goethe), but a lack of uniqueness and moderate threat of future development.

3.7 Engineering

The mitigation plan described in Section 3.4 and the modeling described in Section 3.5 form the basis of the engineering design. In general, the proposed LNP engineering plan consists of modifying the existing roads or ditches. The paragraphs below summarize the engineering design by mitigation activity area.

Activity Area 2 – In Area 2A1, the contractor will grade the area shown on Sheets 11 and 12 of 22 in Section 3.12 to 40.7 ft. NAVD, which is approximately 1 ft. below the existing grade. The Area 2A2, 2A3, and 2A4 proposed plans call for excavating the existing grades to 40 ft. NAVD (Section 3.12, Sheets 13-20 of 27). For the above areas, the contractor will slope the fill material at 10H:1V on the road and 4H:1V along the edges of the road. The contractor will remove approximately 1547 cy of fill from the area. If geotechnical testing shows this material is suitable as fill, the contractor could use the excavated material as fill for Activity Area 4.

Activity Area 4 – The Area 4 proposed plan requires the contractor to fill areas along the existing ditch or road. In Area 4A (Section 3.12, Sheet 18 of 27), the contractor will construct a ditch block by placing and compacting approximately 5 cy of fill, with 4H:1V side slopes, in a 25-ft. section of the existing ditch. As shown in Section 3.11, Sheets 19 and 20 of 27, the Area 4B proposed plan calls for approximately 11 cy of compacted fill, with 4H:1V side slopes, along an 80-ft. section of the existing road. The contractor may use the excavated material from Activity Area 2 if geotechnical borings during final design show the material is suitable for construction fill and is free of muck, roots, and other large debris.

3.8 Implementation Schedule

The construction on the LNP site will begin concurrent with commencement of construction and wetland impacts of the plant and associated transmission lines for the LNP project. The mitigation plan will be implemented in phases, as some activities, such as the pine thinning, are dependent on other factors and can only be completed under appropriate favorable conditions. The restoration of on-site hydrology has the highest priority, with the pine plantation thinning having the lowest priority. The construction sequencing will follow the above priorities. However, in Activity Areas 2 and 4 the thinning will be conducted in conjunction with or prior to the hydrologic improvements to ensure that the thinning activities do not damage the ditch plugs or LWCs.

As with any construction project, natural conditions and weather patterns will be observed and activities will be planned to best coincide with suitable weather conditions. Prior to any land disturbance, appropriate erosion and sedimentation control measures will be installed, including silt fence around all disturbed areas and

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sediment curtains in the channel (LNP Engineering Detail Drawings show erosion control plans). Excavation will occur during the dry season (October-March) and pine thinning will occur once excavation is complete and the area has been constructed properly and approved. Maintenance for invasive/exotic species will be conducted year-round, with manual, mechanical and/or chemical removal methodologies to be utilized throughout the year to ensure the best results (Section 3.9).

Based on the above-referenced priorities, an implementation schedule of the mitigation activities is listed below:

Activity Area 1	Timeframe
Mobilization of contractor and equipment	Week 1
Establish all turbidity/erosion control measures	Week 2
Thin pine plantation areas	Weeks 2-18
Prescribed Fire	Weeks 18-20
Begin 10 year monitoring and maintenance period	Week 20

Activity Area 2	Timeframe
Mobilization of contractor and equipment	Week 1
Establish all turbidity/erosion control measures	Week 2
Thin pine plantation areas and excavate wetland creation areas	Weeks 2-32
Clear and excavate ditch block and regarding areas and begin construction	Weeks 19-21
Generate and review as-built surveys	Week 22
Begin 5 year monitoring and maintenance period (hydrologic areas)	Week 23
Prescribed Fire	Weeks 24-28
Plant wetland creation areas	Weeks 29-74

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Begin 10 year monitoring and maintenance period	Week 75
Activity Area 3	Timeframe
Mobilization of contractor and equipment	Week 1
Establish all turbidity/erosion control measures	Week 2
Thin pine plantation areas and excavate wetland creation areas	Weeks 2-18
Plant wetland creation areas	Weeks 18-36
Prescribed Fire	Weeks 36-38
Begin 10 year monitoring and maintenance period	Week 39

Activity Area 4	Timeframe
Mobilization of contractor and equipment	Week 1
Establish all turbidity/erosion control measures	Week 2
Thin pine plantation areas and excavate wetland creation areas	Weeks 2-10
Clear and excavate ditch block and re-grading areas and begin construction	Weeks 4-5
Generate and review as-built surveys	Week 5
Plant wetland creation areas	Weeks 10-26
Prescribed Fire	Weeks 26-28
Begin 5 and 10 year monitoring and maintenance period for the hydrologic enhancement areas and wetland enhancement/creation areas, respectively.	Week 29

The above is a general timeline of the basic implementation of the proposed mitigation activities. Additional planning and specifics may need to be established once the transmission line construction schedule is finalized.

