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Functional Evaluation of Wetlands for the Alternative Sites, Levy Nuclear Plant, Florida

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Prepared by

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Acronyms and Abbreviations

CFBC	Cross Florida Barge Canal
EPA	U.S. Environmental Protection Agency
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FGDL	Florida Geographic Data Library
FIRM	Flood Insurance Rate Map
FLUCCS	Florida Land Use and Cover Forms Classification System
FNAI	Florida Natural Areas Inventory
GIS	Geographical Information Systems
LEDPA	Least Environmentally Damaging Practicable Alternative
LNP	Levy Nuclear Plant
NRCS	National Resource Conservation Service
NWI	National Wetland Inventory
PEF	Progress Energy Florida
ROW	Right of Way
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SRWMD	Suwannee River Water Management District
SWFWMD	Southwest Florida Water Management District
TMEM	Technical Memorandum
UMAM	Uniform Mitigation Assessment Method
USACE	U.S. Army Corps of Engineers
WMD	Water Management District

1.0 Introduction

This technical memorandum (TMEM) provides an evaluation of wetland functions for the conceptual impact areas at sites considered in the Least Environmentally Damaging Practicable Alternative (LEDPA) analysis (CH2M HILL, 2010). These sites, designated as Putnam 3, Dixie 1, Highlands, and LNP, were considered as practicable alternative locations for the siting of a 2,200 megawatt (nominal) nuclear generating facility. This TMEM is intended to supplement the LEDPA analysis and provide additional detail and discussion of wetland functions for the preferred and non-preferred sites. Additional detailed wetland functional assessments for the preferred Levy Nuclear Plant (LNP) site are presented in the Wetland Mitigation Plan (Biological Research Associates, 2009) and are based on field investigations.

Wetland functions are the physical, chemical, and biological processes performed by wetlands that typically include food web support, stormwater detention, nutrient cycling, sediment trapping, and flood attenuation, among others. Disturbances to a wetland or an adjacent upland buffer can impair these functions. Functional assessments can be used both to describe wetland functions and to provide a measure of wetland quality, relative to optimal conditions.

The wetland functional evaluations are based on data collected as part of the LEDPA analysis and other publicly available records. The evaluation methodology is described in Section 2. Section 3 provides the results of the wetland functional evaluations and Section 4 provides a summary and discusses integrating the results with the LEDPA analysis.

2.0 Methodology

This wetland functional evaluation consists of a qualitative assessment of wetlands occurring within the conceptual impact areas at each site. The evaluation of key wetland functional attributes is based on a desktop review of publicly available data. No site visits were conducted as part of this evaluation.

Wetlands occurring within each site's corresponding transmission line right-of-way (ROW) were characterized separately from site wetlands, using a quantitative evaluation of land uses along the ROW. A functional evaluation of wetlands occurring within transmission line ROWs was not conducted because the length of the conceptual transmission line ROWs and the wide diversity of land uses and habitat types crossed do not lend themselves to a meaningful comparison of wetland functions between the alternative sites. Instead, land uses within the conceptual transmission line ROWs were evaluated relative to degrees of disturbance which could potentially affect wetlands within the associated corridors.

2.1 Review of Available Data

For the LEDPA analysis, a conceptual layout of the proposed plant facilities and associated utility corridors was prepared for each of the four alternative sites to evaluate and compare potential impacts with site resources. An overall site area boundary of 6,000 acres was established around the conceptual layout and served as the basis for comparison of baseline conditions. The conceptual layout was similar for all sites, but optimized as required to meet specific site conditions or constraints. A comprehensive description of the site configuration approach is included in the LEDPA analysis (CH2M HILL, 2010).

To supplement the information presented in the LEDPA analysis, the following information was reviewed relative to wetland functions for each of the alternative sites:

- Florida Land Use and Cover Forms Classification System (FLUCCS) polygons
- Current and historical aerial photographs
- Natural Resource Conservation Service (NRCS) hydric soils maps

Geographical information system (GIS) representations of these data were overlain on historical and current aerial photographs to evaluate changes in wetland coverage and function over time. Parameters that were ranked in the LEDPA analysis, such as threatened and endangered species or impaired water bodies, were not repeated in this functional evaluation.

2.1.1 FLUCCS Data

FLUCCS data (Level III) in the LEDPA analysis were obtained from the Florida water management districts (WMDs) for each of the sites, accessed through the Florida Geographic Data Library (2009). The WMDs are the Suwannee River Water Management District (SRWMD), the St. Johns River Water Management District (SJRWMD), the Southwest Florida Water Management District (SWFWMD), and the South Florida Water

Management District (SFWMD). WMD FLUCCS data were used rather than National Wetlands Inventory (NWI) data for the functional assessment because FLUCCS wetland polygon data (size and classification) are typically more specific to Florida habitats. FLUCCS maps from the LEDPA analysis are provided in Attachment A to this TMEM.

2.1.2 Current and Historical Aerial Photographs

Aerial photographs are a common tool for classifying wetlands and documenting land use changes associated with disturbance, such as clearing and ditching or conversion to silviculture. The landscape setting of a wetland, as discernable through aerial photo-interpretation, provides information about the functions the wetland is expected to provide. Photographic images of the alternative sites from the LEDPA analysis and from Google Earth software were reviewed. The LEDPA analysis presented 2009 color and 1949 (LNP), 1943 (Putnam 3), 1952 (Dixie 1), and 1953 (Highlands) black and white aerial photographs. The dates of aerial photographic images reviewed in Google Earth ranged from 1994 to 2010. Representative aerial photographs from the LEDPA analysis are provided as Attachment B to this TMEM.

2.1.3 NRCS Hydric Soils Maps

When considered with other factors, the ratio of hydric soils acreage to mapped wetland acreage can be used as a broad measure of disturbance to an ecosystem, because under natural undrained conditions, the area of hydric soils typically correlates well with the wetland area. A drained wetland may retain hydric soil characteristics for many years after it no longer exhibits wetland hydrology or wetland vegetation.

Areal coverage data of soils designated as hydric were obtained from the NRCS online County Soil Surveys, accessed through the Florida Geographic Data Library (2009). The ratio of hydric soils acreage to wetland acreage (calculated by FLUCCS) was determined for each site. Hydric soils maps for the alternative sites are provided in Attachment C to this TMEM.

2.2 Site Impacts Wetland Qualitative Evaluation

To compare the general wetland functional quality at each of the sites, a qualitative functional evaluation was conducted, largely based on the Uniform Mitigation Assessment Method (UMAM). The UMAM is used by the U.S. Army Corps of Engineers (USACE) and the State of Florida to assess wetland functions and quantify mitigation requirements. The UMAM was modified based on the source data, since field data were available only for the LNP site. The USACE and U.S. Environmental Protection Agency (EPA) determined that the use of FLUCCS data along with land use information, soil maps, and historical and current photography were acceptable as the basis of the functional evaluation (USACE, 2011). Data sheets for the functional evaluation are provided as Attachment D.

2.2.1 Wetland Location Categories

Wetlands occurring within conceptual impact areas for each site — specifically those included within the LEDPA document under the categories Onsite, Offsite, and Reservoir — were evaluated. All conceptual wetland impacts within these categories were designated as

"Site Impacts" and evaluated together. These wetlands occurred within, or within the vicinity of, the 6,000-acre site boundary used in the LEDPA analysis. These impacts included the conceptual plant layout, access roads, railroads, pipelines, and reservoirs.

2.2.2 Wetland Classification Categories

Using FLUCCS, wetlands at each site and corresponding utility corridors were aggregated into two categories for the purpose of the functional evaluation. All forested wetlands of FLUCCS categories 6100 through 6300 were aggregated into the "Forested Wetlands" group (Table 2-1). All herbaceous and scrub/shrub wetlands of FLUCCS category 6400 were aggregated into the "Herbaceous/Shrub Wetlands" group.

TABLE 2-1
Wetland Classification Categories

FLUCCS Level III	Description
Forested Wetlands	
6110	Bay Swamps
6130	Gum Swamps
6150	Stream and Lake Swamps (Bottomland)
6170	Mixed Wetland Hardwoods
6181	Cabbage Palms
6200	Wetland Coniferous Mixed
6210	Cypress
6240	Cypress-Pine-Cabbage Palm
6250	Hydric Pine Flatwoods
6300	Wetland Forested Mixed
Herbaceous/Shrub Wetlands	
6410	Freshwater Marshes
6430	Wet Prairies
6440	Emergent Aquatic Vegetation
6460	Mixed Scrub-Shrub Wetlands

2.2.3 Functional Evaluation

The following wetland functional attributes were evaluated for each of the alternative sites. As discussed previously, while these attributes are nominally similar to those evaluated under UMAM, the evaluation criteria were modified (particularly for the Water Environment category) commensurate with the level of source data available (that is, publicly available records and aerial photographs).

1. **Landscape Setting**
   - Quality and quantity of adjacent habitat support
   - Wildlife access
   - Downstream benefits provided to fish and wildlife
   - Adverse impacts to wildlife from land uses

- Dependency of downstream habitats on quantity and quality of discharge
- Protection of wetland functions provided by uplands

2. **Water and Soil Environment**
   - Degree of hydrologic modifications (Regional)
   - Degree of hydrologic modifications (Local)
   - Coverage of hydric soils relative to wetland polygons
3. **Vegetation Community**
   - Appropriate vegetation structure present
   - Degree of disturbance within vegetation
   - Likelihood of exotic species

Wetlands associated with the site impacts were evaluated by the modified UMAM based on their general vegetative classification (forested, herbaceous/shrub). Wetland polygons at each of the sites were evaluated as described in Section 2.1 and an overall score for each site classification (forested, herbaceous/shrub) was assigned for each functional attribute. Functional attributes within the three major categories were scored from zero (0) to ten (10), where 10 represents optimal wetland function and 0 represents no wetland function. The score for each major category was then presented as the average of the individual functional attribute scores. The total score of the three major categories was then divided by the total maximum score (30) to provide a functional assessment score between 0.00 (poorest) and 1.00 (optimal). The scores for each site wetland classification (forested, herbaceous/shrub) were combined by multiplying each score by the associated wetland acreage to produce a total wetland functional evaluation score for each site location category.

2.3 Transmission Line ROW Wetland Quantitative Characterization

Wetlands occurring within each site's conceptual transmission line ROWs occur across a range of landscapes from north to central Florida and from central to south Florida. The amount of disturbance associated with each conceptual transmission line ROW was assessed through two evaluations: 1) wetland acreages occurring within the conceptual transmission line ROWs were evaluated based on the degree of collocation of the conceptual transmission line ROW with existing utility corridors; and 2) overall transmission line ROW disturbances were quantified by evaluating the existing degree of disturbance associated with land uses occurring within the conceptual ROW. Collocated wetlands were considered disturbed and suffering some functional loss from the previous impacts of existing utility corridors.

FLUCCS acreages provided in the LEDPA analysis occurring within the conceptual transmission line ROWs were aggregated into four general categories of disturbance (high, moderate, low, and minimal) based on the range of land uses, where urbanized lands were considered highly disturbed and conservation lands were considered minimally disturbed. Generalized disturbance categories are shown in Table 2-2. Each category of disturbance was then given a disturbance value (high = 4, moderate = 3, low = 2, and minimal = 1). The disturbance value was multiplied by the total FLUCCS acreage relative percent contribution for each disturbance category for each conceptual transmission line ROW. The scores for

each category were then combined to produce a total disturbance score for each conceptual transmission line ROW.

As discussed in the LEDPA analysis, conceptual transmission line ROWs were often collocated with existing power line easements, other utility easements, or roadways to reduce environmental impact. The degree of collocation was used to further represent the level of disturbance associated with wetlands within an existing, maintained utility corridor. The relative percentage of wetland FLUCCS polygons collocated with existing utility corridors was calculated for each conceptual transmission line ROW.

TABLE 2-2
Transmission Line ROW FLUCCS Disturbance Categories

FLUCCS	General Description
High Disturbance	
1300 - 1700	Urban and Built Up: Residential – High Density, Commercial, Industrial
700	Barren Land: Disturbed Lands, Spoil areas, Fill areas
800	Transportation, Communication, Utilities: Roads, Utilities, Transmission lines
Moderate Disturbance	
1100 - 1290	Urban and Built Up: Residential – Low and Medium Density
2140 - 2500	Agriculture: Crops, Groves, Nurseries
4400 - 4410	Upland Forest: Tree Plantations
Low Disturbance	
1800 - 1920	Urban and Built Up: Recreational, Open Lands
2100 - 2130, 2510 - 2610	Agriculture: Pastures, Other Open Lands, Fallow Cropland
300	Rangeland: Dry Prairie, Shrub and Brushland, Mixed Rangeland
Minimal Disturbance	
4100 – 4340, 4430	Upland Forest: Natural and Regeneration Areas
500	Water: Streams, Rivers, Lakes, Reservoirs
600	Wetlands: Forested and Nonforested

3.0 Results

This section provides a description of wetland functions for each of the four sites, followed by a discussion of the qualitative functional evaluation.

3.1 Site Impacts Wetland Qualitative Evaluation

3.1.1 Wetland Functional Descriptions

Wetland impacts for conceptual site and transmission layouts were originally provided in the LEDPA document (CH2M HILL, 2010). A summary of impact acres by wetland category is presented in Table 3-1.

TABLE 3-1
Conceptual Wetland Impact Areas (acres)

Area	LNP	Dixie 1	Putnam 3	Highlands
Site Impacts				
Forested	217.7	26.6	495.7	4.4
Herb/Shrub	45.4	185.0	112.7	281.5
Total	**263.1**	**211.6**	**608.4**	**285.9**

Dixie 1

The regional setting for the Dixie 1 site is in Dixie County, near the Suwannee River in north-central Florida. Impacts to wetlands at the Dixie 1 site total 211.6 acres (26.6 acres forested, 185 acres herbaceous/shrub) (Table 3-1). These comprise the following FLUCCS categories: Mixed Wetland Hardwoods (6170), Cypress (6210), Wetland Forested Mixed (6300), Freshwater Marshes (6410), Wet Prairies (6430), and Mixed Scrub-Shrub Wetlands (6460).

Wetland types associated with this site are common in the regional landscape. The site is currently in silviculture production and in recent years had been clear cut except for a few forested wetlands, as seen in historical photographs. Current aerial photographs show evidence of silviculture production (rows and bedding) that extends into many of the wetlands. Silviculture activities are likely to have adversely impacted the community structure and diversity of both forested and herbaceous/shrub wetlands through direct clearing, planting, and soil disturbance. Some forested wetlands near the Suwannee River are connected to larger offsite forested parcels, providing a wildlife corridor.

While few ditches are apparent onsite, silviculture practices have likely altered the site's hydrologic patterns and water quality. Evidence of forest roads and skid trails within wetlands indicate the likelihood of wetland soil compaction and the disruption of sheet flow in the local flatwoods landscape. Some onsite forested wetlands connected to larger parcels along the Suwannee River (an Outstanding Florida Waterway) are expected to detain and

attenuate stormwater flows and provide water quality benefits to downstream waters through retention of sediments and other particulates.

The acreage of hydric soils closely approximated wetland FLUCCS mapping at the Dixie 1 site (12 percent and 11 percent, respectively) (CH2M HILL, 2010). There were more discrepancies between mapped hydric soil and wetland FLUCCS coverage for forested wetlands onsite, particularly within silvicultural areas. Hydric soil boundaries within nonforested wetlands were similar to the associated wetland polygons.

Putnam 3

The Putnam 3 site is in Putnam County, near the St. Johns River in north-central Florida. Site impacts to wetlands at the Putnam 3 site total 608.4 acres (495.7 acres forested, 112.7 acres herbaceous/shrub) (Table 3-1). These comprise the following FLUCCS categories: Bay Swamps (6110), Mixed Wetland Hardwoods (6170), Cypress (6210), Hydric Pine Flatwoods (6250), Wetland Forested Mixed (6300), Freshwater Marshes (6410), Wet Prairies (6430), and Mixed Scrub-Shrub Wetlands (6460).

Wetland types associated with this site are common in the regional landscape. The site is currently in silviculture production, and historical photographs show evidence of past clear cutting in some areas. Recent aerial photographs show planting rows and bedding extending into the wetlands. Onsite forested wetlands have maintained historical connections to larger offsite forested parcels and directly connect to forested wetlands associated with the St. Johns River. This connectivity benefits downstream surface waters and provides wildlife corridors that extend through the Putnam 3 site. Intact forested wetlands areas onsite are expected to be characterized by various vegetative strata that support diverse wildlife species. Onsite herbaceous wetlands are generally isolated and vulnerable to disturbances in adjacent land use.

Few hydrologic modifications are evident for onsite wetlands. However, evidence of forest roads and skid trails within wetlands suggests the potential for soil compaction and disruption in surface water flow supporting these systems. The undeveloped uplands provide a buffer for wetlands but are not ideal due to the forestry operations. Removal of native vegetative species and the bedding and monocultural plantings in uplands reduce the quality of habitats adjacent to wetlands.

The acreage of hydric soils was fairly similar to the wetland FLUCCS acreage at the Putnam 3 site (27 percent and 23 percent, respectively) (CH2M HILL, 2010). Differences between mapped hydric soils and wetland polygons were greater for forested wetlands onsite. Hydric soils boundaries generally extended beyond forested wetland polygons, particularly along linear forested parcels. Hydric soils and wetlands were more closely matched for the nonforested wetlands. Some nonforested wetlands were not associated with hydric soils, suggesting that these areas may have been excavated after the soils were mapped.

Highlands

The Highlands site is in Highlands County in south Florida, near the Kissimmee River and Lake Okeechobee. Site impacts to wetlands at the Highlands site total 285.9 acres (4.4 acres forested, 281.5 acres herbaceous/shrub) (Table 3-1). These comprise the following FLUCCS

categories: Mixed Wetland Hardwoods (6170), Freshwater Marshes (6410), Wet Prairies (6430), and Emergent Aquatic Vegetation (6440).

