Attachment 2 to Letter NDP-MISC 2011-013

Florida Power Corporation d/b/a Progress Energy Florida, Inc.

Levy Nuclear Plant Project

Transmission Line Preferred Rights-of-Way and Substations - Wood Stork Foraging Habitat Assessment

103-89627

Progress Energy

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1.0 INTRODUCTION

Progress Energy Florida, Inc. (PEF) is committed to providing safe, reliable, and affordable energy to its customers. PEF provides electric service to 1.7 million customers and a population of more than 5 million people. The company maintains a diverse mix of power generating facility resources to ensure affordable, efficient, and reliable service. The Levy Nuclear Plant (LNP) and associated facilities are components in PEF's baseload generation plan. PEF is proposing to construct and operate two Westinghouse, AP1000 Reactors at the LNP site located in Levy County, Florida. Project requirements include several offsite linear facilities including a new blow down pipeline and approximately 180 miles of new transmission lines. PEF is continuing to pursue all licenses and permits necessary to construct and operate the LNP. These permits include a Combined Operating License (COL) from the Nuclear Regulatory Commission (NRC), a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE) and certification from the State under the Florida Electrical Power Plant Siting Act (PPSA).

On June 2, 2008, PEF submitted a Site Certification Application (SCA) to the Florida Department of Environmental Protection (FDEP) pursuant to the PPSA, Chapter 403, F.S., and Chapter 62-17, Florida Administrative Code (F.A.C.) requesting certification of the LNP, including the new transmission lines.

The Governor and Cabinet, sitting as the Siting Board, voted unanimously to approve the Administrative Law Judge's Recommended Order to grant full and final certification to PEF for the construction and operation of the LNP and associated facilities. The Final Order on Certification of PEF LNP Units 1 and 2 was granted on August 11, 2009 (Final Order). The Final Order for the project approved by the Siting Board contains a set of conditions that the project must abide by during the construction and operation of the plant and associated facilities. These are collectively referred to as the LNP Conditions of Certification (COC).

PEF has also submitted a Combined Operating License Application (COLA) to the NRC in July 2008. The USACE is a cooperating agency with the NRC and has participated in the development of a Draft Environmental Impact Statement (DEIS) for the project. The NRC issued the DEIS on the project in August 2010. The public comment period for the DEIS has closed. The NRC expects to issue a Final Environmental Impact Statement (FEIS) on the project around April 2012.

PEF has also submitted a permit application for wetland impacts under Section 404 of the Clean Water Act to the USACE. PEF has been working with the USACE to address additional information needs for the Section 404 permit. The USACE anticipates issuing a Record of Decision on the project sometime after the FEIS.

The preparation of these various regulatory documents required the review of the potential impacts to listed species for the project. Listed plant species are those plants that are listed by the U.S. Fish and Wildlife Service (USFWS) under Title 50, Part 17 of the Code of Federal Regulations (50 CFR 17), or by the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, of special concern, or commercially exploited. Listed animal species are those animals that are classified as endangered, threatened, or of special concern by the USFWS under 50 CFR 11-12, or by the Florida Fish and Wildlife Conservation Commission (FWC) under Chapter 68-27, Florida Administrative Code.

To support this effort, Golder Associates Inc. (Golder) conducted preliminary assessments of listed plant and animal species occurrence within each of the transmission line preferred rights-of-way (ROWs) and substation sites. The purpose of the preliminary listed species assessments was to gather information regarding the existing habitat conditions within each transmission line preferred ROW and substation site, document the occurrence of listed species, both plants and animals, and, based on the results of the field assessment and habitat conditions, develop species-specific surveys to be conducted prior to clearing and construction within each ROW and substation site in consultation with the FWC and the USFWS. Listed species assessment reports for each transmission line and substation were submitted to the USFWS on April 6, 2011.

The preliminary assessment indicated the presence of suitable foraging habitat (SFH) for the federally endangered wood stork (*Mycteria americana*). Portions of the proposed transmission facilities are located within USFWS-designated wood stork Core Foraging Areas (CFAs). In central Florida, CFAs are defined as SFH within a 15-mile radius surrounding all known wood stork nesting colonies (USACE, 2008). As nesting wood storks primarily feed in wetlands between 5 and 40 miles from the colony (Ogden, 1990), the loss of suitable foraging wetlands within these CFAs may affect reproductive success through reduction in foraging opportunities.

As part of the USACE wetland permitting process under Section 404(b)(1) of the Clean Water Act and in accordance with 40 CFR Part 230 and 33 CFR Part 320, impacts to wetlands within a wood stork colony CFA are assessed in consultation with the USFWS under Section 7 of the Endangered Species Act. The USACE and USFWS have developed an *Effect Determination Key for Wood Stork in Central and North Peninsular Florida* (see Attachment A) to facilitate USACE's evaluation of potential adverse effects upon wood storks associated with a particular project. The USFWS routinely concurs with USACE's "may affect, not likely to adversely affect" determination for individual project effects to the wood stork when project effects are insignificant due to scope or location, or if assurances are given that wetland impacts have been avoided, minimized, and adequately compensated such that there is no net loss in foraging potential. Impacts to wood stork SFH within a CFA must be compensated through provision of mitigation that provides for equal or greater foraging habitat value, measured in terms of wood stork foraging habitat units.

2.0 METHODOLOGY

Researchers have shown that wood storks forage most efficiently in habitats where prey densities are high, the water is shallow, and the canopy is open enough to hunt successfully (Ogden et al., 1978; Browder, 1984; Coulter, 1987). Prey availability to wood storks is dependent upon fish and crayfish density and physical access to the foraging site, including tree canopy cover, water depth, and density of submerged vegetation. Storks feed primarily on small fish between 1 and 8 inches in length, within foraging sites where the water is between 2 and 15 inches deep (Ogden, 1990). Preferred foraging habitat includes wetlands exhibiting a mosaic of submerged and/or emergent aquatic vegetation, and shallow, open-water areas subject to hydrologic regimes ranging from dry to wet. The vegetative component provides nursery habitat for small fish, frogs, and other aquatic prey, and the shallow, open-water areas provide sites for concentration of the prey during daily or seasonal low water periods. Typical foraging sites for the wood stork include freshwater marshes, depressions in cypress heads, swamp sloughs, managed impoundments, stock ponds, shallow-seasonally flooded roadside or agricultural ditches, and narrow tidal creeks or shallow tidal pools (USACE, 2008).

An evaluation of the loss of wood stork foraging habitat within CFAs associated with construction of the proposed transmission and substation facilities was conducted in accordance with the Wood Stork Foraging Habitat Assessment Procedure (Passarella and Associates, Inc., 2003) contained within the *Effect Determination Key for the Wood Stork in Central and North Peninsular Florida* (Attachment A). A similar evaluation was performed to determine the increase in wood stork foraging habitat associated with the proposed mitigation activities within three watersheds overlapping the CFAs, as described in the *Levy Nuclear Plant and Associated Transmission Lines, Wetland Mitigation Plan, Comprehensive Design Document* (PEF 2011).

The quantification of wood stork foraging habitat loss is based upon both the acreage of wetland impact and the corresponding quality of those wetlands with respect to characteristics preferred by wood storks as foraging habitat. For assessment of mitigation sites, the amount of wood stork foraging habitat generated is based on a comparison of the pre- and post-mitigation condition. The assessment procedure utilizes three variables that are indicative of the necessities and functions of foraging habitat required by the wood stork: prey availability, hydrologic regime, and water quality/land use. Optimal prey availability for wood storks occurs when water depths are within 2 to 15 inches in height, the waters are calm, the area does not have dense coverage of emergent aquatic vegetation, and small depressional pockets are present to concentrate prey. Appropriate wetland hydrology for wood stork foraging is the presence of standing water in the dry season as well as a strong hydrologic connection via ditches, swales, or sheet flow that provides a stable amount of water capable of supporting the appropriate densities of prey. The third variable assesses if the appropriate water quality is prevalent in the

assessment wetland, evaluating the potential presence of chemicals such as fertilizers, pesticides, and herbicides based on the land use and pre-treatment within areas surrounding the wetland.

All three variables have a maximum score of 3.0 for optimal foraging habitat; the sum of all three variables is divided by nine to derive the overall foraging habitat score between zero and one for a given wetland or group of similar wetlands. The resulting score is then multiplied by the acreage of wetland impact to determine the loss of functional units of wood stork foraging habitat. In the case of mitigation, the difference between the pre- and post-mitigation scores for a given wetland or group of wetlands is multiplied by their corresponding acreage to determine the gain of functional units of wood stork foraging habitat.

3.0 CONCEPTUAL WETLAND IMPACT SUMMARY

Based on conceptual engineering design, the proposed transmission and substation facilities will impact approximately 145 acres of wetlands, including approximately 61 acres of direct impact and 84 acres of conversion of forested wetlands to herbaceous wetlands through canopy clearing (Table 1).

Table 1. Proposed Transmission and Substation Facilities Conceptual Wetland Impacts

Transmission Line/Substation	Approximate Wetland Impact Acreage		Total Wetland Impact Acreage
	Fill	Clearing	
Polk-Hillsborough-Pinellas (PHP)	32.12	0.35	32.47
Levy-Central Florida South (LCFS)	6.98	25.27	32.25
Citrus – Brookridge (CB)	0.20	0	0.20
Common Route (CR40 to Citrus Substation)	5.65	37.44	43.09
Levy – Crystal River Energy Complex (LCR)	1.96	20.82	22.78
Brookridge-Brooksville West (BBW)	0	0	0
Kathleen Substation Expansion	0	0	0
Citrus Substation	8.83	0	8.83
Central Florida South Substation	0	0	0
Crystal River Energy Center Substation Expansion	5.34	0	5.34
TOTAL	**61.1**	**83.9**	**145**

The areas designated as wood stork colony CFAs in relation to the proposed transmission and substation facilities are shown in Figure 1. The CFAs associated with these 21 colonies include approximately 3,366,598 acres. Based on USFWS 2010 nesting colony data, the following wood stork colonies occur in the vicinity of the proposed transmission facilities and substation sites (Figure 1):

- Colony # 611004A
- Colony # 611305
- Weeki Wachee
- Devil's Creek
- Little Gator Creek
- Saddlebrook Resort
- Heron Point
- Greenbrooke
- Seven Springs
- Sheldon Road
- Colony #611310
- Colony #611110 Lower Hillsborough River/Swamp
- Cypress Creek
- Cross Creek
- East Lake/Bellows Lake
- Lone Palm
- Colony #615105
- Colony #612316 Lake John
- Colony #616117
- Colony #616114
- NE Mulberry

The following proposed transmission lines and substation sites are located outside of any wood stork colony CFAs:

- Common Route
- Levy-Crystal River (LCR)
- Crystal River Energy Center Substation Expansion Site
- Citrus Substation
- Central Florida South Substation

The Polk-Hillsborough-Pinellas (PHP) transmission line, Brookridge – Brooksville West (BBW) transmission line, Kathleen Substation, and portions of the Citrus – Brookridge (CB) and Levy-Central Florida South (LCFS) transmission lines are located within wood stork colony CFAs. A total of approximately 36 acres of fill and 4 acres of clearing are proposed within wood stork colony CFAs, as summarized in Table 2.

Table 2. Conceptual Wetland Impacts within Wood Stork CFAs

Transmission Line/Substation	Approximate Wetland Impact Acreage		Total Wetland Impact Acreage
	Fill	Clearing	
Polk-Hillsborough-Pinellas (PHP)	32.22	0.35	32.57
Levy-Central Florida South (LCFS)	3.46	3.52	6.98
TOTAL	**35.68**	**3.87**	**39.55**

Based on the conceptual engineering design, construction within the BBW preferred ROW and the Kathleen Substation site will not result in any wetland impacts. Wetland impact associated with construction within the CB transmission line preferred ROW is limited to 0.20 acres, located outside of any wood stork CFA.

Approximately 3.9 acres of forested wetlands will be converted to herbaceous wetlands within the proposed transmission line preferred ROWs through removal of canopy species. Following construction, these systems will continue to provide foraging opportunities for wading birds, and the removal of canopy species may increase the suitability of foraging for wood storks through an increase in accessibility and prey availability. Wood storks prefer foraging within herbaceous wetlands and ponds with little or no canopy (Coulter and Bryan, 1993). Coulter and Bryan's study suggested that open canopies may contribute to detection of the sites and more importantly may allow storks to negotiate landing more easily and take flight quickly to avoid predators when compared to closed-canopy sites.

4.0 WOOD STORK FORAGING HABITAT IMPACT ASSESSMENT

For purposes of the wood stork foraging habitat impact assessment, the assessment area includes those portions of the proposed transmission and substation facilities located within wood stork CFAs. For each proposed facility, a Wood Stork Effect Determination Key was prepared (Attachment B). For those facilities that would incur greater than 0.5 acres of impact to wetlands providing SFH within the CFA of a colony site, the functional quality of each wetland or group of similar wetlands in terms of wood stork foraging habitat was determined, and the acreage of wetland impacts within the CFAs for each transmission line or substation was calculated based on the conceptual engineering design. The loss of wood stork foraging habitat was quantified in terms of functional units by multiplying the acreage of suitable foraging habitat impacted by the foraging habitat functional score.

In accordance with the Wood Stork Effect Determination Key for facilities proposed within wood stork CFAs (Attachment B), construction within the BBW preferred ROW, CB preferred ROW, and Kathleen Substation site are not likely to adversely affect the wood stork. Proposed construction within the PHP preferred ROW and LCFS preferred ROW will result in loss of >0.5 acres of wood stork SFH within colony CFAs, therefore the Wood Stork Foraging Habitat Assessment Procedure was conducted to calculate the loss of SFH in terms of functional habitat units. Wetland impact areas within the PHP and LCFS preferred ROWs are typically small (<0.5 acre) and scattered over many miles of ROW. A total of approximately 35.7 acres of unavoidable wetland fill is proposed within wood stork CFAs, resulting in a total of approximately 25.4 functional units of foraging habitat loss, as detailed below.

4.1 Pinellas-Hillsborough-Polk (PHP) Transmission Line Preferred ROW

Construction of the PHP transmission line will result in filling of approximately 32.2 acres of wetlands within wood stork colony CFAs, including streams and waterways, ditches, reservoirs, willow and elderberry/shrub wetlands, mixed wetland forest, cypress, freshwater marsh, and wet prairie wetlands. The PHP transmission line preferred ROW is located within CFAs of the following colonies: Devil's Creek, Little Gator Creek, Saddlebrook Resort, Heron Point, Greenbrooke, Seven Springs, Sheldon Road, Colony #611310, Colony #611110 Lower Hillsborough River/Swamp, Cypress Creek, Cross Creek, East Lake/Bellows Lake, Lone Palm, Colony #615105, Colony #612316 Lake John, Colony #616117, Colony #616114, and NE Mulberry (Figure 2).

In accordance with the Wood Stork Foraging Habitat Assessment Procedure, impacted wetlands were grouped by similar habitat types and evaluated relative to their potential value as foraging habitat for wood storks using three parameters: prey availability, hydrologic regime, and water quality. The functional assessment score for each wetland habitat type was multiplied by the estimated acreage of impact, resulting in a total of approximately 23 functional units of wood stork foraging habitat lost as a

result of construction (Table 3). Completed wood stork foraging habitat assessment procedure datasheets for the PHP transmission line are provided in Attachment C.