3.9 Monitoring and Maintenance Requirements

All of the proposed vegetative enhancement and wetland creation mitigation areas will be monitored for a minimum of 10 years to ensure the areas reach the intended success criteria. The hydrologic enhancement activities will be monitored for 5 years. One full report, detailing both quantitative and qualitative data will be compiled and submitted to both ACOE and FDEP on an annual basis in November of each year. The reports will detail all aspects of the land management activities for that year, any problems encountered or maintenance events that occurred. In addition, any recommendations or contingency plans will be discussed in the event the mitigation areas are not trending towards success or require any adaptive management activities.

Upland Preservation/Enhancement

An after action report will be generated after each prescribed burn is conducted. This report will focus on the success of the burn and include analysis of the pre-burn prescription sheet with a comparison to post-burn conditions in order to determine if the overall goals were achieved. Both qualitative and quantitative data will be assessed during and after each burn to determine both the success of the burn activity and the appropriate timeframe for the next rotational burn. Quantitative data will be obtained through the use of 100 tenth-acre plots. Information obtained from the tenth-acre plots will include:

- total coverage of desirable naturally recruited species as described by FNAI community description;
- representative photographs from fixed photo points;
- the presence and overall coverage of any listed invasive/exotic species;
- success of any previously recommended treatment methods and any future methods proposed;
- any areas of mortality of natural species;
- any evidence of wildlife presence or utilization;
- any maintenance needs in regard to stabilization, erosion, vandalism, etc. and suggested corrective actions;
- current hydrologic conditions, water depths, and hydric soils observed;
- date, location, acreage, and weather conditions of the most recent burn;
- date, location, and acreage for current burns;
- proposed date, location, and acreage for future burns;
- fireline maintenance status; and
- site specific photographs of recently completed burns.

Please see Section 3.11 for further details of the reporting requirements and success criteria for each of the communities that will be managed via fire.

Wetland Burn Enhancement

An after action report will be generated after each prescribed burn is conducted. This report will focus on the success of the burn and include analysis of the pre-burn prescription sheet with a comparison to post-burn conditions in order to determine if the overall goals were achieved. Both qualitative and quantitative data will be assessed during and after each burn to determine both the success of the burn activity and the appropriate timeframe for the next rotational burn. Quantitative data will be obtained through the use of 100 tenth-acre plots. Information obtained from the tenth-acre plots will include:

- total coverage of desirable naturally recruited species as described by FNAI community description;
- representative photographs from fixed photo points;
- the presence and overall coverage of any listed invasive/exotic species;
- success of any previously recommended treatment methods and any future methods proposed;
- any areas of mortality of natural species;
- any evidence of wildlife presence or utilization;
- any maintenance needs in regard to stabilization, erosion, vandalism, etc. and suggested corrective actions;
- current hydrologic conditions, water depths, and hydric soils observed;
- date, location, acreage, and weather conditions of the most recent burn;
- date, location, and acreage for current burns;
- proposed date, location, and acreage for future burns;
- fireline maintenance status; and
- site specific photographs of recently completed burns.

Please see Section 3.11 for further details of the reporting requirements and success criteria for each of the communities that will be managed via fire.

Herbaceous Wetland Restoration

The herbaceous wetland restoration areas will be monitored on an annual basis and maintained quarterly to ensure their success. Monitoring will document that the habitat type is naturally progressing to resemble its intended target community in regard to plant species and composition. The quantitative monitoring of the herbaceous wetland restoration areas will consist of establishing 100 tenth-acre fixed plots throughout the restoration area in order to obtain a representative coverage of species. Data obtained within each plot will include the following:

- the total groundcover percent coverage within each plot; as well as each species present and their estimated coverage;

- the presence and overall coverage of any listed invasive/exotic species;
- success of any previously recommended treatment methods and any future methods proposed;
- any areas of mortality of natural species;
- current hydrologic conditions, water depths, and hydric soils observed;
- any evidence of wildlife presence or utilization;
- any maintenance needs in regard to stabilization, erosion, vandalism, etc. and suggested corrective actions;
- date, location, acreage, and weather conditions of the most recent burn;
- date, location, and acreage for current burns;
- proposed date, location, and acreage for future burns;
- fireline maintenance status; and
- site specific photographs of recently completed burns.