Wetland types associated with this site are common in the regional landscape. The site is currently in agricultural production (improved pasture) and portions of the site have been in agricultural production since approximately 1953. The most significant disturbance affecting wetland systems at the Highlands site is the extensive ditching that has occurred, both locally and regionally. The nearby Kissimmee River has been channelized and several contributing canals were excavated, one of which runs through the Highlands site from Lake Istokpoga. Extensive networks of surface water ditches traverse both the uplands and wetlands, and are designed to limit seasonal flooding of improved pastures used for livestock production. Livestock trails are observable in wetlands, and adverse impacts to wetland water quality and vegetative community structure are often associated with livestock grazing. Other than ditches, few surface water connections between onsite wetlands and offsite wetlands were observed, and wildlife corridors are not intact. There is a high likelihood of invasive exotic plant species because of the highly disturbed nature of the site, which reduces habitat value for native species, and because of the common regional practice of replacing native groundcover with exotic forage grasses.

Of the four alternative sites, Highands exhibits the largest discrepancy between hydric soils and wetland coverage, with 88 percent mapped as hydric soils and only 18 percent mapped as wetlands. The difference is likely a result of the degree of local and regional hydrologic modifications at the Highlands site, along with conversion of wetlands to improved pasture land uses.

LNP

The regional setting for the LNP site is in Levy County in north Florida, near the Gulf of Mexico. Site impacts to wetlands at the LNP site total 263.1 acres (217.7 acres forested, 45.4 acres herbaceous/shrub) (Table 3-1). These include the following FLUCCS categories: Stream and Lake Swamps (Bottomland) (6150), Cypress (6210), Wetland Forested Mixed (6300), Freshwater Marshes (6410), and Emergent Aquatic Vegetation (6440).

Wetland types identified are common in the regional landscape. Like the Dixie 1 and Putnam 3 sites, most of the LNP site is currently in silviculture production. Upland forests were shown to be nearly clear cut in historical photographs. Wetland disturbances from silviculture operations are expected to be similar to those of the Dixie 1 and Putnam 3 sites. Current aerial photographs show evidence of silviculture production (rows and bedding) extending into many of the wetlands. Silviculture activities have impacted the community structure and diversity of both forested and herbaceous/shrub wetlands through direct clearing and soil disturbance. Upland and wetland areas are less distinct than at the other north-central Florida sites. Disturbance in the upland buffer areas from silviculture likely results in poorer water quality of flows into the wetlands and poorer quality wildlife habitats.

Onsite wetlands are connected to offsite wetlands and surface waters in the northern portion of the site area along the border with the Goethe State Forest, and along the eastern and western property boundaries. Wildlife corridors are more intact in these areas. The southern portion of the site area is bordered by County Road 40 and the Cross Florida Barge Canal (CFBC), altering historical connections to the Withlacoochee River. The habitat quality

of all wetlands onsite is reduced by logging and fragmentation, as well as disturbance in adjacent uplands.

Some hydrologic modifications were observed for onsite wetlands at the LNP site. The dominant regional modification is the nearby CFBC located within the southern portion of the site area. The CFBC is considered to have lowered surficial groundwater levels in the southern portion of the LNP site. Other modifications include those associated with silviculture operations such as forest roads and skid trails within wetlands, which tend to compact wetland soils and interrupt overland sheet flow in the flatwoods landscape.

The acreage of hydric soils closely approximated wetland FLUCCS acreage at the LNP site. Wetland acreage slightly exceeded hydric soils acreage (32 percent and 31 percent, respectively) (CH2M HILL, 2010). Differences between mapped hydric soils and wetland polygons were more pronounced for forested wetlands onsite, particularly within silvicultural areas. Hydric soils boundaries within nonforested wetlands were similar to the associated wetland polygons.

Descriptions of the LNP site wetlands are provided in the *Levy Nuclear Plant Units 1 and 2 Florida Site Certification Application* (Progress Energy Florida [PEF], 2008). Functional assessments of LNP site wetlands using the conventional UMAM methodology are provided in the Wetland Mitigation Plan (BRA, 2009). However, to provide a consistent basis for comparison between the four practicable alternative sites, similar publicly available data sources were used.

3.1.2 Wetland Functional Evaluation Scores

Wetland functional evaluation scores (modified UMAM) for conceptual site impacts are presented in Tables 3-2 and 3-3. Wetland functional evaluation scores for conceptual transmission line corridor impacts are presented in Tables 3-4 and 3-5. Data sheets are included in Attachment D.

As discussed in subsection 2.2.3, the score for each major functional attribute in Table 3-2 represents the average of the scores for several functional metrics evaluated by site. Wetland classifications (forested, herbaceous/shrub) exhibited a range of scores (0.33 to 0.62) from low to moderate for functional attributes (Table 3-3). Within the classification of forested wetlands, the Dixie 1 and Putnam 3 site wetlands scored the highest (0.62) in the conceptual site impact category, in part because of their connectivity to intact downstream systems. Forested wetlands at the Highlands site scored the lowest (0.43), due to the degree of disturbance associated with these systems. Within the classification of herbaceous/shrub wetlands, the Dixie 1 site scored the highest (0.58), largely due to the observable absence of hydrologic modifications. Herbaceous/shrub wetlands at the Highlands site score the lowest (0.33) because of the extent of hydrologic modifications and impacts to the vegetation community at the site.

A total modified UMAM score for each site was calculated by summing the weighted scores of wetland classifications for each site. Wetland classification scores were weighted by multiplying the individual classification scores (Table 3-2) by the wetland acreage at each site (Table 3-3). In terms of the weighted site impact functional evaluation scores, the Putnam 3 site scored the highest (0.60) while the Highlands site scored the lowest (0.33).

TABLE 3-2
Site Impact Wetland Functional Evaluation Scores (Modified UMAM)

Wetlands	LNP	Dixie 1	Putnam 3	Highlands
Forested				
Location and Landscape Support	4.83	5.17	5.33	4.33
Water and Soil Environment	5.00	7.00	7.00	4.33
Vegetation Community	6.33	6.33	6.33	4.33
Score	**0.54**	**0.62**	**0.62**	**0.43**
Herbaceous / Shrub				
Location and Landscape Support	4.67	4.50	4.83	3.83
Water and Soil Environment	5.00	7.33	7.00	3.00
Vegetation Community	5.67	5.67	4.00	3.00
Score	**0.51**	**0.58**	**0.53**	**0.33**

Notes: Maximum possible combined attribute score is 30. Overall score is total of categories divided by 30.

TABLE 3-3
Weighted Site Impact Wetland Functional Evaluation Scores (Modified UMAM)

Wetlands	LNP	Dixie 1	Putnam 3	Highlands
Forested Score	0.54	0.62	0.62	0.43
Forested (%)	83%	13%	81%	2%
Herb/Shrub Score	0.51	0.58	0.53	0.33
Herb/Shrub (%)	17%	87%	19%	98%
Weighted Score	**0.53**	**0.59**	**0.60**	**0.33**

3.2 Transmission Line ROW Wetland Quantitative Characterization

Wetland impacts for conceptual transmission line ROW were originally provided in the LEDPA document (CH2M HILL, 2010). Table 3-5 presents a summary of impacted wetland acreage, including acres collocated with existing utility corridors.

TABLE 3-4
Transmission Line ROW Wetland Impact Areas (Acres)

	Dixie 1	Highlands	LNP	Putnam 3
Total Wetlands	2,185.3	605.4	1,632.9	614.0
Collocated Wetlands	2,140.4	471.8	1,534.6	284.8
% Collocated Wetlands	97.95%	77.93%	93.98%	46.38%

Dixie 1

Transmission line ROW impacts to wetlands associated with the Dixie 1 site total 2,185.3 acres (Table 3-4). Nearly all wetlands within the conceptual transmission line ROW for the Dixie 1 site were collocated with existing utilities. Approximately 98 percent of wetlands occur within existing power line easements or alongside roadways.

FLUCCS categories for all land uses occurring within the Dixie 1 conceptual transmission line ROW, aggregated into generalized disturbance categories, are presented in Table 3-5. Most land uses within the transmission line ROW were categorized as "Minimal" disturbance (37.20 percent of total land area), the lowest category of disturbance, due to the abundance of natural areas including forested uplands and wetlands. The total relative disturbance value for the Dixie 1 conceptual transmission line ROW is 2.29 (Table 3-6), which is between "Low" and "Moderate" disturbance categories. The total relative disturbance value is the sum of the disturbance category values weighted by the relative percent occurrence of each respective disturbance category.

Putnam 3

Transmission line ROW impacts to wetlands associated with the Putnam 3 site total 614.0 acres (Table 3-4). Of the transmission lines for the four sites, those associated with Putnam 3 had the lowest percentage collocated with existing utilities. Approximately 46 percent of wetlands along the Putnam 3 transmission line ROWs are located within existing power line easements or alongside roadways.

FLUCCS categories for all land uses occurring within the Putnam 3 conceptual transmission line ROW, aggregated into generalized disturbance categories, are presented in Table 3-5. Most land uses within the transmission line ROW were categorized as "Minimal" disturbance (40.47 percent of total land area), because of the abundance of natural areas including forested uplands and wetland FLUCCS categories. The total relative disturbance value for the Putnam 3 conceptual transmission line ROW is 2.20 (Table 3-6). This value is the lowest among the four sites and is between "Low" and "Moderate" disturbance categories.

TABLE 3-5
Transmission Line ROW Disturbance Totals

	Dixie 1		Highlands		LNP		Putnam 3	
Disturbance Category	Acres	Rel. %	Acres	Rel. %	Acres	Rel. %	Acres	Rel. %
High	3,264.7	24.27%	1,261.9	18.78%	2,346.1	24.97%	1,092.9	17.59%
Moderate	2,391.9	17.78%	1,631.5	24.28%	1,480.9	15.76%	1,594.8	25.67%
Low	2,790.8	20.75%	2,850.6	42.42%	2,368.4	25.21%	1,010.5	16.27%
Minimal	5,004.8	37.20%	976.6	14.53%	3,199.6	34.06%	2,514.1	40.47%
	13,452.2		6,720.6		9,395		6,212.3	

TABLE 3-6
Transmission Line ROW Relative Disturbance Values

		Dixie 1		Highlands		LNP		Putnam 3	
Disturbance Category	Value	Rel. %	Rel. Value	Rel. %	Rel. Value	Rel. %	Rel. Value	Rel. %	Rel. Value
High	4	24.27%	0.97	18.78%	0.75	24.97%	1.00	17.59%	0.70
Moderate	3	17.78%	0.53	24.28%	0.73	15.76%	0.47	25.67%	0.77
Low	2	20.75%	0.41	42.42%	0.85	25.21%	0.50	16.27%	0.33
Minimal	1	37.20%	0.37	14.53%	0.15	34.06%	0.34	40.47%	0.40
			2.29		2.47		2.31		2.20

Highlands

Transmission line ROW impacts to wetlands associated with the Highlands site total approximately 605.4 acres (Table 3-4). Wetlands within the conceptual transmission line ROW for the Highlands site are mostly collocated with existing utilities. Approximately 78 percent of wetlands are located within existing power line easements or alongside roadways.

FLUCCS categories for all land uses occurring within the Highlands conceptual transmission line ROW, aggregated into generalized disturbance categories, are presented in Table 3-5. Most land uses within the transmission line ROW were categorized as "Low" disturbance (42.42 percent of total land area), the second lowest category of disturbance, because of large areas of pasture and rangeland in the ROW. The total relative disturbance value for the Highlands conceptual transmission line ROW was the greatest of the four sites (2.47), which is between "Low" and "Moderate" disturbance categories (Table 3-6).

LNP

Transmission line ROWs associated with the LNP site are the same as those proposed for the Dixie 1 site, except for sections of the Dixie 1 ROWs north of the LNP site. Transmission line ROW impacts to wetlands associated with the LNP site total 1,632.9 acres (Table 3-4). Wetlands within the conceptual transmission line ROWs for the LNP site are nearly all collocated with existing utilities. Approximately 94 percent of wetlands are located within existing power line easements or alongside roadways.

FLUCCS categories for all land uses occurring within the LNP conceptual transmission line ROW, aggregated into generalized disturbance categories, are presented in Table 3-5. Most land uses within the transmission line ROW were categorized as "Minimal" disturbance (34.06 percent of total land area), the lowest category of disturbance, because of the extent of forested uplands and wetlands within the ROW. The total relative disturbance value for the LNP conceptual transmission line ROW is 2.31 (Table 3-6), which is between "Low" and "Moderate" disturbance categories.

4.0 Summary and Conclusion

This TMEM provides an evaluation of wetland functions for the conceptual impact areas at the four sites considered in the LEDPA analysis: Dixie 1, Putnam 3, Highlands, and LNP. Field-based UMAM functional analyses for the preferred site, LNP, are presented in the Wetland Mitigation Plan (Biological Research Associates, 2009). Characterizations of land use within the associated transmission line ROWs along with the degree of wetland collocation with existing utilities were also provided for the purpose of comparing potential disturbances to wetlands.

Wetlands on the sites are expected to provide functions typical for wetland systems of similar classification and regional landscape setting. Overall modified UMAM scores were highest for the Putnam 3 site and lowest for the Highlands site. Forested wetlands at each site scored higher in the functional assessment than herbaceous and shrub wetlands because they generally provided greater connectivity to downstream habitats, and enhanced water quality and thermoregulatory functions. Forested wetlands also showed less observable disturbance from upland land uses than the herbaceous systems.

Within the conceptual transmission line ROWs, wetland acreages collocated within existing utility corridors were greatest for the Dixie 1 site and lowest for the Putnam 3 site. The degree of disturbance for land uses within the associated transmission line ROWs was greatest for the Highlands site and lowest for the Putnam 3 site. Calculated disturbance values for each site fell between "Minimal" and "Low" disturbance categories.

In order to consider the wetland functions for each site in the LEDPA analysis, the final scores for each site and associated transmission line ROWs were converted to decile values, then converted to quartile values and added to the LEDPA consolidated score.

The modified UMAM scores can be converted to decile values as follows, using the total functional evaluation score range of 0.33 (Highlands) to 0.60 (Putnam 3). Table 4-1 presents modified UMAM scores for site wetlands converted to a decile ranking system.

TABLE 4-1
Modified UMAM Scores for Site Wetlands Converted to Decile Ranking

(Score) – Decile (Rank)	(Score) – Decile (Rank)
.330 - .357 = 10 (Highlands)	.465 - .492 = 5
.357 – .384 = 9	.492 - .519 = 4
.384 - .411 = 8	.519 - .546 = 3 (LNP)
.411 - .438 = 7	.546 - .573 = 2
.438 - .465 = 6	.573 - .600 = 1 (Dixie 1, Putnam 3)

The decile ranking was then converted to the quartile system, using a 1.0 weight to determine the consolidated score for each site. Table 4-2 presents modified UMAM decile

ranked scores for site wetlands converted to a quartile ranking system with the LEDPA scoring weight applied.

TABLE 4-2
Modified UMAM Scores for Site Wetlands Decile to Quartile Conversion

Site	Decile Rank	Converted Quartile Rank	Weight	Weighted Quartile Score
Dixie 1	1	0.40	1.0	0.40
Putnam 3	1	0.40	1.0	0.40
Highlands	10	4.00	1.0	4.00
LNP	3	1.20	1.0	1.20

The process was repeated for the transmission line characterization for each site, using the two calculated disturbance metrics. Table 4-3 presents the transmission line ROW wetland percent collocation values converted to a decile ranking system, using the value range of 46.38 percent (Putnam 3) to 97.95 percent (Dixie 1).

TABLE 4-3
Transmission Line ROW Wetland Percent Collocation Values Converted to Decile Ranking

(Score) – Decile (Rank)	(Score) – Decile (Rank)
92.79 – 97.95 = 10 (Dixie 1, LNP)	67.01 – 72.17 = 5
87.64 – 92.79 = 9	61.85 – 67.01 = 4
82.48 – 87.64 = 8	56.69 – 61.85 = 3
77.32 – 82.48 = 7 (Highlands)	51.54 – 56.69 = 2
72.17 – 77.32 = 6	46.38 – 51.54 = 1 (Putnam 3)

Table 4-4 presents the transmission line ROW relative disturbance values converted to a decile ranking system, using the range of 2.20 percent (Putnam 3) to 2.47 percent (Highlands).

TABLE 4-4
Transmission ROW Relative Disturbance Values Converted to Decile Ranking

(Score) – Decile (Rank)	(Score) – Decile (Rank)
2.44 – 2.47 = 10 (Highlands)	2.31 – 2.34 = 5 (LNP)
2.42 – 2.44 = 9	2.28 – 2.31 = 4 (Dixie 1)
2.39 – 2.42 = 8	2.25 – 2.28 = 3
2.36 – 2.39 = 7	2.23 – 2.25 = 2
2.34 – 2.36 = 6	2.20 – 2.23 = 1 (Putnam 3)

The decile ranking was then converted to the quartile system. A total 0.25 weight was applied to the transmission line ROW disturbance metrics (0.125 each) to determine the consolidated score for each site. This lower weighting for transmission line ROW relative to site impacts reflects the nature of the impacts (mostly clearing and partial loss of wetland function, as opposed to mostly fill and complete loss of function) along the transmission lines, as well as the additional flexibility in placing pads to avoid and minimize wetland impacts. Table 4-5 presents transmission line ROW percent wetland collocation decile ranked values converted to a quartile ranking system with the metric weighting applied. Table 4-6 presents transmission line ROW relative disturbance decile ranked values converted to a quartile ranking system with the metric weighting applied.

TABLE 4-5
Transmission Line ROW Percent Wetland Collocation Values Decile to Quartile Conversion

Site	Decile Rank	Converted Quartile Rank	Weight	Weighted Quartile Score
Dixie 1	10	4.0	0.125	0.50
Putnam 3	1	0.4	0.125	0.05
Highlands	7	2.8	0.125	0.35
LNP	10	4.0	0.125	0.50

TABLE 4-6
Transmission Line ROW Relative Disturbance Values Decile to Quartile Conversion

Site	Decile Rank	Converted Quartile Rank	Weight	Weighted Quartile Score
Dixie 1	4	1.6	0.125	0.20
Putnam 3	1	0.4	0.125	0.05
Highlands	10	4.0	0.125	0.50
LNP	5	2.0	0.125	0.25

The total evaluation score (site functional score plus transmission disturbance characterization scores) can be added to the consolidated LEDPA score, as adjusted by USACE (2011) (Table 4-7).