Table 3. PHP Transmission Line Preferred ROW Wood Stork Foraging Habitat Impact Summary

Habitat Type (FLUCFCS Code)	Fill Impact (acres)	Functional Assessment Score	Functional Units of Foraging Habitat Loss
Streams & Waterways (510)	0.63	0.69	0.43
Ditches (511)	0.98	0.68	0.67
Reservoirs/Reservoirs <10 acres (530/534)	0.88	0.75	0.66
Willow & Elderberry/Wetland Shrub (618/631)	8.39	0.70	5.87
Cypress (621)	0.17	0.80	0.14
Wetland Forested Mixed (630)	0.20	0.71	0.14
Freshwater Marsh (641)	19.76	0.73	14.42
Wet Prairie (643)	1.21	0.51	0.62
TOTAL	**32.22**		**22.95**

Descriptions of the wetlands proposed for impact within the PHP transmission line preferred ROW are provided below, classified in accordance with the Florida Land Use, Cover and Forms Classification System (FLUCFCS).

4.1.1 Streams & Waterways/Ditches (FLUCFCS 510/511)

Streams and waterways within the PHP transmission line preferred ROW proposed for impact include small portions of Itchepackasassa Creek, Flint Creek, Cypress Creek, and an unnamed channelized stream. These areas typically contain approximately 2-3 feet of standing water and support a vegetative community including laurel oak (*Quercus laurifolia*), coastal plain willow (*Salix caroliniana*), wild taro (*Colocasia esculenta*), soft rush (*Juncus effusus*), pickerelweed (*Pontederia cordata*), primrose willow (*Ludwigia* spp.), and wax myrtle (*Myrica cerifera*). Drainage ditches proposed for impact are typically roadside ditches, with variable hydroperiods ranging from saturated soils (no standing water) to water depths of approximately 2 feet. Many of the ditches are relatively densely vegetated with a mixture of emergent herbaceous species, such as maidencane (*Panicum hemitomon*), pickerelweed, soft rush, bushy broomsedge (*Andropogon glomeratus*), smartweed (*Polygonum* spp.), sedges (*Cyperus* spp.), primrose willow, marsh pennywort (*Hydrocotyle umbellata*), and torpedo grass (*Panicum repens*).

4.1.2 Reservoirs/Reservoirs <10 acres (530/534)

Portions of stormwater ponds and cattle ponds proposed for impact include areas of relatively shallow littoral zone that provide suitable wood stork foraging habitat. Vegetation along the perimeter of these areas typically consists of a mixture of sedges, primrose willow, bushy broomsedge, torpedo grass, water hyssop (*Bacopa monnieri*), spikerush (*Eleocharis* spp.), and cattail (*Typha latifolia*).

4.1.3 Willow & Elderberry/Wetland Shrub (618/631)

Shrub dominated wetlands within the PHP transmission line preferred ROW proposed for impact do not typically provide optimal wood stork foraging habitat due to the density of woody vegetation. However, open areas within these wetlands may provide foraging opportunities. Wetlands classified as willow and elderberry/wetland shrub are typically dominated by a shrub strata consisting of coastal plain willow, elderberry (*Sambucus canadensis*), groundsel tree (*Baccharis halimifolia*), primrose willow, and Brazilian pepper (*Schinus terebinthifolius*), as well as sapling red maple (Acer rubrum) and laurel oak.

4.1.4 Cypress (621)

Small areas (approximately 0.17 acres) of cypress are proposed to be filled within the PHP transmission line preferred ROW near the Kathleen and Lake Tarpon Substations as well as adjacent to Double Branch Creek. These areas are dominated by a canopy of pond cypress (*Taxodium ascendens*) and bald cypress (*Taxodium distichum*) and laurel oak, with an understory of ferns, including Virginia chain fern (*Woodwardia virginica*), royal fern (*Osmunda regalis*), and swamp fern (*Blechnum serrulatum*). Water depths typically range from approximately 0 – 12 inches, suitable for wood stork foraging, although the canopy slightly reduces the foraging habitat value.

4.1.5 Wetland Forested Mixed (630)

Unavoidable fill impact to mixed forested wetlands within the PHP transmission line preferred ROW are limited to approximately 0.20 acres, with a relatively dense canopy consisting of cypress, slash pine (*Pinus elliottii*), red maple, American elm (*Ulmus americana*), and water oak (*Quercus nigra*). Water depths within these areas typically range from 2 – 24 inches, but as the case with cypress wetlands, the canopy reduces the suitability of the habitat for wood stork foraging.

4.1.6 Freshwater Marsh (641)

Unavoidable freshwater marsh impacts within the PHP transmission line preferred ROW comprise approximately 19.76 acres, with many of the areas disturbed due to cattle, mowing, and adjacent developed areas. These marshes typically range in water depth from saturated soil (no standing water) to approximately 2 feet. The variety in hydroperiod provides potential wood stork foraging opportunities during both wet and dry seasons. The vegetative community consists of a diverse assemblage of herbaceous and shrub species, including smartweed, maidencane, cattail, spikerush, torpedo grass, primrose willow, lizard's tail (*Saururus cernuus*), meadow beauty (*Rhexia* sp.), buttonbush (*Cephalanthus occidentalis*), soft rush, blue maidencane (*Amphicarpum muhlenbergiana*), musky mint (*Hyptis alata*), dogfennel (*Eupatorium capillifolium*), bushy broomsedge, marsh pennywort, and occasional coastal plain willow, red maple, slash pine, groundsel tree, and laurel oak.

4.1.7 Wet Prairie (643)

Areas of wet prairie within the PHP transmission line preferred ROW typically do not contain standing water, but support a variety of obligate and facultative vegetation upon saturated soils. Due to infrequent inundation, these areas typically do not provide adequate densities of prey, although during periods of high rainfall wet prairies may become inhabited by fish and crayfish from adjacent longer hydroperiod systems, providing potential wood stork foraging opportunities.

4.2 Levy – Central Florida South (LCFS) Transmission Line Preferred ROW

Construction of the LCFS transmission line will result in approximately 3.46 acres of unavoidable wetland impacts to ditches, hydric pine flatwoods, freshwater marsh, and wet prairie wetlands within the CFA of Colony # 611004A (Figure 3).

In accordance with the Wood Stork Foraging Habitat Assessment Procedure, impacted wetlands were grouped by similar habitat types and evaluated relative to their potential value as foraging habitat for wood storks using three parameters: prey availability, hydrologic regime, and water quality. The functional assessment score for each wetland habitat type was multiplied by the estimated acreage of impact, resulting in a total of approximately 2.45 functional units of wood stork foraging habitat lost as a result of construction (Table 4).

Table 4. LCFS Transmission Line Preferred ROW Wood Stork Foraging Habitat Impact Summary

Habitat Type (FLUCFCS Code)	Fill Impact (acres)	Functional Assessment Score	Functional Units of Foraging Habitat Loss
Ditches (511)	0.12	0.71	0.09
Hydric Pine Flatwoods (625)	0.04	0.45	0.02
Freshwater Marsh (641)	2.68	0.75	2.01
Wet Prairie (643)	0.62	0.53	0.33
TOTAL	**3.46**		**2.45**

Completed wood stork foraging habitat assessment procedure datasheets for the LCFS transmission line are provided in Attachment D. A description of the impacted wetland types is provided below, classified in accordance with the FLUCFCS.

4.2.1 Ditches (FLUCFCS Code 511)

Three ditches proposed for impact within the LCFS transmission line preferred ROW occur within the CFA, Wetlands 54, 58, and Y. A total of approximately 0.12 acres of impact to these ditches is proposed associated with construction of transmission structure pads and access roads. These ditches are components of freshwater marsh, wet prairie, and hydric pine systems, surrounded by mixed rangeland, pasture, and residential areas. Typical vegetative community components include beaksedges

(*Rhynchospora* spp.), torpedo grass, maidencane, soft rush, smartweed, and sedges. Water levels range from saturated soils (no standing water) observed in Wetlands 54 and Y, to 12 inches observed in Wetland 58.

4.2.2 Hydric Pine Flatwoods (FLUCFCS Code 625)

Within the CFA, a small area of fill (approximately 0.04 acres) is proposed within hydric pine flatwoods (Wetland Y) associated with a transmission structure pad. This area is dominated by slash pine and maidencane, typically with no standing water present, which provides relatively poor wood stork foraging habitat.

4.2.3 Freshwater Marsh (FLUCFCS Code 641)

Unavoidable freshwater marsh impacts within the CFA comprise 2.68 acres, including portions of Wetlands 51, 54, 55, 58, I, and K. These systems are dominated by a variety of emergent herbaceous vegetation and grasses, including maidencane, blue maidencane, threadleaf arrowhead (*Sagittaria filiformis*), climbing aster (*Aster carolinianus*), rattlebox (*Sesbania punicea*), pickerelweed (*Pontederia cordata*), water hyacinth (*Eichhornia crassipes*), primrose willow (*Ludwigia* spp.), smartweed, soft rush, and marsh pennywort (*Hydrocotyle umbellata*). Water levels vary from saturated soils (no standing water), to permanent inundation of >3 feet in depth. The variety in hydroperiod provides foraging opportunities during both wet and dry seasons.

4.2.4 Wet Prairie (FLUCFCS Code 643)

Approximately 0.62 acres of wet prairie impacts are proposed within the CFA, including portions of Wetlands 54, W, and X. Wet prairie systems within the LCFS transmission line preferred ROW are typically infrequently inundated, ephemeral systems supporting hydrophytic vegetation upon hydric soils. Typical vegetative community composition includes maidencane, blue maidencane, and beakrushes. These systems provide limited opportunity for wood stork foraging due to reduced hydroperiod and resulting limited prey base.

5.0 MITIGATION OF IMPACTS TO FORAGING HABITAT

The LNP mitigation plan has been designed to provide an overall increase in ecological function across several thousand acres in regionally significant locations utilizing a watershed approach focused on wetland creation, restoration, enhancement, and preservation within the same watersheds as the proposed wetland impacts. The mitigation plan includes creation, restoration, and enhancement of wetlands that will provide suitable wood stork foraging habitat similar to the wetlands proposed for impact within the Withlacoochee River, Hillsborough River, Tampa Bay, and Upper Coastal Watersheds. The wood stork colony CFAs associated with the PHP and LCFS transmission lines are located wholly or partially within sub-basins of these four watersheds (Figures 4 and 5). Details of the proposed activities at each mitigation site are provided in the *Levy Nuclear Plant and Associated Transmission Lines, Wetland Mitigation Plan, Comprehensive Design Document* (PEF 2011).

Mitigation within the Withlacoochee River Watershed will occur on-site within the LNP property and off-site at Boarshead Ranch (BHR). Impacts within the Hillsborough River Watershed will be offset through mitigation within Boarshead Ranch (BHR). Mitigation within the Tampa Bay Watershed will occur within the Brooker Creek Preserve mitigation site (BCP). Mitigation within the Upper Coastal Watershed in the vicinity of the wood stork CFAs will occur at the Five Mile Creek (FMC) site. The location of the mitigation sites relative to wood stork colony CFAs is summarized in Figures 4 and 5 and Table 5.

Table 5. Mitigation Site Location Relative to Wood Stork Colony Core Foraging Areas

Wood Stork Colony	Mitigation Site Located within CFA			
	LNP Site	BHR	BCP	FMC
4 - Devil's Creek		X		
5 - Little Gator Creek		X		
6 - Saddlebrook Resort		X		X
7 - Heron Point			X	X
8 - Greenbrooke			X	X
9 - Seven Springs			X	X
10 - Sheldon Road			X	
12 - Cypress Creek/Colony #611310				X
13 - Cross Creek				X
15 - Lone Palm		X		
Wood Stork Colony	**Mitigation Site Located within Same Sub-Basin as CFA**			
	LNP Site	**BHR**	**BCP**	**FMC**
1 -Colony #611004A	X			
11 - Colony #611110 Lower Hillsborough River/Swamp			X	
14 - East Lake/Bellows Lake			X	
18 - Colony #616117		X		
17 - Colony $612316 Lake John		X		
Wood Stork Colony	**Mitigation Site Located within Same Watershed as CFA**			
	LNP Site	**BHR**	**BCP**	**FMC**
16 - Colony #615105		X		
19 - Colony #616114		X		
20 - NE Mulberry		X		

5.1 LNP On-Site Mitigation

The total area of the LNP parcel is approximately 5,200 acres, but the proposed enhancement/restoration activities for this project are located primarily in the four mitigation Activity Areas, comprised of 1,548.7 acres. Activity Area 3 is located within the same sub-basin (Withlacoochee River Sub-basin) as the CFA associated with wood stork colony #611004A (Figure 5). The LNP on-site mitigation parcel abuts the southwestern portion of the Goethe State Park to the north and a portion of the 110-mile Cross Florida Greenway (Inglis Island) to the south. The enhancement/restoration activities proposed at LNP will improve the link between these two regionally significant preserves and will ultimately result in an ecologically improved and protected corridor between these two large systems.

Mitigation activities proposed at the LNP site include wetland preservation, herbaceous wetland restoration, hydrologic enhancement, wetland pine thinning, upland preservation, and upland pine thinning, as described in *Levy Nuclear Plant and Associated Transmission Lines, Wetland Mitigation Plan, Comprehensive Design Document* (PEF 2011). The proposed herbaceous wetland restoration will directly create and/or improve suitable foraging habitat for wood storks.

Along with the cessation of silvicultural activities, approximately 313.9 acres of high density pine plantations at the LNP mitigation site will be cleared and converted to herbaceous wetland systems within mitigation Activity Areas 1 through 4, including 29.4 acres within Activity Area 3. Once the trees have been removed, the land will be graded to match adjacent wetland elevations and the herbaceous wetland vegetative community will be allowed to naturally regenerate. The locations of the proposed herbaceous restoration areas were selected so that surrounding, established herbaceous communities would provide a significant seed source for the recruitment of desirable species. The maintenance and monitoring, along with an adaptive management plan, will ensure successful repopulation of desirable herbaceous species.

5.2 Boarshead Ranch

The BHR mitigation site is located on a privately-owned parcel in Pasco County. This parcel is part of a corridor that is situated where the Hillsborough and Withlacoochee rivers diverge, and is adjacent to approximately 9 square miles of Southwest Florida Water Management District-owned Green Swamp property and other conservation lands located to the north, east and south. The total area of the BHR parcel is approximately 2,096.80 acres, yet the proposed enhancement/restoration activities for this project are scattered throughout the property limits and include approximately 240.69 acres. The enhancement/restoration activities proposed at BHR will improve wetland and ecosystem functions in the floodplains of the aforementioned rivers through enhancement of the largest area of natural forest remaining in the upper Withlacoochee and Hillsborough Watersheds, providing an ecologically improved and protected corridor between these two large systems.

Proposed mitigation activities at BHR total approximately 241 acres of wetland creation, restoration, enhancement, and preservation including the following target communities: mixed wetland hardwoods/dome swamp hardwoods, cypress domes, stream and lake swamps/bottomlands, lakes, hydric pine flatwoods, and wet prairies. The overall goal of the mitigation plan for BHR is to preserve, restore, and enhance existing wetlands and lakes that have been impacted by ongoing agricultural activities, as well as creation of additional wetlands from uplands that have been previously converted to silvicultural uses or pastureland. The proposed wet prairie restoration, hydrologic enhancement, and lake preservation will directly benefit wood storks through an increase in suitable foraging habitat.

