Enclosure

Turkey Point Units 6 and 7
COL Application

TURKEY POINT UNITS 6 & 7 FEDERAL BIOLOGICAL ASSESSMENT FOR SIX LISTED SPECIES
November 2012

Turkey Point Units 6 & 7

Federal Biological Assessment for Six Listed Species

090531-0100

FPL

November 2012

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LIST OF ABBREVIATIONS AND ACRONYMS

APLIC	Avian Power Line Interaction Committee
APP	avian protection plan
BA	biological assessment
BNP	Biscayne National Park
CERP	Comprehensive Everglades Restoration Plan
CFA	core foraging area
CFR	Code of Federal Regulations
COLA	Construction and Operating License Application
ECT	Environmental Consulting & Technology, Inc.
EIS	environmental impact statement
EMB	Everglades Mitigation Bank
ENP	Everglades National Park
ESE	Environmental Science and Engineering, Inc.
FDEP	Florida Department of Environmental Protection
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FPL	Florida Power & Light Company
ft	feet
FWC	Florida Fish and Wildlife Conservation Commission
GPS	global positioning system
HID	Hole-in-the-Donut
kg/yr	kilograms per year
km	kilometers
km^2	square kilometers
kv	kilovolts
mi^2	square miles
mph	miles per hour
MW	megawatts
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NWR	National Wildlife Refuge

LIST OF ABBREVIATIONS AND ACRONYMS
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the Plant	FPL Turkey Point Plant
PPSA	Florida Electrical Power Plant Siting Act
ppt	parts per thousand
Project	Turkey Point Units 6 & 7 Project (as described in Section 2.0)
SCA	site certification application
SFWMD	South Florida Water Management District
the Site	approximately 300-acre Units 6 & 7 Plant area
SR	State Road
U.S. 1	U.S. Highway 1
U.S. 41	U.S. Highway 41
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish & Wildlife Service
WCA	Water Conservation Area

1.0 INTRODUCTION

1.1 Project Background

Florida Power & Light Company (FPL) is in the process of licensing two new nuclear generating units (1,100 megawatts [MW] net each), associated non-transmission linear facilities corridors, and electric transmission line corridors all in Miami-Dade County, Florida (see Section 2.0, Project Description). The Turkey Point Units 6 & 7 Project (Project) is being licensed through the federal Nuclear Regulatory Commission (NRC) Construction and Operating License Application (COLA) process as well as the Florida Electrical Power Plant Siting Act (PPSA) process. Numerous other federal reviews, approvals, and permits will be required as well, including a federal environmental impact statement (EIS) and U.S. Army Corps of Engineers (USACE) 404 permit. USACE will evaluate the Project in accordance with the criteria set forth in Title 40, Part 230, Section 404(b)(1), Code of Federal Regulations (CFR), Guidelines for Specification of Disposal Sites for Dredged or Fill Material, as well as the public interest review factors identified in 33 CFR 320.4(a). The USACE permit decision will be documented in the USACE record of decision, which will be issued following the issuance of the EIS.

The FPL Turkey Point Plant (Plant) property is located on the shore of Biscayne Bay in Miami-Dade County, approximately 25 miles south of Miami, 8 miles east of Florida City, and 9 miles southeast of Homestead, Florida (Figure 1). Access to the Plant is primarily via SW 344th Street/Palm Drive from its intersection with U.S. Highway 1 (U.S. 1). The Plant is adjacent to the approximately 13,000-acre Everglades Mitigation Bank (EMB), also owned by FPL (Figure 2), and lies west of the boundary of Biscayne National Park (BNP), which extends along the shoreline both north and south of the generating facilities. Everglades National Park (ENP) is approximately 13 miles west of the Plant.

The Plant was originally constructed in 1964 with a once-through cooling system, which discharged warm water to Biscayne Bay. As mitigation for thermal impacts to the biota of Biscayne Bay, the use of the once-through cooling system was discontinued in the mid-1970s in favor of the 5,900-acre closed-loop industrial wastewater facility that currently serves Units 1 through 4 for cooling and the five existing units as an industrial wastewater treatment facility. Initially, a series of test cooling canals, a perched impoundment (the "moat" and associated berms), and a test cooling tower were constructed in 1969 north of the current location of the industrial wastewater facility. The industrial wastewater facility was completed in 1974; the canals of the existing industrial wastewater facility are

approximately 5 miles long, 2 miles wide, and consist of 32 discharge and 7 return canals totaling approximately 168 miles in length (Figure 3). Of the 5,900 acres contained within the industrial wastewater facility, approximately 1,500 acres are berms, which separate the canals and were created from spoils material from canal construction.

American crocodiles (*Crocodylus acutus*) were first observed at Turkey Point in 1976, and nesting was first documented on berms within the industrial wastewater facility in 1978 (Mazzotti and Brandt, 1994). As a result, FPL developed a crocodile management plan, which focuses on the creation and enhancement of habitats for crocodile nesting, as well as monitoring the reproductive success, growth, and survival of hatchlings. FPL's efforts have resulted in a significant increase in the number of crocodile nests and hatchlings in the industrial wastewater facility over nearly three decades, from 2 nests and 20 hatchlings in 1978 to 28 known nests and 512 hatchlings in 2008 and 24 known nests and 548 hatchlings in 2009.

The majority of the industrial wastewater facility and adjacent canals (Interceptor Ditch and L-31E, Sea Dade, C-107, S-20 Outfall, and Model Land Canals) (Figure 3) are included within the area designated as critical habitat for the American crocodile, which is classified as threatened by the U.S. Fish & Wildlife Service (USFWS) and endangered by the Florida Fish and Wildlife Conservation Commission (FWC) (Figure 4).

In addition to the American crocodile, several federally listed species have been observed or are likely to occur within the Project area. The eastern indigo snake (*Drymarchon corais couperi*) has been observed on FPL property south of the industrial wastewater facility within the EMB and the East Preferred Corridor. The wood stork (*Mycteria americana*) forages within the industrial wastewater facility, and nesting colonies occur in proximity to the proposed western transmission line corridors. Historical telemetry records indicate a Florida panther (*Puma concolor coryi*) utilized portions of the Plant property west of the L-31E Canal and portions of the western transmission line corridors. The Everglade snail kite (*Rostrhamus sociabilis plumbeus*) has been observed within the area of the western transmission line corridors by independent biologists (Darby, 2012). The Florida manatee (*Trichechus manatus latirostris*) occurs within Biscayne Bay and South Florida Water Management District (SFWMD) canals in the vicinity of the Plant and East Preferred Corridor. In addition, a variety of federally listed or candidate plant species have been observed or are likely to occur on the Plant property, transmission line corridors, and surrounding vicinity, as reflected in Table 1.

As a result of the various approvals required by regulatory agencies, FPL has been meeting proactively with state and federal agencies since the Project started in 2007. In anticipation of federally listed wildlife and plant species being potentially affected by various Project components, FPL proposed a comprehensive list of federally listed wildlife and plant species that may occur in the Project area and their current status, preferred habitat types, and likelihood of the Project affecting them (Table 1). In reviewing potential impacts to federally listed species, USFWS normally concludes one of three decisions: not likely to affect, may affect but not likely to adversely affect, and likely to adversely affect. As a result of meetings with several biologists from the USFWS Vero Beach office, USFWS has identified six wildlife species, where a may-affect determination might be made during the review process:

- American crocodile.
- Eastern indigo snake.
- Wood stork.
- Florida manatee.
- Everglade snail kite.
- Florida panther.

Based on a recent (May 30, 2012) meeting with USFWS in Vero Beach, FPL and USFWS agreed that a biological assessment (BA) for the aforementioned six species could be initiated in anticipation of formal consultation under the Endangered Species Act of 1973. This document is the applicant-prepared BA for the Project.

Due to the minimal potential for impact associated with the Project, the following candidate species are not included in the BA: mangrove rivulus (*Rivulus marmoratus*), gopher tortoise (*Gopherus polyphemus*), Florida brickell-bush (*Brickellia mosieri*), pinelands spurge (*Chamaesyce deltoidea* spp. *pinetorum*), and sand flax (*Linum arenicola*) (Table 1). Brief summaries of these species and rationale supporting exclusion of these species from the BA are provided in the following subsections. The Project is not likely to have any impact on the remaining species identified on Table 1. In addition, the Project is not likely to have any significant adverse impact to essential fish habitat, as described in Subsection 1.1.4.

1.1.1 Mangrove Rivulus

The mangrove rivulus is a small fish (average 2.5 centimeters) that inhabits mangrove swamps and is classified as a species of special concern by FWC and a candidate species by USFWS. The mangrove rivulus occurs from southeastern Brazil through the Antilles and Central America to Florida (Taylor, 1999). They are known to be tolerant of extreme conditions, including exposure to air for up to 30 days (Litwiller *et al.*, 2006), salinities ranging from 0 to 80 parts per thousand (ppt) (Taylor,

1999), and temperatures ranging from 41 to 100 degrees Fahrenheit (National Marine Fisheries Service [NMFS], 2009). The mangrove rivulus is the only vertebrate with a self-fertilizing hermaphroditic reproductive strategy, in which both eggs and sperm are produced by one parent, and offspring are genetically identical to the parent.

Mangrove rivulus have been collected within microhabitats of mangrove swamps, including crab burrows, stagnant pools, intermittently dry sloughs or ditches, and fossorial niches inside or under logs, debris, leaf litter, etc. (NMFS, 2009). On most of the east coast of Florida, its preferred microhabitat is the land crab (*Cardisoma* sp.) burrow, while in South Florida and on Florida's west coast, the preferred microhabitats are stagnant pools and old mosquito ditches within mangrove forests (NMFS, 2009). The primary threat is habitat destruction, with the distribution of this species being closely tied to the presence of mangroves (Taylor, 1999; Taylor *et al.*, 2008).

The status of the mangrove rivulus in Florida is difficult to determine due to cryptic habits that make this species invulnerable to most standard fish-collecting gear (Taylor *et al.*, 2008). Between 1928 and 1999, an estimated 2,188 specimens were collected in Florida (Taylor, 1999). However, recent studies employing new types of sampling gear have collected large numbers over small geographic areas. For example, McIvor and Silverman (2010) collected 450 specimens with modified bottomless lift nets from riverine mangroves in Southwest Florida from 2001 to 2007. The next most abundant fish taxon collected in this study was represented by only 37 individuals. Similarly, recent studies have indicated that this species is much more common in the Tampa Bay area than previously thought (McIvor, unpublished data). According to FWC's Biological Status Review for the Mangrove Rivulus (2011), FWC staff recommends the mangrove rivulus be removed from the state species of special concern list. Due to lack of documented observations within the Project area, limited disturbance of suitable habitat, and recent data indicating a relatively stable population within the species' range, the potential for adverse impact to the mangrove rivulus resulting from the Project is minimal.

1.1.2 Gopher Tortoise

The gopher tortoise is classified as threatened by FWC and as a candidate species by USFWS. Gopher tortoises are medium-sized terrestrial turtles that dig burrows for shelter, typically in dry sandy areas where the depth to the seasonal high water table is greater than 45 centimeters (FWC, 2007). Gopher tortoises are commonly found in dry upland habitats, such as sandhills, scrub, xeric oak hammock, and dry pine flatwoods, as well as pastures and old fields (FNAI, 2001). Suitable habitat is uncommon within the Project area. No gopher tortoise burrows or individuals have been observed

within the area of the proposed approximately 300-acre Units 6 & 7 Plant area (the Site) or associated facilities. In the event gopher tortoise burrows are encountered within the Project area during preclearing surveys, FWC's Gopher Tortoise Permitting Guidelines will be followed to safely capture and relocate any individuals. The potential for adverse impact to the gopher tortoise resulting from the Project is minimal.

1.1.3 Florida Brickell-Bush, Pinelands Spurge, and Sand Flax

These plant species are candidates for listing by USFWS and classified as endangered by the Florida Department of Agriculture and Consumer Services. Florida brickell-bush and pinelands spurge occur within pine rocklands habitat with an open, scattered shrub layer and exposed limestone. Sand flax also occurs in pine rocklands habitats as well as marl prairie and adjacent disturbed areas. These species have been observed within the West Preferred Corridor. Proposed impacts within suitable pine rocklands habitat are anticipated to be less than 2 acres (Transmission Completeness Response MD[3]-04, <http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Turkey_Point/Units_6_7/Completeness/TransmissionLine/FPL_TL_Completeness_Response/FPL_TP_3rd_Completeness_Response_TL/07%20MDC%2011-23-09%20supplemental%20analysis%20submittal.pdf>). Preclearing plant surveys will be conducted to aid in location of access roads and transmission line structure pads to avoid impacts to candidate plant species. Relocation of unavoidable individuals to undisturbed areas of the transmission line right-of-way may be conducted, if feasible. Due to the small area of suitable habitat, preclearing plant surveys, and relocation of unavoidable individuals, the potential for adverse impacts to these candidate plant species resulting from the Project is minimal.