TABLE 4-7
Consolidated LEDPA Scores Plus Total Evaluation Scores

			Transmission Line ROW		
Site	Consolidated LEDPA Score	Site Wetlands Modified UMAM Score	% Wetland Collocation Value	Relative Disturbance Value	Total Score
Dixie 1	86.60	0.40	0.50	0.20	87.70
Putnam 3	76.90	0.40	0.05	0.05	77.40
Highlands	82.80	4.00	0.35	0.50	87.65
LNP	92.70	1.20	0.50	0.25	94.65

The results of this functional evaluation, when considered with the LEDPA analysis, do not change the findings of LNP as the LEDPA. The Dixie 1 site was ranked second, the Highlands site was ranked third, and the Putnam 3 site was ranked as least favorable.

5.0 References

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Attachment A
Figures from LEDPA (338884-TMEM-102, Rev 4)

N
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Sources
Imagery: ESRI, 2009

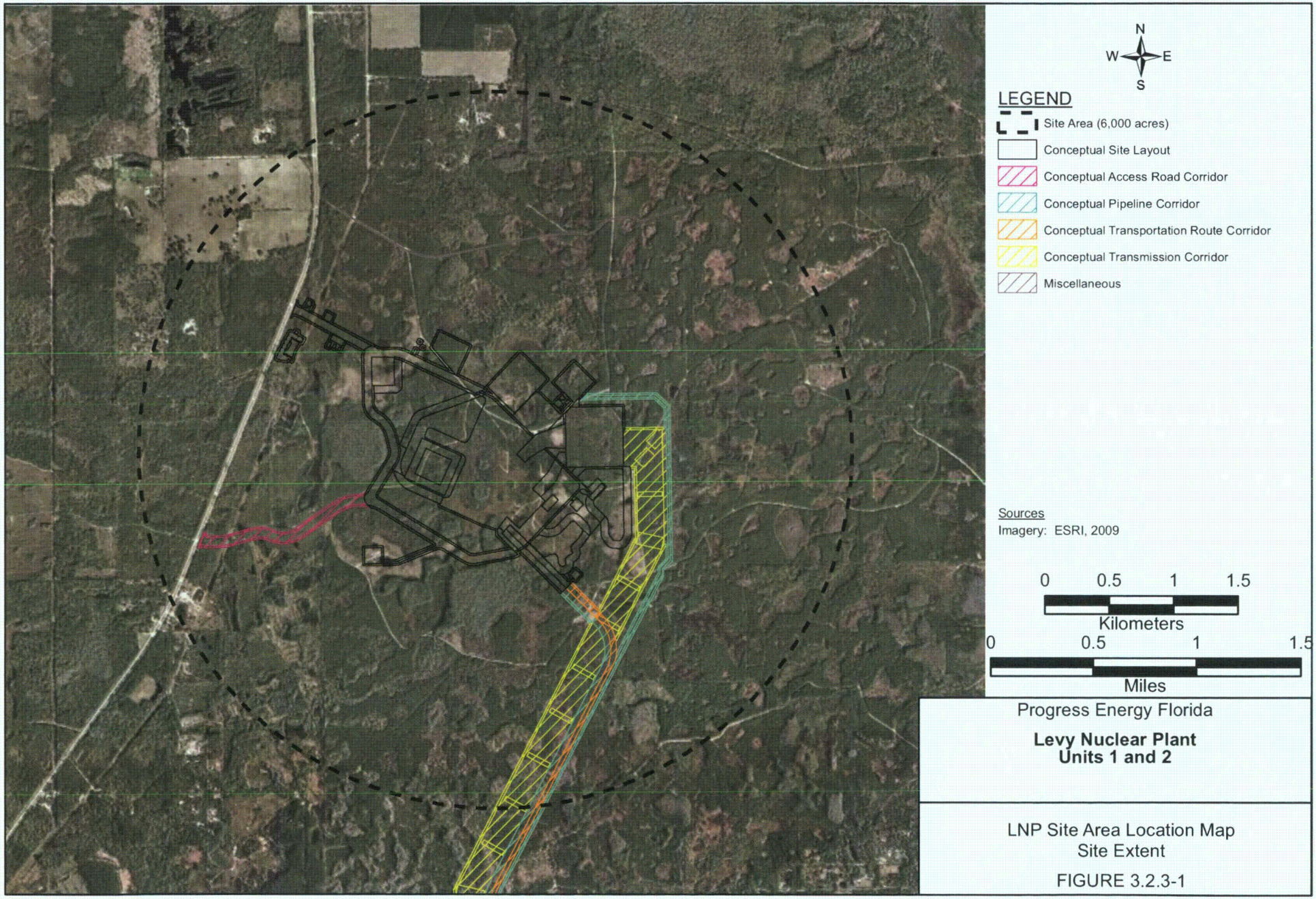
0 50 100
Kilometers
0 50 100
Miles

Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Overview Map

FIGURE 1.4-1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Site Area (6,000 acres)
Conceptual Site Layout
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Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
Miscellaneous
Sources
Imagery: ESRI, 2009
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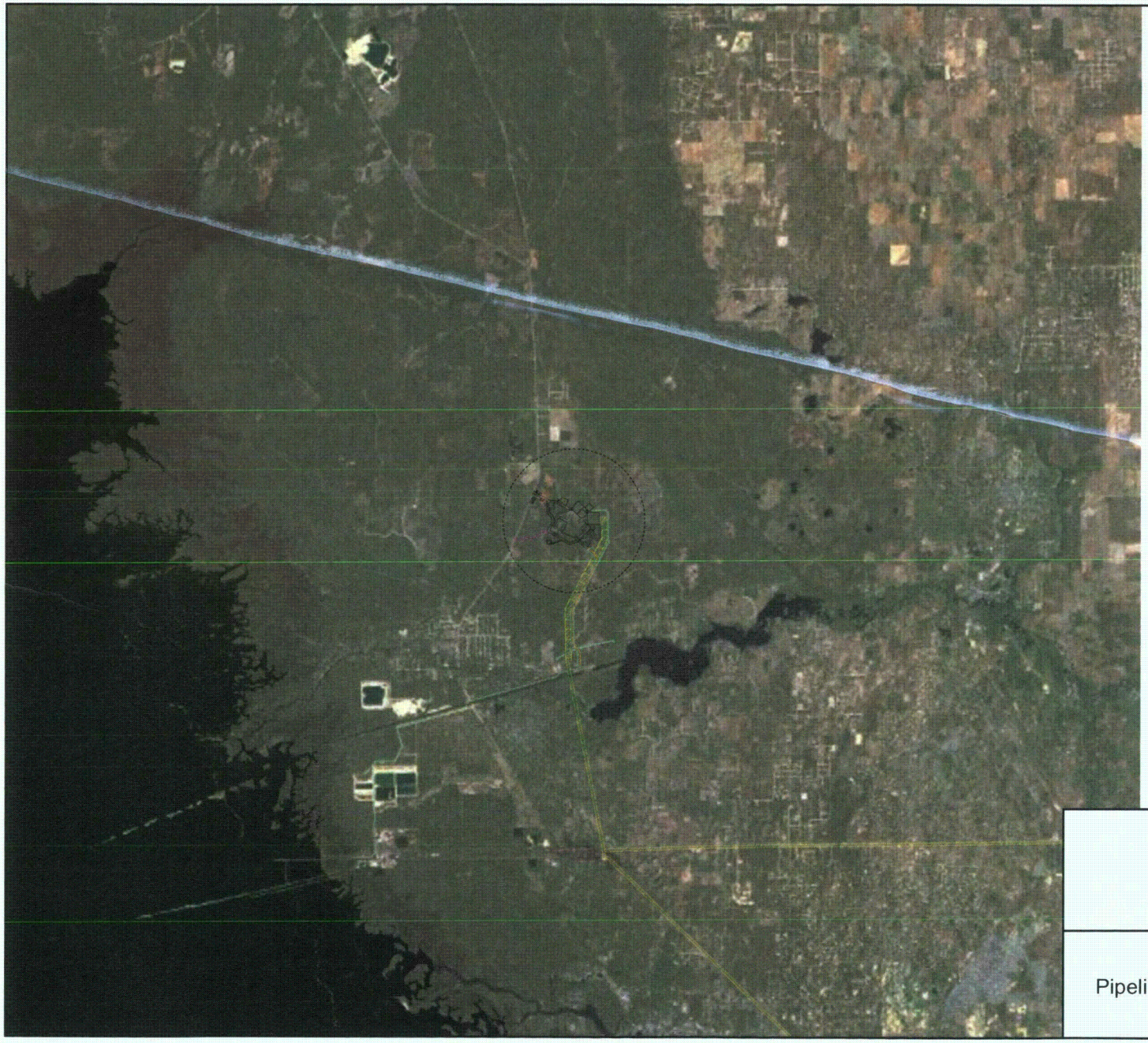
Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
LNP Site Area Location Map
Site Extent
FIGURE 3.2.3-1



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- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor
- Miscellaneous

Sources
Imagery: ESRI, 2009

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Kilometers
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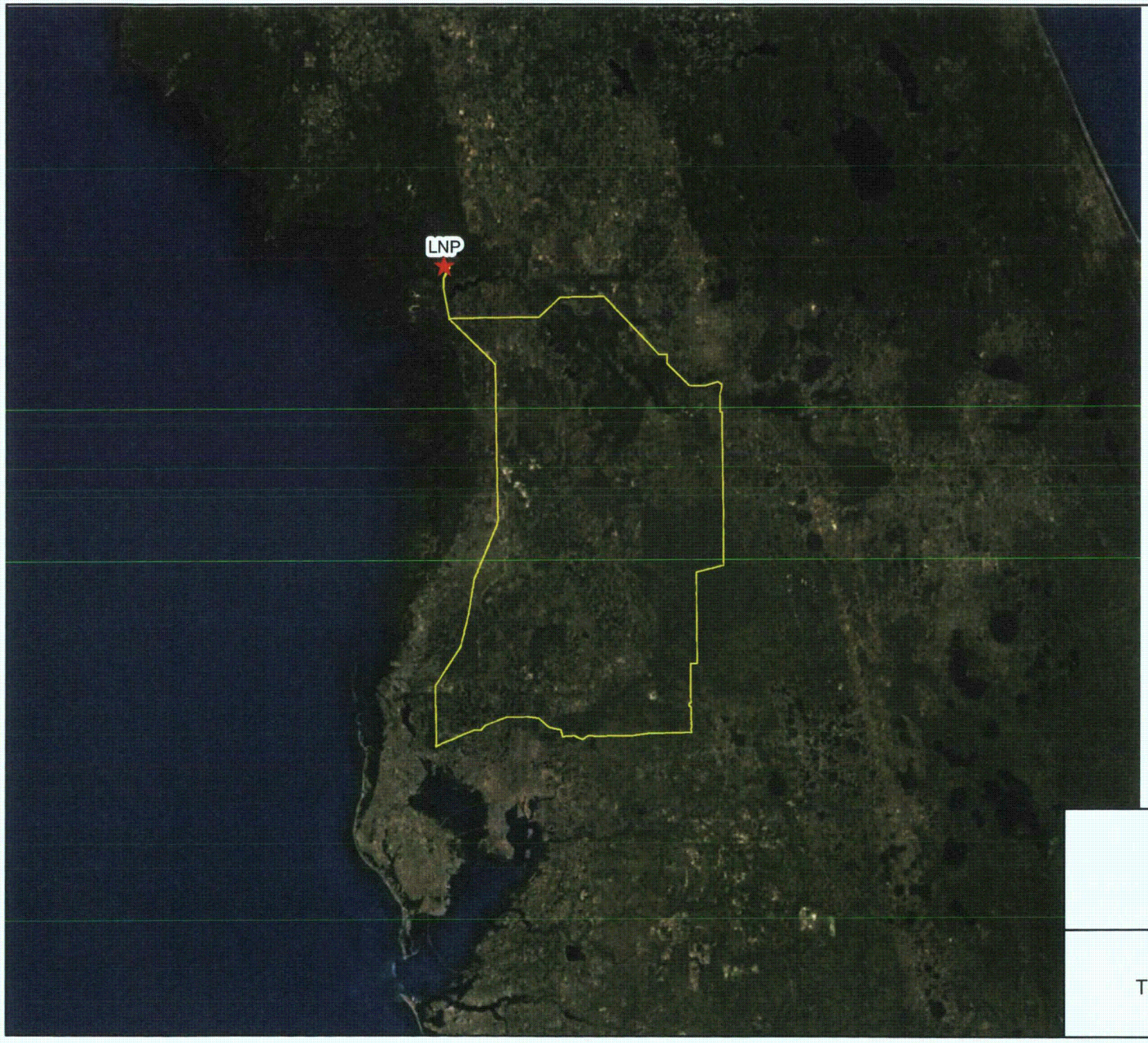
Miles

Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

LNP Site Area Location Map
Pipeline and Transportation Corridor Extent

FIGURE 3.2.3-2



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★ Site Center Point

Conceptual Transmission Corridor

Sources

Imagery: ESRI, 2009

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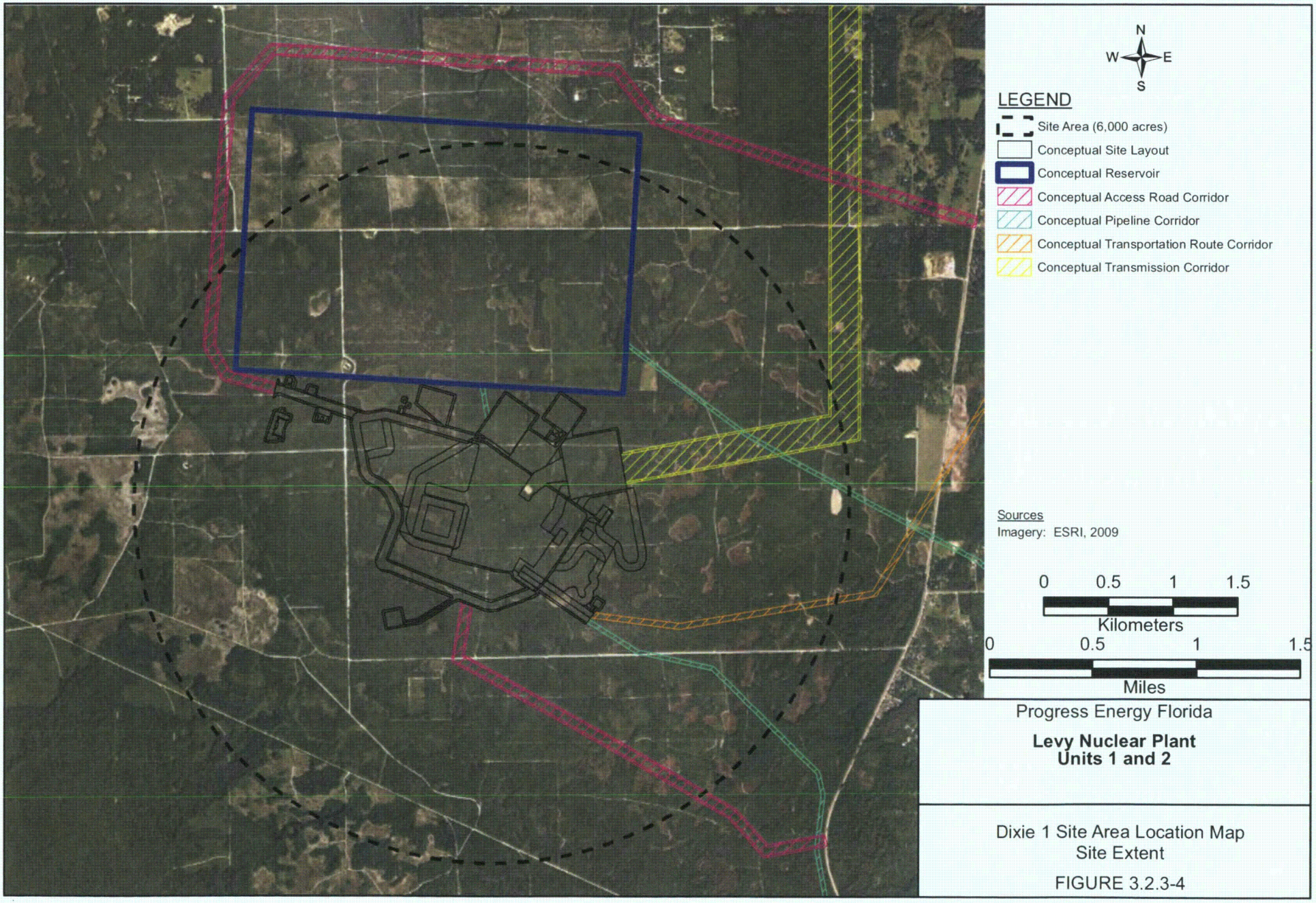
Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