Approximately 160 acres of herbaceous wetland restoration, hydrologic enhancement, and lake preservation is proposed in the southwest portion of BHR. A man-made lake exists in this area and was excavated in historic wetland areas (approximately 52.15 acres of lake and 1.08 acres of connected ditch to total 53.23 acres). This lake acts additional storage for peak flows from the Withlacoochee River and associated floodplain. The existing lake appears to be groundwater driven, yet water normally flows south. Under high volume circumstance, the water stages up in the river and floodplain, and is forced west into a ditch containing water control structures that convey the water further into the lake. This lake was designed at different elevations and contains deep water portions as well as shallower, freshwater marsh habitat. The water is then further conveyed through another ditch and control structure along the southern edge of the lake. Both ditch systems will have alterations to control structures to enhance hydrology. In addition, two berms will be removed from the pond to permanently hydrologically connect isolated areas. These enhancement acreages are included in the lake preservation total. Any excess water flows through the southern ditch structure into a large, low-lying pasture, planted pine areas, and a small wet prairie. Water may also stage to a level that also forces water north into existing agricultural areas which are already relatively low lying and will become herbaceous wetlands.

The proposed herbaceous restoration totals approximately 106.76 acres and consists of lowering current elevations to 73 feet to encroach upon the water table to ensure hydric conditions. Additional hydration will occur from lake overflow during peak staging events to further the restoration of historical hydrological conditions. All vegetation will be removed, the area excavated and planted with aquatic herbaceous vegetation to mimic wet prairie and marsh conditions. In the southwestern most restoration area, a berm will be created to an elevation of 80 feet, and will tie into an existing 80 foot contour elevation line to ensure that restoration activities do not have negative flooding effects on adjacent property owners. This berm will be sodded to prevent erosion. The wetland herbaceous areas will be planted on three-foot centers (4,840 plants/acre) with native wetland species such as maidencane (*Panicum hemitomon*), cordgrass (*Spartina bakeri*), St. Johns wort (*Hypericum* spp.), and sawgrass (*Cladium jamaicensis*).

5.3 Brooker Creek Preserve

The approximately 1,300-acre BCP site encompasses an existing PEF-owned transmission line ROW and surrounding habitats owned and managed by Pinellas County. The BCP site is located in the Tampa Bay Watershed and mitigation activities are designed to offset primarily herbaceous wetland impacts through the restoration of historic flow patterns and the enhancement and restoration of existing low-quality wetlands. This parcel is part of the largest remaining natural forest in Pinellas County. The proposed mitigation plan will restore historic flow patterns that were disturbed during the construction of transmission facilities, adversely affecting the hydrology and species composition of the adjacent natural wetlands. The proposed mitigation plan will help to return BCP to a more natural hydrologic condition and help to restore the adjacent natural wetlands within the Preserve.

The proposed mitigation plan for the approximately 161-acre BCP consists of a combination of herbaceous wetland enhancement and hydrologic improvements to restore historic flow paths through the installation of low water crossings. The proposed wetland enhancement is located in several wetland areas throughout the transmission line ROW, totaling approximately 43.5 acres, which will directly benefit the wood stork through increasing the acreage of suitable wetland foraging habitat.

Wetland enhancement activities consist of a combination of treating existing populations of invasive/exotic species and installing native emergent aquatic vegetation where necessary. Invasive/exotic species will be treated through a combination of herbicide application and mechanical removal. Some areas will be excavated to remove the seed source and encourage additional hydrologic flow. The wetland enhancement areas will be planted on three-foot centers at a density of 4,840 plants/acre with native wetland species such as pickerelweed (*Pontederia cordata*), arrowhead (*Sagittarria latifolia*), soft rush (*Juncus effusus*), maidencane, and fire flag (*Thalia geniculata*).

5.4 Five Mile Creek

The FMC site is located west of US 41 and south of SR 52 in Pasco County. The total area of the FMC parcel is approximately 81.6 acres, but the proposed enhancement/restoration activities for this project consist of approximately 27 acres in the southern portion of the property. Historically, the property consisted of the FMC slough system and several cypress domes surrounded by wet prairie and freshwater marsh. The property was used as a borrow area, which resulted in excavation of four large borrows pits, conversion of marshes to deep open water habitats, and colonization of upland spoil disposal areas by invasive/exotic vegetation.

The primary mitigation activities at the FMC site include herbaceous wetland enhancement and restoration, littoral shelf creation, forested wetland restoration, and upland enhancement. The proposed activities are adjacent to and designed to complement the Meres Crossing Phase III mitigation project

(SAJ-2009-01024). The restoration, enhancement, and creation activities will directly benefit the wood stork by increasing the amount and quality of suitable foraging habitat.

A total of approximately 14.44 acres of herbaceous wetland restoration and enhancement is proposed within four areas of the FMC site, Areas adjacent to the FMC channel and within the peninsula will be cleared of existing vegetation and excavated to within 0.5 feet of the seasonal high water mark to maintain wetland hydrology. Approximately 1.37 acres of littoral shelf will be created utilizing the material excavated from the peninsula wetland enhancement and restoration.

The littoral shelf and wetland restoration/enhancement areas will be planted on three foot centers (4,840 plants/acre) with native freshwater marsh vegetation, including pickerelweed, arrowhead, bulrush (*Scirpus* sp.), maidencane, and fire flag.

5.5 Mitigation Assessment Results

In accordance with the Wood Stork Foraging Habitat Assessment Procedure, proposed mitigation activities within each mitigation site were evaluated relative to their potential value as foraging habitat for wood storks using three parameters: prey availability, hydrologic regime, and water quality. The functional assessment for each mitigation activity was evaluated for the existing conditions and the proposed conditions upon completion of restoration, enhancement, or wetland creation. Each functional assessment score was multiplied by the acreage of mitigation, and the net gain in functional units of wood stork foraging habitat was calculated. Completed wood stork foraging habitat assessment procedure datasheets for the mitigation sites are provided in Attachment E.

For the PHP transmission line, the proposed mitigation at the Boarshead Ranch, Brooker Creek, and Five Mile Creek Preserve will generate approximately 45.8 functional units of wood stork foraging habitat (Table 6). At total of approximately 171.8 acres of SFH in the form of freshwater wetland marsh, wet prairie, and littoral shelves will be restored, enhanced, or created within these mitigation sites.

Table 6. PHP Transmission Line Preferred ROW Wood Stork Foraging Habitat Mitigation Summary

Mitigation Site	Activity/ Habitat Type (FLUCFCS Code)	Size (acres)	Functional Assessment Score		Net Gain in Functional Units of Foraging Habitat
			Current Condition	Proposed Condition	
Boarshead Ranch (Activity Area 1)	Littoral Shelf and Freshwater Marsh (641) Creation	7.8	3.98	5.23	1.25
Boarshead Ranch (Activity Area 2)	Wet Prairie (643) Creation	8.47	1.95	3.89	1.94
Boarshead Ranch (Activity Area 3)	Wet Prairie (643) Restoration	106.76	24.55	60.85	36.30
Brooker Creek Preserve	Freshwater Marsh (641) Enhancement	33.0	22.11	25.74	3.63
Five Mile Creek	Freshwater Marsh (641) Restoration/ Enhancement	14.44	7.36	9.82	2.46
Five Mile Creek	Littoral Shelf Freshwater Marsh Creation (641)	1.37	0.70	0.93	0.23
TOTAL		**171.84**	**60.65**	**106.46**	**45.81**

For the LCFS transmission line, the proposed restoration of approximately 29.4 acres of herbaceous wetlands will generate approximately 6.47 functional units of wood stork foraging habitat (Table 7).

Table 7. LCFS Transmission Line Preferred ROW Wood Stork Foraging Habitat Mitigation Summary.

Mitigation Location	Activity/ Habitat Type (FLUCFCS Code)	Size (acres)	Functional Assessment Score		Net Gain in Functional Units of Foraging Habitat
			Current Condition	Proposed Condition	
LNP Site – Activity Area 3	Freshwater Marsh (641) Restoration	29.4	14.99	21.46	6.47

6.0 SUMMARY AND CONCLUSIONS

An evaluation of impacts to wood stork foraging habitat and associated mitigation for transmission line preferred ROWs and associated substations was conducted. This evaluation was conducted for wetland impacts within wood stork colony CFAs and for mitigation sites within watersheds that overlap the impacted CFAs. The evaluation was performed in accordance with the wood stork foraging assessment methodology contained within the *Effect Determination Key for the Wood Stork in Central and North Peninsular Florida* (USACE, 2008). Wetland impacts were estimated based on conceptual transmission line and substation engineering design, and will be revised upon detailed transmission line design to refine the location, type, and extent of impacts and corresponding loss of wood stork SFH. The functional units of wood stork foraging habitat generated through mitigation was evaluated based upon the proposed wetland restoration, enhancement, and creation activities detailed in the *Levy Nuclear Plant and Associated Transmission Lines, Wetland Mitigation Plan, Comprehensive Design Document* (PEF 2011).

Based on conceptual engineering design, construction within the PHP and LCFS transmission line preferred ROWs will result in approximately 35.7 acres of unavoidable impact to wetlands providing SFH within areas designated as wood stork CFAs. Construction of the remaining proposed transmission line and substation facilities (Common Route, LCR, CB, and BBW transmission lines; Kathleen, Citrus, Central Florida South, and CREC substations) will not impact wetlands within wood stork CFAs.

Impacted wetlands within the PHP and LCFS transmission line preferred ROWs were grouped by similar habitat type and evaluated relative to their potential value as foraging habitat for wood stork using three parameters: prey availability, hydrologic regime, and water quality. The functional assessment scores for each wetland habitat type were multiplied by the acreage of impact to determine the total loss of functional units of foraging habitat. Based on the estimated wetland impacts, approximately 25.4 functional units of wood stork foraging habitat would be impacted.

The mitigation plan includes wetland creation, restoration, and enhancement that will provide wood stork foraging habitat within the Withlacoochee River, Hillsborough River, Tampa Bay, and Upper Coastal Watersheds. The CFAs of all colonies in which impacts to foraging habitat occur are located wholly or partially within these four watersheds. Mitigation within the Withlacoochee River and Hillsborough River Watersheds will occur on-site within the LNP property and off-site within Boarshead Ranch. Mitigation within the Tampa Bay Watershed will occur within the Brooker Creek Preserve mitigation site, and mitigation within the Upper Coastal Watershed in the vicinity of wood stork colony CFAs will occur at the Five Mile Creek site. Based on the proposed mitigation plans, approximately 52.28 functional units of wood stork foraging habitat would be generated through 201.24 acres of wetland restoration, enhancement and creation, resulting in a net gain of approximately 26.88 functional units of wood stork foraging habitat as a result of the project (Table 8).

Table 8. Wood Stork Foraging Habitat Impacts, Mitigation, and Net Gain

Transmission Line	Total Loss in Functional Units of Foraging Habitat	Total Gain in Functional Units of Foraging Habitat	Net Gain in Functional Units of Foraging Habitat
LCFS	2.45	6.47	4.02
PHP	22.95	45.81	22.86
TOTAL	**25.40**	**52.28**	**26.88**

The impacts to wood stork SFH within the CFAs have been avoided and minimized to the greatest extent practicable, and will be fully compensated through provision of mitigation that provides a net increase in wood stork foraging habitat value, therefore the construction of transmission facilities within the preferred ROWs is not likely to adversely affect the wood stork.

7.0 REFERENCES

Browder, J. A. 1984. Wood stork feeding areas in southwest Florida. Florida Field Naturalist 12:81–96.

Coulter, M. C. 1987. Foraging and breeding ecology of Wood Storks in east-central GA. Proceedings of the Third Southeastern Nongame and Endangered Wildlife Symposium. (Odom, R. R., K. A. Riddleberger, and J. Ozier, Eds.) Georgia Department of Natural Resources.

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Ogden, J.C. 1990. Habitat Management Guidelines for the Wood Stork in the Southest Region. U.S. Fish and Wildlife Service.

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U.S. Army Corps of Engineers. 2008. The Corps Of Engineers, Jacksonville District, U.S. Fish and Wildlife Service, Jacksonville Ecological Services Field Office and State of Florida Effect Determination Key for the Wood Stork in Central and North Peninsular Florida.

MAP ID	NAME
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2	611305
3	WEEKI WACHEE
4	611021 DEVIL'S CREEK
5	611024 LITTLE GATOR CREEK
6	SADDLEBROOK RESORT
7	HERON POINT
8	GREENBROOKE
9	SEVEN SPRINGS
10	SHELDON RD
11	611110 L. HILLSBOROUGH RIVER/SWAMP
12	CYPRESS CREEK/611310
13	CROSS CREEK
14	EAST LAKE/BELLOWS LAKE
15	LONE PALM
16	615105
17	612316 LAKE JOHN
18	616117
19	616114
20	NE MULBERRY

LEGEND

- Substation
- Florida Wood Stork Nesting Colony
- Wood Stork Core Foraging Area (CFA)
- Preferred Right-of-Way
- Levy Nuclear Plant Property Boundary
- County Boundary

REFERENCES

Substations, Levy Nuclear Plant and Right-of-Way: Progress Energy Florida & Golder Associates Inc., 2009; Roads: Florida Department of Transportation, 2010; Florida Wood Stork Nesting Colonies and Forage Areas: US Fish & Wildlife Service, 2010; County Boundaries: U.S. Census Bureau, 2000; Aerial: i-cubed, 2009

15 0 15 Miles

REV.	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

LEVY NUCLEAR PLANT PROJECT

TITLE

LOCATION OF WOOD STORK COLONIES AND CFAs RELATIVE TO THE PREFERRED TRANSMISSION LINE RIGHTS-OF-WAY AND SUBSTATION LOCATIONS

PROJECT No. 103-89627			FILE No. 103-89627K001
DESIGN	JG	05/19/2011	SCALE: AS SHOWN REV. 0
GIS	JG	08/24/2011	
CHECK	KB	08/24/2011	**FIGURE 1**
REVIEW	KB	08/24/2011	

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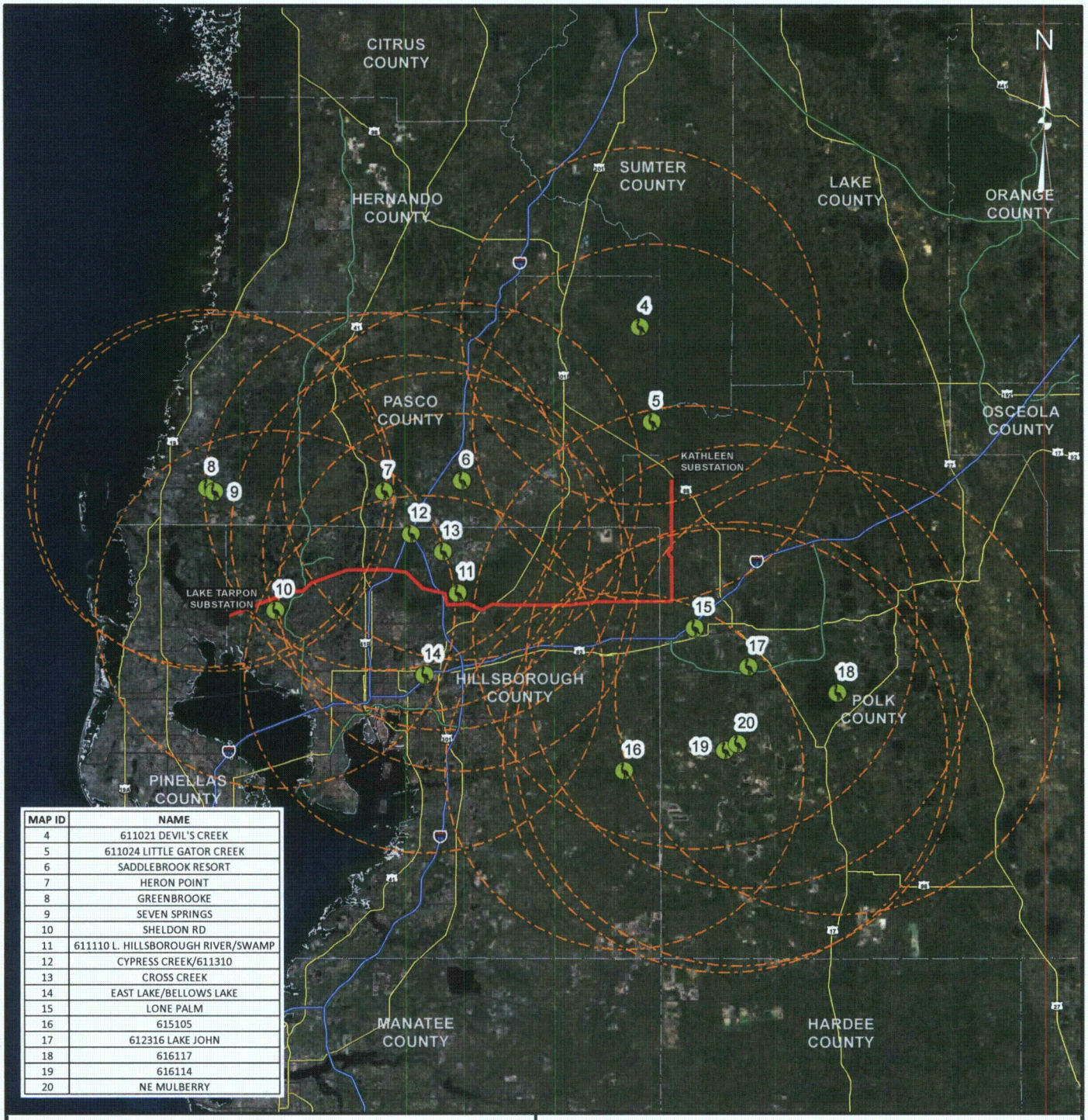