1.1.4 Essential Fish Habitat

An assessment of essential fish habitat (EFH) for the Project was conducted in conformance with the Magnuson-Stevens Act (MSA), 2006. The MSA requires that all federal action agencies that fund, permit, and/or carry out nonfishing activities that may adversely impact EFH are required to consult with NMFS regarding the potential impacts of their actions on EFH. The Project is located adjacent to an area designated as EFH for five federal fishery management plans (FMPs): shrimp, snapper-grouper, coastal migratory pelagics, spiny lobster, and red drum. Of the 80 species that are federally managed under these plans, 27 are known to or may potentially occur either permanently or seasonally within the coastal habitats adjacent to the Project.

The definition of EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" is based on the life cycles of managed species. These life cycles are de-

pendent upon marine and aquatic habitats and their interaction with adjacent, connected, coastal wetlands with respect to nutrient transfer, salinity modulation, and other physiochemical interactions. The previous construction of the L-31E Levee and Canal, Turkey Point plant access road (Palm Drive), and industrial wastewater facility have created a hydrologic barrier between Biscayne Bay and the wetland communities west of these structures. The existing canals, levees, and roads prevent interactions between Biscayne Bay and wetlands west of these structures such that these wetlands do not serve as EFH. The areas east of these structures contain three habitats that are considered essential for fish species managed in the South Atlantic region and other species of interest: estuarine shrub/scrub (mangroves), estuarine water column, and seagrass.

Proposed impacts to wetland resources include those directly related to construction of Units 6 & 7, associated nonlinear associated facilities (nuclear administration building, training building, parking area, FPL reclaimed water treatment facility and associated delivery pipelines, radial collector wells and associated delivery pipelines to the Site, equipment barge unloading area), and the associated linear facilities (transmission lines, reclaimed water pipelines, and temporary construction access roadway improvements). With the exception of the radial collector well delivery pipelines and equipment barge unloading area, these wetland impacts occur west of the L-31E Levee and Canal, Turkey Point plant access road, and industrial wastewater facility, within areas that do not provide EFH.

No permanent impacts to EFH are expected as a result of construction and operation of the radial collector wells, delivery pipelines, and equipment barge unloading area. Radial collector wells will consist of central cassions constructed on uplands connected to laterals that will horizontally project from the caissons up to 900 feet (ft) at a depth of approximately 25 to 40 ft beneath Biscayne Bay, as described in Section 2.2.3. Operation of the radial collector wells is not anticipated to result in significant adverse effects on aquatic biota or seagrasses due to the extremely low through-substrate velocity, well-mixed shallow surface waters of the bay, and avoidance of impingement or entrainment of biota. The modeled effects of radial collector well operation upon salinity in the bay indicate a moderating effect on high- and low-salinity conditions and no significant difference in average conditions.

Approximately 3 acres of mangrove EFH will be temporarily impacted during installation of the radial collector well delivery pipelines (Figure 6). These temporary impacts will be mitigated through *in situ* restoration. Habitat will be restored within the pipeline installation area to avoid any permanent reduction in wetland acreage, wetland functional values, or EFH. Additional mitigation will be

provided to offset the time lag required for *in situ* restoration in the form of mangrove wetland restoration in the nearby EMB.

Expansion of the equipment barge unloading area will require excavation of upland fill material and approximately 0.1 acre of dredging adjacent to the existing manmade turning basin. The turning basin is adjacent to Biscayne Bay northeast of Turkey Point Units 1 through 4 (Figure 6). Sparse coverage of seagrass occurs within the turning basin, limited due to the steep slopes and depth of the excavated basin. Several small areas with 5- to 20-percent coverage of turtlegrass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*) were observed, comprising a total of approximately 170 square feet (0.004 acre) within the turning basin The expansion is not expected to result in any significant impacts to adjacent surface waters or EFH due to the limited area of in-water work and utilization of best management practices to isolate the construction area with turbidity curtains, silt screens, and/or other erosion and turbidity control measures.

1.2 BA Purpose and Organization

This Turkey Point Units 6 & 7 BA addresses the status and habitat preferences of six federally listed species in the area of the Site and associated facilities (Project area) and describes FPL's commitments regarding avoidance, minimization, and mitigation efforts to be conducted preconstruction, during construction, and during operation of the Project in consultation with USACE, USFWS, FWC, Florida Department of Environmental Protection (FDEP), SFWMD, and Miami-Dade County. FPL will minimize or avoid impacts to threatened and endangered species through preservation of all habitats identified as critical to such species to the greatest extent practicable, commitment to conduct preclearing surveys prior to construction, incorporation of wildlife protection features in access roadway designs, and adoption of mitigation measures to address any unavoidable impacts, in consultation with USACE, USFWS, FWC, FDEP, SFWMD, and Miami-Dade County.

For this BA, all information for these six species is addressed under the following sections:

- 2.0—Project Description.
- 3.0—Description of Listed Species and Critical Habitat.
- 4.0—Status of the Species within the Project Area.
- 5.0—Effects of the Proposed Action.
- 6.0—Conservation Measures.
- 7.0—Conclusions.

- 8.0—References.
- 9.0—List of Preparers.

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT UNITS 6 & 7 PROJECT

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at	Potential Impact to Listed Species
Common Name	Scientific Name	Status†	Miami Dade County	Turkey Point Units 6 & 7 Plant or Along Associated Facilities	from Turkey Point Units 6 & 7 Plant and Associated Facilities
ANIMALS					
Smalltooth sawfish	*Pristis pectinata*	E	Peninsular Florida; relatively common only in the Everglades region at the southern tip of the state	None.	Not likely—no impacts within suitable habitat; Project not located within designated critical habitat
Mangrove rivulus*	*Rivulus marmoratus*	C (NMFS)	Microhabitats of mangrove swamps including crab burrows, stagnant pools, intermittently dry sloughs or ditches, and fossorial niches inside or under logs, debris, leaf litter, etc. (NMFS, 2009)	None observed in Project area. Reported within BNP and in ditches near Black Creek Canal in 1961; approximately 1 mile north of Palmetto Lake in 1966; and approximately 2 miles north of Homestead Air Force Base in 1977. Recent literature indicates more abundant than previously considered. According to the Biological Status Review for the Mangrove Rivulus (2011), FWC staff recommends it be removed from state species of special concern list.	Minimal—due to minimal disturbance of suitable habitat and lack of documented observations within Project area
Sea turtles (loggerhead, green turtle, leatherback, hawksbill)	*Caretta caretta, Chelonia mydas, Dermochelys coriacea, Eretmochelys imbricata*	E‡	Oceanic waters, nests on coastal sand beaches; documented nesting within sand beaches of BNP, Key Biscayne, Golden Beach, Miami Beaches, Virginia Key, Fisher Island, and Cape Florida State Park	None.	Not likely—no impacts within suitable habitat, no nesting in vicinity of Project
Gopher tortoise*	*Gopherus polyphemus*	C	Upland well drained habitats, sandy soils, more northerly reaches of Miami-Dade County	None.	Minimal—if tortoise burrows found within Project facilities, FWC Gopher Tortoise Permitting Guidelines will be followed
American crocodile	*Crocodylus acutus*	T	Mangrove swamps, Turkey Point industrial wastewater facility; designated critical habitat	Documented at the Turkey Point facility since 1976; successfully nesting within industrial wastewater facility.	Small—implementation of crocodile management plan, Project avoidance of nesting areas, creation of additional nesting habitat within EMB to benefit continued growth of population onsite

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 2 of 7)

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at	Potential Impact to Listed Species
Common Name	Scientific Name	Status†	Miami Dade County	Turkey Point Units 6 & 7 Plant or Along Associated Facilities	from Turkey Point Units 6 & 7 Plant and Associated Facilities
Eastern indigo snake	*Drymarchon corais couperi*	T	Primarily uplands including pine rocklands, tropical hardwood hammocks, and also edges of mangrove swamps	Several observations since 2008 primarily south of the industrial wastewater facility; observation along eastern transmission line corridor.	Small—FPL will implement indigo snake management plan; snakes will utilize additional habitats onsite and along corridors after construction
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E	Currently inhabits seasonally inundated freshwater interior marshes within ENP and Big Cypress National Preserve; formerly occupied brackish marshes in the Cape Sable area of extreme Southwest Florida	None.	Not likely—preferred habitat uncommon in Project area, no individuals observed; Project not located within designated critical habitat
Piping plover	*Charadrius melodus*	T	Winters on both Gulf and Atlantic coasts, although much more common on Gulf coast; found on open, sandy beaches and on tidal mudflats and sandflats	None.	Not likely—no individuals observed, impact to nontidal mudflat habitat within industrial wastewater facility not considered preferred habitat
Wood stork	*Mycteria americana*	E	Nest in medium to tall trees in swamps; forage in shallow water marshes with fish and crayfish populations	Core foraging areas cover much of the western transmission line corridors. Four colonies near western transmission line corridors in Tamiami Trail vicinity.	Small—Foraging impacts will be assessed using USFWS foraging model, mitigation will be provided; risk assessment performed for potential collisions will be reevaluated after pre- and postconstruction field studies; FPL will install flight diverters on overhead ground wires near the four colonies
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	Freshwater marshes and lake edges, where primary prey (apple snail) found; occurs in ENP, WCA 3B, and wetlands along the western transmission line corridors; critical habitat is designated but well west of any Turkey Point facilities	Observed along western transmission line corridors in northern ENP and WCA 3B; historic nesting occurred near Tamiami Trail near the corridors.	Small—due to minimal disturbance of foraging habitat and lack of documented evidence of snail kite interactions with transmission lines
Florida bonneted bat*	*Eumops floridanum*	C	Primarily found in dwellings in urban areas, but occasionally in tree cavities	Only three records in Miami Dade County after 1965.	Not likely—FPL will not impact any existing dwellings; population in the county presumed to be rare

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 3 of 7)

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at	Potential Impact to Listed Species
Common Name	Scientific Name	Status†	Miami Dade County	Turkey Point Units 6 & 7 Plant or Along Associated Facilities	from Turkey Point Units 6 & 7 Plant and Associated Facilities
Florida panther	*Puma (=Felis) concolor coryi*	E	Large expanses of a mosaic of habitats including cypress and hardwood swamps, pine flatwoods, and upland hardwoods	Documented occurrences along western transmission line corridors in ENP and historical observations (1987 and 1988) west of the Turkey Point facility.	Small—due to minimal removal of cover habitat; may actually provide easier access for hunting along transmission line corridors, especially in wetter areas; proposed temporary construction access roadway improvements will incorporate wildlife fencing and underpasses as well as reduced speed limits to reduce potential panther impacts
Florida (West Indian) manatee	*Trichechus manatus*	E	Fresh, brackish, or salt water habitats; affected by water temperatures; critical habitat designated in Miami-Dade County	Can be expected in Biscayne Bay and canals inland from the coast.	Minimal—FPL will adhere to Manatee Guidelines for construction in water
INVERTEBRATES					
Miami blue butterfly	*Cylargus (=Hemiargus) thomasi bethunebakeri*	E	Not likely, currently known from the Key West area of Monroe County	None.	None
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	E	Not likely, known from the upper Florida Keys	None.	None
Lamarck's sheet coral*	*Agaricia lamarcki*	C	Dominant species of coral in moderate to deep water marine environs in southern and western portions of Caribbean, Atlantic, and Gulf Coasts of Florida and the Bahamas	None.	None
Pillar coral*	*Dendrogyra cylindrus*	C	Rare in Florida Keys; sometimes locally abundant in shallow marine waters of Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 4 of 7)

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at Turkey Point Units 6 & 7 Plant or Along Associated Facilities	Potential Impact to Listed Species from Turkey Point Units 6 & 7 Plant and Associated Facilities
Common Name	Scientific Name	Status†	Miami Dade County		
Elliptical star coral*	*Dichocoenia stokesii*	C	Common coral in marine waters in Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None
Boulder star coral*	*Montastraea annularis*	C	Common in intermediate marine waters in Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None
Mountainous star coral*	*Montastraea faveolata*	C	Common in shallow to intermediate marine waters in the Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None
Star coral*	*Montastraea franksi*	C	Common in intermediate to deep marine waters in the Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None
Rough cactus coral*	*Mycetophyllia ferox*	C	Common in shallow to intermediate marine waters in the Caribbean, Bahamas, and Atlantic and Gulf Coasts of Florida	None.	None
PLANTS					
Crenulate lead-plant	*Amorpha herbacea* var. *crenulata*	E	Pine rockland and marl prairie (transverse glades) with slash pine, saw palmetto, wax myrtle, and poisonwood	None.	Not likely—six populations known, five on managed areas (one introduced)
Blodgett's wild-mercury*	*Argythamnia blodgettii*	C	Sunny gaps and edges in pine rocklands, wet margins and openings of hammock, coastal rock barrens	None.	Not likely—approximately 18 occurrences and fewer than 10,000 plants remain; most in conservation areas
Florida brickell-bush*	*Brickellia mosieri*	C	Pine rocklands with open shrub layer, exposed limestone, and minimal leaf litter	Observed on western transmission line corridor.	Minimal—preclearing surveys will be used to aid in access road and structure pad location/design to avoid impact; relocation of individuals, if feasible