LNP Site Area Location Map
Transmission Line Corridor Extent

FIGURE 3.2.3-3

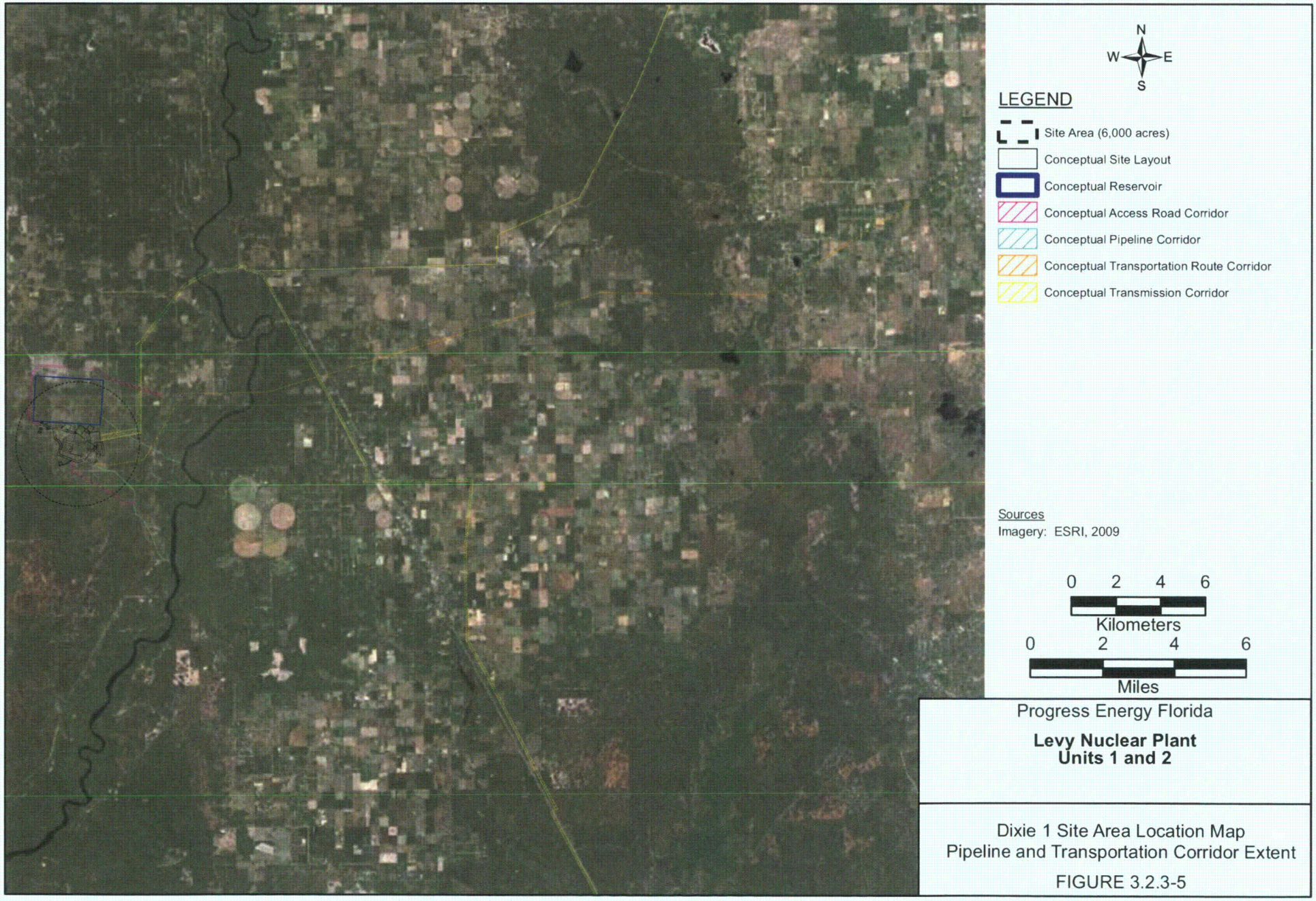


Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Dixie 1 Site Area Location Map
Site Extent

FIGURE 3.2.3-4

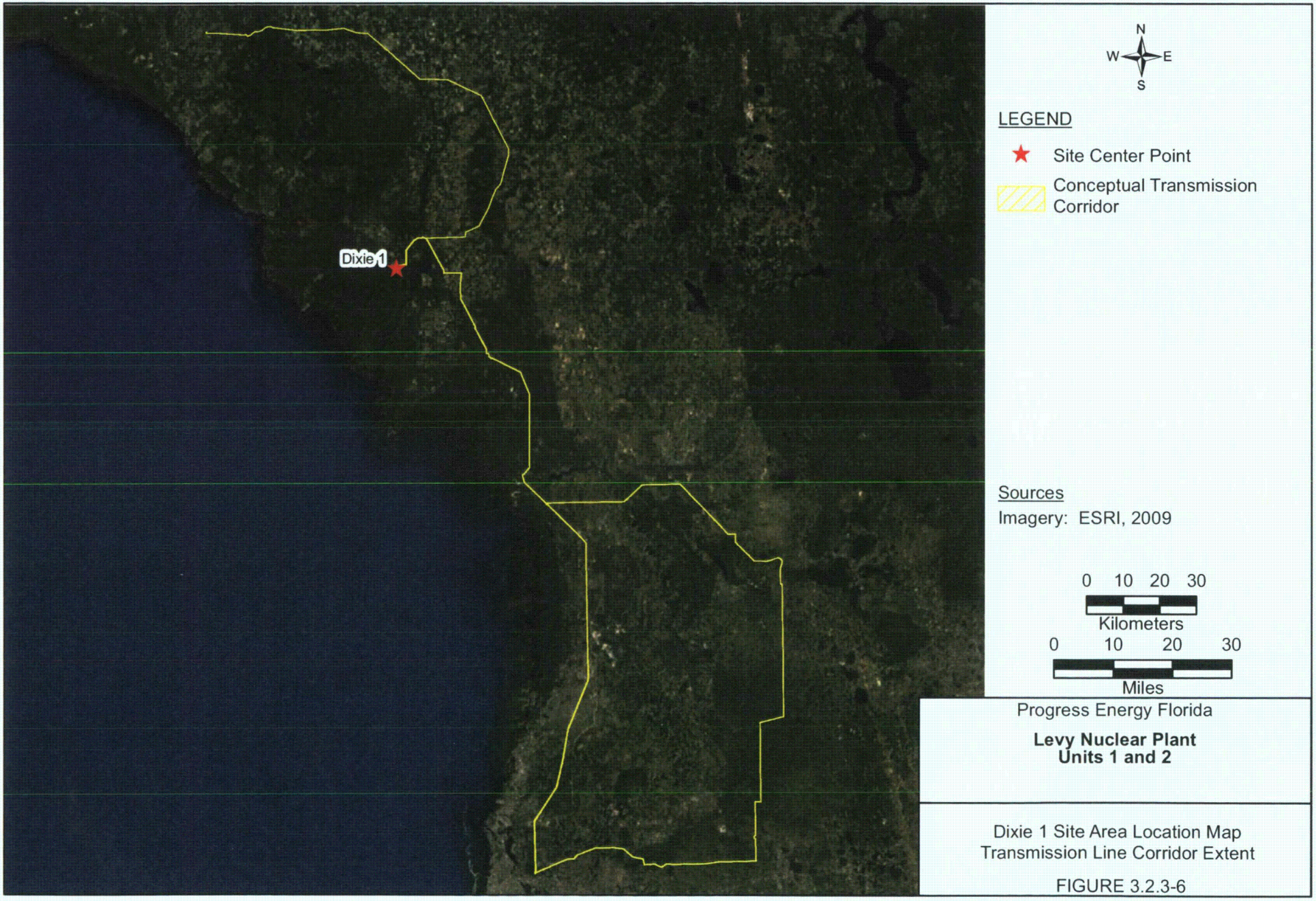


Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Dixie 1 Site Area Location Map
Pipeline and Transportation Corridor Extent

FIGURE 3.2.3-5


Dixie 1
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Conceptual Transmission Corridor
Sources
Imagery: ESRI, 2009
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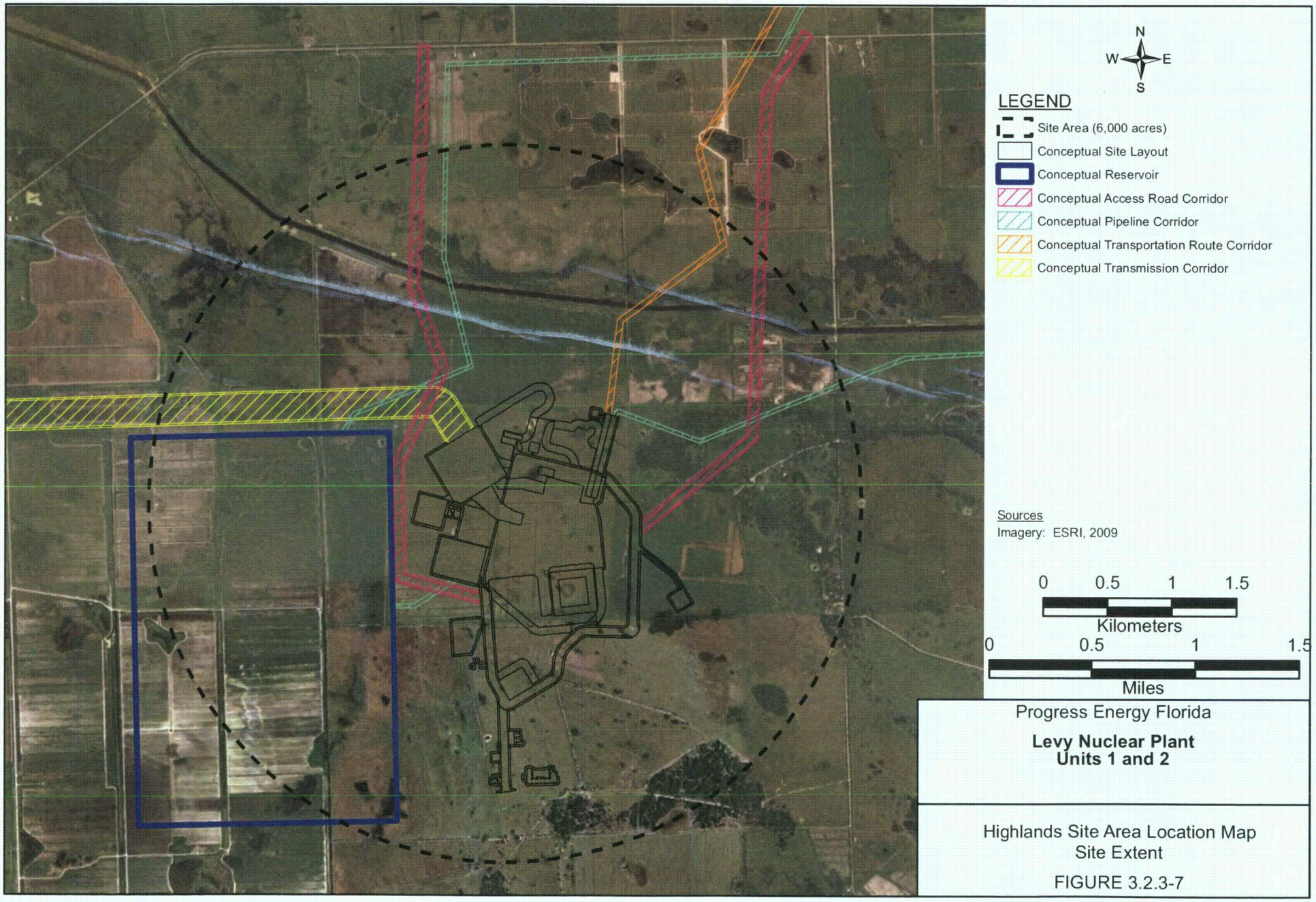
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Dixie 1 Site Area Location Map
Transmission Line Corridor Extent
FIGURE 3.2.3-6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Site Area (6,000 acres)
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Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
Sources
Imagery: ESRI, 2009
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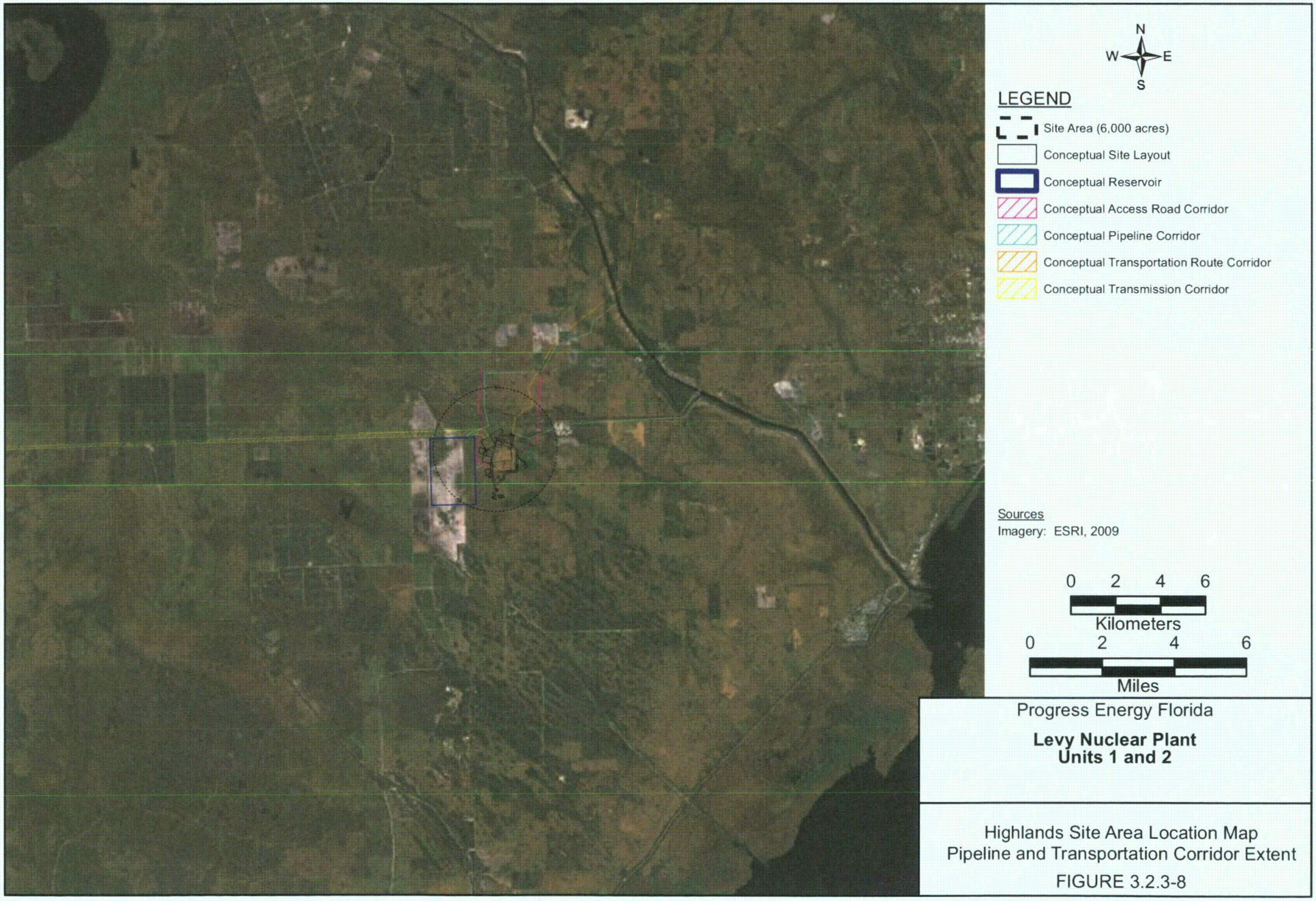
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Highlands Site Area Location Map
Site Extent
FIGURE 3.2.3-7

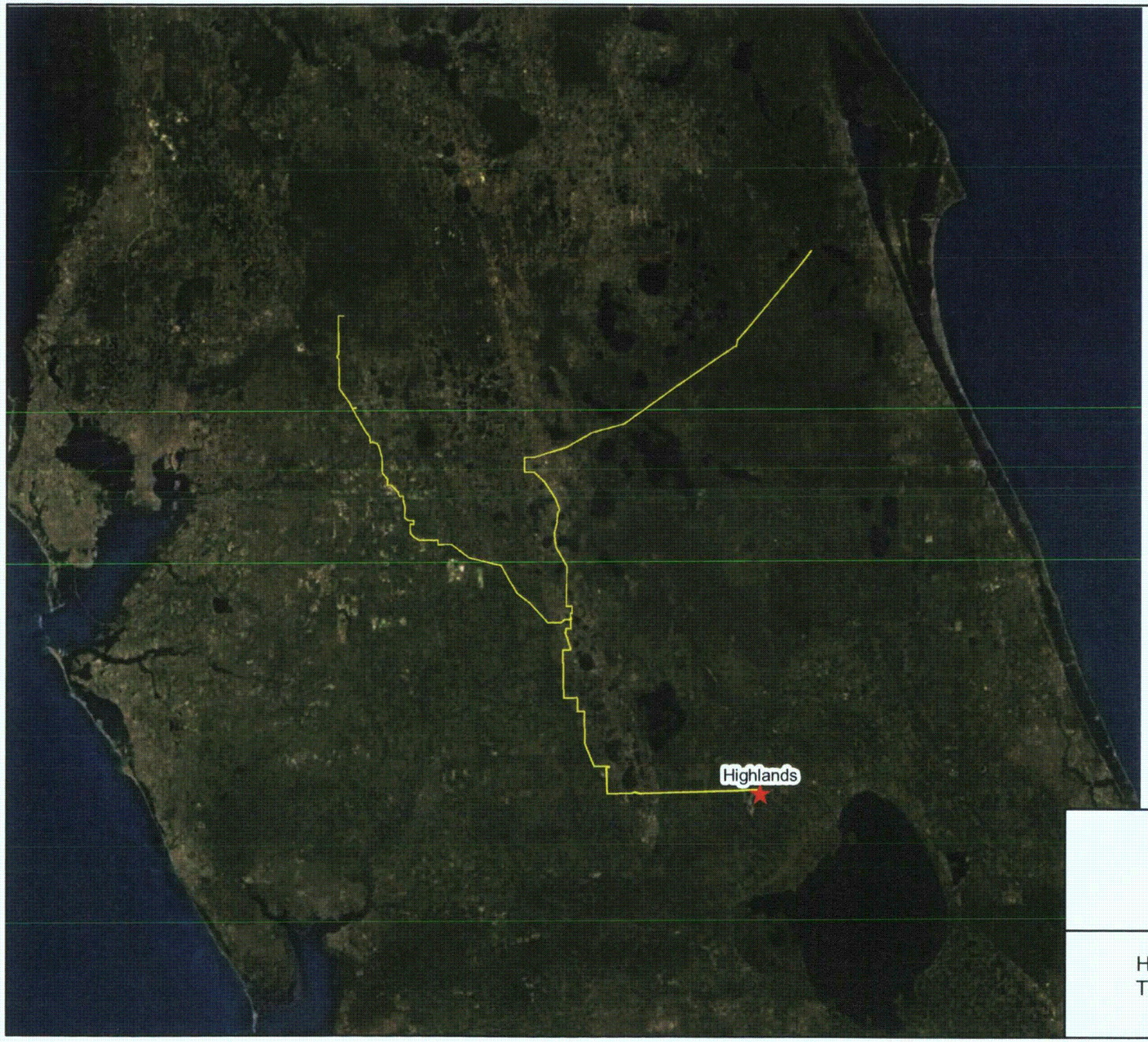


Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Highlands Site Area Location Map
Pipeline and Transportation Corridor Extent