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5	611024 LITTLE GATOR CREEK
6	SADDLEBROOK RESORT
7	HERON POINT
8	GREENBROOKE
9	SEVEN SPRINGS
10	SHELDON RD
11	611110 L. HILLSBOROUGH RIVER/SWAMP
12	CYPRESS CREEK/611310
13	CROSS CREEK
14	EAST LAKE/BELLOWS LAKE
15	LONE PALM
16	615105
17	612316 LAKE JOHN
18	616117
19	616114
20	NE MULBERRY

LEGEND

- Substation
- Florida Wood Stork Nesting Colony
- Wood Stork Core Foraging Area (CFA)
- Preferred Right-of-Way
- County Boundary

REFERENCES

Substations and Right-of-Way: Progress Energy Florida & Golder Associates Inc., 2009; Roads: Florida Department of Transportation, 2010; Florida Wood Stork Nesting Colonies and Forage Areas: US Fish & Wildlife Service, 2010; County Boundaries: U.S. Census Bureau, 2000; Aerial: i-cubed, 2009

12 0 12 Miles

REV.	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

LEVY NUCLEAR PLANT PROJECT

TITLE

LOCATION OF WOOD STORK COLONIES AND CFAs RELATIVE TO THE PHP PREFERRED TRANSMISSION LINE RIGHTS-OF-WAY AND SUBSTATION LOCATIONS

PROJECT No. 103-89627			FILE No. 103-89627K002	
DESIGN	JG	05/19/2011	SCALE: AS SHOWN	REV. 0
GIS	JG	08/24/2011		
CHECK	KB	08/24/2011	FIGURE 2	
REVIEW	KB	08/24/2011		

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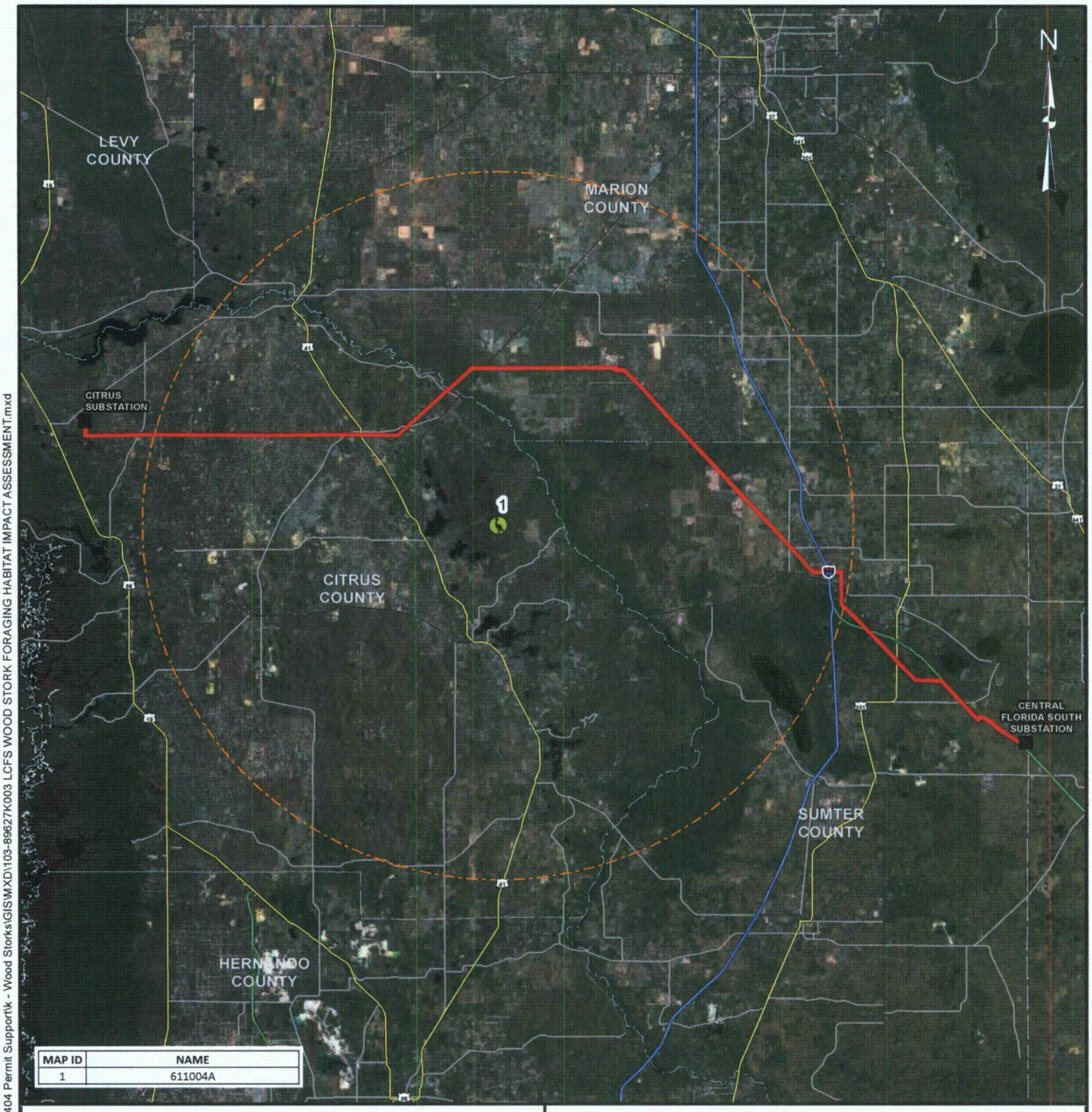

MAP ID	NAME
1	611004A

LEGEND

- Substation
- Florida Wood Stork Nesting Colony
- Wood Stork Core Foraging Area (CFA)
- Preferred Right-of-Way
- County Boundary

REFERENCES

Substations and Right-of-Way: Progress Energy Florida & Golder Associates Inc., 2009; Roads: Florida Department of Transportation, 2010; Florida Wood Stork Nesting Colonies and Forage Areas: US Fish & Wildlife Service, 2010; County Boundaries: U.S. Census Bureau, 2000; Aerial: i-cubed, 2009

6 0 6 Miles

REV	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

LEVY NUCLEAR PLANT PROJECT

TITLE

LOCATION OF WOOD STORK COLONIES AND CFAs RELATIVE TO THE LCFS PREFERRED TRANSMISSION LINE RIGHTS-OF-WAY AND SUBSTATION LOCATIONS

PROJECT No. 103-89627			FILE No. 103-89627K003	
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CHECK	KB	05/19/2011	**FIGURE 3**	
REVIEW	KB	05/19/2011		

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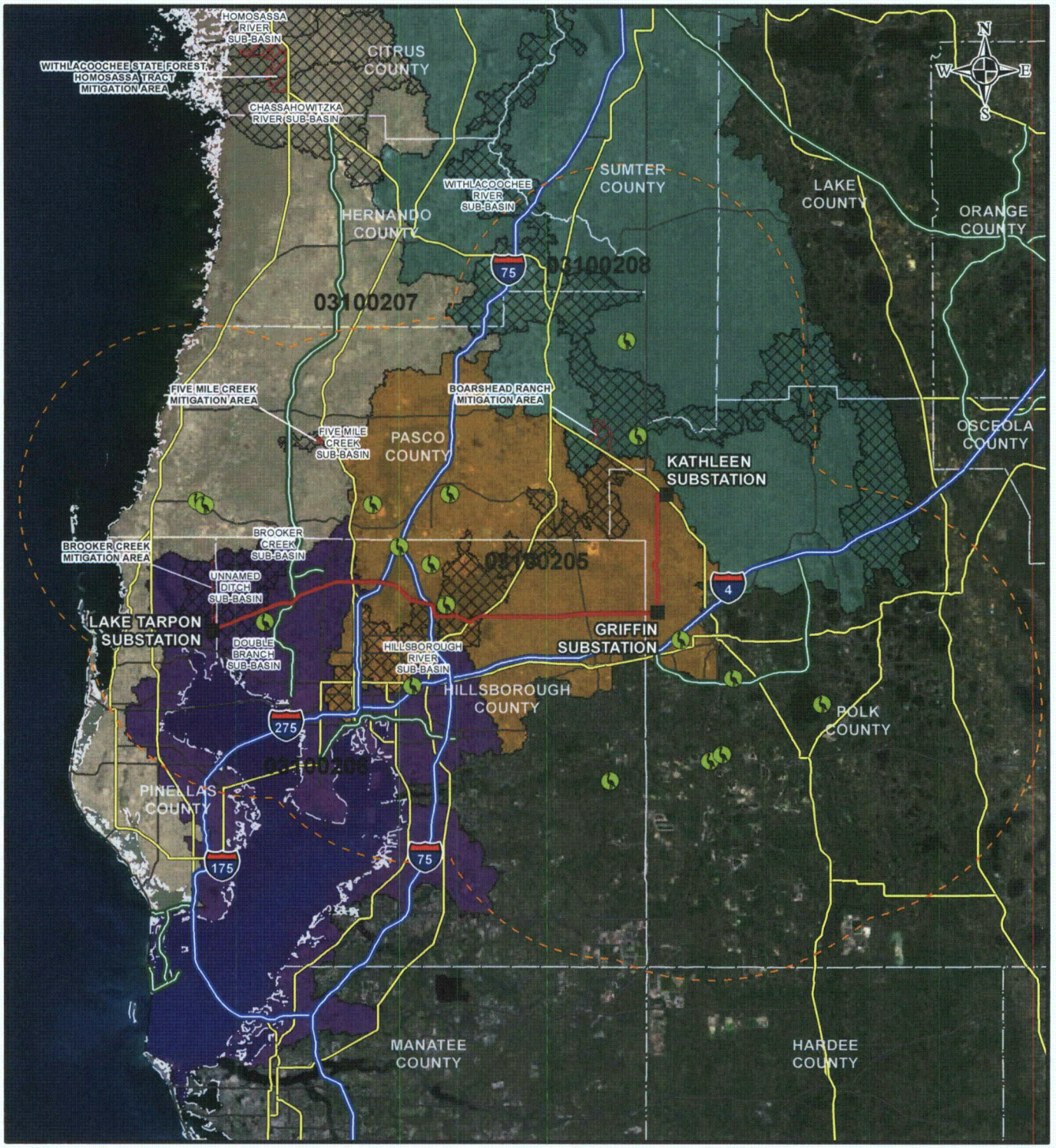

LEGEND

- Substation
- Florida Wood Stork Nesting Colony
- Interstate
- Toll Road
- US Road
- State Road
- PHP Preferred Right-of-Way
- Wood Stork Core Foraging Areas
- Mitigation Area
- Drainage Sub-Basin
- County Boundary

8 Digit HUC Code - Drainage Basins

- 03100207 - Upper Coastal
- 03100205 - Hillsborough River
- 03100206 - Tampa Bay
- 03100208 - Withlacoochee River, South

12 6 0 12 Miles

REFERENCE

Substations and Right-of-Way: Progress Energy Florida & Golder Associates Inc., 2009; Roads: Florida Department of Transportation, 2010; Florida Wood Stork Nesting Colonies and Forage Areas: US Fish & Wildlife Service, 2010; HUC Basins: Florida Department of Environmental Protection, 1993; County Boundaries: U.S. Census Bureau, 2000; Mitigation Areas: Progress Energy Florida, 2011; Drainage Basins: SWFWMD, 2004; Aerial: i-cubed, 2009

PROGRESS ENERGY FLORIDA
LEVY NUCLEAR PLANT

POLK - HILLSBOROUGH - PINELLAS WOOD STORK NESTING COLONIES, CFAs, MITIGATION AREAS AND DRAINAGE BASINS

Progress Energy

MXD File No. 103-89627A021			SCALE AS SHOWN	REV. 0
DESIGN	JDG	02/18/2011		
GIS	JDG	08/23/2011		
CHECK	SAR	08/23/2011		
REVIEW	KB	08/23/2011		

FIGURE 4

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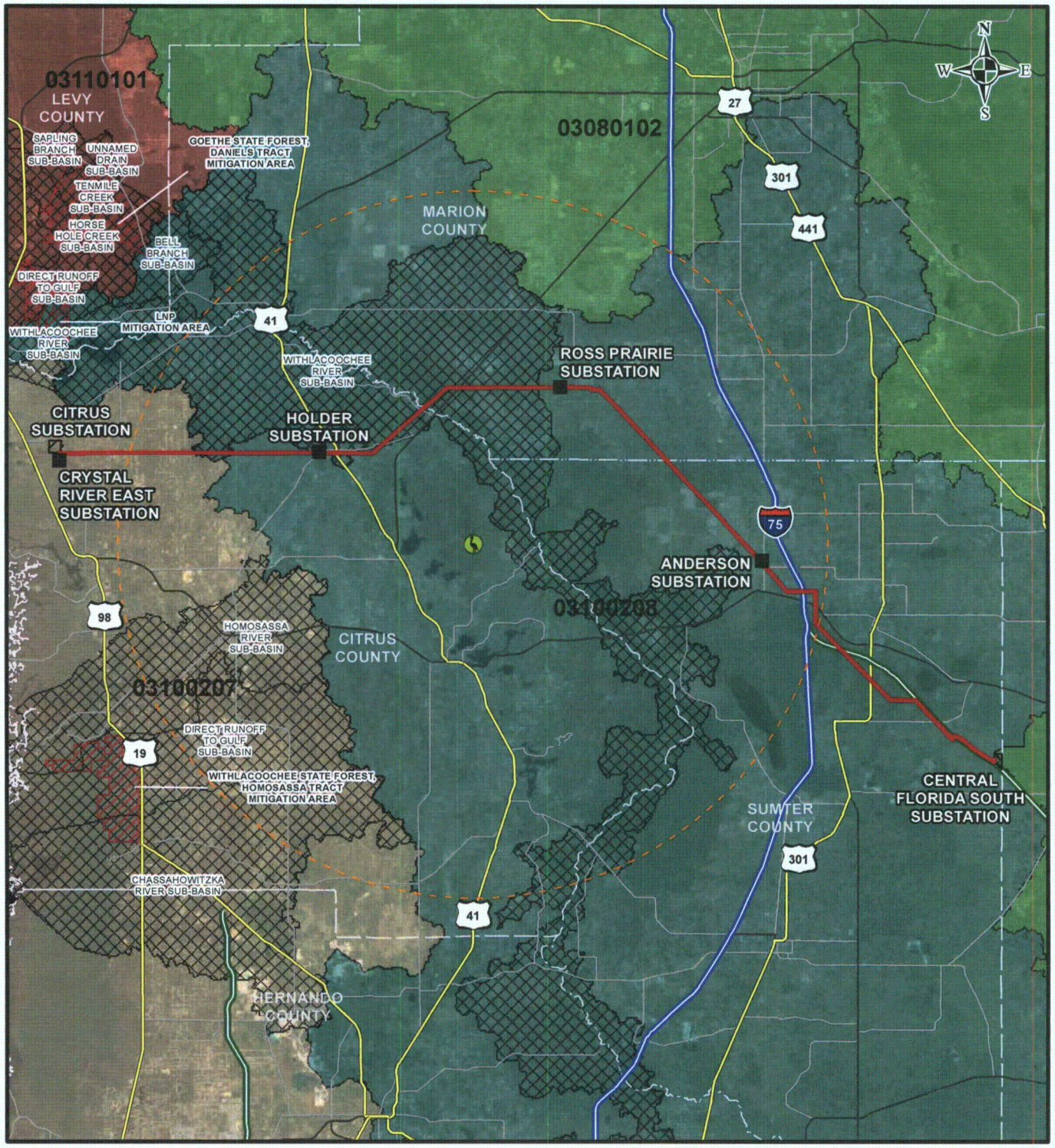