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 5 of 7)

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at	Potential Impact to Listed Species
Common Name	Scientific Name	Status†	Miami Dade County	Turkey Point Units 6 & 7 Plant or Along Associated Facilities	from Turkey Point Units 6 & 7 Plant and Associated Facilities
Hairy deltoid spurge	*Chamaesyce deltoidea* ssp. *adhaerens*	E	Pine rocklands with scattered shrubs and exposed limestone	None.	Not likely—preferred habitat uncommon in Project area, no individuals observed
Deltoid spurge	*Chamaesyce deltoidea* ssp. *deltoidea*	E	Pine rocklands with scattered shrubs and exposed limestone	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed
Pinelands spurge*	*Chamaesyce deltoidea* ssp. *pinetorum*	C	Pine rocklands with scattered shrubs and limestone	Observed on western transmission line corridor.	Minimal—preclearing surveys will be used to aid in access road and structure pad location/design to avoid impact; relocation of individuals, if feasible
Garber's spurge	*Chamaesyce garberi*	T	Sandy soils over limestone in pine rocklands, hammock edges, coastal rock barrens, grass prairies, salt flats, beach ridges, and swales	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed
Big Pine partridge pea*	*Chamaecrista lineata keyensis*	C	Edge of rockland hammocks and pinelands in the pine rocklands ecological community	None.	Not likely—almost the entire population occurs on two islands, Big Pine Key and Cudjoe Key; occurs on Big Pine Key where it is distributed across most of the island
Cape Sable thoroughwort*	*Chromolaena frustrata*	C	Coastal rock barrens, sunny edges of rockland hammocks, and coastal berms	None.	Not likely—only four or five protected; occurrences known in Monroe County (FNAI)
Florida semaphore cactus*	*Consolea corallicola*	C	Grows close to salt water on bare rock with a minimum of humus-soil cover in hammocks near sea level; habitats include low buttonwood transition areas between rockland hammocks and mangrove swamps and possibly other habitat such as openings in rockland hammocks	None.	Not likely—two naturally occurring populations and a few planted populations; The Nature Conservancy owns and maintains Torchwood Hammock Preserve on Little Torch Key in Monroe County; second population occurs in Miami-Dade County on Swan Key in BNP

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 6 of 7)

USFWS Listed Species		Federal Status†	Potential Habitat within Miami Dade County	Documented Occurrence at Turkey Point Units 6 & 7 Plant or Along Associated Facilities	Potential Impact to Listed Species from Turkey Point Units 6 & 7 Plant and Associated Facilities
Common Name	Scientific Name				
Florida prairie clover*	*Dalea carthagenensis* var. *floridana*	C	Pine rocklands, edges of rockland hammocks, coastal uplands, marl prairie	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed
Few-flowered fingergrass*	*Digitaria pauciflora*	C	Pine rocklands, marl prairie	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed
Small's milk pea	*Galactia smallii*	E	Redland pine rocklands of southern Dade County, with South Florida slash pine, saw palmetto, willow bustic, and poisonwood	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed
Johnson's seagrass	*Halophila johnsonii*	T	Indian River Lagoon and northern Biscayne Bay	None.	Not likely—Project not located within range of species
Gulf licaria*	*Licaria triandra*	C	Rockland hammocks	None.	Not likely—preferred habitat uncommon in Project area; no individuals observed; most populations destroyed by development; now found in only one park in Miami-Dade County
Sand flax*	*Linum arenicola*	C	Pine rockland, marl prairie, and adjacent disturbed areas	Observed on western transmission line corridor.	Minimal—preclearing surveys will be used to aid in access road and structure pad location/design to avoid impact; relocation of individuals, if feasible
Carter's small-flowered flax*	*Linum carteri* var. *carteria*	C	Mowed pine rockland, roadside, and marl prairies	None.	Not likely—preferred habitat uncommon in Project area, no individuals observed; nine known occurrences in Miami-Dade County, three on conservation lands

TABLE 1. FEDERALLY LISTED SPECIES POTENTIALLY AFFECTED BY THE TURKEY POINT 6 & 7 PROJECT (Continued, Page 7 of 7)

USFWS Listed Species		Federal	Potential Habitat within	Documented Occurrence at	Potential Impact to Listed Species
Common Name	Scientific Name	Status†	Miami Dade County	Turkey Point Units 6 & 7 Plant or Along Associated Facilities	from Turkey Point Units 6 & 7 Plant and Associated Facilities
Everglades bully*	*Sideroxylon reclinatum* ssp. *austrofloridense*	C	Pinelands with tropical understory vegetation on limestone rock (pine rocklands); in ENP, pinelands, pineland/prairie ecotones, and prairies; occurrences in Miami-Dade County are within remnant pine rocklands	None.	Not likely—largest population (14 occurrences) located at Long Pine Key within ENP; another population (not surveyed) occurs within Big Cypress National Preserve; occurs at Miami-Dade County's Larry and Penny Thompson Park; smaller occurrences on private land, including some natural forest community fragments

*Includes candidate species for listing/delisting.
† E = endangered.
T = threatened.
C = candidate proposed for listing.
‡Federally listed as a threatened species in the state of Florida.

Sources: Golder Associates, Inc., 2012.
Environmental Consulting & Technology, Inc. (ECT), 2012.

2.0 PROJECT DESCRIPTION

The proposed action is the construction and operation of two approximately 1,100-MW (net) nuclear units on the existing approximately 11,000-acre FPL Turkey Point Plant property located in unincorporated Miami-Dade County. The Project will include the two nuclear units and other associated linear and non-linear facilities. These associated facilities are considered interrelated and interdependent actions associated with the proposed action. FPL submitted its site certification application (SCA) (FPL, 2009) to FDEP in June 2009. This widely distributed application and subsequent responses to completeness questions more fully detail the various Project components, how they will be constructed, and potential environmental impacts. USFWS was also provided courtesy copies of those documents.

The Turkey Point Units 6 & 7 plant area, where the generating facilities and associated infrastructure such as the Clear Sky substation and makeup water reservoir will be located, as well as laydown areas to the west are entirely located within a 300-acre site within the existing industrial wastewater facility. Figures 5 and 6 present the Site, non-linear associated facilities, and areas used during construction.

Associated facilities and areas used during construction contained within the Turkey Point Plant property include laydown and parking areas, an access road on SW 359th Street, the nuclear administration building, the training building and parking area, FPL reclaimed water treatment facility and pipelines, radial collector wells and pipelines, equipment barge unloading area, spoil areas, potable water pipelines, and transmission line corridors exiting the property to the north and west. Associated facilities located outside the Turkey Point Plant property include the temporary construction access roadway improvements, reclaimed and potable water pipelines, East Preferred Corridor, and West Preferred Corridor (Figure 7).

The following summarizes the existing habitats and proposed impacts within the Site and areas designated for construction of associated facilities.

2.1 Site

The approximately 300-acre Site consists of the 218-acre plant area for Units 6 & 7 and adjacent areas designated for laydown. Existing vegetation/land use within the Site includes hypersaline mud

flats (Florida Land Use, Cover, and Forms Classification System [FLUCFCS] 650), manmade active cooling canals (FLUCFCS 510), manmade remnant canals (FLUCFCS 511), previously filled areas/roadways (FLUCFCS 744), red mangrove (*Rhizophora mangle*) heads (FLUCFCS 612-A) associated with historical tidal channels, dwarf mangroves (FLUCFCS 612-B), open water/discharge canal (FLUCFCS 531) associated with the proposed laydown area on the western portion of the Site, wet spoil berms (FLUCFCS 743-Wet) associated with remnant canals, and upland spoil areas (FLUCFCS 743) (Figure 8).

Construction on the Site will impact a total of approximately 250 acres of previously disturbed wetland habitat types within the industrial wastewater facility, primarily in the form of hypersaline mud flats (approximately 187.5 acres), whose water elevation is artificially maintained. The historical tidal connections to Biscayne Bay were severed during construction of the industrial wastewater facility, which has resulted in hypersaline conditions, altered hydrology, and elevated water temperatures in the industrial wastewater facility. Whereas undisturbed tidal creeks of Biscayne Bay typically contain dense mangrove growth along the entire creek channel, the Site contains sparse pockets of stunted mangroves, likely due to stress caused by the hypersaline conditions and drastic fluctuations in water levels.

The laydown area in the western portion of the Site contains approximately 12 acres of open water associated with a manmade active cooling canal. This area experiences highly variable hydrology resulting from operation of the existing Turkey Point Plant. Due to the elevated water temperatures, high salinity, and altered hydrology, much of the substrate is bare sediment. Approximately 17 acres of dwarf mangroves and dead buttonwood (*Conocarpus erectus*) are located within the proposed laydown area. The extreme low temperatures experienced in the winter of 1989 and the impact of Hurricane Andrew in 1992 further stressed the vegetative community within the Site, resulting in high mortalities, particularly of buttonwood.

Spoils material removed from the Site during construction will be placed on approximately 200 acres of existing spoil areas on the southern boundary of the industrial wastewater facility and along the existing berms of one north-south canal within the industrial wastewater facility, as illustrated in Figure 6.

2.2 Non-Linear Associated Facilities

2.2.1 Nuclear Administration Building, Training Building, and Parking Area

Land use/cover in the area proposed for construction of the nuclear administration building, training building, and parking area includes isolated parcels of mangrove swamp (FLUCFCS 612), mangrove/coastal plain willow (*Salix caroliniana*) (FLUCFCS 612/618), and fill areas/roadways (FLUCFCS 744) surrounded by the existing Turkey Point Plant infrastructure. These areas comprise approximately 32 acres, including approximately 18.5 acres of isolated mangroves, 7.6 acres of isolated mangrove/willow wetlands, and 5.9 acres of fill areas located south of the existing Units 3 and 4 parking lots.

2.2.2 FPL Reclaimed Water Treatment Plant

An approximately 44-acre FPL reclaimed water treatment facility is proposed north of the industrial wastewater facility between the L-31E Canal and the existing Turkey Point Plant access road. The originally proposed location for the FPL reclaimed water treatment facility is an area of sawgrass (*Cladium jamaicense*) marsh and scattered dwarf mangroves (FLUCFCS 6411/612-B) located adjacent to the existing Turkey Point Plant access road north of the test cooling canals (Figure 6). The potential alternative location for the FPL reclaimed water treatment plant is located on the historically dredged "moat" area to the west of the test cooling canals. The area currently consists of upland spoil piles dominated by Australian pine (*Casuarina equisetifolia*) (FLUCFCS 437), excavated open water canals and ditches (FLUCFCS 510/511), an upland access pathway (FLUCFCS 814), sawgrass marsh (FLUCFCS 6411), dwarf red mangroves (FLUCFCS 612-B), and exotic wetland hardwoods (FLUCFCS 619) dominated by Australian pine.

2.2.3 Radial Collector Wells

The radial collector wells, substratum collectors of saltwater that will recharge from below Biscayne Bay, are a necessary backup cooling water source for the new nuclear units. The wells will be used when reclaimed water, the primary source of cooling water, is not available in a quantity or quality needed to meet the Project's cooling water needs. Up to four radial collector well caissons will be located in uplands on the Turkey Point peninsula to the east of the existing Plant. The footprint for each caisson will be approximately 25 to 30 ft in diameter. Each radial collector well will consist of a central reinforced concrete caisson extending below the ground level with laterals projecting from the caisson. The well laterals will be at a depth of approximately 25 to 40 ft and will be advanced from within the caissons horizontally a distance of up to 900 ft beneath Biscayne Bay. The radial collector

well pumps will be located within the onshore caissons. The pumps are submersible and will be housed below ground level within the caissons. Vegetative communities present within the Turkey Point peninsula include previously filled areas/roadways (FLUCFCS 744) and adjacent coastal mangrove swamp (FLUCFCS 612). The caissons will be located within previously filled areas of the peninsula.

The drilling technology envisioned for the radial collector well laterals would be a conventional rotary-type drilling method extending horizontally, whereby the drilling fluid would consist of formation water. The drilling would occur from a position inside the concrete caisson that would be maintained in a dewatered condition. This would place the drilling equipment below sea level and use the natural head in the formation (and bay) to push the drilling water (and cuttings) back toward the caisson, where the drilling water and cuttings would be managed to handle the water and spoils generated. This reverse-flow scenario will maintain control of the drilling water within the drill bore and within the caisson precluding "frac-outs" as the water in the formation would be drawn in rather than pushed out by head pressure.

2.2.4 Equipment Barge Unloading Area

To facilitate equipment barge unloading, a portion of the existing barge unloading area (FLUCFCS 512) will be expanded through excavation of approximately 0.21 acre of adjacent uplands. Approximately 0.44 acre of uplands will be used for construction of concrete aprons adjacent to the excavated equipment barge unloading area. Upland portions of the equipment barge unloading area consist of land currently classified as electric power facilities (FLUCFCS 831). Approximately 0.1 acre of dredging will be required to connect the equipment barge unloading area to the existing turning basin.