FIGURE 3.2.3-8



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★ Site Center Point

Conceptual Transmission Corridor

Sources

Imagery: ESRI, 2009

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Kilometers

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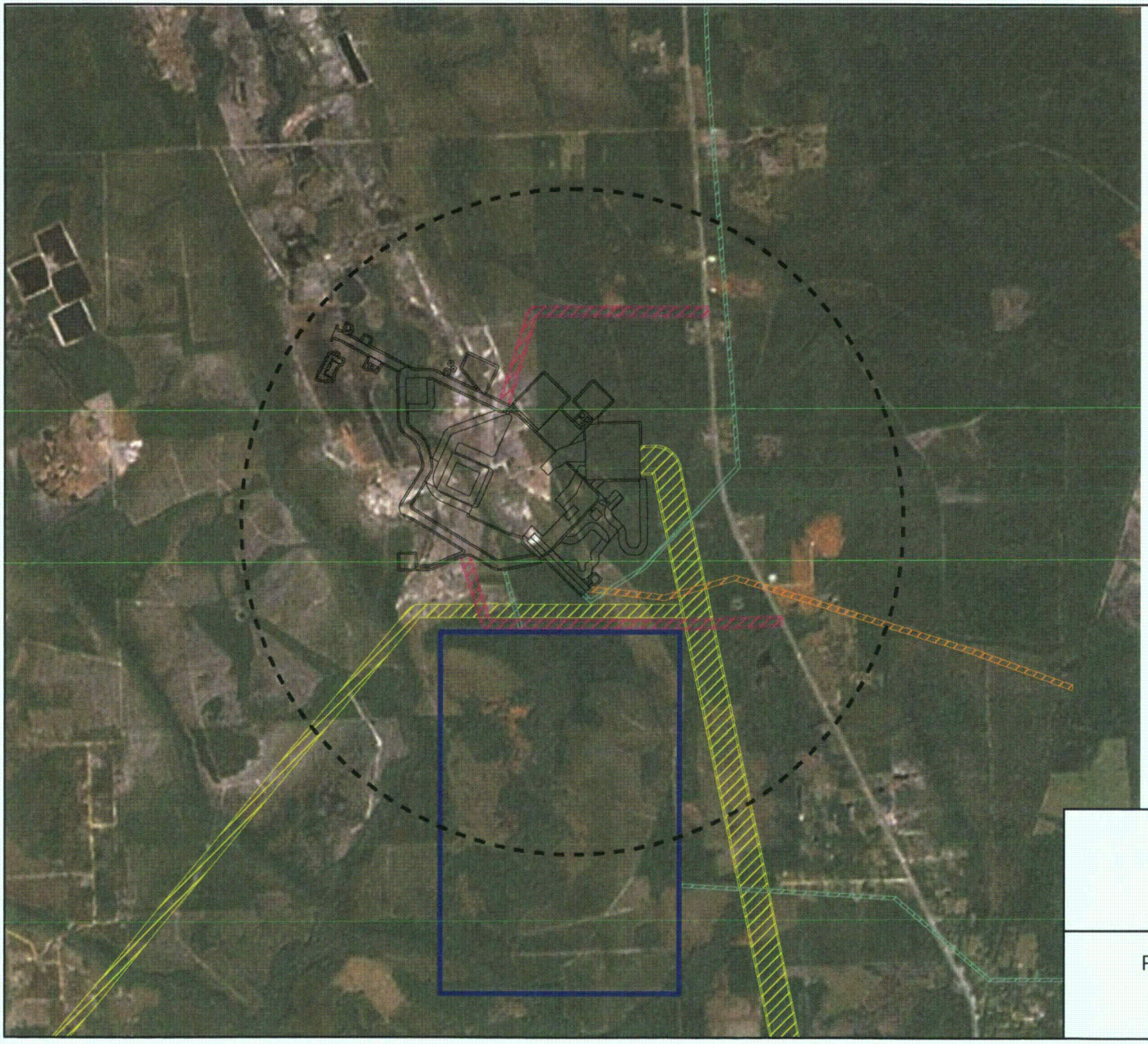
Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Highlands Site Area Location Map
Transmission Line Corridor Extent

FIGURE 3.2.3-9



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- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
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- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources
Imagery: ESRI, 2009

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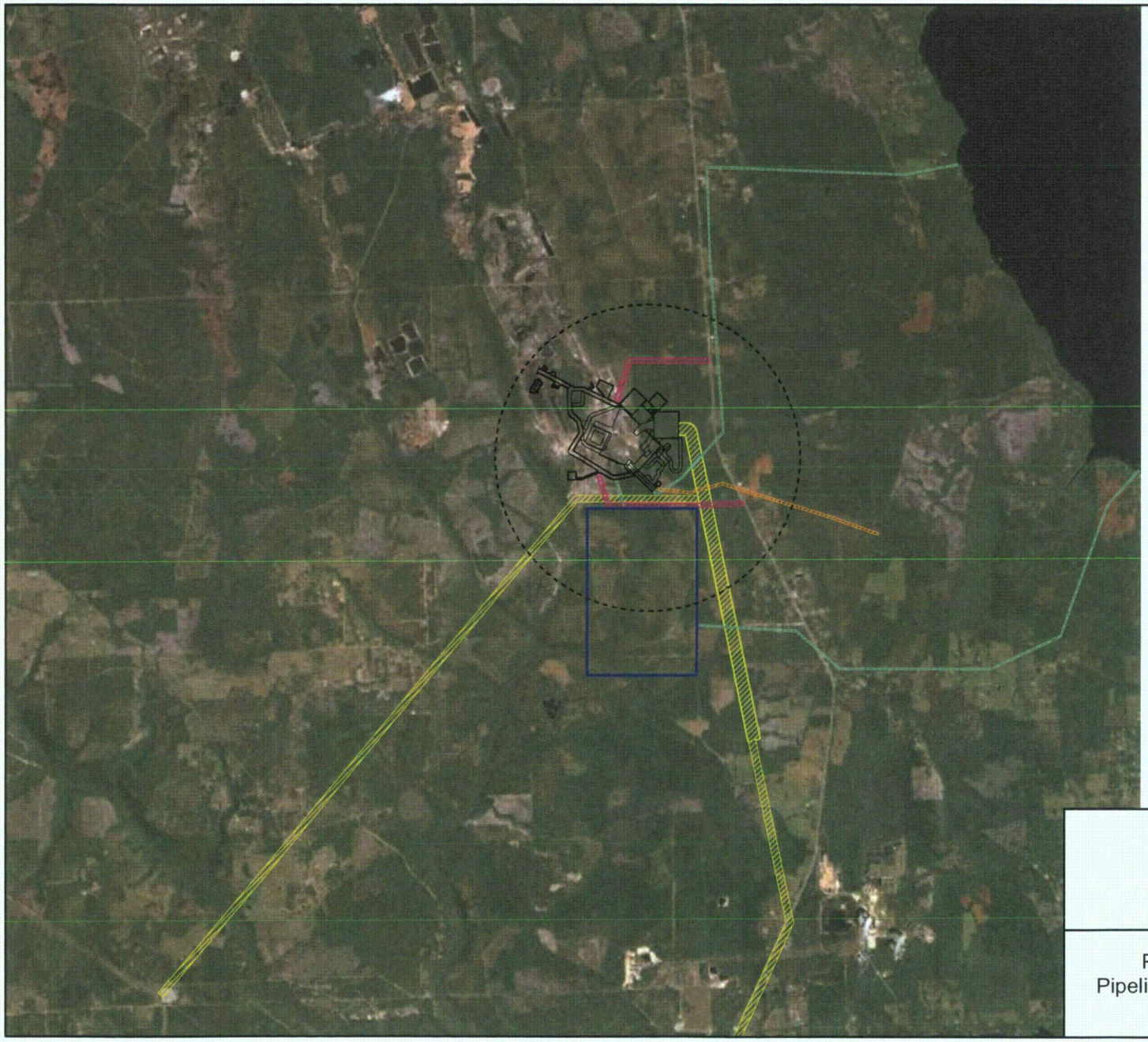
Miles

Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Putnam 3 Site Area Location Map
Site Extent

FIGURE 3.2.3-10



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- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources
Imagery: ESRI, 2009

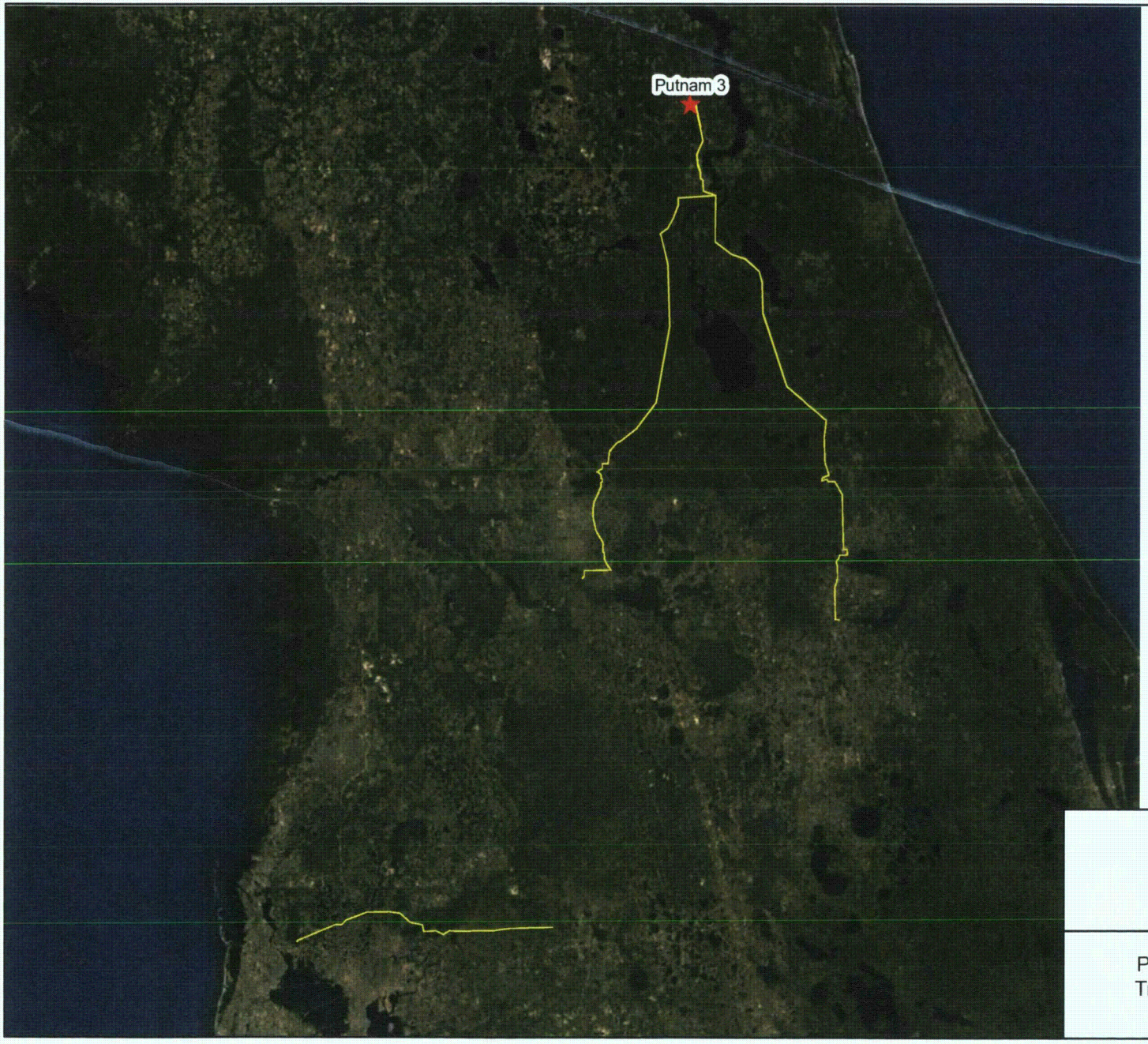
0 1 2 3
Kilometers
0 1 2 3
Miles

Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2

Putnam 3 Site Area Location Map
Pipeline and Transportation Corridor Extent

FIGURE 3.2.3-11



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Site Center Point

Conceptual Transmission Corridor

Sources

Imagery: ESRI, 2009

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Kilometers

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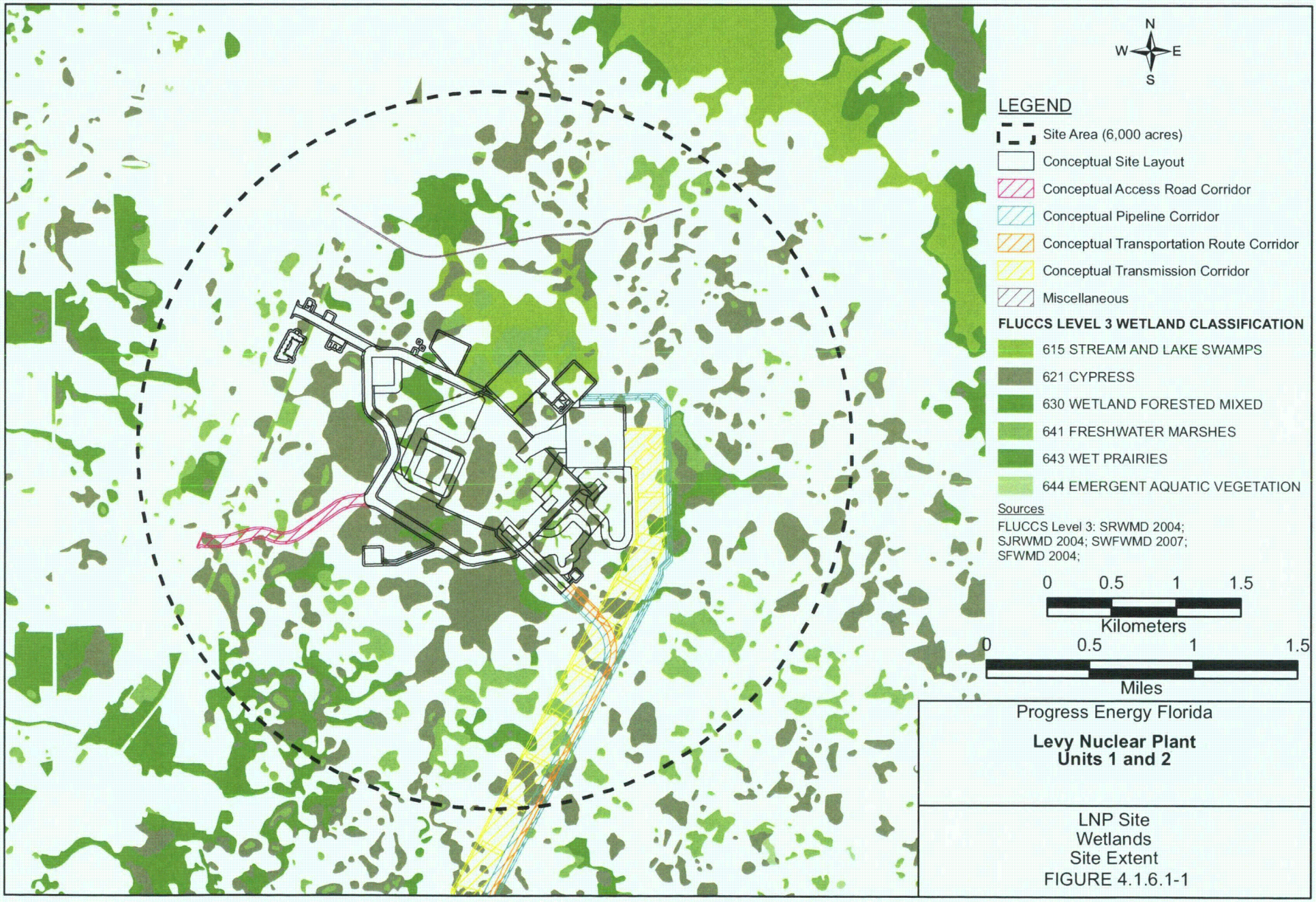
Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Putnam 3 Site Area Location Map
Transmission Line Corridor Extent