LEGEND

- Substation
- Florida Wood Stork Nesting Colony
- Interstate
- Toll Road
- US Road
- State Road
- County Road
- LCFS Preferred Right-of-Way
- Wood Stork Core Foraging Area
- Citrus Substation
- Central Florida South Substation
- Mitigation Area
- Drainage Sub-Basin
- County Boundary

8 Digit HUC Code - Drainage Basins

- 03100207 - Upper Coastal
- 03080102 - Oklawaha River
- 03110101 - Waccasassa River
- 03100208 - Withlacoochee River, South

6 3 0 6 Miles

REFERENCE

Substations and Right-of-Way: Progress Energy Florida & Golder Associates Inc., 2009; Roads: Florida Department of Transportation, 2010; Florida Wood Stork Nesting Colonies and Forage Areas: US Fish & Wildlife Service, 2010; HUC Basins: Florida Department of Environmental Protection, 1993; County Boundaries: U.S. Census Bureau, 2000; Mitigation Areas: Progress Energy Florida, 2011; Drainage Basins: SWFWMD, 2004; Aerial: i-cubed, 2009

PROGRESS ENERGY FLORIDA
LEVY NUCLEAR PLANT

LEVY - CENTRAL FLORIDA SOUTH WOOD STORK NESTING COLONIES, CFAs, MITIGATION AREAS AND DRAINAGE BASINS

Progress Energy

MXD File No. 103-89627C017			SCALE AS SHOWN	REV. 0
DESIGN	JG	03/01/2011		
GIS	JG	08/23/2011		
CHECK	SR	08/23/2011		
REVIEW	KB	08/23/2011		

FIGURE 5

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ATTACHMENT A

USACE/USFWS Effect Determination Key for the Wood Stork in Central and North Peninsular Florida, Wood Stork Foraging Habitat Assessment Procedure

THE CORPS OF ENGINEERS, JACKSONVILLE DISTRICT, U. S. FISH AND WILDLIFE SERVICE, JACKSONVILLE ECOLOGICAL SERVICES FIELD OFFICE AND STATE OF FLORIDA EFFECT DETERMINATION KEY FOR THE WOOD STORK IN CENTRAL AND NORTH PENINSULAR FLORIDA
September 2008

Purpose and Background

The purpose of this document is to provide a tool to improve the timing and consistency of review of Federal and State permit applications and Federal civil works projects, for potential effects of these projects on the endangered wood stork (*Mycteria americana*) within the Jacksonville Ecological Services Field Office (JAFL) geographic area of responsibility (GAR see below). The key is designed primarily for Corps Project Managers in the Regulatory and Planning Divisions and the Florida Department of Environmental Protection or its authorized designee, or Water Management Districts. The tool consists of the following dichotomous key and reference material. The key is intended to be used to evaluate permit applications and Corps' civil works projects for impacts potentially affecting wood storks or their wetland habitats. At certain steps in the key, the user is referred to graphics depicting known wood stork nesting colonies and their core foraging areas (CFA), footnotes, and other support documents. The graphics and supporting documents may be downloaded from the Corps' web page at http://www.saj.usace.army.mil/permit or at the JAFL web site at http://www.fws.gov/northflorida/WoodStorks. We intend to utilize the most recent information for both the graphics and supporting information; so should this information be updated, we will modify it accordingly. **Note: This information is provided as an aid to project review and analysis, and is not intended to substitute for a comprehensive biological assessment of potential project impacts. Such assessments are site-specific and usually generated by the project applicant or, in the case of civil works projects, by the Corps or project co-sponsor.**

Explanatory footnotes provided in the key must be closely followed whenever encountered.

Scope of the key

This key should only be used in the review of permit applications for effects determinations on wood storks within the JAFL GAR, and not for other listed species. Counties within the JAFL GAR include Alachua, Baker, Bradford, Brevard, Citrus, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Hernando, Hillsborough, Lafayette, Lake, Levy, Madison, Manatee, Marion, Nassau, Orange, Pasco, Pinellas, Putnam, St. Johns, Seminole, Sumter, Suwannee, Taylor, Union, and Volusia.

The final effect determination will be based on project location and description, the potential effects to wood storks, and any measures (for example project components, special permit conditions) that avoid or minimize direct, indirect, and/or cumulative

impacts to wood storks and/or suitable wood stork foraging habitat. Projects that key to a "no effect" determination do not require additional consultation or coordination with the JAFL. Projects that key to "NLAA" also do not need further consultation; however, the JAFL staff will assist the Corps if requested, to answer questions regarding the appropriateness of mitigation options. Projects that key to a "may affect" determination equate to "likely to adversely affect" situations, and those projects should not be processed under the SPGP or any other programmatic general permit. For all "may affect" determinations, Corps Project Managers should request the JAFL to initiate formal consultation on the Wood stork.

Summary of General Wood Stork Nesting and Foraging Habitat Information

The wood stork is primarily associated with freshwater and estuarine habitats that are used for nesting, roosting, and foraging. Wood storks typically nest colonially in medium to tall trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Ogden 1991; Rodgers et al. 1996). Successful breeding sites are those that have limited human disturbance and low exposure to land based predators. Nesting sites protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle. These colonies have water depths between 0.9 and 1.5 meters (3 and 5 feet) during the breeding season.

In addition to limited human disturbance and land-based predation, successful nesting depends on the availability of suitable foraging habitat. Such habitat generally results from a combination of average or above-average rainfall during the summer rainy season, and an absence of unusually rainy or cold weather during the winter-spring breeding season (Kahl 1964; Rodgers et al. 1987). This pattern produces widespread and prolonged flooding of summer marshes that tends to maximize production of freshwater fishes, followed by steady drying that concentrate fish during the season when storks nest (Kahl 1964). Successful nesting colonies are those that have a large number of foraging sites. To maintain a wide range of foraging opportunities, a variety of wetland habitats exhibiting short and long hydroperiods should be present. In terms of wood stork foraging, the Service (1999) describes a short hydroperiod as one where a wetland fluctuates between wet and dry in 1 to 5-month cycles, and a long hydroperiod where the wet period is greater than five consecutive months. Wood storks during the wet season generally feed in the shallow water of short-hydroperiod wetlands and in coastal habitats during low tide. During the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry down (though usually retaining some surface water throughout the dry season).

Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly concentrated prey. Typical foraging sites for the wood stork include freshwater marshes, depressions in cypress heads, swamp sloughs, managed impoundments, stock ponds, shallow-seasonally flooded roadside or agricultural ditches, and narrow tidal creeks or shallow tidal pools. Good foraging conditions are characterized by water that is relatively calm, open, and having water depths between 5 and 15 inches (5 and 38 cm). Preferred foraging habitat includes wetlands exhibiting a mosaic of submerged and/or emergent aquatic vegetation, and shallow, open-water areas subject to hydrologic

regimes ranging from dry to wet. The vegetative component provides nursery habitat for small fish, frogs, and other aquatic prey, and the shallow, open-water areas provide sites for concentration of the prey during daily or seasonal low water periods.

WOOD STORK KEY

Although designed primarily for use by Corps Project Managers in the Regulatory and Planning Divisions, and State Regulatory agencies or their designees, project permit applicants and co-sponsors of civil works projects may find this key and its supporting documents useful in identifying potential project impacts to wood storks, and planning how best to avoid, minimize, or compensate for any identified adverse effects.

A. Project within 2,500 feet of an active colony site[1].....*May affect*

Project more than 2,500 feet from a colony site.....go to B

B. Project does not affect suitable foraging habitat[2] (SFH).....*no effect*

Project impacts SFH[2].....go to C

C. Project impacts to SFH are less than or equal to 0.5 acre[3].....*NLAA*[4]

Project impacts to SFH are greater than or equal to 0.5 acre.....go to D

D. Project impacts to SFH not within a Core Foraging Area[5] (see attached map) of a colony site, and no wood storks have been documented foraging on site.....NLAA[4]

Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA .....go to E

E. Project provides SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the CFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (see *Wood Stork Foraging Habitat Assessment Procedure*[6] for guidance), is not contrary to the Service's *Habitat Management Guidelines For The Wood Stork In The Southeast Region* and in accordance with the CWA section 404(b)(1) guidelines.....*NLAA*[4]

Project does not satisfy these elements.....*May affect*

[1] An active nesting site is defined as a site currently supporting breeding pairs of wood storks, or has supported breeding wood storks at least once during the preceding 10-year period.

[2] Suitable foraging habitat (SFH) is described as any area containing patches of relatively open (< 25% aquatic vegetation), calm water, and having a permanent or seasonal water depth between 2 and 15 inches (5 to 38 cm). SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to, freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs. See above *Summary of General Wood Stork Nesting and Foraging Habitat Information.*

[3] On an individual basis, projects that impact less than 0.5 acre of SFH generally will not have a measurable effect on wood storks, although we request the Corps to require mitigation for these losses when appropriate. Wood Storks are a wide ranging species, and individually, habitat change from impacts to less than 0.5 acre of SFH is not likely to adversely affect wood storks. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

[4] Upon Corps receipt of a general concurrence issued by the JAFL through the Programmatic Concurrence on this key, "NLAA" determinations for projects made pursuant to this key require no further consultation with the JAFL.

[5] The U.S. Fish and Wildlife Service (Service) has identified core foraging area (CFA) around all known wood stork nesting colonies that is important for reproductive success. In Central Florida, CFAs include suitable foraging habitat (SFH) within a 15-mile radius of the nest colony; CFAs in North Florida include SFH within a 13-mile radius of a colony. The referenced map provides locations of known colonies and their CFAs throughout Florida documented as active within the last 10 years. The Service believes loss of suitable foraging wetlands within these CFAs may reduce foraging opportunities for the wood stork.

[6]This draft document, *Wood Stork Foraging Habitat Assessment Procedure*, by Passarella and Associates, Incorporated, may serve as further guidance in ascertaining wetland foraging value to wood storks and compensating for impacts to wood stork foraging habitat.

Monitoring and Reporting Effects

For the Service to monitor cumulative effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued that were determined "may affect, not likely to adversely affect." It is requested that information on date, Corps identification number, project acreage, project wetland acreage, and latitude and longitude in decimal degrees be sent to the Service quarterly.

Literature Cited

Kahl, M.P., Jr. 1964. Food ecology of the wood stork (*Mycteria americana*) in Florida. Ecological Monographs 34:97-117.

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U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Fish and Wildlife Service; Atlanta, Georgia. Available from: http://verobeach.fws.gov/Programs/Recovery/vbms5.html.

WOOD STORK FORAGING HABITAT ASSESSMENT PROCEDURE

DRAFT

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INTRODUCTION

This procedure provides a tool to assist the user in making a comparative assessment of the potential value of foraging habitat for the wood stork (*Mycteria americana*) on a land development site and on the proposed habitat compensation site, which are subject to a federal action (i.e., federal permit). This procedure should only be used after the appropriate regulatory agencies and permit applicant have agreed that foraging habitat compensation is an acceptable voluntary conservation measure for the wood stork.

The wood stork is listed as endangered and is protected under the Endangered Species Act of 1973. There is no critical habitat designated for the wood stork.

METHODOLOGY

This wood stork foraging habitat functional assessment procedure is based on information obtained from the U.S. Fish and Wildlife Service's (USFWS) Draft Habitat Management Guidelines for the Wood Stork (1990 and 2002), Florida's Fragile Wildlife (Wood 2001), Rare and Endangered Biota of Florida (Rodgers *et al.* 1996), and local field knowledge.

The functional assessment is a rating index organized similar to the format utilized in the Wetland Rapid Assessment Procedure (WRAP) developed by the South Florida Water Management District (1997). However, this assessment has been established using three variables that are indicative of the necessities and functions of foraging habitat required by the wood stork. This specific functional assessment analyzes each wetland on-site. All three variables have a maximum score of 3.0 for optimal foraging habitat (Appendix A). After each variable has been rated, the final sum is divided by nine for a mean average of all three variables. The resulting score is then multiplied by the acreage of the wetland polygon for either the development site or habitat compensation site to determine the functional units of foraging habitat provided by that wetland. The variable scores and foraging habitat functional score are summarized using a data sheet (Appendix B).

Prey Availability

The first variable is the availability of prey within the wetland assessment area. Optimal foraging depths occur in littoral areas that range from two inches to 15 inches in depth (Ogden 1990) with the water fluidity calm and without dense coverage of emergent aquatic vegetation (Rodgers *et al.* 1996). Also included in this rating index is an assessment of the wetland for small depressional pockets that will concentrate forage during a drying hydrologic regime (Ogden 1990). An optimal rating of preferred foraging habitat would score a 3.0 (Appendix A).

Hydrologic Regime

The second variable is the hydrologic regime required for wood stork foraging. Appropriate hydrological regimes for wood stork foraging for larger wetland systems or water bodies should provide indicators indicative of a longer hydroperiod for interior wetlands during the dry cycle of

the drying season along with still providing some standing water in the dry season (USFWS 2002). Also, smaller water bodies or wetlands that demonstrate shallower hydrological regimes are necessary in the initial stages of the wet season to maintain required foraging depths compared to larger and deeper hydrological areas (Ogden 1990). Furthermore, these wetlands and water bodies should have strong hydrological connections such as ditches, swales, sheetflow, etc. to provide a stable amount of hydrology for supporting the appropriate densities of fish as prey (Rodgers *et al.* 1996). These three hydrological ratings are necessary to determine appropriate staging levels for adequate supplies of foraging prey and foraging depths. A combination of all above mentioned ratings would be considered as optimal hydrological regimes to supporting foraging habitat (Appendix A).