Wetland Creation

The wetland creation areas will be monitored in the fall (September/October) for ten years. Additionally, quarterly piezometer readings will be obtained for each creation area in order to continually monitor the hydrologic regime of each creation area. One full quantitative report, including EN-55 forms, will include all data collected and solutions undertaken. Reports will specifically address the incidence of nuisance species, including the methods by which they were controlled or removed, and the frequency and dates of such maintenance events. Monitoring reports will be forwarded to FDEP and ACOE following each monitoring event.

Sampling Design for Fall Monitoring Event

Various sampling methods will be utilized in the creation area to aid in data collection.

1. Belt Transects (planted areas only). Twenty-five-foot wide belt transects will be located across the creation area. The number of transects will be determined in order to represent approximately 10 percent of the creation areas. The location of each transect will be staked in the field with fixed reference points.

Data collected along the belt transects will include:

- total number of planted trees per transect;
- percent survival of planted trees along each transect;
- estimated recruitment density and composition of other trees in the creation areas; and
- visual estimation of the percent groundcover species.

2. Photographs. Photographic records will be submitted along with each monitoring report. Fixed reference points will be staked in the field adjacent to

the mitigation area for a panoramic series of photographs. Each of the monitoring transects will have one photo location, totally approximately 45 photographs.

3. Wildlife Utilization. Qualitative observations of wildlife utilization of the mitigation area will be recorded with emphasis upon aquatic and wetland dependent species and endangered/threatened species.

4. Hydrology. Surface water elevations and/or depth to groundwater will be recorded at a fixed piezometer/gauge station in the creation area. The gauge will be calibrated to measure to the nearest 0.1 foot. If surface water is not present, ground water elevations will be taken. Piezometers will be located within a majority of each creation area. There will be a total of 43 piezometers (0 in MAA1; 30 in MAA2; 12 in MAA3; and 1 in MAA4).

Hydrologic Enhancement

The hydrologic enhancement activities in MMA 2 and 4 will be monitored continuously for five years to ensure their success. Monitoring will document that daily, monthly, and seasonal water levels are matching those proposed in the hydrologic modeling. In addition, wildlife utilization, hydrologic conditions, presence of invasive/exotic species and any other management issues will be noted and addressed.

Hydrologic restoration areas will be monitored by the installation of piezometers and the collection of pre-construction and post-construction data. Post-construction data collected with the piezometers will be compared to both pre-construction data and the proposed hydrologic model to ensure that the hydrology of the wetland system is returning towards more natural historic conditions and that the activities are beneficial for the wetland system.

The enhancement and creation areas will be periodically maintained after planting to remove Florida Exotic Pest Plant Council (FEPPC) listed invasive, exotic and/or nuisance species that may invade the area. Maintenance events will occur periodically on an as-needed basis and include the application of approved aquatic herbicides, the use of machinery for mechanical clearing/thinning and/or physical removal of any species present. Generally, such events will be more frequent following the initial planting effort, decreasing in frequency as the mitigation areas become established and coverage is evident. Maintenance will ensure that no greater than ten percent coverage by nuisance species occurs.

A baseline monitoring event will be conducted at the LNP mitigation areas no less than 60 days after the completion of the initial thinning event and completion of construction. The baseline event will help to establish the initial conditions after

construction and will be used as a reference to assess progression during future monitoring events. The annual monitoring will commence after the baseline event and will be submitted to FDEP and ACOE in the fall (November) of each year. The report will consist of a narrative describing the site conditions, the management activities that have occurred, photographs taken from fixed location points and maps depicting the mitigation activity area (Figure 3-10).

In addition, all activity areas will be monitored for any other potential activities that could affect the success of the proposed mitigation work plan. This may include any natural “acts of God” such as flooding, drought conditions, wildfire or any other abnormal condition that may ultimately affect the desired success criteria. Should any of these conditions be encountered, they will be detailed within the annual monitoring report and will include any potential remedies proposed. Based on the severity of the situation, regulatory agencies may be contacted for additional input at the time of discovery in order to facilitate an appropriate plan of action.