FIGURE 3.2.3-12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Site Area (6,000 acres)
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Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
Miscellaneous
FLUCCS LEVEL 3 WETLAND CLASSIFICATION
615 STREAM AND LAKE SWAMPS
621 CYPRESS
630 WETLAND FORESTED MIXED
641 FRESHWATER MARSHES
643 WET PRAIRIES
644 EMERGENT AQUATIC VEGETATION
Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
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Kilometers
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Progress Energy Florida
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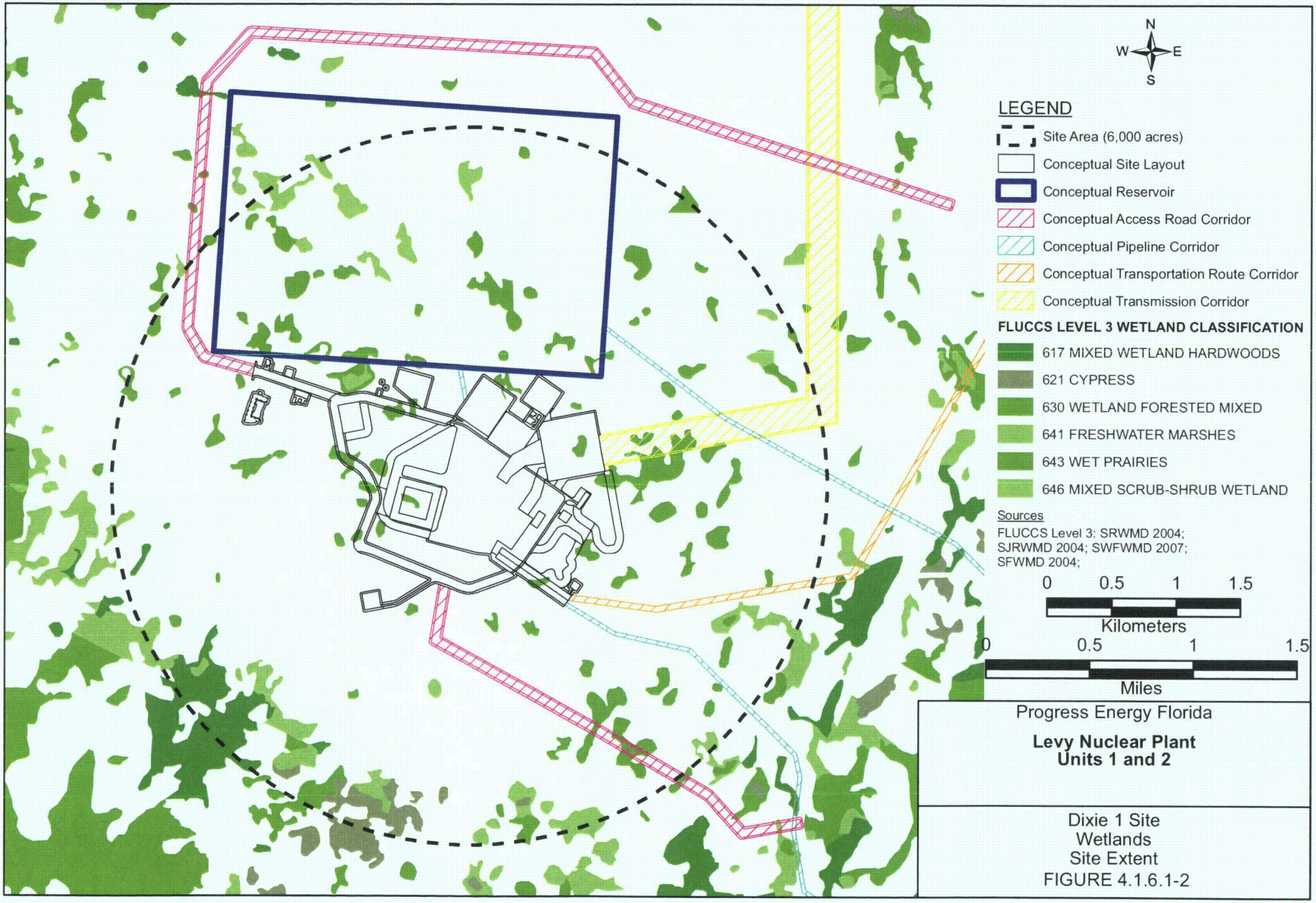
Units 1 and 2
LNP Site
Wetlands
Site Extent
FIGURE 4.1.6.1-1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Site Area (6,000 acres)
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Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
FLUCCS LEVEL 3 WETLAND CLASSIFICATION
617 MIXED WETLAND HARDWOODS
621 CYPRESS
630 WETLAND FORESTED MIXED
641 FRESHWATER MARSHES
643 WET PRAIRIES
646 MIXED SCRUB-SHRUB WETLAND
Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
0 0.5 1 1.5
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Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Dixie 1 Site
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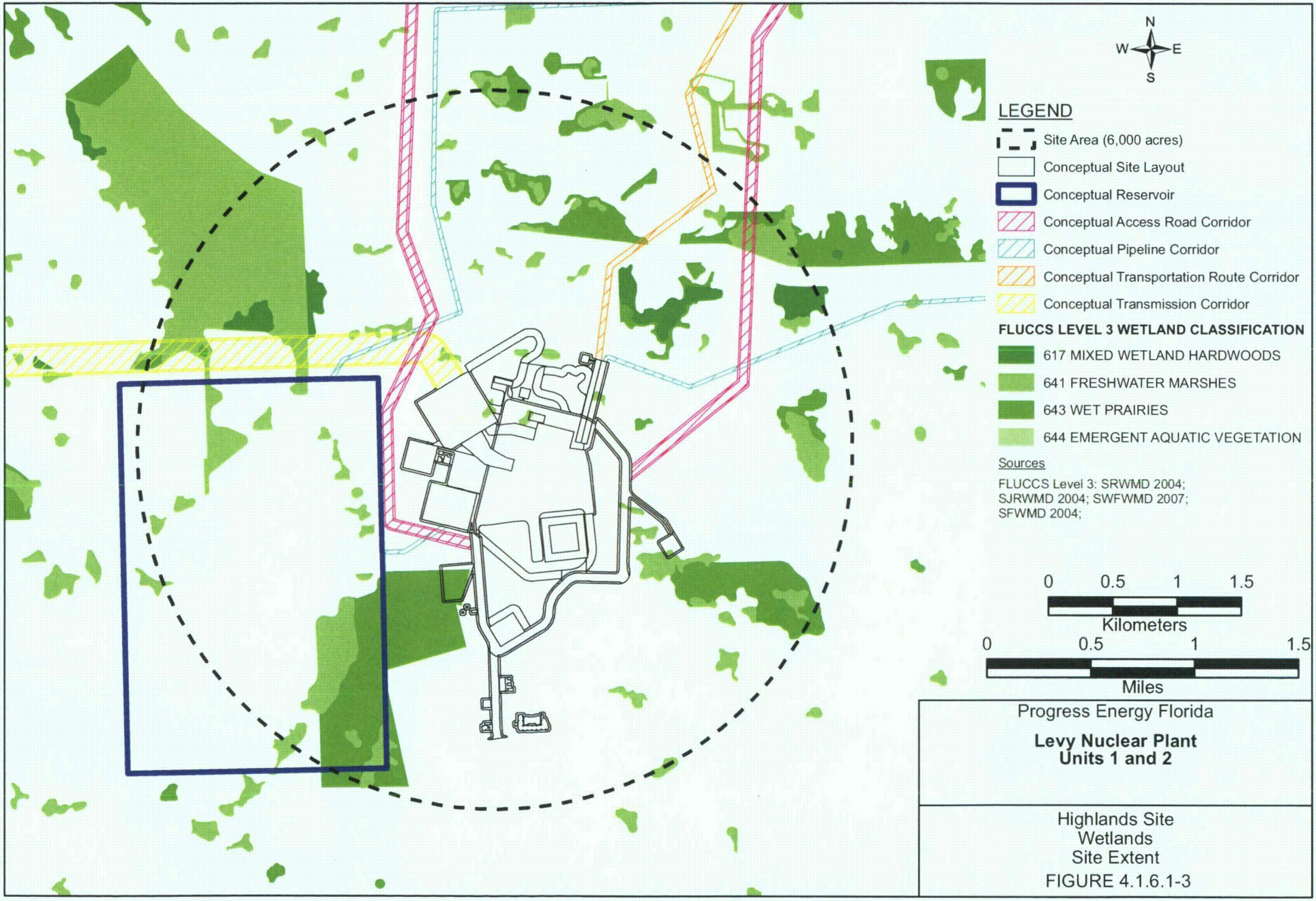
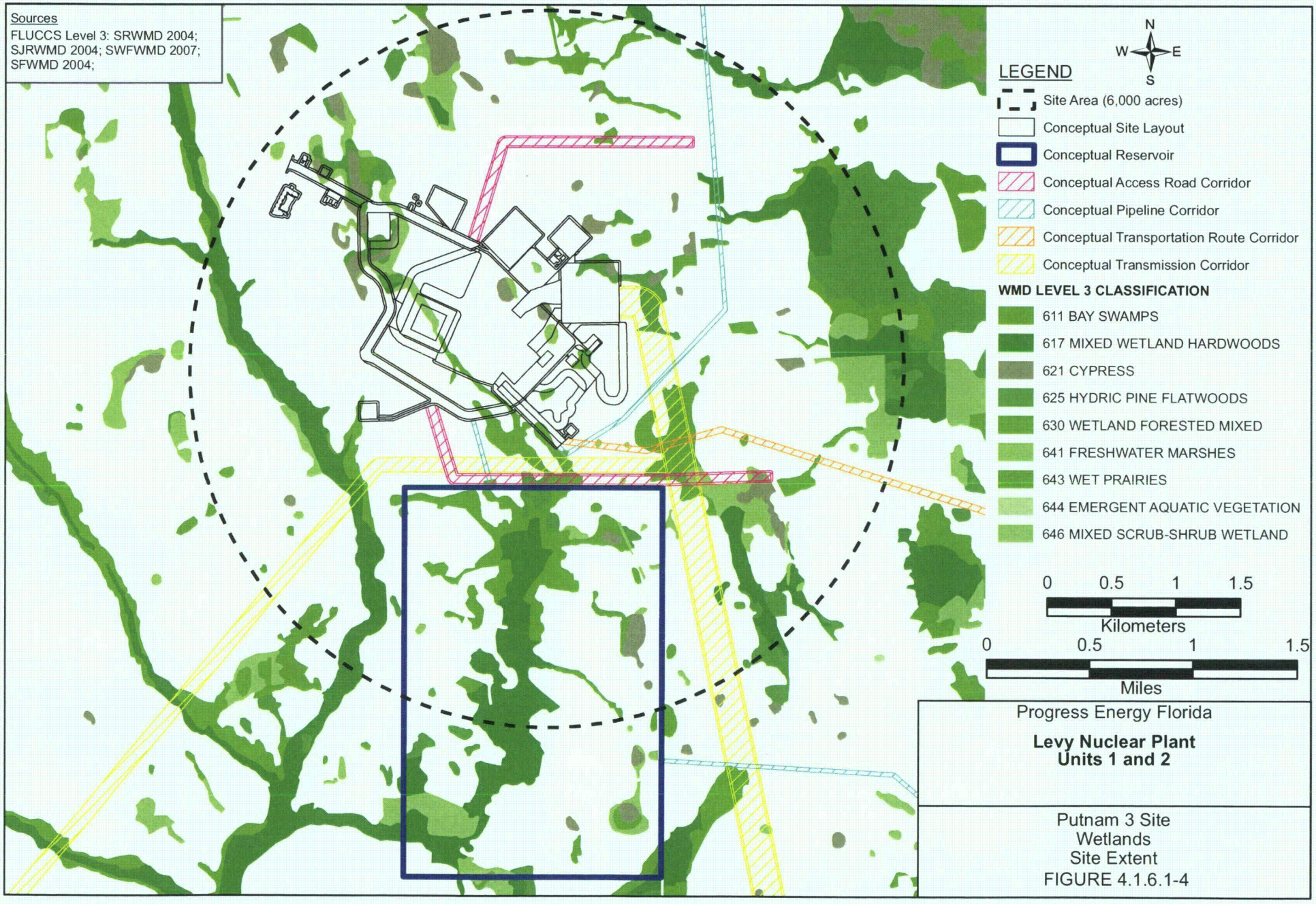
Site Extent
FIGURE 4.1.6.1-2



Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Highlands Site
Wetlands
Site Extent
FIGURE 4.1.6.1-3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FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
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Site Area (6,000 acres)
Conceptual Site Layout
Conceptual Reservoir
Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
WMD LEVEL 3 CLASSIFICATION
611 BAY SWAMPS
617 MIXED WETLAND HARDWOODS
621 CYPRESS
625 HYDRIC PINE FLATWOODS
630 WETLAND FORESTED MIXED
641 FRESHWATER MARSHES
643 WET PRAIRIES
644 EMERGENT AQUATIC VEGETATION
646 MIXED SCRUB-SHRUB WETLAND
0 0.5 1 1.5
Kilometers
0 0.5 1 1.5
Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Putnam 3 Site
Wetlands
Site Extent
FIGURE 4.1.6.1-4

WMD LEVEL 3 CLASSIFICATION

- 110 RESIDENTIAL LOW DENSITY (<2 DU/ACRE)
- 111 RESIDENTIAL LOW DENSITY - FIXED SINGLE FAMILY UNITS
- 112 RESIDENTIAL LOW DENSITY - MOBILE HOME UNITS
- 113 RESIDENTIAL LOW DENSITY - FIXED AND MOBILE HOME UNITS
- 118 RURAL RESIDENTIAL
- 119 RESIDENTIAL LOW DENSITY - UNDER CONSTRUCTION
- 120 RESIDENTIAL MEDIUM DENSITY (2 - 5 DU/ACRE)
- 121 RESIDENTIAL MEDIUM DENSITY - FIXED SINGLE FAMILY UNITS
- 122 RESIDENTIAL MEDIUM DENSITY - MOBILE HOME UNITS
- 123 RESIDENTIAL MEDIUM DENSITY - MIXED UNITS
- 129 RESIDENTIAL MEDIUM DENSITY - UNDER CONSTRUCTION
- 130 RESIDENTIAL HIGH DENSITY
- 131 RESIDENTIAL HIGH DENSITY - FIXED SINGLE FAMILY UNITS (> 6 DU/ACRE)
- 132 RESIDENTIAL HIGH DENSITY - MOBILE HOME UNITS
- 133 RESIDENTIAL HIGH DENSITY - MULTIPLE DWELLING UNITS (< 2 - 3 STORIES)
- 134 RESIDENTIAL HIGH DENSITY - MULTIPLE DWELLING UNITS (HIGH RISE)
- 135 RESIDENTIAL HIGH DENSITY - FIXED AND MOBILE HOME UNITS
- 139 RESIDENTIAL HIGH DENSITY - UNDER CONSTRUCTION
- 140 COMMERCIAL AND SERVICES
- 141 RETAIL SALES AND SERVICES
- 142 WHOLESALE SALES AND SERVICES (EXCLUDING WAREHOUSES ASSOCIATED WITH INDUSTRIAL USE
- 145 CAMPGROUNDS
- 146 OIL AND GAS STORAGE (EXCEPT THOSE AREAS ASSOCIATED WITH INDUSTRIAL USE OR MANUFACTURING
- 148 CEMETERIES
- 149 COMMERCIAL AND SERVICES - UNDER CONSTRUCTION
- 150 INDUSTRIAL
- 152 TIMBER PROCESSING
- 154 OIL AND GAS PROCESSING
- 155 OTHER LIGHT INDUSTRIAL
- 156 OTHER HEAVY INDUSTRIAL
- 159 INDUSTRIAL - UNDER CONSTRUCTION
- 160 EXTRACTIVE
- 161 STRIP MINES
- 162 SAND AND GRAVEL PITS
- 163 ROCK QUARRIES
- 164 OIL AND GAS FIELDS
- 165 RECLAIMED LAND
- 166 HOLDING PONDS
- 167 ABANDONED MINING LANDS
- 170 INSTITUTIONAL
- 171 EDUCATIONAL FACILITIES
- 172 RELIGIOUS
- 173 MILITARY
- 175 GOVERNMENTAL
- 176 CORRECTIONAL
- 180 RECREATIONAL
- 181 SWIMMING BEACH
- 182 GOLF COURSES
- 183 RACE TRACKS
- 184 MARINAS AND FISH CAMPS
- 185 PARKS AND ZOOS
- 186 COMMUNITY RECREATIONAL FACILITIES
- 187 STADIUMS - FACILITIES NOT ASSOCIATED WITH HIGH SCHOOLS, COLLEGES, OR UNIVERSITIES
- 189 OTHER RECREATIONAL
- 190 OPEN LAND
- 191 UNDEVELOPED LAND WITHIN URBAN AREAS
- 192 INACTIVE LAND WITH STREET PATTERN BUT WITHOUT STRUCTURES

Notes

Pipelines:
Intake - from Waterbody to Reservoir
Makeup - from Reservoir to Conceptual Site
Blowdown - from Conceptual Site to Waterbody

Sources

FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

0 2 4 6
Kilometers
0 2 4 6
Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

FLUCCS Land Use Level 3 Legend
100 Series

FIGURE 4.2.8-10


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WMD LEVEL 3 CLASSIFICATION
210 CROPLAND AND PASTURELAND
211 IMPROVED PASTURES
212 UNIMPROVED PASTURES
213 WOODLAND PASTURES
214 ROW CROPS
215 FIELD CROPS
216 MIXED CROP
220, TREE CROPS
221 CITRUS GROVES
222 FRUIT ORCHARDS
223 OTHER GROVES
224 ABANDONED TREE CROPS
230 FEEDING OPERATIONS
231 CATTLE FEEDING OPERATIONS
232 POULTRY FEEDING OPERATIONS
240 NURSERIES AND VINEYARDS
241 TREE NURSERIES
242 SOD FARMS
243 ORNAMENTALS
245 FLORICULTURE
250 SPECIALTY FARMS
251 HORSE FARMS
252 DAIRIES
254 AQUACULTURE
255 TROPICAL FISH FARMS
260 OTHER OPEN LANDS - RURAL
261 FALLOW CROP LAND
310 HERBACEOUS (DRY PRAIRIE)
320 SHRUB AND BRUSHLAND
321 PALMETTO PRAIRIES
322 COASTAL SCRUB
323 ABANDONED GROVES
330 MIXED RANGELAND
410 UPLAND CONIFEROUS FORESTS
411 PINE FLATWOODS
412 LONGLEAF PINE - XERIC OAK
413 SAND PINE
414 PINE - MESIC OAK
420 UPLAND HARDWOOD FORESTS
421 XERIC OAK
422 BRAZILIAN PEPPER
424 MELALEUCA
427 LIVE OAK
428 CABBAGE PALM
430 UPLAND HARDWOOD FORESTS
434 HARDWOOD CONIFER MIXED
437 AUSTRALIAN PINE
440 TREE PLANTATIONS
441 CONIFEROUS PLANTATIONS
442 HARDWOOD PLANTATIONS
443 FOREST REGENERATION AREAS
510 STREAMS AND WATERWAYS
511 NATURAL RIVER, STREAM, WATERWAY
512 CHANNELIZED RIVER, STREAM, WATERWAY
520 LAKES
525 OPEN WATER WITHIN A FRESHWATER MARSH / MARSHY LAKE
530 RESERVOIRS
540 BAYS AND ESTUARIES
541 EMBAYMENTS OPENING DIRECTLY INTO THE GULF OF MEXICO OR THE ATLANTIC OCEAN
542 EMBAYMENTS NOT OPENING DIRECTLY INTO THE GULF OF MEXICO OR THE ATLANTIC OCEAN
543 ENCLOSED SALTWATER PONDS WITHIN A SALT MARSH
550 MAJOR SPRINGS
560 SLOUGH WATERS
571 ATLANTIC OCEAN
572 GULF OF MEXICO
610 WETLAND HARDWOOD FORESTS
611 BAY SWAMPS
612 MANGROVE SWAMPS
613 GUM SWAMPS
614 TITI SWAMPS
615 STREAM AND LAKE SWAMPS (BOTTOMLAND)
617 MIXED WETLAND HARDWOODS
618 WILLOW AND ELDERBERRY
619 EXOTIC WETLAND HARDWOODS
620 WETLAND CONIFEROUS FORESTS
621 CYPRESS
622 POND PINE
624 CYPRESS - PINE - CABBAGE PALM
625 HYDRIC PINE FLATWOODS
626 HYDRIC PINE SAVANNA
630 WETLAND FORESTED MIXED
640 VEGETATED NON-FORESTED WETLANDS
641 FRESHWATER MARSHES
642 SALTWATER MARSHES
643 WET PRAIRIES
644 EMERGENT AQUATIC VEGETATION
646 MIXED SCRUB-SHRUB WETLAND
650 NON-VEGETATED WETLANDS
651 TIDAL FLATS
652 SHORELINES
653 INTERMITTENT PONDS
654 OYSTER BARS
660 SALT FLATS
Notes
Pipelines:
Intake - from Waterbody to Reservoir
Makeup - from Reservoir to Conceptual Site
Blowdown - from Conceptual Site to Waterbody
Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
0 2 4 6
Kilometers
0 2 4 6
Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
FLUCCS Land Use Level 3 Legend
200 - 600 Series
FIGURE 4.2.8-10