2.3 Associated Non-Transmission Linear Facilities

2.3.1 Reclaimed Water Delivery Pipelines

The reclaimed water pipeline corridor is approximately 9 miles in length, starting at the Miami-Dade Water and Sewer Department South District Wastewater Treatment Plant and ending at the FPL reclaimed water treatment facility. The reclaimed water pipeline corridor is located within or adjacent to existing roadways, canals, and transmission line rights-of-way between the South District Wastewater Treatment Plant and the Site. Dominant land use and vegetative communities within the corridor include mangrove (FLUCFCS 612) and freshwater marsh wetlands (FLUCFCS 641), tree

nurseries (FLUCFCS 241), Brazilian pepper (*Schinus terebinthifolius*) (FLUCFCS 422), several manmade canals (FLUCFCS 510), maintained grassed-roadside rights-of-way (FLUCFCS 814), exotic wetland hardwoods (FLUCFCS 619), and mixed hardwood wetlands (FLUCFCS 617). Pipeline installation will require temporary disturbance of an approximately 75-ft-wide right-of-way within of the pipeline corridor to facilitate trench excavation. Areas of temporary impact will be restored following pipeline construction.

2.3.2 Treated Reclaimed Water Delivery Pipelines

From the potential alternative location for the FPL reclaimed water treatment facility, the treated reclaimed water delivery pipelines will be installed beneath upland access roads and fill areas (FLUCFCS 814 and 744) on the northern edge of the industrial wastewater facility east then south to the Site. From the originally proposed location for the FPL reclaimed water treatment facility, installation of the treated reclaimed water delivery pipelines to the Site would require temporary impact to approximately 3.4 acres of sawgrass/dwarf mangrove wetlands (FLUCFCS 6411/612-B) and mixed wetland hardwoods (FLUCFCS 617).

2.3.3 Radial Collector Well Delivery Pipelines

From the radial collector well caissons located on the Turkey Point peninsula, approximately 1.6 miles of radial collector well delivery pipelines will be installed underground to the Site. Vegetative communities along the radial collector well delivery pipelines include previously filled areas/roadways (FLUCFCS 744) and adjacent coastal mangrove swamp (FLUCFCS 612). Pipeline installation will require approximately 3 acres of temporary impact to mangrove wetlands associated with trench excavation. Areas of temporary impact will be restored following pipeline construction.

2.3.4 Temporary Construction Access Roadway Improvements

Temporary construction access roadway improvements are necessary to ensure safe, secure access during construction and facilitate the most cost-effective construction schedule for the Project. The improvements to existing paved roadways consist of widening the following from two lanes to four:

- SW 328th Street/North Canal Drive from SW 137th Avenue/Tallahassee Road to SW 117th Avenue (approximately 2 miles).
- SW 344th Street/Palm Drive from SW 137th Avenue/Tallahassee Road West to SW 137th Avenue/Tallahassee Road East (approximately 0.3 mile).
- SW 117th Avenue from SW 328th Street/North Canal Drive to SW 344th Street/Palm Drive (approximately 1 mile).

The improvements to existing unpaved roadways consist of the following:

- SW 359th Street will be improved to three lanes from SW 137th Avenue/Tallahassee Road to SW 117th Avenue and to four lanes from SW 117th Avenue to the Units 6 & 7 construction parking areas and Site (approximately 5 miles). This segment will require a bridge over the L-31E Canal.
- SW 137th Avenue/Tallahassee Road will be improved to three lanes from SW 344th Street/Palm Drive south to SW 359th Street (approximately 1 mile).
- SW 117th Avenue will be improved to four lanes from SW 344th Street/Palm Drive south to SW 359th Street (approximately 1 mile).

In addition, intersection improvements at six locations will be made to accommodate peak construction traffic.

The roadway improvements are located adjacent to and along established road and transmission line rights-of-way. A total of approximately 130 acres would be disturbed, including approximately 30 acres of existing roadways and 82 acres of wetlands in the form of freshwater marshes (FLUCFCS 641), exotic wetland hardwoods (FLUCFCS 619), dwarf mangroves (FLUCFCS 612-B), mixed hardwood wetlands (FLUCFCS 617), and canals and ditches (FLUCFCS 510/511). The roadway improvements are uniquely required for safe and efficient construction of the facility, but not all are necessary postconstruction. Although FPL is providing compensatory mitigation for all wetland impacts associated with the temporary construction access roadway improvements as if they are permanent, FPL will also remove lanes required for temporary construction access following construction of Units 6 & 7 and restore the temporarily impacted wetlands. Permanent access road facilities on SW 359th Avenue will be limited to an 18-ft transmission line access road.

2.3.5 Potable Water Pipelines

The potable water pipelines corridor is approximately 9 miles in length and 330 ft wide, extending from the Miami-Dade Water and Sewer Department potable water main near Florida's Turnpike and SW 137th Avenue/Tallahassee Road to the Site. The potable water pipelines rights-of-way will be located within and/or adjacent to existing or planned roads and rights-of-way. The pipelines are proposed to be installed under the existing medians or roads on SW 137th Avenue to SW 328th Street, then within the proposed temporary construction access roadway improvements from SW 328th Street to the Site.

2.4 Transmission Line Corridors

Within the PPSA certification proceeding, multiple transmission line corridors (proposed by FPL and others) are under consideration. FPL's SCA addresses FPL's East Preferred, West Preferred, and West Secondary Corridors (see Figure 7). This BA addresses FPL's two preferred options—the West and East Preferred Corridors. In the event FPL's West Secondary Corridor or one or more other alternate transmission line corridors proposed by third parties are certified, this BA will be updated as appropriate.

New 500- and 230-kilovolt (kV) electric transmission lines are needed to connect the Units 6 & 7 proposed Clear Sky substation to various other existing FPL substations in Miami-Dade County. Approximately 88.7 miles of transmission line corridors are being proposed (52 miles West Preferred Corridor and 36.7 miles East Preferred Corridor). Within the West Preferred Corridor, FPL is also proposing to certify an expansion of its Levee substation in northern Miami-Dade County and two access-only corridor laterals (total of 5.25 miles) that will be used solely for access to the new transmission lines.

2.4.1 West Preferred Corridor

From the proposed onsite Clear Sky substation, two 500-kV lines to the Levee substation and one 230-kV line to the Pennsuco substation are proposed within an approximately 52-mile corridor of typically 330 ft in width, referred to as the West Preferred Corridor. Two 500-kV lines are proposed west from the Site and then north to the existing Levee substation located in unincorporated Miami-Dade County east of State Road (SR) 997/Krome Avenue and north of U.S. Highway 41 (U.S. 41)/ Tamiami Trail. FPL currently has available right-of-way (either in fee or easement) for a significant portion of this distance. The total length of this transmission line corridor to Levee substation is approximately 43.6 miles. FPL acquired this right-of-way in the 1960s and early 1970s in anticipation of the future need for electrical facilities to serve electrical load growth in Miami-Dade County and Southeast Florida. Approximately 7.4 miles of this right-of-way was encompassed by the addition of the ENP Expansion Area to ENP in 1989. As a consequence, a total of approximately 12 miles of FPL's existing right-of-way is proposed for relocation, including a short portion that was encompassed by the 8.5 Square Mile Area project (immediately south of ENP). The remaining portion of the right-of-way to be relocated extends across the southeast corner of Water Conservation Area

(WCA) 3B (immediately north of ENP). This 12-mile portion of the existing FPL right-of-way is the proposed West Secondary Corridor.

FPL and the National Park Service (NPS), as well as SFWMD, have been working together for several years to relocate FPL's existing right-of-way within ENP to the eastern edge of ENP along the L-31N Levee. In exchange for FPL's right-of-way, ENP and SFWMD agreed to work on this "land exchange," so FPL could still maintain a north-south transmission line corridor connecting its existing right-of-way outside ENP boundaries. The proposed relocation of this existing right-of-way is included in the West Preferred Corridor. The Clear Sky-Pennsuco 230-kV line is proposed within the same corridor as the Clear Sky-Levee 500-kV lines but will bypass the Levee substation and continue to the Pennsuco substation located within an existing multicircuit transmission line right-of-way that will be used in part for the proposed Clear Sky-Pennsuco 230-kV transmission line. This 230-kV-only portion of the West Preferred Corridor is approximately 8.4 miles long.

Two access corridors, the Tamiami Trail and Krome Avenue Access Corridors, are proposed within the West Preferred Corridor to provide access to the transmission line right-of-way. No transmission line structures will be built in these access corridors, although access roads or road improvements may be required. In addition, expansion of the existing Levee substation is required to facilitate connection with the Clear Sky-Levee 500-kV transmission lines.

The landscape within the West Preferred Corridor reflects human-induced changes, as much of the historical vegetation that occurred within the corridor and in the region has been cleared for residential, agricultural, or industrial uses. Upland communities found within the corridor(s) range from areas of relatively undisturbed pine rockland communities to areas vegetated by a variety of nuisance or weedy plants such as Brazilian pepper, melaleuca (*Melaleuca quinquenervia*), or Australian pine. Aquatic communities within the West Preferred Corridor include canals, ditches, channelized river/stream/waterways, and reservoirs. Most are vegetated by a variety of floating or emergent herbs, many of which are considered nuisance species by the Florida Exotic Plant Pest Council. No natural streams or waterways occur within the corridor. A variety of herbaceous and forested wetlands occur within the West Preferred Corridor, primarily in the form of freshwater marsh, wet prairies, exotic wetland hardwoods, and mixed wetland hardwoods. The quality of wetlands ranges from those exhibiting expected floristic and structural characteristics providing valuable wildlife habitat to those that have been so impacted by drainage or location, within/next to intensive agricultural or developed areas, that inherent functional values such as wildlife habitat, water quality, and flood attenuation have

been severely degraded. The extensive drainage system (canals/ditches) that has been constructed in the region has drastically altered the historic hydrology of many wetland communities in the corridors with a concomitant change to structure and functional attributes. This is often manifested by the proliferation of transitional or even upland vegetative species, as well as nuisance exotic species in many wetlands within the region.

A conservative scenario was used to estimate impacts associated with construction of transmission line facilities within the West Preferred Corridor and will be revised following final route selection and refinement of linear facility engineering design. This enveloping approach results in a worst-case scenario of wetland impacts that will be reduced during final engineering design. Using conservative assumptions, it is estimated there will be up to 308 acres of permanent wetland impact from construction of the associated transmission line facilities within a conceptual right-of-way within the West Preferred Corridor.

2.4.2 East Preferred Corridor

From the proposed Clear Sky substation, FPL proposes a single-circuit, 230-kV transmission line connecting to the existing Davis substation and another 230-kV transmission line connecting the Davis substation to the existing Miami substation. The Davis substation is located in unincorporated Miami-Dade County at the intersection of SW 136th Street and SW 127th Avenue. The Miami substation is located in the city of Miami at the northeast intersection of SW 2nd Avenue and the Miami River. This new 230-kV line is proposed within an approximately 36.7-mile corridor identified as the East Preferred Corridor. FPL already owns and operates the multicircuit transmission line right-of-way between the Site and the existing Davis substation that will be used for the new transmission line.

Most of the land within the East Preferred Corridor reflects significant human-induced changes, as much of the historic vegetation that occurred along the corridor and in the region has been cleared for residential, agricultural, or industrial uses. Although most of the areas within the East Preferred Corridor have been altered, a variety of plant communities of varying quality exist within the corridor, primarily within the segment between the proposed Clear Sky substation and Davis substation. Upland communities found within the corridor are typically disturbed habitats supporting nuisance exotic species such as Brazilian pepper and Australian pine. Surface waters are limited to canals, ditches, channelized river/stream/waterway, and reservoirs. Forested and herbaceous wetlands in the East Preferred Corridor are dominated by mangroves, mixed wetland hardwoods, and freshwater marsh/wet prairie systems. The quality of wetlands within the East Preferred Corridor varies due to relative col-

onization by exotic species, hydrologic alterations, and proximity of development. From the Davis substation, the East Preferred Corridor proceeds east along an existing FPL transmission line right-of-way until its intersection with U.S. 1. From that point all the way to the Miami substation, the East Preferred Corridor includes heavily developed land uses associated with residential, commercial, and transportation development. Through the use of existing transmission line infrastructure and avoidance and minimization efforts in corridor selection, wetland impacts associated with the East Preferred Corridor are estimated to be less than 0.5 acre.

3.0 DESCRIPTION OF SELECTED LISTED SPECIES AND CRITICAL HABITAT

The following describes the species biology and current rangewide conditions for the American crocodile, eastern indigo snake, wood stork, Florida manatee, Everglade snail kite, and Florida panther, as well as location of each species' designated critical habitat.