Water Quality

The third variable assesses if the appropriate water quality is prevalent in the assessment wetland. It has been determined that the presence of chemicals such as fertilizers, pesticides, and herbicides can adversely impact prey species for the wood stork (Wood 2001). Also, elevated levels of organochlorine pesticides, PCBs, and mercury have been identified in small samples from wood storks (Rodgers *et al.* 1996). Therefore, an appropriate rating of the localized water quality is necessary to determine possible impacts to the wood stork. The rating index utilized is the same water quality, pre-treatment index utilized in WRAP (South Florida Water Management District 1997). This method evaluates the contributing areas to the wetland. This rating index is determined by the summation of the land use category with the pre-treatment category divided by two. The maximum score of each category is 3.0 (Appendix A).

SUMMARY AND DISCUSSION

This procedure provides a tool in making a comparative assessment between impacts to wood stork foraging habitat resulting from a land development project and the proposed foraging habitat compensation. The habitat variables of prey availability, hydrologic regime, and water quality all play a role in determining the ecological function that a wetland provides for wood stork foraging.

This functional assessment provides a rating index for foraging habitat and does not assess roosting or nesting habitat. Rogers (*et al.* 1996) establishes that nesting habitat for colonies is optimal on isolated islands or in woody vegetated areas surrounded by vast areas of open water. Wood (2001) explains three to five feet in water depths is adequate to deter predators such as raccoons and skunks. These water depths also provide areas for alligators, which also may deter land based predators (Wood 2001). Night time roosting within the project site will be dependent on the locality of the nearest nest colonies. Ogden (1990) explains nesting storks traveling long distances (more than 40 miles) may feed at a site and roost nearby and travel back to the colony the following day. If nesting or roosting occurs on the project site, then additional variables would need to be considered if this assessment procedure is to be used to assess nesting and roosting habitat. This procedure also does not assess human induced disturbances. Wood (2001) found that nesting wood storks have a somewhat higher tolerance to human disturbances than other wading birds. General observations of wood storks feeding on roadside swales and water management lakes also indicate their comfort zone for human disturbances while foraging.

REFERENCES

Ogden, J.C. 1990. Habitat Management Guidelines for the Wood Stork in the Southest Region. U.S. Fish and Wildlife Service. Pgs. 1-7.

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South Florida Water Management District. 1997. Wetland Rapid Assessment Procedure (WRAP) Technical Publication. Second Edition. Natural Resource Management Division Regulation Department. South Florida Water Management District.

Wood, D.A. 2001. Florida's Fragile Wildlife Conservation and Management. University of Florida. Gainesville, Florida. Pgs. 178-193.

U.S. Fish and Wildlife Service. 2002. Draft Habitat Management Guidelines for the Wood Storks in the South Florida Ecological Services Consultation Area. Vero Beach, Florida.

APPENDIX A

RATING INDICES FORAGING HABITAT VARIABLES

1. Prey Availability

Descriptions	Score
➢ Wetland or water body provides two to 15 inches of littoral depth for foraging purposes for the majority of the forging area ➢ Wetland or water body provides relative calm fluidity and without dense coverage of aquatic vegetation ➢ Wetland contains many small depressional pockets for forage to become concentrated	3.0
➢ Wetland or water body provides two to 15 inches of littoral depth for at least half of the foraging area ➢ Wetland or water body provides a calm fluidity motion with a few patches of dense aquatic vegetation ➢ Wetland contains scattered depressional pockets for forage to become concentrated	2.0
➢ Wetland or water body provides two to 15 inches of littoral depths for at least some of the foraging area ➢ Wetland or water body provides a calm fluidity motion with scattered patches of dense aquatic vegetation ➢ Wetland contains few depressional pockets for forage to become concentrated	1.0
➢ Wetland or water body does not provide littoral foraging areas with two to 15 inches in depth ➢ Wetland or water body does not provide a calm fluidity motion or has extreme coverage of dense aquatic vegetation	0.0

2. Hydrologic Regime

Descriptions	Score
➢ Wetland or water body provides indicators indicative of longer hydroperiods for interior wetlands during the drying cycle of the dry season ➢ Wetland or water body provides indicators indicative of a short hydroperiod during the wet season to provide littoral foraging of appropriate depths when larger wetlands and water bodies are too inundated ➢ Wetland or water body has a strong hydrological connection such as ditches, swales, sheetflow, etc. that provides more permanent hydrology to make available necessary fish densities for foraging	3.0

2. Hydrologic Regime (Continued)

Descriptions	Score
➢ Wetland or water body provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season ➢ Wetland or water body provides evidence of very few hydrological alterations during the wet season that will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated ➢ Wetland or water body has an adequate hydrological connection such as ditches, swales, sheetflow, etc. that provides more permanent hydrology to make available necessary fish densities	2.0
➢ Wetland or water body provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season. ➢ Wetland or water body provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated ➢ Wetland or water body has moderate hydrological connections such as ditches, swales, sheetflow, etc. that provides adequate hydrology to make available necessary fish densities	1.0
➢ Wetland or water body provides evidence of a severely altered hydroperiod for interior wetlands during the drying cycle that provide no available foraging habitat ➢ Wetland or water body provides evidence of a severely altered hydroperiod during the wet season that provide no littoral areas when other areas have extreme inundation ➢ Wetland or water body has no hydrological connection such as ditches, swales, sheetflow, etc. that could provide adequate hydrology for necessary fish densities	0.0

3. Water Quality

Land Use Category	Score
Open Space/Natural, Undeveloped Areas	3.0
Unimproved Pasture/Rangeland	2.5
Citrus Grove	2.0
Sugar Cane	2.0
Low Density Residential	2.0
Low Density Commercial	2.0
Low Density Highway	2.0
Institutional	2.0
Single-family Residential	1.5

3. **Water Quality (Continued)**

Land Use Category	Score
Recreational	1.5
Golf Course	1.5
Moderately Intense Commercial	1.5
High Volume Highway	1.0
Industrial	1.0
Mining	1.0
Multi-family Residential	1.0
Improved Pasture	1.0
Row Crop	1.0
High Intensity Commercial	0.5
Dairy or Feed Lot	0.0
Pretreatment Category	
Natural, Undeveloped Areas	3.0
Wet Detention with Swales	2.5
Wet Detention with Dry Detention	2.5
Combination Grass Swales with Dry Detention	2.0
Grass Swales Only	1.0
Dry Detention Only	1.0
No Treatment	0.0

APPENDIX B

WOOD STORK FORAGING HABITAT ASSESSMENT PROCEDURE DATA SHEET

Wood Stork Foraging Habitat Assessment Procedure

☑ Check One

☐ Existing Conditions ☐ Proposed Conditions

USACOE Appl. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site

FLUCFCS Code	Description	Wetland Acreage	Wetland Number

Prey Availability

Hydrologic Regime

Water Quality

Land Use Category (LU)

Land Use Category	(Score) X	(% of area)	=Sub Total
		(LU) Total	

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of area)	=Sub Total
		(PC) Total	

Score

Notes

Prey Availability

Hydrologic Regime

Water Quality

ATTACHMENT B

Wood Stork Effect Determination Keys for Proposed Transmission and Substation Facilities located within Wood Stork CFAs

PEF Levy Nuclear Plant Project
Brookridge-Brooksville West (BBW) Transmission Line Preferred ROW
Wood Stork Key

A	Project within 2,500 feet of an active colony site	**May effect**	
	Project more than 2,500 feet from a colony site	**go to B**	**X**
B	Project does not affect suitable foraging habitat (SFH)	**no effect**	**X**
	Project impacts SFH	**go to C**	
C	Project impacts to SFH are less than or equal to 0.5 acre	**not likely to adversely affect (NLAA)**	
	Project impacts to SFH are greater than or equal to 0.5 acre	**go to D**	
D	Project impacts to SFH not within a Core Foraging Area (CFA) of a colony site, and no wood storks have been documented foraging on site	**NLAA**	
	Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA	**go to E**	
E	Project involves SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the DFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration, or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (See *Wood Stork Foraging Habitat Assessment Procedure* for guidance), is not contrary to the Services' *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the CWA section 404(b) guidelines	**NLAA**	
	Project does not satisfy these elements	**May effect**	

PEF Levy Nuclear Plant
Citrus - Brookridge (CB) Transmission Line Preferred ROW
Wood Stork Key

A	Project within 2,500 feet of an active colony site	**May effect**	
	Project more than 2,500 feet from a colony site	**go to B**	**X**
B	Project does not affect suitable foraging habitat (SFH)	**no effect**	
	Project impacts SFH	**go to C**	**X**
C	Project impacts to SFH are less than or equal to 0.5 acre	**not likely to adversely affect (NLAA)**	**X**
	Project impacts to SFH are greater than or equal to 0.5 acre	**go to D**	
D	Project impacts to SFH not within a Core Foraging Area (CFA) of a colony site, and no wood storks have been documented foraging on site	**NLAA**	
	Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA	**go to E**	
E	Project involves SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the DFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration, or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (See *Wood Stork Foraging Habitat Assessment Procedure* for guidance), is not contrary to the Services' *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the CWA section 404(b) guidelines	**NLAA**	
	Project does not satisfy these elements	**May effect**	

PEF Levy Nuclear Plant Project
Kathleen Substation Expansion
Wood Stork Key

A	Project within 2,500 feet of an active colony site	**May effect**	
	Project more than 2,500 feet from a colony site	**go to B**	**X**
B	Project does not affect suitable foraging habitat (SFH)	**no effect**	**X**
	Project impacts SFH	**go to C**	
C	Project impacts to SFH are less than or equal to 0.5 acre	**not likely to adversely affect (NLAA)**	
	Project impacts to SFH are greater than or equal to 0.5 acre	**go to D**	
D	Project impacts to SFH not within a Core Foraging Area (CFA) of a colony site, and no wood storks have been documented foraging on site	**NLAA**	
	Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA	**go to E**	
E	Project involves SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the DFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration, or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (See *Wood Stork Foraging Habitat Assessment Procedure* for guidance), is not contrary to the Services' *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the CWA section 404(b) guidelines	**NLAA**	
	Project does not satisfy these elements	**May effect**	

PEF Levy Nuclear Plant Project
Polk-Hillsborough-Pinellas Transmission Line Preferred ROW
Wood Stork Key

A	Project within 2,500 feet of an active colony site	**May effect**	
	Project more than 2,500 feet from a colony site	**go to B**	**X**
B	Project does not affect suitable foraging habitat (SFH)	**no effect**	
	Project impacts SFH	**go to C**	**X**
C	Project impacts to SFH are less than or equal to 0.5 acre	**not likely to adversely affect (NLAA)**	
	Project impacts to SFH are greater than or equal to 0.5 acre	**go to D**	**X**
D	Project impacts to SFH not within a Core Foraging Area (CFA) of a colony site, and no wood storks have been documented foraging on site	**NLAA**	
	Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA	**go to E**	**X**
E	Project involves SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the DFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration, or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (See *Wood Stork Foraging Habitat Assessment Procedure* for guidance), is not contrary to the Services' *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the CWA section 404(b) guidelines	**NLAA**	**X**
	Project does not satisfy these elements	**May effect**	

PEF Levy Nuclear Plant Project
Levy - Central Florida South (LCFS) Transmission Line Preferred ROW
Wood Stork Key

A	Project within 2,500 feet of an active colony site	**May effect**	
	Project more than 2,500 feet from a colony site	**go to B**	**X**
B	Project does not affect suitable foraging habitat (SFH)	**no effect**	
	Project impacts SFH	**go to C**	**X**
C	Project impacts to SFH are less than or equal to 0.5 acre	**not likely to adversely affect (NLAA)**	
	Project impacts to SFH are greater than or equal to 0.5 acre	**go to D**	**X**
D	Project impacts to SFH not within a Core Foraging Area (CFA) of a colony site, and no wood storks have been documented foraging on site	**NLAA**	
	Project impacts to SFH are within the CFA of a colony site, or wood storks have been documented foraging on a project site outside the CFA	**go to E**	**X**
E	Project involves SFH compensation within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank preferably within the DFA, or consists of SFH compensation within the CFA consisting of enhancement, restoration, or creation in a project phased approach that provides an amount of habitat and foraging function equivalent to that of impacted SFH (See *Wood Stork Foraging Habitat Assessment Procedure* for guidance), is not contrary to the Services' *Habitat Management Guidelines for the Wood Stork in the Southeast Region*, and in accordance with the CWA section 404(b) guidelines	**NLAA**	**X**
	Project does not satisfy these elements	**May effect**	

ATTACHMENT C

PHP Wood Stork Foraging Habitat Assessment Datasheets

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/22/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
510	Streams and Waterways(Creeks)	0.63	CD, DF, 49, 93

Prey Availability	Hydrologic Regime	Water Quality
2	2	2.75

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	25	0.75
Unimproved Pasture/Rangeland	2.5	50	1.25
Low Density Residential	2.0	25	0.5
	(LU) Total		2.5

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	100	3.0
	(PC) Total		3.0

Score

0.69

Functional Units of Foraging Habitat

0.69*0.63= 0.43

Prey Availability

The creeks are fairly deep in the main channel and foraging areas would be limited to bank edges.

- Water body provides two to 15 inches of littoral depth for at least half the foraging area
- Water body provides a calm fluidity of motion with a few patches of dense aquatic vegetation
- Water body contains scattered depressional areas for forage to become concentrated.

Score = 1.5

Hydrologic Regime

The creeks are connected to other wetlands and waterbodies though tributaries, ditches, and sheetflow.

- Water body provides evidence of very few hydrological alterations during the drying cycle of the dry season.
- Water body provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Water body has moderate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

Creeks bisect cleared and maintained transmission ROWs that are surrounded by areas of undeveloped forest and low density residential areas

- Land Use Category = Unimproved Pasture/Rangeland, Undeveloped Natural Areas, and Low Density Residential= (0.5 *2.5)+(0.25 * 3.0) + (0.25* 2.0) = 2.5
- Pretreatment Category = Natural Undeveloped Areas= 3.0

Score = (2.5 +3.0)/2 = 2.75

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/22/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
511	Ditches	0.98	5,7, 11,25A/B, 29, 32-33,34,37,46,47A, 50,50A,55,59,63, 69, 75, 78, 79, 83, 97, 110A, 111, 121, 128, 131, H, Y, AQ, BB, BG,CS, DA, MM, Y

Prey Availability	Hydrologic Regime	Water Quality
2	2	2.13

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	17	0.51
Unimproved Pasture /Rangeland	2.5	50	1.25
Low Density Residential	2.0	17	0.34
Improved Pasture	1.0	16	0.16
		(LU) Total	2.26

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Grass Swales	1	50	0.50
		(PC) Total	2

Score

0.68

Functional Units of Foraging Habitat

0.68*0.98 = 0.67

Prey Availability

Ditches of varying depths and widths; many adjacent to freshwater marsh or wet prairie areas.

- Water bodies provide two to 15 inches of littoral depth for foraging purposes for at least half of the foraging area.
- Water bodies provide relative calm fluidity with a few patches of dense coverage of aquatic vegetation.
- Wetland contains scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

The ditches are connected to other surface waters and wetlands.

- Water body provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Water body provides evidence of very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Waterbody has adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

The ditches bisect or run approximately parallel to the existing ROW, which is primarily surrounded by unimproved pasture/rangeland, residential development, and undeveloped natural lands.

- Land Use Category = Unimproved Pasture/Rangeland, Low Density Residential, Improved Pasture, and Natural Undeveloped Area = (0.5 *2.5)+(0.17*2) +(0.17*3)+(0.16*1) = 2.26
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.5 * 3) + (0.5 *1.0) = 2

Score = (2.26 +2)/2 = 2.13

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/22/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
530 & 534	Reservoirs/Reservoirs <10 acres	0.88	AH,AW, BE,PP, RR, TT, YY, ZZ, CR, DK, DT, 90, 103, 113

Prey Availability	Hydrologic Regime	Water Quality
2.5	2	2.26

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	25	0.75
Unimproved Pasture	2.5	25	0.63
Improved Pasture	1	25	0.25
Residential	1.5	25	0.38
		(LU) Total	2.01

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	75	2.25
Grass Swales Only	1	25	0.25
		(PC) Total	2.5

Score
0.75

Functional Units of Foraging Habitat
0.75*0.88 = 0.66

Prey Availability

The reservoirs are located within the existing transmission line ROW and many are in areas of improved or unimproved pasture. Water depth limits accessibility for wood stork for foraging in the center of reservoirs during high stage periods.