WMD LEVEL 3 CLASSIFICATION

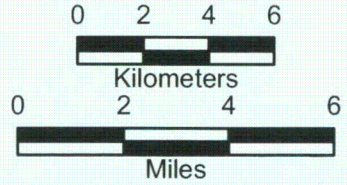
- 710 BEACHES OTHER THAN SWIMMING BEACHES
- 720 SAND OTHER THAN BEACHES
- 730 EXPOSED ROCK
- 740 DISTURBED LAND
- 741 RURAL LAND IN TRANSITION WITHOUT POSITIVE INDICATORS OF INTENDED ACTIVITY
- 742 BORROW AREAS
- 743 SPOIL AREAS
- 744 FILL AREAS - HIGHWAYS AND RAILWAYS
- 745 BURNED AREAS
- 810 TRANSPORTATION
- 811 AIRPORTS
- 812 RAILROADS
- 813 BUS AND TRUCK TERMINALS
- 814 ROADS AND HIGHWAYS
- 815 PORT FACILITIES
- 816 CANALS AND LOCKS
- 817 OIL, WATER OR GAS LONG DISTANCE TRANSMISSION LINES
- 818 AUTO PARKING FACILITIES
- 820 COMMUNICATIONS
- 830 UTILITIES
- 831 ELECTRIC POWER FACILITIES
- 832 ELECTRICAL POWER TRANSMISSION LINES
- 833 WATER SUPPLY PLANTS
- 834 SEWAGE TREATMENT
- 835 SOLID WASTE DISPOSAL
- 836 TREATMENT PONDS (NON-SEWAGE)
- 837 SURFACE WATER COLLECTION FEATURES
- 839 UTLITIES UNDER CONSTRUCTION

Notes

Pipelines:
Intake - from Waterbody to Reservoir
Makeup - from Reservoir to Conceptual Site
Blowdown - from Conceptual Site to Waterbody

Sources

FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

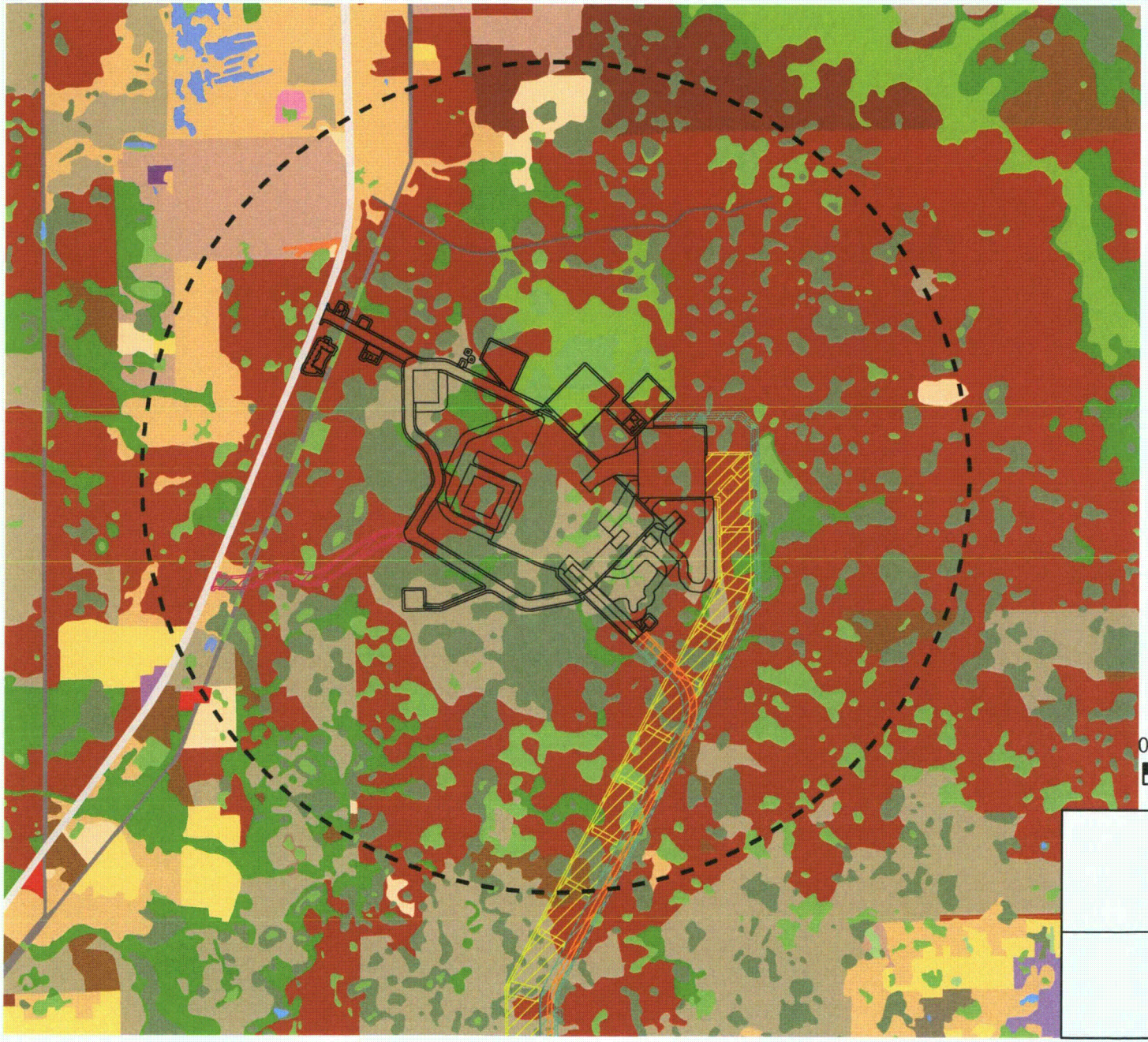


Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

FLUCCS Land Use Level 3 Legend
700 - 800 Series

FIGURE 4.2.8-10



N
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LEGEND

- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor
- Miscellaneous

Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

0 0.5 1 1.5
Kilometers

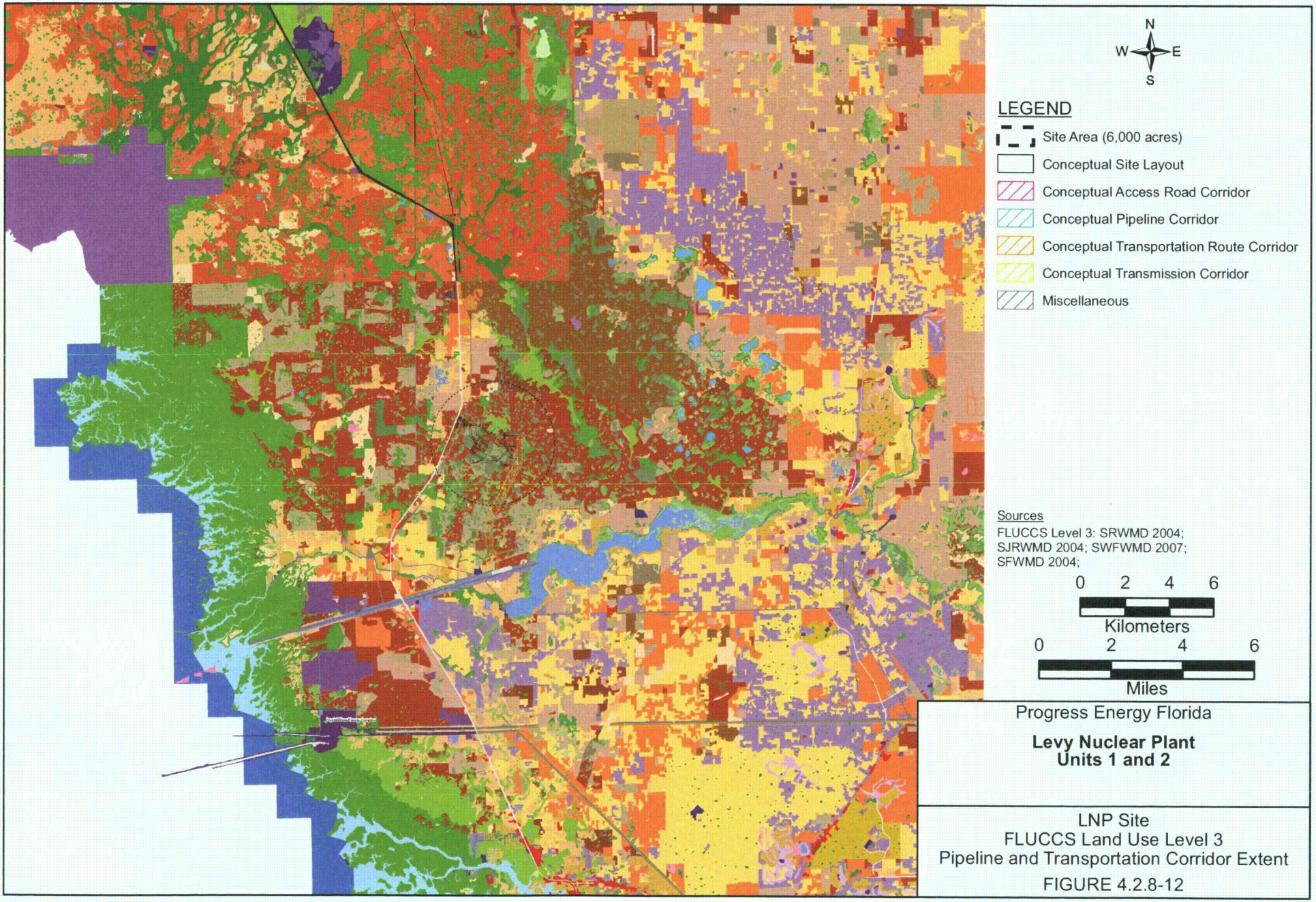
0 0.5 1 1.5
Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

LNP Site
FLUCCS Land Use Level 3
Site Extent

FIGURE 4.2.8-11


N
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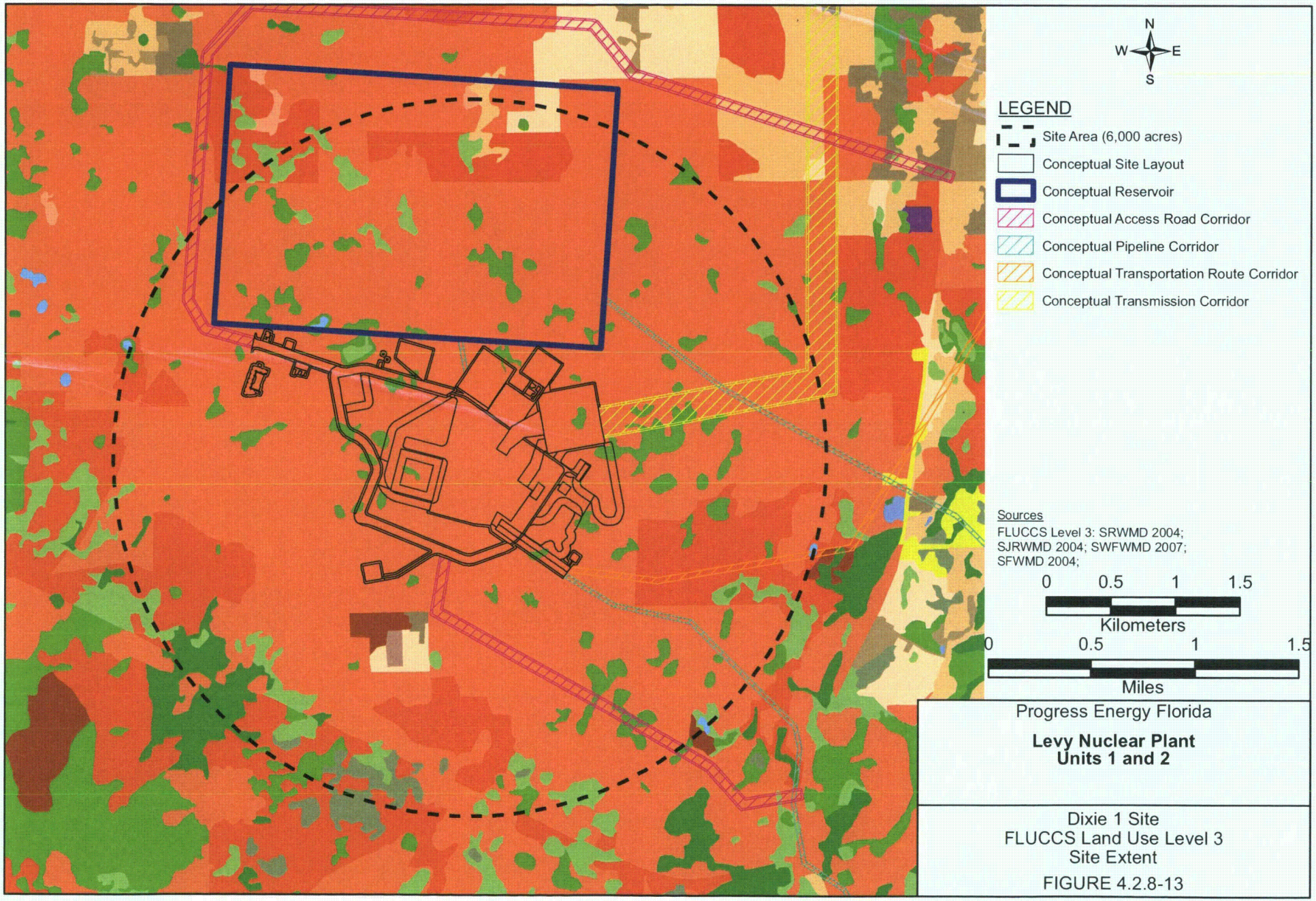
LEGEND
Site Area (6,000 acres)
Conceptual Site Layout
Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
Miscellaneous
Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
0 2 4 6
Kilometers
0 2 4 6
Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
LNP Site
FLUCCS Land Use Level 3
Pipeline and Transportation Corridor Extent
FIGURE 4.2.8-12

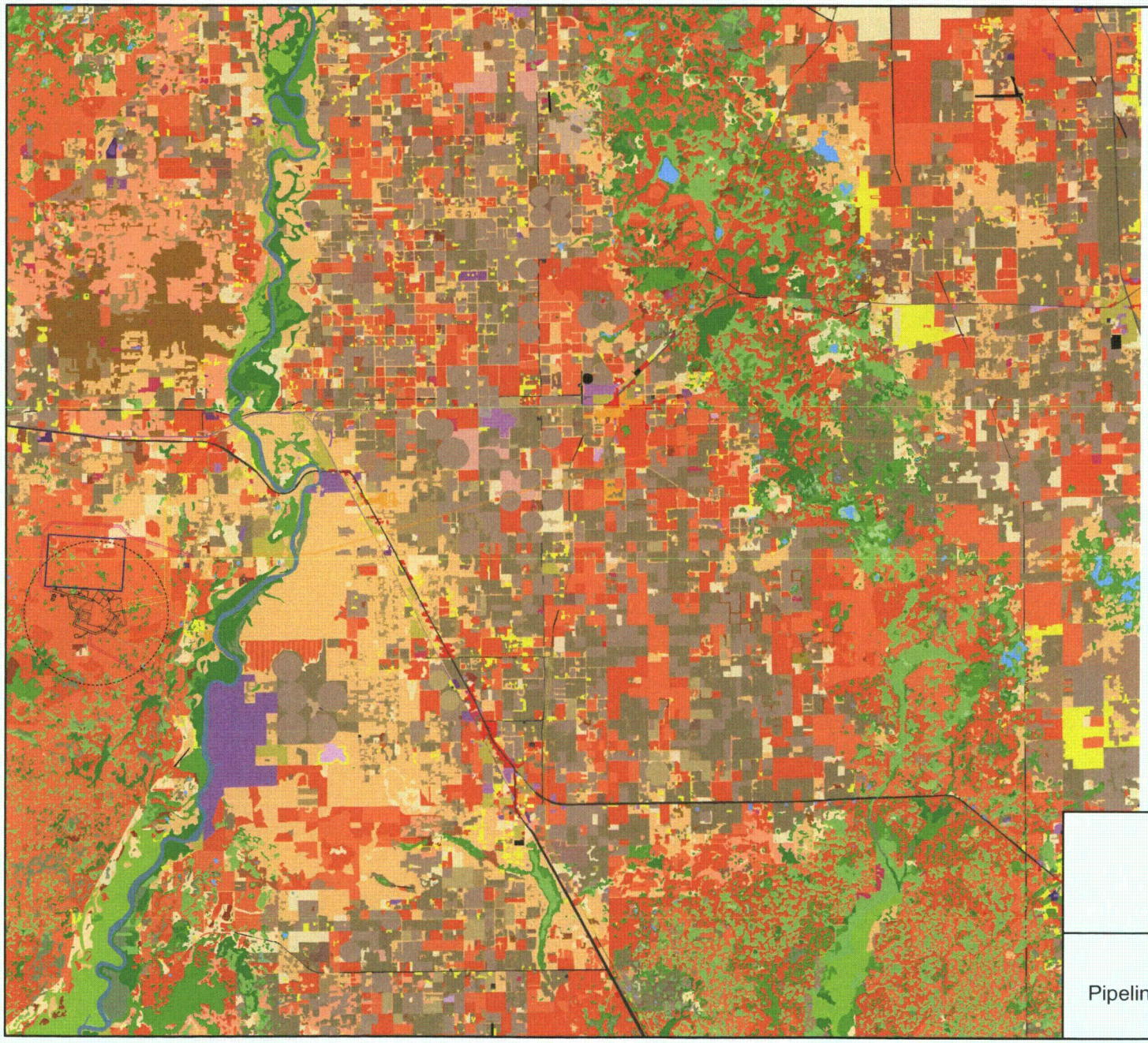


Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Dixie 1 Site
FLUCCS Land Use Level 3
Site Extent