3.1 American Crocodile

The American crocodile is one of the two species of crocodilians endemic to the United States (USFWS, 2010b). The American crocodile was first designated as endangered by USFWS in 1975 and reclassified as threatened in 2007. The American crocodile is a primarily coastal crocodilian that occurs in parts of Mexico, Central and South America, the Caribbean, and, at the northern end of its range, South Florida. The current range of the American crocodile in Florida largely consists of coastal areas of Miami-Dade, Monroe, Collier, and Lee Counties. Crocodiles are regularly observed in ENP along the shoreline of Florida Bay, on north Key Largo, and at the Turkey Point Plant (USFWS, 2006c). Sightings of crocodiles are also infrequently reported north of Miami-Dade County on the east coast and in the lower Florida Keys (Moler, 1992). They are found primarily in mangrove swamps and along low-energy mangrove-lined bays, creeks, and inland swamps (Kushlan and Mazzotti, 1989).

Habitat loss and fragmentation due to urbanization and agricultural land uses are the biggest threats to this species (USFWS, 2010b). Nesting populations were restricted to portions of the shoreline of northeastern Florida Bay and Barnes Sound in 1975, including one population on the northeastern shore within ENP and one on the eastern shore of Barnes Sound in northern Key Largo (Environmental Science and Engineering, Inc. [ESE], 2000). At that time, crocodiles were declared federally endangered. In 1978, a third nesting colony was discovered within the Plant property. It appears likely that this population colonized the area after development of the industrial wastewater facility, taking advantage of the plentiful food source, protected waters, and artificial substrates of the canal berms as nesting substrate.

To protect crocodiles, NPS established a crocodile sanctuary in northeastern Florida Bay in 1980, USFWS acquired the Crocodile Lake National Wildlife Refuge (NWR) on Key Largo, and FPL initi-

ated a management program in 1983. Monitoring programs were established around all three nesting areas, focusing on reproductive success and growth and survival of hatchlings.

Ogden (1978a) estimated that between 1,000 to 2,000 American crocodiles existed in South Florida in the early 20th century, but the population had been reduced to approximately 100 to 400 adults in the 1960s and 1970s (Ogden, 1978b). The American crocodile population in South Florida has increased substantially over the last 20 years. USFWS (1999) estimated the total population at 500 to 1,000 animals in 1999. Recent population estimates range between 1,400 and 2,000 animals (USFWS, 2006c), not including hatchlings, within the range of the population size estimated at the turn of the century, evidence that led USFWS to reclassify the American crocodile from endangered to threatened in 2007. The recent increase is best represented by changes in nesting effort.

Nest survey data collected in South Florida suggest that the American crocodile population is increasing (USFWS, 2006c). Nesting effort increased from approximately 20 nests per year in the late 1970s to approximately 94 nests in 2005 (USFWS, 2006c). Female crocodiles produce only one clutch per year, so the population of productive females more than quadrupled during this period. It is likely that the male population has also increased in rough proportion to the females (USFWS, 1999). The distribution of crocodiles during the non-nesting season may vary considerably over years, since adult crocodiles can disperse great distances. However, the majority of crocodiles are present in the vicinity of the documented nesting areas (Kushlan and Mazzotti, 1989).

In 1970, nesting in ENP was restricted to northeastern Florida Bay, with the westernmost nests near Black Betsy Key (ESE, 2000). However, the nesting effort has recently increased dramatically within the Turkey Point Plant property. Crocodile nesting in the industrial wastewater facility makes up roughly a third of the annual nest production in all of South Florida (USFWS, 2006c). Within ENP, the nesting area has expanded approximately 30 kilometers (km) to the west since 1970 (Mazzotti, 1999), extending now as far west as Cape Sable.

The nesting populations in ENP, the Plant property, and Key Largo are not isolated. Crocodiles have been documented to range at least 30 km, and tagged hatchlings from Turkey Point and ENP have been recovered near the Key Largo nesting area. Within the industrial wastewater facility, FPL survey teams regularly capture crocodiles originating from North Key Largo and ENP. Juvenile and subadult males are forced to disperse to avoid adult males, which would attack them. Dispersal is beneficial to

the genetic diversity of the population but limits the ability of mark and recapture programs to accurately quantify survival of hatchlings by nesting area.

Mazzotti (1989) defined the optimal nesting habitat requirements for American crocodiles. The most important requirements for nesting success of crocodiles are the presence of elevated, well-drained nesting substrate adjacent to relatively deep (greater than 1 meter) intermediate salinity (10 to 20 ppt) water, protected from the effects of wind and wave action, and free from human disturbance. The manmade nesting areas along canal banks (berms) at the Basin Hills area of the Crocodile Lake NWR and the Turkey Point industrial wastewater facility provide nearly ideal nesting conditions. One exception is the relatively high salinity in the industrial wastewater facility, although this has been ameliorated by the creation of freshwater ponds in the interior of the berms and the existence of nearby lower salinity canals. Crocodiles are able to survive hypersaline environments by excreting salt through salt glands in their tongues, but require access to freshwater to persist (USFWS, 2011c).

In contrast, in northeastern Florida Bay in ENP, the most successful natural nesting areas are sandy beaches often kilometers away from good nursery habitat. Creek nest sites in ENP are within good nursery habitat, but are at low elevation, making them vulnerable to flooding (Mazzotti, 1989 and 1999). Nests on artificial substrates in the Flamingo/Cape Sable area of ENP are also in nursery habitat but are at risk to depredation by raccoons (Mazzotti, 1999). Hence, the unintentional creation of manmade nest sites within the Turkey Point industrial wastewater facility and on North Key Largo has provided good conditions for nesting and, to some extent, compensated for the loss of nesting areas elsewhere in South Florida. One of the most striking aspects of nesting habits of the American crocodile is its ability to find and use artificial substrates for nesting. In fact, virtually the entire increase of crocodiles nesting in South Florida is due to crocodiles nesting on artificial substrates similar to those of the Turkey Point industrial wastewater facility (ESE, 2000).

3.2 Eastern Indigo Snake

The eastern indigo snake is a large, black, nonvenomous snake widely distributed throughout Central and South Florida but primarily occurring in sandhill habitats in northern Florida and southern Georgia (USFWS, 1999). The eastern indigo snake is classified as threatened by both FWC and USFWS. No critical habitat has been designated for this species. The eastern indigo snake was listed as a threatened species as a result of dramatic population declines caused by overcollecting for the domestic and international pet trade as well as mortalities caused by rattlesnake collectors who gassed go-

pher tortoise burrows to collect snakes. Since its listing, major threats include loss, degradation, and fragmentation of habitats and associated highway mortality.

Historically, the eastern indigo snake occurred throughout Florida and in the coastal plains of Georgia, Alabama, and Mississippi (Löding, 1922; Haltom, 1931; Carr, 1940; Cook, 1954; Diemer and Speake, 1983; Moler, 1985), although the remaining endemic populations occur only in Georgia and Florida (Lawler, 1977). Although considered rare in the Florida panhandle, the eastern indigo snake still occurs throughout Florida, even though they are not commonly seen (Moler, 1985).

In extreme South Florida, eastern indigo snakes are found in tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats (Steiner *et al.*, 1983). Given their preference for upland habitats, eastern indigo snakes are not commonly found in great numbers in the wetland complexes of the Everglades region, even though they are found in pine rocklands, tropical hardwood hammocks, and mangrove forests (Duellman and Schwartz, 1958; Steiner *et al.*, 1983; Kuntz, 1977). It is suspected that they prefer hammocks and pine forests, because most observations occur in these habitats disproportionately to their area (Steiner *et al.*, 1983). Eastern indigo snakes also occur in the Florida Keys (USFWS, 1999). They have been collected from Big Pine and Middle Torch Keys and are reliably reported from Big Torch, Little Torch, Summerland, Cudjoe, Sugarloaf, and Boca Chica Keys (Lazell, 1989). Moler (1996) documented eastern indigo snakes on North Key Largo and indicated they are probably restricted to Crocodile Lake NWR and the protected hammock areas on that key.

A more comprehensive life history is contained in a recent biological opinion issued for the C-111 Spreader Canal, Western Phase I (USFWS, 2009), and in the eastern indigo snake 5-year review (USFWS, 2008a).

3.3 Wood Stork

The wood stork is a large (up to 1.15 meters) wading bird inhabiting marshes, cypress swamps, and mangrove swamps and classified by both USFWS and FWC as endangered. No critical habitat has been designated for this species. Their plumage is white, except for iridescent black primary and secondary feathers and a short black tail. On adult wood storks, the rough scaly-appearing skin of the head and neck is unfeathered and blackish in color.

The southeastern United States is the northern extent of the wood stork's breeding range. Wood storks nest in large colonies with other wading birds and typically construct their nests in medium to tall trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Palmer, 1962; Rodgers *et al.*, 1996; Ogden, 1991). Nesting wood storks primarily feed in wetlands between 5 and 40 miles from the colony and occasionally at distances as great as 75 miles (Ogden, 1990). Storks forage in a wide variety of shallow wetlands, wherever small fish or other potential prey items reach high enough densities, and in water that is shallow and open enough for the birds to be successful in their hunting efforts (Ogden *et al.*, 1978; Browder, 1984; Coulter, 1987; Cornell Lab of Ornithology, 2012). Due to their tactile feeding method, good feeding conditions usually occur in relatively calm water where depths are between 10 and 25 centimeters and where the water column is uncluttered by dense patches of aquatic vegetation (Coulter and Bryan, 1993). Typical foraging sites throughout the wood stork's range include 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. Almost any shallow wetland depression that concentrates fish may be used as feeding habitat. In the wet season, wood storks typically feed in the shallow water of short-hydroperiod wetlands, while during the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry down.

USFWS (1990) defined primary and secondary protection zones (radius up to 1,500 and 2,500 ft, respectively) surrounding active wood stork colonies and recommended restrictions within each zone to minimize colony disturbance. The newer USFWS (2006a) draft guidelines recommend the primary zone be up to 1,300 ft with no change to the secondary zone.

USFWS has defined core foraging areas (CFAs) surrounding nesting wood stork colonies within North, Central, and South Florida as 13, 15, and 18.6 miles, respectively. The circular CFA around a nesting colony is considered the minimum area necessary to provide enough prey biomass to support the adults and new offspring during a nesting season. USFWS requires the loss of wetlands that provide suitable foraging habitat within a wood stork colony CFA to be replaced through in-kind compensation or offset through habitat improvements that would increase the quantity and/or quality of potential foraging habitat. The calculation of loss of wood stork foraging habitat is required using a model developed by USFWS.

A more comprehensive life history is contained in recent biological opinions issued for the Interstate 75 widening project from SR 826 to Interstate 595 (USFWS, 2012), Tamiami Trail Modifica-

tions: Next Steps Project (USFWS, 2010a), Krome Avenue Widening Project (USFWS, 2011a), and also in the wood stork 5-year review (USFWS, 2007a).

3.4 Florida Manatee

The Florida manatee is one of two subspecies of the West Indian manatee, inhabiting fresh, brackish, and marine waters throughout Florida, the Greater Antilles, Central America, and South America (USFWS, 1999). It is classified as endangered by both FWC and USFWS. USFWS has established a consultation area for this species and has also designated critical habitat for the manatee (Figures 9 and 10).

The Florida manatee feeds on submergent, emergent, and floating vegetation (USFWS, 1999) and often forages in shallow grass beds adjacent to deeper channels (Hartman, 1979; Powell and Rathbun, 1984). On average, adults can reach a length of 3.5 meters and weigh 1,000 kilograms. Both male and female manatees can reach sexual maturity by age 3 and may be reproductive throughout their lives with a minimum 2-year interval between calves for females (Marmontel, 1993). Life expectancy is estimated to be approximately 50 years (Marmontel *et al.*, 1992).

The seasonal distribution of the manatee is affected by water temperatures, as water temperatures below 20 degrees Celsius increase susceptibility to cold stress and cold-induced mortality (USFWS, 1999). The only year-round populations of manatees occur throughout the coastal and inland waterways of peninsular Florida and Georgia (Hartman, 1974). In South Florida, prominent year-round populations can be found in the Indian River, Biscayne Bay, Everglades and Ten Thousand Island area, Estero Bay and Caloosahatchee River area, and Charlotte Harbor area (USFWS, 1996). On the west coast, manatees winter at Crystal River, Homosassa Springs, and other warm mineral springs (Powell and Rathbun, 1984; Rathbun *et al.*, 1990). In the winter, higher numbers of manatees are seen on the east coast at the natural warm waters of Blue Spring and near manmade warm water sources on or near the Indian River Lagoon, at Titusville, Vero Beach, Fort Pierce, Riviera Beach, Port Everglades, Fort Lauderdale, and throughout Biscayne Bay and nearby rivers and canals (USFWS, 1996). They also aggregate near industrial warm water outflows in Tampa Bay, the warmer waters of the Caloosahatchee and Orange Rivers (from the FPL Fort Myers power plant), and in inland waters of the Everglades and Ten Thousand Islands (USFWS, 1999).