- Water bodies provide two to 15 inches of littoral depth for foraging purposes for at least half of the foraging area.
- Water bodies provide relative calm fluidity without dense coverage of aquatic vegetation.
- Wetland contains scattered depressional pockets for forage to become concentrated

Score = 2.5

Hydrologic Regime

The reservoirs are isolated from other water bodies or wetlands except through sheetflow. Reservoirs have groundwater inflow.

- Water body provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Water body provides evidence of very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Water body adequate moderate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

These reservoirs are located within existing maintained transmission line ROW. Many of the areas are also used as pasture.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, Improved Pasture, Residential = (0.25 *3)+(0.25 * 2.5)+(0.25*1.0)+(0.25 *1.5) = 2.01
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.01 +2.5)/2 = 2.26

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**4/26/11**	**C. Cunningham**	**Project**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
618 & 631	**Willow & Elderberry and Wetland Shrub**	**8.39**	**42,54,57,58,71, 89, 91,95A,AM,AZ,BA,BC,BD,BI,BO, BS,BU,BV,BZ,CA,CC,CW,DB,DD, DH,DO,EE,EEA, LL, XX**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.26**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**25**	**0.75**
Unimproved Pasture	**2.5**	**25**	**0.63**
Improved Pasture	**1**	**25**	**0.25**
Residential	**1.5**	**25**	**0.38**
		(LU) Total	**2.01**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**75**	**2.25**
Grass Swales Only	**1**	**25**	**0.25**
		(PC) Total	**2.5**

Score
0.70

Functional Units of Foraging Habitat
0.70*8.39= 5.87

Prey Availability

Density of shrubs limits wood stork foraging in some areas.

- Wetland provides two to 15 inches of littoral depth for at least half of the foraging area
- Wetland provides a calm fluidity of motion with a few patches of dense aquatic vegetation
- Wetland contains scattered depressional pockets for forage to become concentrated.

Score = 2

Hydrologic Regime

The area of impact appears to connect to other wetlands through ditching and surface sheetflow.

- Wetland provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

The wetlands are within existing maintained transmission line ROW. Adjacent land uses inlcued improved and unimproved pasture, residential areas, and natural areas.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, Improved Pasture, Residential = (0.25 *3)+(0.25 * 2.5)+(0.25*1.0)+(0.25 *1.5) = 2.01
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.01 +2.5)/2 = 2.26

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/26/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
621	Cypress	0.17	A/B, B, K

Prey Availability	Hydrologic Regime	Water Quality
2.5	2.5	2.19

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	25	0.75
Industrial	1	50	0.50
Commercial	1.5	25	0.63
		(LU) Total	1.88

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	75	2.25
Grass Swales Only	1	25	0.25
		(PC) Total	2.5

Score

0.80

Functional Units of Foraging Habitat

0.80*0.17= 0.14

Prey Availability

Cypress canopy and dense vegetation inhibits foraging somewhat; littoral depth optimum for foraging.

- Wetland provides two to 15 inches of littoral depth for foraging in the majority of the foraging area
- Wetland provides relative calm fluidity of motion and with pockets of dense coverage of aquatic vegetation
- Wetland contains many small depressional areas for forage to become concentrated.

Score = 2.5

Hydrologic Regime

The area of impact is connected to a larger wetland which appears to connect to other wetlands through ditching and surface sheetflow.

- Wetland provides evidence indicative of longer hydroperiods for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence indicative of a short hydroperiod during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are too inundated.
- Wetland has strong hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2.5

Water Quality

Wetlands are adjacent to existing substations, commercial development, and natural areas.

- Land Use Category = Industrial, Commercial, and Natural Undeveloped Area = (0.5 *1)+(0.25 * 1.5) +(0.25*3.0)= 1.63
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (1.88 +2.5)/2 = 2.19

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/26/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
630	Wetland Forested Mixed	0.20	A/B, AQ, E

Prey Availability	Hydrologic Regime	Water Quality
2	2	2.35

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Industrial	1	25	0.25
Golf Course	1.5	8	0.12
Unimproved Pasture	2.5		0.2
Residential	1.5	8	0.12
		(LU) Total	2.19

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	75	2.25
Grass Swales Only	1	25	0.25
		(PC) Total	2.5

Score

0.71

Functional Units of Foraging Habitat

0.71*0.20 = 0.14

Prey Availability

Density of canopy cover limits wood stork foraging in some areas.

- Wetland provides two to 15 inches of littoral depth for at least half of the foraging area
- Wetland provides a calm fluidity of motion with a few patches of dense aquatic vegetation
- Wetland contains scattered depressional pockets for forage to become concentrated.

Score = 2

Hydrologic Regime

The area of impact appears to connect to other wetlands through ditching and surface sheetflow.

- Wetland provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

These wetlands are in an existing transmission line ROW and are adjacent to existing substations, natural areas, residential areas, and a golf course.

- Land Use Category = Natural Undeveloped Area, Industrial, golf course, unimproved pastures, and residential areas = (0.5 *3)+(0.25 * 1.0)+(0.08*1.5)+(0.08*2.5)+(0.08*2) = 2.19
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.19 +2.5)/2 = 2.35

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**4/27/11**	**C. Cunningham**	**Project**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Freshwater Marsh**	**19.76**	2, 3, 4, 6, 10, 14, 15, 16,18, 20 A/B, 20A, 21A/B, 21B, 22A/B, 23A/B, 30A/B, 30A, 30B, 32-33, 35, 37, 40, 45, 56, 60, 61, 71, 81, 92, 94, 95, 96, A, B, A/N, AL, AM, B, BQ, C, CE, CF, CH, CI, CK/CL, CM, CP, CV, D, DC, DG, DW, EH, F, FF, J, KK, N, OO, QQ, U, VV, W, X, XCO, EE, NN, V, WW

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.57**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**50**	**1.5**
Unimproved Pasture	**2.5**	**25**	**0.63**
Residential	**2**	**25**	**0.5**
		(LU) Total	**2.63**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**75**	**2.25**
Grass Swales Only	**1**	**25**	**0.25**
		(PC) Total	**2.5**

Score
0.73

Functional Units of Foraging Habitat
0.73*19.76 = 14.42

Prey Availability

Flow within some wetland areas is less than optimal for foraging and in some areas vegetation may be too dense for foraging.

- Wetlands provide two to 15 inches of littoral depth for at least half of the foraging area,
- Wetlands provide a calm fluidity of motion with a few patches of dense aquatic vegetation
- Wetland contains scattered depressional pockets for forage to become concentrated.

Score = 2

Hydrologic Regime

The areas of impact are connected to larger wetlands which appear to connect to other wetlands through ditching and surface sheetflow.

- Wetlands provide evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Wetlands provide evidence of very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetlands have adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

The wetlands are within existing transmission line ROW. Adjacent landuses are primarily natural undeveloped land, pasture, and residential.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, and Residential= (0.50 *3)+(0.25 * 2.5)(0.25*2) = 2.63
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.63 +2.5)/2 = 2.57

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	4/27/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643	Wet Prairie	1.21	A/B, CB,CC, CCa, CG, DW, 66, 77, 112A, 123

Prey Availability	Hydrologic Regime	Water Quality
1	1	2.63

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Unimproved Pasture	2.5	25	0.63
Residential	2	25	0.5	
		(LU) Total	2.63

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	75	2.25
Grass Swales Only	1	25	0.25
		(PC) Total	2.5

Score

0.51

Functional Units of Foraging Habitat

0.51*1.21= 0.62

Prey Availability

Vegetation density and flow are not optimal for foraging throughout the wetlands

- Wetland provides two to 15 inches of littoral depths in a portion of the foraging area
- Wetland provides a calm fluidity of motion with a few scattered dense areas of aquatic vegetation
- Wetland contains few scattered depressional areas for forage to become concentrated.

Score = 1

Hydrologic Regime

The areas of impact appear to connect to other wetlands through ditching and surface sheetflow.

- Wetland provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has moderate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 1

Water Quality

The wetlands are within existing transmission line ROW. Adjacent landuses are primarily natural undeveloped land, pasture, and residential.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, and Residential= (0.50 *3)+(0.25 * 2.5)(0.25*2) = 2.63
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.63 +2.5)/2 = 2.57

ATTACHMENT D

LCFS Wood Stork Foraging Habitat Assessment Datasheets

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	**5/2/11**	**C. Cunningham**	**Project**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
511	**Ditches**	**0.12**	**54, 58, Y**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.4**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**25**	**0.75**
Unimproved Pasture	**2.5**	**50**	**1.25**
High Volume Highway	**1.0**	**25**	**0.25**
		(LU) Total	**2.25**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**75**	**2.25**
Grass Swales	**1**	**25**	**0.25**
		(PC) Total	**2.50**

Score

0.71

Functional Units of Foraging Habitat

0.71*0.12= 0.09

Prey Availability

Ditches of varying depths and widths; adjacent to freshwater marsh areas; areas of limited littoral depth.

- Water bodies provide two to 15 inches of littoral depth for foraging purposes for at least half of the foraging area.
- Water bodies provide relative calm fluidity and without dense coverage of aquatic vegetation.
- Wetland contains scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

The ditches are connected to other surface waters and wetlands.

- Water bodies provides evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Water bodies provides evidence of very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Waterbodies has adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2

Water Quality

The ditches bisect or run approximately parallel to the existing ROW, which is surrounded by pasturelands, low density residential development, some undeveloped natural lands.

- Land Use Category = Unimproved Pasture, Natural Undeveloped Area, and High Volume Highway= (0.5 *2.5)+(0.25*3) +(0.25*1) = 2.25
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.75 * 3) + (0.25 *1.0) = 2.5

Score = (2.25 +2.5)/2 = 2.4

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	5/2/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
625	Hydric Pine Flatwoods	0.04	Y

Prey Availability	Hydrologic Regime	Water Quality
0.5	1.5	2.07

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Improved Pasture	1.0	25	0.25
Residential	1.5	25	0.38
		(LU) Total	2.13

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	0.5	1.5
Grass Swales	1.0	0.5	0.5
		(PC) Total	2.0

Score

0.45

Functional Units of Foraging Habitat

0.45*0.04 = 0.02

Prey Availability

Density of canopy cover in hydric pine flatwoods limits wood stork foraging in some areas; limited hydroperiod reduces prey biomass.

- Wetland provides limited littoral foraging areas with two to 15 inches of depth for short periods
- Wetland provides a calm fluidity of motion with a few patches of dense aquatic vegetation
- Wetland contains few depressional pockets for forage to become concentrated.

Score = 0.5

Hydrologic Regime

The area of impact appears to connect to other wetlands through ditching and surface sheetflow; infrequently inundated.

- Wetland provides evidence of moderately altered hydroperiod for interior wetlands during the wet and dry seasons; limited provision of foraging opportunities.
- Wetland has inadequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 1.5

Water Quality

These wetlands are in an existing transmission line ROW and are adjacent to existing substations, natural areas, residential areas, and a golf course.

- Land Use Category = Natural Undeveloped Area, Improved pastures, and Residential areas = (0.5 *3)+(0.25 * 1.0)+(0.25*2) = 2.51
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.5 * 3) + (0.5 *1.0) = 2.0

Score = (2.13 +2.0)/2 = 2.07

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	5/2/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	Freshwater Marsh	2.68	51, 54, 55, 58, I, K

Prey Availability	Hydrologic Regime	Water Quality
2	2.5	2.25

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	25	0.75
Unimproved Pasture	2.5	50	1.25
Roadways	1.0	25	0.5
		(LU) Total	2.5

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Grass Swales Only	1	50	0.50
		(PC) Total	2.0

Score

0.75

Functional Units of Foraging Habitat

0.75*2.68 = 2.01

Prey Availability

Water depth within some wetland areas is greater than optimal for foraging.

- Wetlands provide two to 15 inches of littoral depth for at least half of the foraging area,
- Wetlands provide a calm fluidity of motion with a few patches of dense aquatic vegetation
- Wetland contains scattered depressional pockets for forage to become concentrated.

Score = 2

Hydrologic Regime

The areas of impact are connected to larger wetlands which appear to connect to other wetlands through ditching and surface sheetflow.

- Wetlands provide evidence of very few hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Wetlands provide evidence of very few hydrological alterations during the wet season that will provide littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetlands have adequate hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 2.5

Water Quality

The wetlands are within existing transmission line ROW. Adjacent landuses are primarily natural undeveloped land, pasture, and residential.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, and Roadways= (0.25 *3)+(0.25 * 2.5)(0.25*1.0) = 2.5
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.5 * 3) + (0.5 *1.0) = 2.0

Score = (2.5 +2.0)/2 = 2.25

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	5/2/11	C. Cunningham	Project

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643	Wet Prairie	0.62	54, W, X

Prey Availability	Hydrologic Regime	Water Quality
1	1.5	2.25

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	25	0.75
Unimproved Pasture	2.5	50	1.25
Residential	2	25	0.5
		(LU) Total	2.5

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	50	1.5
Grass Swales Only	1	50	0.5
		(PC) Total	2.0

Score
0.53

Functional Units of Foraging Habitat
0.53*0.62= 0.33

Prey Availability

Water depth and ephemeral hydroperiod is less than optimal for foraging throughout the wetlands

- Wetland provides two to 15 inches of littoral depths in a portion of the foraging area
- Wetland provides a calm fluidity of motion with a few scattered dense areas of aquatic vegetation
- Wetland contains few depressional areas for forage to become concentrated.

Score = 1

Hydrologic Regime

The areas of impact appear to connect to other wetlands through ditching and surface sheetflow; limited hydroperiod

- Wetland provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has no hydrological connections such as ditches, swales, sheetflow, etc. of sufficient duration to provide permanent hydrology to make available necessary fish densities.

Score = 1.5

Water Quality

The wetlands are within existing transmission line ROW. Adjacent landuses are primarily natural undeveloped land, pasture, and residential.

- Land Use Category = Natural Undeveloped Area, Unimproved Pasture, and Residential= (0.25 *3)+(0.5 * 2.5)(0.25*2) = 2.5
- Pretreatment Category = Natural Undeveloped Area and Grass Swales = (0.5* 3) + (0.5 *1.0) = 2.0

Score = (2.5 +2.0)/2 = 2.25

ATTACHMENT E

Mitigation Sites Wood Stork Foraging Habitat Assessment Datasheets

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Boarshead Ranch Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Littoral Shelf Freshwater Marsh Creation**	**7.8**	**Activity Area 1 – Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
1	**1.5**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score

0.51

Functional Units of Foraging Habitat

0.51*7.8 = 3.98

Prey Availability

Lake and ditch dominated by exotic vegetation, inappropriate depths for foraging.

- Lake/ditch provides two to 15 inches of littoral depth for small portion of area
- Lake/ditch dominated by dense exotic vegetation
- Lake/ditch contains few depressional pockets for forage to become concentrated

Score = 1

Hydrologic Regime

Lake and ditch inundated at depth > 15 inches for majority of area, no significant seasonal drydown.