FIGURE 4.2.8-13



N
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LEGEND

- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources

FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

0 2 4 6

Kilometers

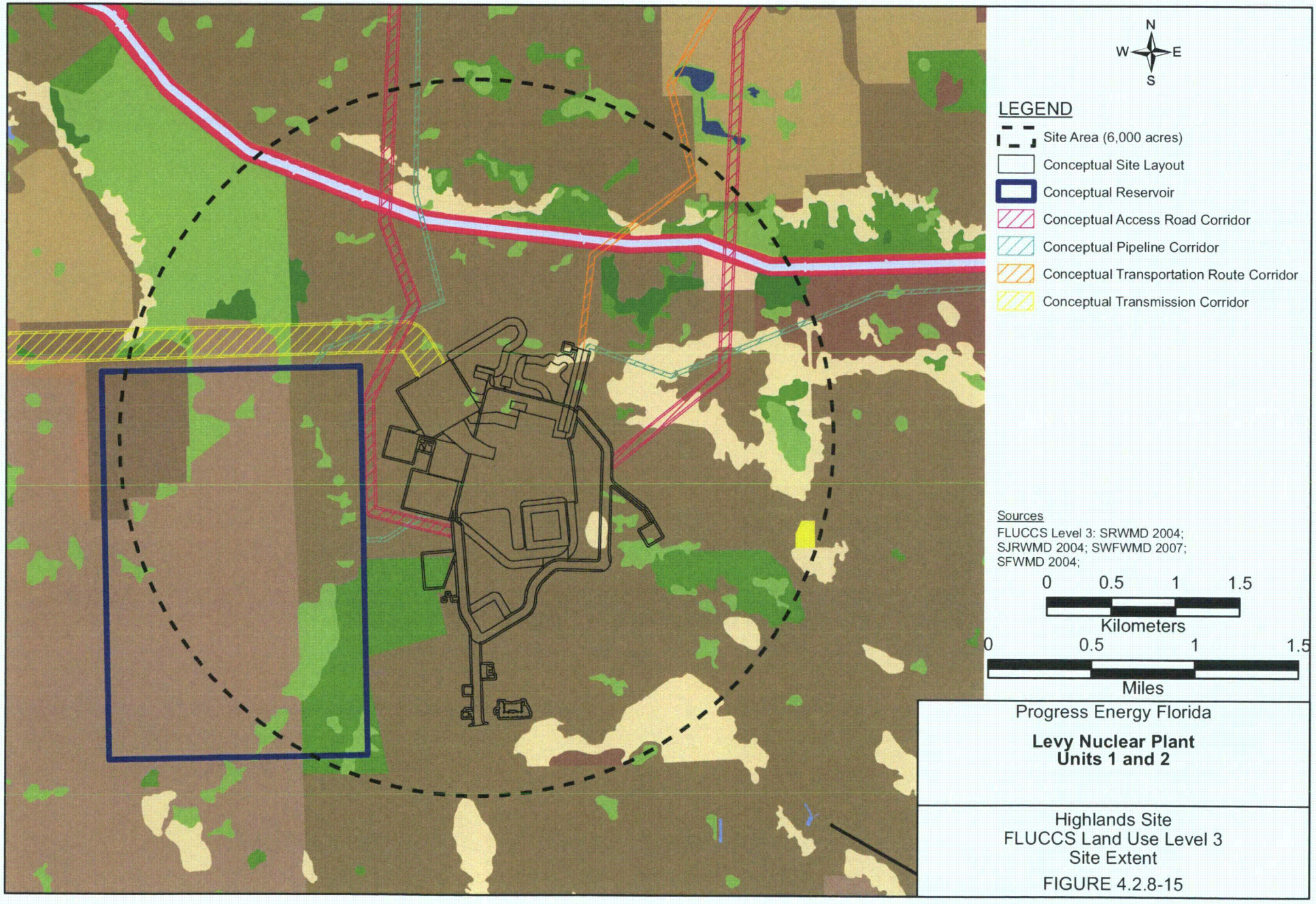
0 2 4 6

Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Dixie 1 Site
FLUCCS Land Use Level 3
Pipeline and Transportation Corridor Extent
FIGURE 4.2.8-14


N
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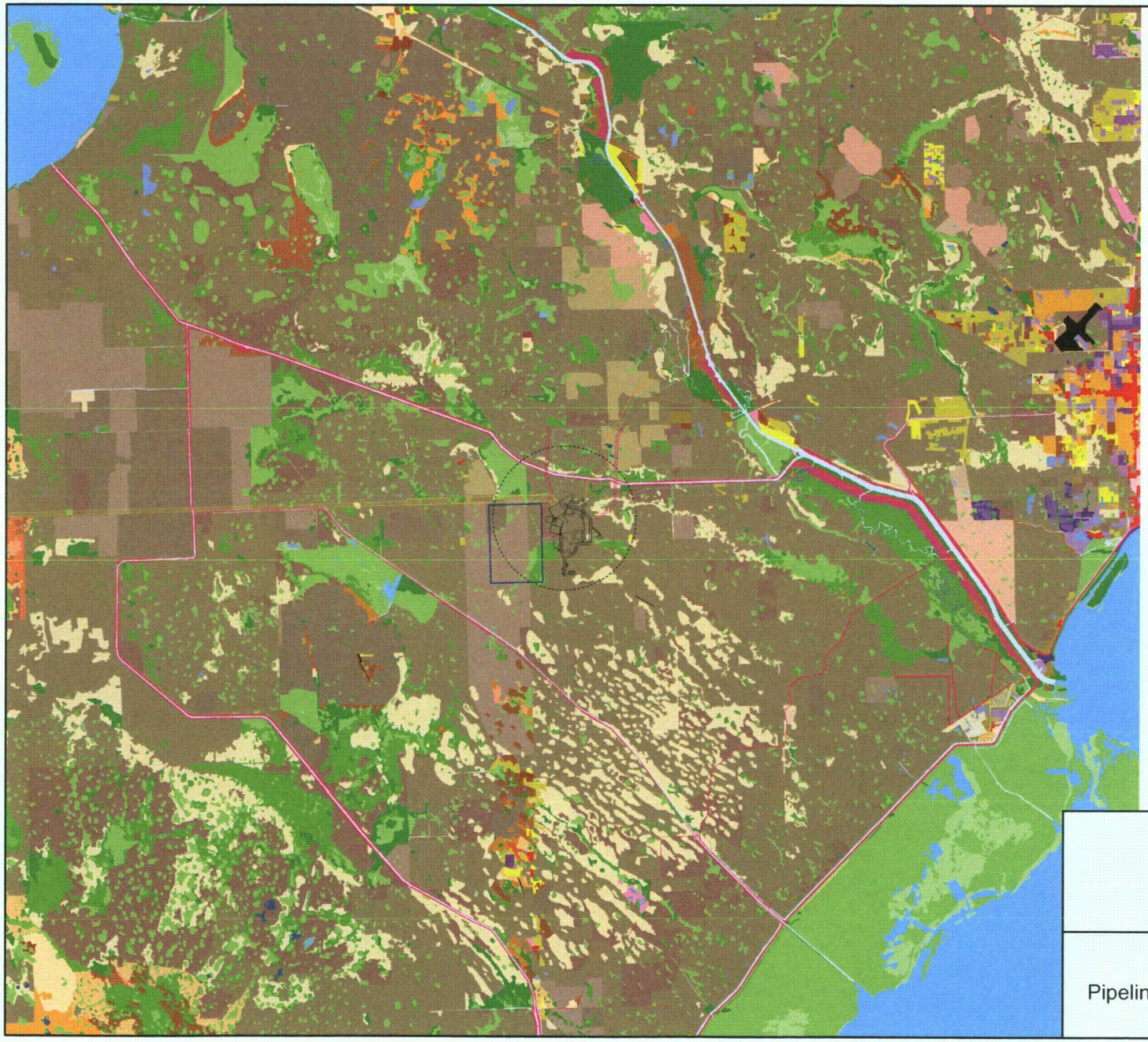
LEGEND
Site Area (6,000 acres)
Conceptual Site Layout
Conceptual Reservoir
Conceptual Access Road Corridor
Conceptual Pipeline Corridor
Conceptual Transportation Route Corridor
Conceptual Transmission Corridor
Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;
0 0.5 1 1.5
Kilometers
0 0.5 1 1.5
Miles
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Highlands Site
FLUCCS Land Use Level 3
Site Extent
FIGURE 4.2.8-15



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LEGEND

- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

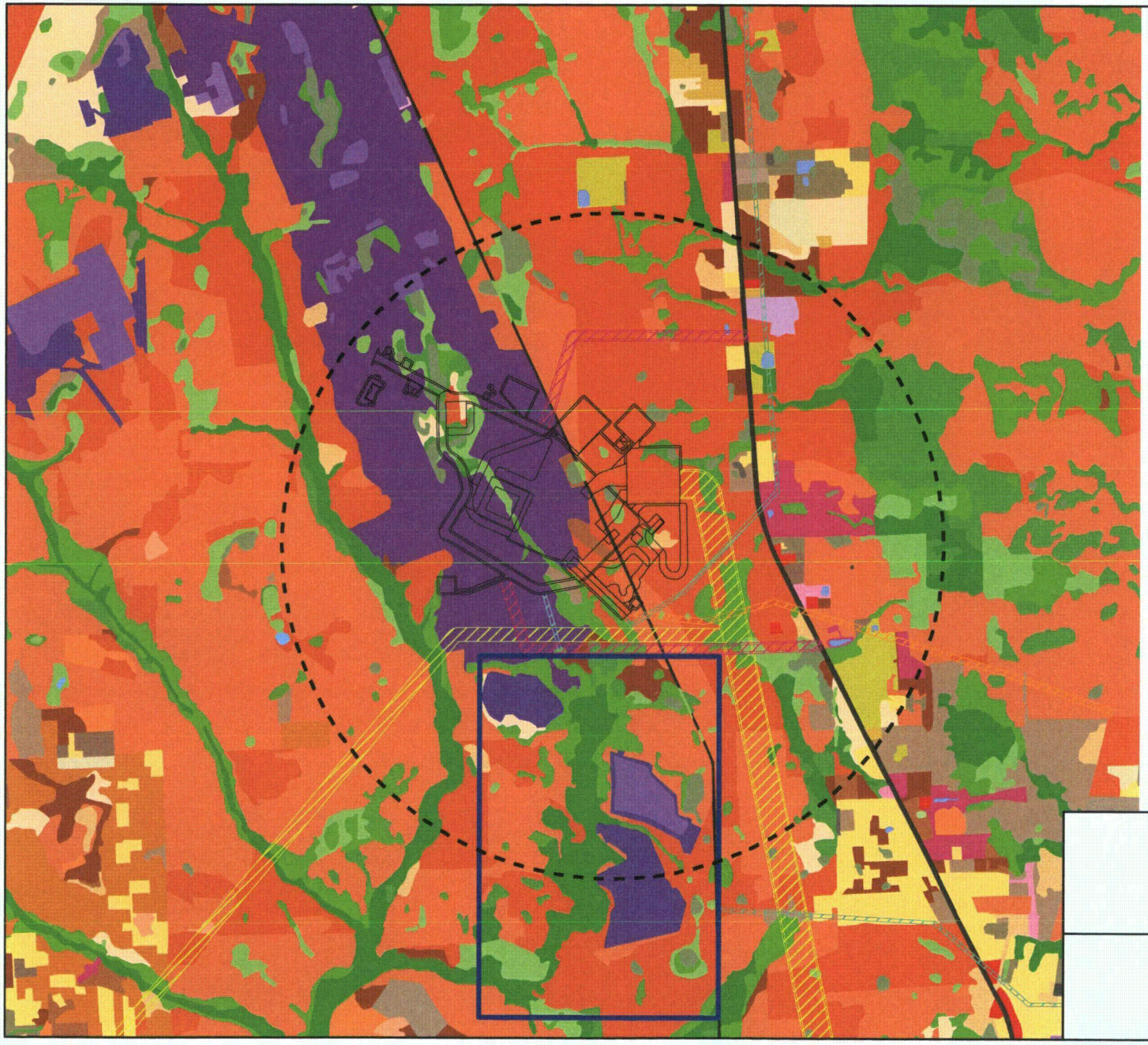
0 2 4 6
Kilometers

0 2 4 6
Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Highlands Site
FLUCCS Land Use Level 3
Pipeline and Transportation Corridor Extent
FIGURE 4.2.8-16



N
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LEGEND

- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources
FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

0 0.5 1 1.5
Kilometers

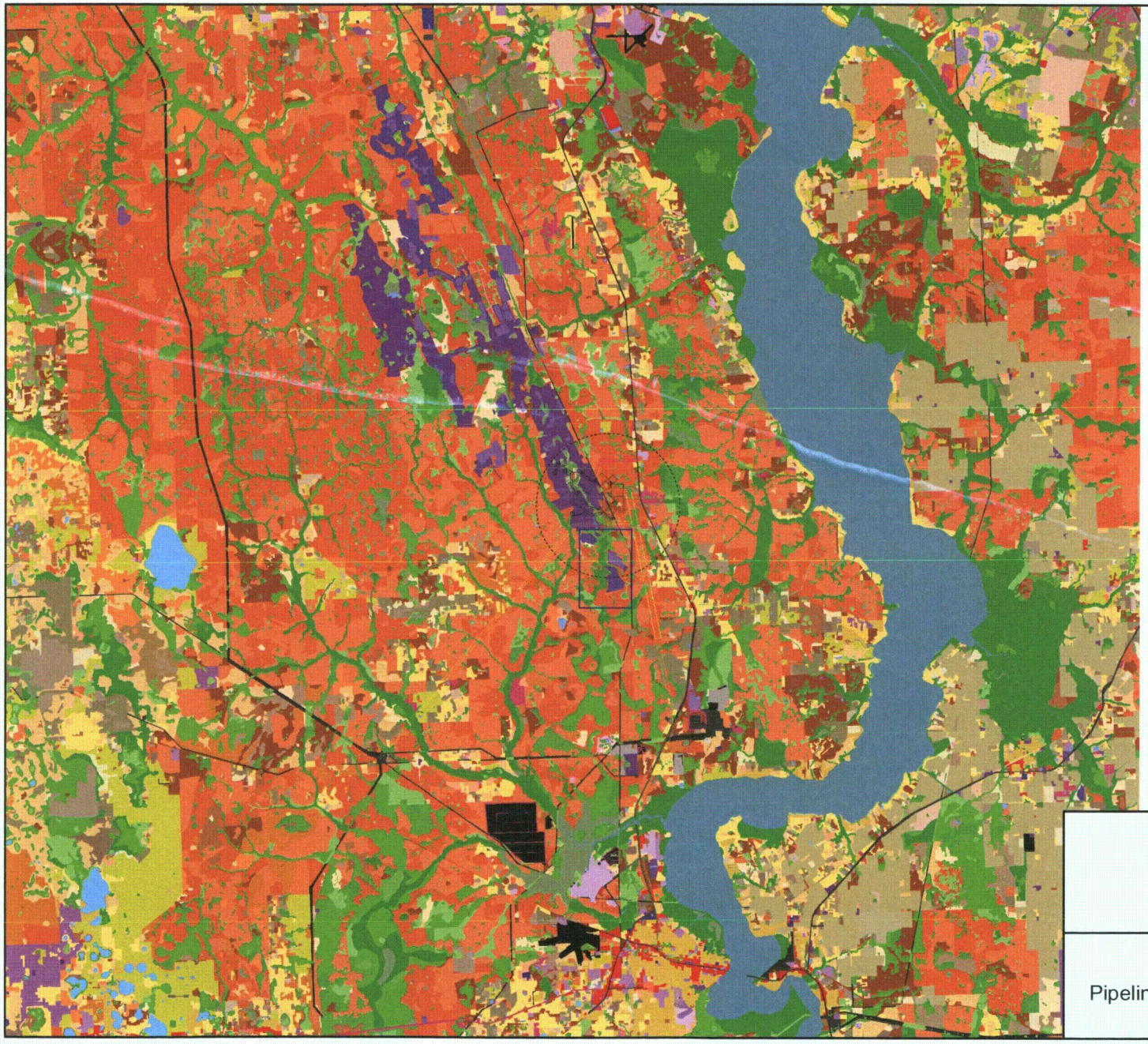
0 0.5 1 1.5
Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Putnam 3 Site
FLUCCS Land Use Level 3
Site Extent

FIGURE 4.2.8-17



N
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LEGEND

- Site Area (6,000 acres)
- Conceptual Site Layout
- Conceptual Reservoir
- Conceptual Access Road Corridor
- Conceptual Pipeline Corridor
- Conceptual Transportation Route Corridor
- Conceptual Transmission Corridor

Sources

FLUCCS Level 3: SRWMD 2004; SJRWMD 2004; SWFWMD 2007; SFWMD 2004;

0 2 4 6

Kilometers

0 2 4 6

Miles

Progress Energy Florida

Levy Nuclear Plant Units 1 and 2

Putnam 3 Site
FLUCCS Land Use Level 3
Pipeline and Transportation Corridor Extent

FIGURE 4.2.8-18