FWC coordinates an interagency team to conduct synoptic surveys of the known wintering habitats of manatees in Florida, including natural springs, thermal discharges from power and industrial plants, and deep canals. The current synoptic survey method provides a minimum count of manatees, but it does not provide population estimates (FWC, 2012a). Recent synoptic survey results represent the largest number of manatees observed since 1991, with 3,802, 5,077, and 4,834 individuals observed during 2009, 2010, and 2011, respectively (FWC, 2012a).

Additional locational and life history information for the manatee can be found in the Fish and Wildlife Coordination Act Report on the Biscayne Bay Coastal Wetlands Project Phase I (USFWS, 2010b).

3.5 Everglade Snail Kite

The Everglade snail kite is classified as endangered by both FWC and USFWS. It is a medium-sized raptor with a square-tipped tail and distinctive white base, red eyes, and a slender decurved bill adapted for extracting the kite's primary prey, the apple snail (*Pomacea paludosa*). In addition to the native apple snail, Everglade snail kites also forage on the introduced exotic apple snail (*Pomacea insularum*). Sexual dimorphism is exhibited in this species, with adult males appearing uniformly slate gray, while adult females are brown with cream streaking in the face, throat, and breast (USFWS, 1999). The Florida population of snail kites is restricted to the watersheds of the Everglades, lakes Okeechobee and Kissimmee, and the upper St. Johns River, with a highly specific diet composed almost entirely of apple snails (USFWS, 1999). Snail kites are nomadic in response to water depths, hydroperiod, food availability, and other habitat changes (Sykes, 1978 and 1983; Beissinger and Takekawa, 1983; Bennetts *et al.*, 1994). The principal threat to the snail kite is the loss or degradation of wetlands in Central and South Florida.

Critical habitat was designated for the snail kite in 1977 (Figure 11) and includes the Arthur R. Marshall Loxahatchee NWR, WCA 2, portions of WCA 3, portions of ENP, western portions of Lake Okeechobee, the Strazzulla and Cloud Lake reservoirs in St. Lucie County, and portions of the St. Johns Marsh in Indian River County. USFWS has also proposed a consultation area outside the designated critical habitat, which includes all of South Florida from north of Lake Okeechobee to Florida Bay. Portions of the Project components (West Preferred and Secondary Corridors) fall within the consultation area, but no portion of the Project falls within the designated critical habitat.

Snail kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes (natural and manmade) where apple snails can be found (USFWS, 1999). Snail kites require foraging areas that are relatively clear and open in order to visually search for apple snails, with interspersed emergent vegetation, which enables apple snails to climb near the surface to feed, breathe, and lay eggs (USFWS, 1999). Nearly continuous flooding of wetlands for more than 1 year is needed to support apple snail populations that, in turn, sustain foraging by the snail kite (Sykes, 1979; Beissinger *et al.*, 1988).

Using field data from 1995 to 2004, Darby *et al.* (2006) estimated apple snail densities less than 0.14 individual per square meter are unable to support kite foraging. Darby *et al.* (2008) also reported that adult snails can survive dry downs lasting up to 12 weeks, although smaller snails survive at lower rates (less than 50 percent alive after 8 dry weeks). Snail recruitment may be truncated if dry downs occur during the peak breeding season, when young snails can become stranded (Darby *et al.*, 2008). Darby *et al.* (2009) recommended a range of water depths between 4 and 20 inches during the peak apple snail breeding period between April and June. Foraging habitat conditions that differ substantially from those described previously will result in either reduced apple snail density or reduced ability of snail kites to locate and capture snails. Vegetation cover that is either too dense or too sparse can result in reduction in the quality of the area as foraging habitat.

Nesting almost always occurs over water, which deters predation (Sykes, 1987). Nesting substrates include a variety of small trees, shrubs, and herbaceous vegetation, such as willow, bald cypress (*Taxodium distichum*), pond cypress (*Taxodium ascendens*), melaleuca (*Melaleuca quinquenervia*), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), pond apple (*Annona glabra*), dahoon holly (*Ilex cassine*), wax myrtle (*Myrica cerifera*), cocoplum (*Chrysobalanus icaco*), buttonbush (*Cephalanthus occidentalis*), rattlebox (*Sesbania* spp.), elderberry (*Sambucus canadensis*), Brazilian pepper, sawgrass, cattail (*Typha* spp.), bulrush (*Scirpus* spp.), and common reed (*Phragmites australis*) (Sykes *et al.*, 1995).

Snail kites are considered nomadic; this behavior pattern is related to changing hydrologic conditions (Sykes, 1979). During breeding season, kites remain close to their nest sites until they fledge young or fail. Following fledging, adults remain around the nest for several weeks. Once young are fully independent, adults may depart the area. Outside of breeding season, snail kites regularly travel long distances within and among wetland systems in southern Florida (Bennetts and Kitchens, 1992). While most movements may be in response to droughts or other unfavorable conditions, kites may also

move away from wetlands when conditions appear favorable. Martin *et al.* (2007) found that movements within large wetlands and among adjacent wetland units occurred frequently, while movements among spatially isolated wetlands occurred less frequently. Fledgling kites also move frequently but are more likely to move to immediately adjacent wetland units than adults, which may indicate a degree of familiarity with the availability of wetlands across the landscape that adult kites acquire through experience.

More detailed life history information for the snail kite can be found in the biological opinion issued for the Everglades Restoration Transition Plan, Phase I (USFWS, 2010c).

3.6 Florida Panther

The Florida panther is classified as endangered by both FWC and USFWS. Although the adult population has increased from an estimated 12 to 20 in the early 1970s (USFWS, 2008b) to an estimated 100 to 160 adults in 2010 (FWC, 2010), the panther continues to face numerous threats due to an increasing human population and associated development in panther habitat. No critical habitat has been designated for the Florida panther; however, USFWS has designated a panther consultation area that delineates a zone within which a proposed project has the potential to affect the Florida panther (USFWS, 2007b). The Florida panther is the last subspecies of puma still surviving in the eastern United States (USFWS, 2008b). It is a large, long-tailed cat with a great deal of color variation, including pale brown or rusty upper parts, dull white or buffy under parts, and the tail tip, back of ears, and sides of nose are dark brown or blackish (USFWS, 2011b). Mature male panthers examined in the wild in Florida since 1978 have weighed from 102 to 154 pounds (Roelke, 1990; Roelke and Glass, 1992) and measured nearly 7 ft from nose to tip of tail. Females were considerably smaller, with a weight range of 50 to 108 pounds (Roelke, 1990) and measuring approximately 6 ft (USFWS, 2008b). Their primary prey is medium and large mammals including feral hogs, deer, raccoons, and armadillos.

Panthers historically occurred throughout the southeastern United States, but are currently restricted to less than 5 percent of their historic range in one breeding population located in South Florida (USFWS, 2008b). The panther presently occupies one of the least developed areas in the eastern United States: a contiguous system of large private ranches and public conservation lands in Miami-Dade, Broward, Collier, Hendry, Lee, and Monroe Counties (USFWS, 2008b). The core of the breeding population is centered in Miami-Dade, Collier, and Hendry Counties associated with the Big Cy-

press Swamp and the Everglades. Radio-collared panthers have also been documented in DeSoto, Highlands, Osceola, and Polk Counties. Furthermore, there are still large areas of privately owned land in Charlotte County where uncollared individuals may reside (Maehr, 1992). Most panther dispersal occurs south of the Caloosahatchee River with only four radio-collared panthers crossing the river and continuing north since 1981 (Land and Taylor, 1998; Land *et al.*, 1999; Shindle *et al.*, 2000, Maehr *et al.*, 2002; Belden and McBride, 2006).

Panthers require large areas of land, with numerous factors influencing home range size, including habitat quality, prey density, and landscape configuration (Belden, 1988, Comiskey *et al.*, 2002). The home range sizes of 26 radio-collared panthers monitored between 1985 and 1990 averaged 200 square miles (mi^2) (519 square kilometers [km^2]) for resident adult males and 175 mi^2 (93 km^2) for resident females, while transient males had a home range of 240 mi^2 (623 km^2) (Maehr *et al.*, 1991). In a study of 50 adult panthers, Comiskey *et al.* (2002) found resident males had a mean home range of 251 m^2 (650 km^2), and females had a mean home range of 153 mi^2 (396 km^2). Forested cover types, particularly cypress swamp, pinelands, hardwood swamp, and upland hardwood forests, are the habitat types most selected by panthers (Belden, 1986; Belden *et al.*, 1988; Maehr, 1990; Maehr *et al.*, 1991; Maehr, 1992; Smith and Bass, 1994; Comiskey *et al.*, 2002; Cox *et al.*, 2006; Kautz *et al.*, 2006; Land *et al.*, 2008; Onorato *et al.*, 2011). Dense and tall stands of saw palmetto are also an important habitat component, primarily used for resting and denning (Maehr, 1990; Beier *et al.*, 2006; Benson *et al.*, 2008).

A more comprehensive discussion of the panther's life history in South Florida can be found in the biological opinion issued for the Tamiami Trail Modification: Next Steps Project (USFWS, 2010a).

4.0 STATUS OF THE SPECIES WITHIN THE PROJECT AREA

The following subsections describe the status of threatened and endangered species within the Project area based upon literature reviews, field surveys, agency consultation, Florida Natural Areas Inventory (FNAI) data, presence of suitable habitat, data from USFWS and FWC, as well as more than three decades of data collected at the Turkey Point Plant.

4.1 American Crocodile

Adult crocodiles were first observed at Turkey Point in 1976, and nesting was first documented on berms within the industrial wastewater facility in 1978 (Mazzotti and Brandt, 1994). As a result, FPL developed a crocodile management plan focusing on the creation and enhancement of habitats for crocodile nesting, as well as monitoring the reproductive success, growth, and survival of hatchlings. FPL's efforts have resulted in a significant increase in the number of crocodile nests and hatchlings in the industrial wastewater facility over nearly three decades, from 1 to 2 per year between 1978 and 1981 (Gaby *et al.*, 1985) to 10 to 15 nests per year in the 1990s (Brandt *et al.*, 1995; Cherkiss, 1999), 28 known nests and 520 hatchlings in 2008, and 24 known nests and 548 hatchlings in 2009. The nesting habitat maintained by FPL within the industrial wastewater facility has been responsible for virtually the entire increase in population of the American crocodile reported in South Florida through 2004 (Tucker *et al.*, 2004). Creation of additional crocodile nesting habitat within FPL's EMB, an approximately 13,000-acre restoration area between BNP and ENP, has directly benefitted the regional crocodile population. The Turkey Point property now supports the second largest breeding aggregation of crocodiles in Florida (Federal Register, Volume 72, No. 53, March 20, 2007). The present population at Turkey Point is estimated to total approximately 400 animals.

Although the Site is located within the USFWS-designated critical habitat (Federal Register, 1977) area for the crocodile, historical monitoring of the crocodile population within the industrial wastewater facility indicates occasional observations of basking crocodiles along the perimeter of the Site but no use of the Site for nesting. Crocodiles are not known to use the Site for foraging or nesting due to the lack of suitable nesting substrate, altered and highly variable hydrology, and limited food supply. Due to the lack of consistent hydroperiod, food sources for crocodiles are relatively scarce within the Site. Crocodile nesting does not occur on the Site due to the lack of suitable nesting substrate, as well as potential aversion to human disturbance associated with the existing Turkey Point generating facilities.

The temporary construction access roadway improvement corridor west of the L-31E Canal, reclaimed water pipeline corridor, potable water pipeline corridor, radial collector well system and delivery pipeline area, East Preferred Corridor, West Preferred Corridor west of the L-31E Canal, and originally proposed location for the FPL reclaimed water treatment facility are not located within the federally designated critical habitat for the crocodile and provide no suitable crocodile nesting or foraging habitat. Portions of the West Preferred Corridor and temporary construction access roadway improvement corridor located east of the L-31E Canal traverse within or adjacent to the northern edge of the industrial wastewater facility. Crocodile utilization of the northern portion of the industrial wastewater facility is limited, with no nesting occurring in this portion of the facility since 2006. Subadult crocodiles have been observed within portions of excavated canals associated with the proposed alternate location for the reclaimed water treatment facility (Figure 6). However, due to extensive infestation by exotic vegetation and lack of suitable substrate conditions, no nesting habitat is present within this area.

The features that attract crocodiles to the industrial wastewater facility include the elevated berms that provide a lee side regardless of wind direction, an ample food supply, the shallow water canals bordered by deeper canals that allow movement to and from the area, and the presence of freshwater ponds within a hypersaline environment. The industrial wastewater facility is adjacent to Biscayne Bay and its tidal creeks that form a portion of the historic range of the American crocodile. The southwest corner of the industrial wastewater facility is an area where crocodiles have a wide variety of habitats available. Within 75 meters, crocodiles can choose between the hypersaline environment of the cooling canals, salinity of Biscayne Bay, and lower-salinity water of the interceptor ditch. These conditions are not present within the Site.

4.2 Eastern Indigo Snake

Although no indigo snakes have been observed within the Site, they are known to exist on the Plant property south of the industrial wastewater facility outside the Project area. FPL has recorded 12 indigo snake sightings within the EMB and southern edge of the industrial wastewater facility since 2008, typically on tree islands, spoil berms, or roads. FPL created an upland indigo snake habitat area adjacent to the EMB crocodile sanctuary in 2008.