- Lake/ditch does not provide interior wetland foraging habitat during drying cycle
- Lake/ditch does not provide significant areas of littoral foraging at appropriate depth during wet season
- Wetland has an adequate hydrological connection that provides more permanent hydrology to make available necessary fish densities

Score = 1.5

Water Quality

Area is surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40

Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Boarshead Ranch Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Littoral Shelf Freshwater Marsh Creation**	**7.8**	**Activity Area 1 – Post-Mitigation**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score

0.67

Functional Units of Foraging Habitat

0.67*7.8= 5.23

Functional Units of Foraging Habitat Generated (Proposed-Existing): 5.23 - 3.98 = 1.25

Prey Availability

Open freshwater herbaceous wetlands with both long and short hydroperiod areas.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for the majority of the foraging area
- Wetlands provide a calm fluidity motion with patches of dense aquatic vegetation
- Wetlands contain scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

Herbaceous wetlands will be graded to allow for continued presence of water during the dry season. Connection to lake will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide very few hydrological alterations during the wet season that will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has an adequate hydrological connection that provides more permanent hydrology to make available necessary fish densities

Score = 2

Water Quality

Area will continue to be surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40
- Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Boarshead Ranch Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643	**Wet Prairie Creation**	**8.47**	**Activity Area 2 – Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
0	**0**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score

0.23

Functional Units of Foraging Habitat

0.23*8.47= 1.95

Prey Availability

Upland pine plantation and improved pasture land that is not currently foraging habitat.

- Upland does not provide foraging areas with two to 15 inches depth.

Score = 0

Hydrologic Regime

Upland pine plantation and improved pasture land that is not currently foraging habitat and has limited inundation (major storm events).

- Uplands with no regular hydroperiod.

Score = 0

Water Quality

Area is surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40

Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	8/11/11	M. Harrington	Mitigation (Boarshead Ranch Site)

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643	Wet Prairie Creation	8.47	Activity Area 2 – Post Mitigation

Prey Availability	Hydrologic Regime	Water Quality
1	1	2.1

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	40	1.20
Improved Pasture	1	60	0.60
		(LU) Total	1.80

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	40	1.20
Grass Swales & Dry Retention	2	60	1.20
		(PC) Total	2.40

Score: **0.46**

Functional Units of Foraging Habitat: **0.46*8.47= 3.89**

Functional Units of Foraging Habitat Generated (Proposed-Existing): 3.89 - 1.95 = 1.94

Prey Availability

Wet prairie wetlands with short hydroperiod areas.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for at least some of the foraging area
- Wetlands provide a calm fluidity motion with scattered patches of dense aquatic vegetation
- Wetlands contain few depressional pockets for forage to become concentrated

Score = 1

Hydrologic Regime

Wet prairies will be graded to allow for some areas of standing water during the dry season. Connection to adjacent cypress wetlands will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide some littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has moderate hydrological connection that provides potential hydrology to make available necessary fish densities

Score = 1

Water Quality

Area will continue to be surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40
- Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	8/11/11	M. Harrington	Mitigation (Boarshead Ranch Site)

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643/641	Herbaceous Wetland Creation & Restoration	106.76	Activity Area 3 – Existing Condition

Prey Availability	Hydrologic Regime	Water Quality
0	0	2.1

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	40	1.20
Improved Pasture	1	60	0.60
		(LU) Total	1.80

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	3	40	1.20
Grass Swales & Dry Retention	2	60	1.20
		(PC) Total	2.40

Score

0.23

Functional Units of Foraging Habitat

0.23*106.76= 24.55

Prey Availability

Upland pine plantation and improved pasture land that is not currently foraging habitat.

- Upland does not provide foraging areas with two to 15 inches depth.

Score = 0

Hydrologic Regime

Upland pine plantation and improved pasture land that is not currently foraging habitat and has limited inundation (major storm events).

- Uplands with no regular hydroperiod.

Score = 0

Water Quality

Area is surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40

Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Boarshead Ranch Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
643/641	**Herbaceous Wetland Creation & Restoration**	**106.76**	**Activity Area 3 – Post Mitigation**

Prey Availability	Hydrologic Regime	Water Quality
1.5	**1.5**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score

0.57

Functional Units of Foraging Habitat

0.57*106.76= 60.85

Functional Units of Foraging Habitat Generated (Proposed-Existing): 60.85 - 24.55 = 36.30

Prey Availability

Large, open freshwater herbaceous wetlands with both longer and shorter hydroperiod areas.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for at least some of the foraging area
- Wetlands provide a calm fluidity motion with a few patches of dense aquatic vegetation
- Wetlands contain few depressional pockets for forage to become concentrated

Score = 1.5

Hydrologic Regime

Herbaceous wetlands will be graded to allow for continued presence of water during the dry season. Connection to lake and adjacent forested wetlands will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide some littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has adequate hydrological connection that provides areas of more permanent hydrology to make available necessary fish densities

Score = 1.5

Water Quality

Area will continue to be surrounded by both improved pasture and mixed forested wetlands.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40
- Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Brooker Creek Preserve)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Herbaceous Wetland Enhancement**	**33.0**	**Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
1.5	**1**	**3.0**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**100**	**3.0**
		(LU) Total	**3.0**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**100**	**3.0**
		(PC) Total	**3.0**

Score

0.67

Functional Units of Foraging Habitat

0.67*33.0= 22.11

Prey Availability

Herbaceous wetlands currently overgrown with nuisance/exotic species that limit access for foraging.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for at least some of the foraging area
- Wetlands dominated by dense vegetation and exotic species
- Wetlands contain few depressional pockets for forage to become concentrated

Score = 1.5

Hydrologic Regime

These areas have restricted connections to other wetlands due to historic alterations.

- Wetland provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has limited hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 1.5

Water Quality

The wetlands are within existing transmission line ROW. Adjacent land use is primarily natural undeveloped land.

- Land Use Category = Natural Undeveloped Area = (1.00 *3) = 3.0
- Pretreatment Category = Natural Undeveloped Area = (1.00 * 3) = 3.0

Score = (3.0 + 3.0)/2 = 3.0

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Brooker Creek Preserve)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Herbaceous Wetland Enhancement**	**33.0**	**Post-Mitigation**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**3.0**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**100**	**3.0**
		(LU) Total	**3.0**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**100**	**3.0**
		(PC) Total	**3.0**

Score

0.78

Functional Units of Foraging Habitat

0.78*33.0= 25.74

Functional Units of Foraging Habitat Generated (Proposed-Existing): 25.74 - 22.11 = 3.63

Prey Availability

Treatment, plantings and restored low water crossings will result in open freshwater herbaceous wetlands with improved hydroperiods.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for the majority of the foraging area
- Wetlands provide a calm fluidity motion with patches of dense aquatic vegetation
- Wetlands contain scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

Restored hydrologic connections will allow for continued presence of water during the dry season. Connection to adjacent forested wetlands will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide very few hydrological alterations during the wet season that will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has an adequate hydrological connection that provides more permanent hydrology to make available necessary fish densities

Score = 2

Water Quality

The wetlands will continue to be within existing transmission line ROW. Adjacent land use will remain natural undeveloped land.

- Land Use Category = Natural Undeveloped Area = (1.00 *3) = 3.0
- Pretreatment Category = Natural Undeveloped Area = (1.00 * 3) = 3.0
- Score = (3.0 + 3.0)/2 = 3.0

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Five Mile Creek Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Freshwater Marsh Restoration and Enhancement**	**14.44**	**FMC Site – Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
1	**1.5**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score
0.51

Functional Units of Foraging Habitat
0.51*14.44= 7.36

Prey Availability

Currently overgrown with nuisance/exotic species that limit access for foraging, inadequate hydrology to support prey densities.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for at least some of the foraging area
- Wetlands dominated by dense vegetation and exotic species
- Wetlands contain few depressional pockets for forage to become concentrated

Score = 1

Hydrologic Regime

Current hydrologic regime altered due to historic borrow pits and spoil disposal

- Wetland provides evidence of a moderately altered hydroperiod for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of a moderately altered hydroperiod during the wet season that will provide some littoral foraging at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has limited hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 1.5

Water Quality

Area is surrounded by improved pasture, spoil disposal, and borrow pits.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40

Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Five Mile Creek Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Freshwater Marsh Restoration and Enhancement**	**14.44**	**FMC Site – Post-Mitigation**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score
0.68

Functional Units of Foraging Habitat
0.68*14.44= 9.82

Functional Units of Foraging Habitat Generated (Proposed-Existing): 9.82 – 7.36 = 2.46

Prey Availability

Open freshwater herbaceous wetlands with connection to deepwater systems and native vegetative community.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for at least half of the foraging area
- Wetlands provide a calm fluidity motion with few patches of dense aquatic vegetation
- Wetlands contain scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

Herbaceous wetlands will be graded to allow for continued presence of water during the dry season. Connection to adjacent deepwater systems will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has adequate hydrological connection that provides areas of more permanent hydrology to make available necessary fish densities

Score = 2

Water Quality

Area is surrounded by improved pasture, spoil disposal, and borrow pits.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40
- Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:
☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Five Mile Creek Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Littoral Shelf Freshwater Marsh Creation**	**1.37**	**FMC Site – Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
1	**1.5**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score
0.51

Functional Units of Foraging Habitat
0.51*1.37 = 0.70

Prey Availability

Inlet area currently exhibits inappropriate depths for foraging.

- Inlet provides two to 15 inches of littoral depth for small portion of area
- Inlet supports scattered patches of dense exotic vegetation
- Inlet contains few depressional pockets for forage to become concentrated

Score = 1

Hydrologic Regime

Inlet area inundated at depth > 15 inches for majority of area, no significant seasonal drydown.

- Inlet does not provide interior wetland foraging habitat during drying cycle
- Inlet does not provide significant areas of littoral foraging at appropriate depth during wet season
- Inlet has an adequate hydrological connection that provides more permanent hydrology to make available necessary fish densities

Score = 1.5

Water Quality

Area is surrounded by improved pasture, spoil disposal, and borrow pits.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40

Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		PHP Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (Boarshead Ranch Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Littoral Shelf Freshwater Marsh Creation**	**1.37**	**FMC Site – Post-Mitigation**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.1**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Improved Pasture	**1**	**60**	**0.60**
		(LU) Total	**1.80**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**40**	**1.20**
Grass Swales & Dry Retention	**2**	**60**	**1.20**
		(PC) Total	**2.40**

Score

0.68

Functional Units of Foraging Habitat

0.68*1.37= 0.93

Functional Units of Foraging Habitat Generated (Proposed-Existing): 0.93 – 0.70 = 0.23

Prey Availability

Open freshwater herbaceous wetland with connection to deepwater systems and native vegetative community.

- Wetland provides two to 15 inches of littoral depth for foraging purposes for at least half of the foraging area
- Wetland provides a calm fluidity motion with few patches of dense aquatic vegetation
- Wetland contains scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime Hydrologic Regime

Littoral shelf will be graded to allow for continued presence of water during the dry season through connection with adjacent deepwater systems.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has adequate hydrological connection that provides areas of more permanent hydrology to make available necessary fish densities

Score = 2

Water Quality Water Quality

Area is surrounded by improved pasture, spoil disposal, and borrow pits.

- Land Use Category = Improved Pasture and Natural Undeveloped Area = (0.6 *1.0)+(0.4*3.0) = 1.80
- Pretreatment Category = Natural Undeveloped Area and Grass Swales/Dry Retention= (0.4 *3.0)+(0.6*2.0) = 2.40
- Score = (1.80 +2.40)/2 = 2.1

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☒ Existing Conditions ☐ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (LNP Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Herbaceous Wetland Restoration**	**313.9**	**Mitigation Activity Area 3 – Existing Condition**

Prey Availability	Hydrologic Regime	Water Quality
1	**1**	**2.6**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**50**	**1.50**
Dense Pine Plantation	**2.5**	**50**	**1.25**
		(LU) Total	**2.75**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area/Pine Plantation ditch/bed system	**2.5**	**100**	**2.5**
		(PC) Total	**2.5**

Score

0.51

Functional Units of Foraging Habitat

0.51*29.4= 14.99

Prey Availability

Dense wet pine plantation with very limited access and altered hydrology.

- Wetland provides very limited foraging areas with two to 15 inches depth.
- Wetland has dense coverage of slash pine and other vegetation.

Score = 1

Hydrologic Regime

Dense pine plantation has altered groundwater levels resulting in very limited inundation.

- Wetland provides evidence of moderate to severe hydrological alterations for interior wetlands during the drying cycle of the dry season.
- Wetland provides evidence of moderate to severely altered hydroperiods during the wet season such that very limited littoral foraging is possible at appropriate depths when larger wetlands and water bodies are inundated.
- Wetland has limited hydrological connections such as ditches, swales, sheetflow, etc. that provide more permanent hydrology to make available necessary fish densities.

Score = 1

Water Quality

Areas are surrounded by both dense pine plantation and mixed forested wetlands.

- Land Use Category = Dense Pine Plantation and Natural Undeveloped Area = (0.5 *2.5)+(0.5*3.0) = 2.75
- Pretreatment Category = Natural Undeveloped Area/Pine Plantation ditch/bed system = (1.00 * 2.5) = 2.5

Score = (2.75 + 2.5)/2 = 2.6

Wood Stork Foraging Habitat Assessment Procedure

Check one:

☐ Existing Conditions ☒ Proposed Conditions

USACOE Appt. No.	USFWS Log No.	Project Name	Date	Evaluator	Project/Mitigation Site
		LCFS Transmission Line	**8/11/11**	**M. Harrington**	**Mitigation (LNP Site)**

FLUCFCS Code	Description	Wetland Acreage	Wetland Number
641	**Herbaceous Wetland Restoration**	**313.9**	**Mitigation Activity Area 3 – Post-Restoration**

Prey Availability	Hydrologic Regime	Water Quality
2	**2**	**2.6**

Land Use Category (LU)

Land Use Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area	**3**	**50**	**1.50**
Dense Pine Plantation	**2.5**	**50**	**1.25**
	(LU) Total		**2.75**

Pretreatment Category (PC)

Pretreatment Category	(Score) X	(% of Area)	= Sub Total
Natural Undeveloped Area/Pine Plantation ditch/bed system	**2.5**	**100**	**2.5**
		(PC) Total	**2.5**

Score

0.73

Functional Units of Foraging Habitat

0.73*29.4= 21.46

Functional Units of Foraging Habitat Generated (Proposed-Existing): 21.46 – 14.99 = 6.47

Prey Availability

Large, open freshwater herbaceous wetlands with both long and short hydroperiod areas.

- Wetlands provide two to 15 inches of littoral depth for foraging purposes for the majority of the foraging area
- Wetlands provide a calm fluidity motion with patches of dense aquatic vegetation
- Wetlands contain scattered depressional pockets for forage to become concentrated

Score = 2

Hydrologic Regime

Herbaceous wetlands will be graded to allow for continued presence of water during the dry season. Connection to large forested wetlands will provide additional hydrologic buffer during dry seasons.

- Wetland will provide few hydrological alterations for interior wetlands during the drying cycle of the dry season
- Wetland will provide very few hydrological alterations during the wet season that will provide littoral foraging of appropriate depths when larger wetlands and water bodies are inundated
- Wetland has an adequate hydrological connection that provides more permanent hydrology to make available necessary fish densities

Score = 2

Water Quality

Areas will continue to be surrounded by both pine plantation and mixed forested wetlands.

- Land Use Category = Dense Pine Plantation and Natural Undeveloped Area = (0.5 *2.5)+(0.5*3.0) = 2.75
- Pretreatment Category = Natural Undeveloped Area/Pine Plantation ditch/bed system = (1.00 * 2.5) = 2.5
- Score = (2.75 + 2.5)/2 = 2.6