Additionally, two indigo snake observations have occurred along the East Preferred Corridor in late 2011. Both of these observations occurred on an existing FPL-maintained transmission line right-of-way. Based on the presence of suitable habitat, the indigo snake also has a high likelihood of occurrence along the West Preferred Corridor.

According to the FNAI database, two occurrences of the eastern indigo snake were documented in 1981 within upland areas adjacent to SW 344th Street/Palm Drive north of the Project area. Although not considered high-quality habitat due to dominance by the exotic species Australian pine, indigo snakes may also occur in upland spoil areas within the potential alternative location for the FPL reclaimed water treatment facility. Indigo snakes have not been identified on SW 359th Street or within areas of freshwater marsh located adjacent to the proposed temporary construction access roadways on SW 359th Street. The portion of SW 359th Street west of the L-31E Canal does not traverse upland areas that are typically preferred by eastern indigo snakes, although they may use the existing narrow transmission line access roads, as well as tropical hardwood hammocks and mangrove forests in the vicinity.

4.3 Wood Stork

Wood storks are known to occasionally forage within the western portions of the Units 6 & 7 Site, in the open water area associated with Discharge Canal 1, and are likely to forage in areas of suitable habitat within areas designated for construction of associated facilities. No wood stork nesting colonies are located within the vicinity of the Site or associated facilities with the exception of the West Preferred and Secondary Corridors.

A total of nine wood stork colony CFAs encompass portions of the transmission line corridors, as identified on Figure 12: Colony 620018 Madeira, Lower Taylor Slough, Grossman Ridge West, Colony 620131, Tamiami West, Tamiami East 2, Tamiami East 1, 3B-Mud East, and an unnamed colony.

Four colonies occur within 3 miles of the West Preferred and Secondary Corridors: the Tamiami East 1, Tamiami East 2, Tamiami West, and 3B-Mud East colonies. The West Preferred Corridor is located within the USFWS (1990)-recommended maximum secondary protection zone (2,500 ft) of the 3B-Mud East colony, located north of U.S. 41 (Tamiami Trail), and the Tamiami East 1 colony, located south of U.S. 41 (Figure 13). Two colonies occur within 2,500 ft of the West Secondary Cor-

ridor: Tamiami East 2 and Tamiami West. Both are located alongside and just south of Tamiami Trail in ENP. The site-specific primary and secondary zones have not yet been established for the wood stork colonies in the general area of the West Preferred or Secondary Corridors. There are no other known wading bird colonies within 5 miles of the proposed transmission line corridors.

SFWMD has monitored all wading bird colonies within their jurisdiction for many years and annually produce their South Florida wading bird report. The four Tamiami colonies have been fluctuating vastly the last few years primarily due to hydrological conditions. Table 2 shows the nesting that has occurred in the four Tamiami colonies (Tamiami Complex) for the last 14 years. However, these data do not include actual fledgling numbers, which is a more viable indicator of nesting success (Bryan, 2012).

As Table 2 indicates, the Tamiami West Colony is the largest of the complex and has the most consistent data reported for the last several years. From virtually no reported nesting activity in 2008, that colony was somewhat successful in 2009 in terms of nesting effort, but then has drastically fallen off the last 2 years. That colony is approximately 2.5 miles west of the West Preferred Corridor. The other colonies in the complex had no reported nesting in 2011, including both colonies (Tamiami East 1 and 3B-Mud East) that fall within the 2,500-ft maximum secondary protection zone suggested by USFWS (1990) for the West Preferred Corridor. SFWMD reports do not include specific fledgling production for those years reported in Table 2, which is typically the key to a successful nesting season. However, for 2011, they reported, "Wood Stork production was relatively low in 2011; many stork nests initially hatched large numbers of nestlings, but the number of nests that fledged young was lower than average. Stork nestlings likely died as a result of starvation after critical foraging habitat dried out, or from predation after the colonies dried and mammalian predators (raccoons) were able to use dry land to access nests."

The 2011 SFWMD wading bird report also made the following observations:

- Wood stork nest success in Tamiami West was 43 percent, and brood size was 3.07.
- If storks nesting in freshwater (ENP and WCAs) were tallied together (870 nests), 228 of those at Tamiami West were estimated to have failed. SFWMD indicated that almost 80 percent of all the stork nests in freshwater marshes failed in 2011.
- Nest success at Tamiami West may also give an overly optimistic picture, since SFWMD only estimated success through 65 days of nesting. A trip into the colony after young had left the nest but had not fledged found appreciable numbers of dead young

TABLE 2.
SFWMD WADING BIRD REPORTS, WOOD STORKS

Year	Peak Numbers of Wood Stork Nests — Colony			
	Tamiami West	Tamiami East 1	Tamiami East 2	3B-Mud East
2011	400	0	0	0
2010	350 nests	15 nests	30 nests	0
2009	1,300 nests*	10 nests	20 nests	7 nesting pairs
2008	No activity	No activity	No activity	No activity
2007	75 nests	—	0	—
2006	400 nests	0	0	15 nests
2005	110 nests	0	0	20 nests
2004	50 nests	0	0	30 nests
2003	400 nests	—	—	—
2002	450 nests	—	—	—
2001	1400 nests			—
2000	1347 nests	—		—
1999	75 nests	—		—
1998	0	—	—	—
1997	90 nests	—		—

*University of Florida estimate.

Sources: SFWMD, 2012.
ECT, 2012.

> and scavenged carcasses in and near nests. SFWMD concluded, "So the numbers of chicks actually fledged from any of the freshwater colonies was almost certainly very low. This suggests that the 2011 season was only marginally successful for storks, with about the same number of nest starts as the 10-year average, but poorer nest success than usual."

Early indications by Bryan (2012) indicated that the 2012 nesting season is also going to be unsuccessful due to hydrological conditions.

4.4 Florida Manatee

The Florida manatee occurs throughout Biscayne Bay but does not occur within the Site or the industrial wastewater facility, as the closed-loop cooling canals do not connect to the bay. Turkey Point Units 1 through 4 use the industrial wastewater facility for cooling and do not contribute any thermal discharge into Biscayne Bay that could attract manatees during winter months. The Site and associated facilities are not located within the federally designated critical habitat for the manatee (Figure 9).

Manatees occasionally occur in some of the SFWMD canals connecting to Biscayne Bay north of the Turkey Point Plant, some of which are contained within the reclaimed water pipeline corridor and East Preferred Corridor.

Manatees are most frequently observed in tributaries and near-shore seagrass beds of Biscayne Bay. Manatees have been observed in virtually all conveyance canals connecting to Biscayne Bay, including (from north to south) the C-100, C-1, C-102, Military, C-103, North, Florida City, FPL (Sea Dade), Card Sound Road, and C-111 Canals (USFWS, 2010b). As stated in the Biscayne Bay Coastal Wetlands Project Final Fish and Wildlife Coordination Act Report (USFWS 2010b):

> "Manatees depend upon canals as a source of freshwater and resting sites, as well as a cold-weather refuge. The relatively deep waters of the canals respond more slowly to temperature fluctuations at the air/water interface than the shallow bay waters. Thus, the canal waters remain warmer than open bay waters during the passage of winter cold fronts. Manatees are present year-round, and are most abundant in winter, when more than 130 have been counted on a single day (Mayo and Markley, 1995). Biscayne Bay is a seasonal migratory corridor for manatees, thus the total number of animals using the Biscayne Bay area is likely to be greater than the maximum number observed on any given day. The general distribution of manatees is linked to freshwater, with animals more frequently occupying areas where freshwater sources are readily available (O'Shea and Kochman, 1990; Mayo and Markley, 1995; LeFebrve *et al.*, 2001; Deutsch *et al.*, 2003)."

The proposed reclaimed water pipeline corridor traverses the C-102, Military, C-103, North, and Florida City Canals, while the East Preferred Corridor traverses the C-102, Military, C-103, and North Canals.

4.5 Everglade Snail Kite

No snail kites have been observed within the Site or associated facilities, with the exception of the West Preferred and Secondary Corridors, where they have been observed in freshwater marsh wetlands in and around ENP and WCA 3B, both north and south of Tamiami Trail. The Site and associated facilities are not located within the federally designated critical habitat for the snail kite (Figure 11). The Everglades Restoration Transition Plan Phase 1 Biological Opinion (USFWS, 2010c) reported:

> "The current distribution of the snail kite in Florida is limited to central and southern portions of Florida. Six large freshwater systems (the Upper St. Johns drainage, Kissimmee Valley, Lake Okeechobee, Loxahatchee Slough, the Everglades, and the Big Cypress basin) generally encompasses the current range of the species, although radio tracking of snail kites has revealed that the network of habitats used by the species also includes many other smaller widely dispersed wetlands within this overall range (Bennetts and Kitchens, 1992). Continuing radio tracking work underscores the importance of these smaller, peripheral habitats that support large numbers of snail kites, particularly in years when the larger wetland areas are drier than average. Kites may occur within nearly all remaining wetlands of the Everglades region, with recent nesting occurring within WCA-2B, WCA-3A, WCA-3B, and ENP (Martin *et al.*, 2007).
>
> The kite population has dropped by more than 75 percent from an estimate of approximately 3,400 birds in 1999 to fewer than 700 in 2008 and 2009 (Cattau *et al.*, 2009). In addition to negative effects of regional droughts on adult and juvenile survival, the distribution of nesting activity in recent years suggests that several of the traditional nesting areas have suffered from a decreased forage base and the loss of suitable foraging and nesting habitat. Low productivity, both in terms of low rates of nest initiation and low success rates from those nests initiated, suggests that conditions have been poor for kite nesting in recent years. Relatively low juvenile survival rates in recent years also support the conclusion that conditions for kites in the recent past have been relatively unfavorable due to a variety of factors. Recent studies implicate low recruitment and a decline in the species' nearly exclusive food source, the apple snail, as factors in the recent population decline (Cattau *et al.*, 2008). The existing water management system, especially during extreme meteorological conditions, contributes to unnatural water levels and altered marsh recession rates that are hypothesized causes for the decline in snail kites and their prey. Because the apple snail is the primary food source for the snail kite, changes in hydrology that affect the survival and productivity of the apple snail and their availability to snail kites have a direct effect on the survival and productivity of the snail kite (Mooij *et al.*, 2002)."

ENP staff provided FPL with historical nesting data (2006) for the areas near FPL's West Preferred Corridor, and that data showed nesting had occurred along the corridor just north of Tamiami Trail. Darby (2012) confirmed that snail kite foraging does currently occur in that area.

4.6 Florida Panther

The USFWS Florida panther consultation area (Figure 14) includes the western portion of the proposed temporary construction access roadway improvement corridor and the West Preferred Corridor.

The FWC panther radio-telemetry database from February 1981 through June 2011 (N = 93,797 records) contains 275 records of panther occurrence within 5 miles of the proposed temporary construction access roadway improvements. These records are all from FP21, a female panther that was originally captured for monitoring by ENP researchers in March 1987 (Figure 15). FP21 was injured in a collision with a motor vehicle on July 23, 1988. The injury occurred approximately 1 mile east of U.S. 1 on SW 344th Street approximately 2.7 miles west of the proposed roadway improvements. Panther FP21 was removed from the wild for medical reasons and was relocated to White Oak Plantation in Nassau County, Florida. Panther FP21 remained in captivity until she was euthanized in December 1997. The FWC panther mortality database through October 10, 2009, contains one record of panther mortality within 5 miles of the proposed temporary construction access roadway improvements. An uncollared 3-year-old female died in a collision with a motor vehicle on U.S. 1 approximately 0.5 mile south of the intersection with Card Sound Road on May 9, 2007. The FWC panther den database contains no records of panther dens within 5 miles of the proposed roadway improvements. This information demonstrates that radio-collared Florida panthers have not been recorded in the vicinity of the proposed construction access roadway improvements since 1988, but at least one uncollared female panther has occurred in the vicinity as recently as May 2007 based on roadkill mortality records. Other than the one mortality incident discussed previously from 2007, there have been no telemetry records since then for panthers within 5 miles of the proposed access road improvement corridors.

The FWC panther radio-telemetry database through June 2011 contains records representing the occurrence of 13 Florida panthers and one Texas female puma (*Puma concolor stanleyana*) within 5 miles of the West Preferred Corridor. These records are summarized as follows:

- 47 records for female FP14 between December 18, 1986, and July 24, 1990.
- 463 records for male FP16 between January 26, 1987, and January 7, 2000.

- 375 records for female FP21 between April 5, 1987, and July 23, 1988.
- 4 records for female FP22 between January 29, 1988, and January 12, 1989.
- 59 records for female FP23 between November 18, 1989, and February 27, 1990.
- 97 records for female FP27 between May 14, 1988, and July 26, 1989.
- 125 records for male FP42 between March 24, 1990, and April 29, 1991.
- 334 records for female FP61 between November 10, 1997, and June 4, 2003.
- 116 records for male FP85 between March 6, 2000, and February 17, 2004.
- 1 record for female FP94 on March 7, 2001.
- 117 records for female FP95 between March 2, 2001, and January 9, 2008.
- 24 records for male FP125 between July 27 and September 28, 2004.
- 8 records for Texas female TX108 between May 1, 1996, and March 2, 2001.
- 2 records for female FP142 dated May 25, 2006.

According to FWC data, panther FP16 died of unknown causes in 2000 near the northeastern boundary of ENP. Panthers FP42 and FP85 were reported deceased in 1995 and 2000, respectively. The FWC panther mortality database through December 2011 contains five records of mortality within 5 miles of the West Preferred Corridor. Two vehicle-related mortalities occurred in 2007, one vehicle-related morality occurred in 2008, and one record each of panther mortality due to unknown causes occurred in 1989 and in 2000. The FWC database of panther dens contains one record of a panther den within 5 miles of the West Preferred Corridor, dated September 27, 2002.

5.0 EFFECTS OF THE PROPOSED ACTION

The following provides a description of the direct, indirect, and cumulative effects of the proposed action and interrelated/interdependent actions on each species and/or designated critical habitat.

5.1 American Crocodile

A summary of wetland impacts within the Site by habitat type and the potential use by crocodiles is presented in the following table:

Habitat	Existing Acres	Area (%)	Wetland Impact Acreage	Potential Crocodile Use
Remnant canals	8.4	2.9	8.4	Foraging, conveyance
Open water	12.0	4.1	12.0	Foraging, conveyance
Mangrove heads	12.2	4.2	12.2	Foraging
Dwarf mangroves	16.9	5.8	16.9	Foraging
Mud flats	187.5	64.5	187.5	Basking
Wetland spoils areas	9.1	3.1	9.1	Basking
Upland spoils areas	7.8	2.7	0	Basking
Canals	16.7	5.7	4.1	Foraging, conveyance
Fill areas/roadways	20.2	6.9	0	Not applicable
Total	**290.7**	**100**	**250.2**	

Construction on the Site will impact a total of approximately 250 acres of previously disturbed wetlands within the industrial wastewater facility, primarily in the form of hypersaline mud flats. Although the Site is located within the USFWS-designated critical habitat area for the crocodile, historical monitoring of the crocodile population within the industrial wastewater facility indicates occasional observations of basking crocodiles along the perimeter of the Site but no utilization of the Site for nesting. The Site is primarily devoid of vegetation and experiences frequent episodic changes in hydroperiod, which limit food supply and render the area undesirable for crocodile foraging. Crocodile nesting does not take place in this area due to the lack of suitable nesting substrate as well as potential aversion to human disturbance associated with the existing Turkey Point generating facilities.

The originally proposed location for the FPL reclaimed water treatment facility, located outside the Site but within the Project area, contains sawgrass marsh and scattered dwarf mangrove habitat, which are not located within the federally designated critical habitat for the crocodile and do not provide suitable crocodile nesting habitat. The FPL reclaimed water treatment facility potential alternative location was historically dredged in association with the moat and associated berms and currently consists of upland spoil piles dominated by Australian pine, excavated open water canals, an upland access pathway, sawgrass marsh, dwarf red mangroves, and exotic wetland hardwoods dominated by Australian pine. No crocodile nesting has been observed within this area, as the upland spoil piles are densely vegetated with exotic vegetation upon rocky substrate that does not provide suitable nesting substrate. Although the area is not used for nesting, subadult crocodiles have been observed within portions of the open water canals. A total of approximately 3 acres of excavated canals and ditches would be impacted by construction of the reclaimed water treatment facility at the potential alternative location; however, this area is not located within federally designated critical habitat for the crocodile.

Spoil materials removed from the Units 6 & 7 Site will be placed on select berms within the industrial wastewater facility (Figure 6), the berms along the southern boundary, and berms adjacent to one north-south canal. Areas designated for placement of spoil materials excavated from the Units 6 &7 Site were specifically selected due to their lack of suitable nesting substrate for the American crocodile and lack of recorded crocodile nesting in these areas. The proposed spoil stockpiling area along the southern boundary of the industrial wastewater facility has been used for spoil disposal since the 1970s and is an area with high banks located between the industrial wastewater facility and the C-107 Canal to the south. Traffic associated with transport of fill to the Site and disposal of spoil material from the Site creates the potential for vehicular mortality. However, this impact should be minimized through incorporation of wildlife underpasses and constraints on traffic, as discussed in Section 6.0, Conservation Measures.

Facilities associated with the Project, including the reclaimed water pipelines, nuclear administration building, training building and parking area, temporary construction access roadway improvements, and transmission lines, are located north of the USFWS critical crocodile habitat boundary and do not provide basking, nesting, or foraging habitat comparable to the conditions within the remainder of the industrial wastewater facility. Similarly, the location of the radial collector wells and delivery pipelines upon previously filled upland areas of the Turkey Point peninsula does not provide significant nesting, basking, or foraging habitat for the crocodile. The western transmission line corridor extends

outside the critical habitat boundary from the Units 6 & 7 Site across the northern portion of the industrial wastewater facility. Structures located on canal berms and associated access bridges from SW 359th Street will be designed to avoid crocodile nesting areas.

5.2 Eastern Indigo Snake

The Project is expected to have minimal effects on the eastern indigo snake or its habitat, as the Site is located on a portion of the Plant property where indigo snakes have not been observed and/or habitat is not present. The onsite observations have occurred south of the Site in the vicinity of the EMB and southern edge of the industrial wastewater facility. FPL has also established an upland indigo snake habitat area adjacent to the EMB crocodile sanctuary. Onsite FPL staff and contractors have been educated on identifying this animal and instructed on leaving it undisturbed.

Historical and recent observations along various linear facilities associated with the Project (roads and transmission lines) have occurred due to human-induced habitat changes that resulted in providing refugia for the animal. For example, snakes have been observed sunning on the berms of roads or found under debris along existing and maintained transmission line rights-of-way in the East Preferred Corridor.

Potential effects of Project construction could alter or remove some habitat for the indigo snake. However, due to a majority of the proposed Project being located in less than ideal habitat for the animal and much of the Project's components being constructed in existing disturbed habitats, habitat loss and/or alteration should be minimal.

There is a slight potential for mortality due to vehicles along the construction access roads and onsite, especially during the construction period when high volumes of vehicular traffic will occur. However, due to the conservation measures discussed in Section 6.0, this impact should be minimized.

Gopher tortoise burrows, normally a common refuge for indigo snakes, do not occur on the Site and are expected to occur in extremely low numbers (if at all) within the Project's associated facilities due to the groundwater table being shallow, substrate being unsuitable, and much of the habitat being mesic to hydric. Gopher tortoise surveys will be performed, and gopher tortoises (if present) will be relocated. If any indigo snakes are observed during gopher tortoise burrow excavation or land clearing activities, they will be allowed sufficient time to move away from the area on their own before

resuming clearing or burrow excavation, per USFWS guidelines. No indigo snakes are proposed for relocation, unless authorized by USFWS.

5.3 Wood Stork

Wood storks may be affected by the Project in four primary ways: direct loss of foraging or nesting habitat, potential electrocutions from the electrical components, potential collisions with the overhead ground wires or conductors, and potential behavioral modification from construction/maintenance activities. FPL commissioned a risk assessment study for the western transmission lines associated with this Project (Pandion Systems, 2010) to evaluate the potential risks from this Project to wading birds, in particular to wood storks in the Tamiami Trail Complex. That report was submitted to the wildlife agencies through FPL's completeness responses in the licensing process:

- Pages 78 through 190 (5th Completeness Responses); http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Turkey_Point/Units_6_7/Completeness/TransmissionLine/FPL_TL_Completeness_Response/FPL_TP_5th_Completeness_Response_TL.pdf.
- Addendum to Pandion Risk Assessment, pages 12 through 27 (6th Completeness Responses); http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Turkey_Point/Units_6_7/Completeness/TransmissionLine/FPL_TL_Completeness_Response/FPL_TP_6th_Completeness_Response_TL.pdf.

In addition, FPL has prepared a preliminary wood stork foraging habitat assessment (Appendix A) based on the conservative worst-case scenario of wetland impacts within the West Preferred Corridor described in Section 2.4.1. Some of the conclusions reached by these reports are summarized in the following subsections.

5.3.1 Nesting and Foraging Habitat Loss

During construction, excavation and filling of wetlands will occur within the 330-ft-wide right-of-way. No existing nesting vegetation will be affected. Compared to the total amount of foraging habitat for any of the seven colonies whose CFAs are intersected by the proposed western transmission line corridors, the loss of wetland habitat including foraging and possible future nesting habitat will be minimal and is not considered to affect the foraging resources of these colonies. (Note: the proposed transmission line corridors intersect a total of nine CFAs; however, two of them have minimal intersection with the corridors and do not contain wetlands in those areas.)

Approximately 239 acres of wetlands providing potential foraging habitat within wood stork colony CFAs could be lost in the West Preferred Corridor based on the conservative worst-case estimate of wetland impacts. This represents 0.04 percent of the approximately 517,273 acres of CFA wetlands habitat for a given colony and 0.02 percent of all habitat (more than 1.4 million acres) within the CFAs of the seven colonies. Some tree island habitat could potentially be excavated or filled. However, not all tree islands in the West Preferred Corridor are suitable for future wood stork nesting habitat, since many of these tree islands are infested with melaleuca, Australian pine, Brazilian pepper, and other exotic vegetation.

The loss of wood stork foraging habitat was evaluated in accordance with the assessment methodology contained within the USFWS South Florida Wood Stork Effect Determination Key (USFWS, 2010d) based on the worst-case estimate of wetland impacts within CFAs associated with the West Preferred Corridor, vegetative community composition of impacted wetlands relative to suitable wood stork foraging habitat, and approximate hydroperiods of impacted wetlands (Appendix A). The impacts were quantified as the total annual loss of prey biomass (kilogram per year [kg/yr]) associated with the loss of foraging habitat. The results indicate a total loss of approximately 643 kg/yr of prey biomass, with approximately 32 kg/yr lost within short hydroperiod wetlands (180 days or less of inundation per year) and 611 kg/yr lost within long hydroperiod wetlands (more than 180 days inundation).

Once the lines are built, there is no anticipated excavation or filling of nesting or foraging habitats while conducting vegetation maintenance activities. The risk for habitat destruction is considered to be of the "lowest potential" for nesting habitat and "lower potential" for foraging habitat (Pandion Systems, 2010). This is true for both the West Preferred and Secondary Corridors.

5.3.2 Injury and Mortality from Electrocutions

In the last 20 years, few incidents of reported injury and mortality of wood storks from electrocutions and collisions could be found. For electrocutions the risk of exposure was the key determinant in evaluating electrocution risks. Wood storks do not use transmission line towers for nesting, perching, or roosting. In addition, the separation of energized parts and energized and ground parts is two or three times greater than the ability of a wood stork (i.e., wing span) to make simultaneous contact with these parts. This limited or no exposure results in a "lowest potential" risk of electrocutions, if any, to wood storks from the proposed transmission lines (Pandion Systems, 2010). Given this "low-

est potential" risk of electrocutions, there is no difference in risk between the two western transmission line corridors proposed by FPL with respect to the risk of electrocutions.

5.3.3 Injury and Mortality from Collisions

For collisions, nesting, fledging, foraging, and migrating wood storks will be exposed to the proposed transmission lines in the West Preferred Corridor (assuming that is the corridor certified). This exposure will be highly variable depending on the number of nesting wood storks, which in itself is highly variable in any given year, the season of the year, and proximity of the active colonies to the proposed West Preferred and Secondary Corridors. It is possible over the life of the Project that some mortality from collisions may occur. However, limited mortality is anticipated because of observed behavioral avoidance of power lines while flying, the collocated design of the lines, which makes them highly visible to wood storks, and the infrequent reports of collision morality in spite of high exposure of wood storks to power lines and communications towers and guy wires in the Project study area. However, the overall risk is considered of "moderate potential" because of the degree of exposure (i.e., length of the lines near the colonies) (Pandion Systems, 2010). No population level effects will result.

The risk of collisions for the West Secondary Corridor, if it is built, is considered somewhat higher than the West Preferred Corridor because of the closer proximity of the transmission lines to the Tamiami East 2 colony. This risk is still considered "moderate potential" (Pandion Systems, 2010).

5.3.4 Behavioral Disturbance

During construction and maintenance, human activities will generate both noise and visual stimuli. In experimental studies and observations in the field, both nesting and foraging wood storks exhibit a high degree of tolerance and acclimation to such activities (Pandion Systems, 2010). For noise, wood storks likely have a narrower hearing range than humans and either do not hear what humans hear or the levels of sounds must be greater to be heard (Pandion Systems, 2010). The frequency of noise emitting from truck and earth-moving equipment is generally lower frequency than optimum hearing frequency for birds. Birds from the Tamiami Colony Complex and the 3B-Mud East colony are already acclimated to similar noises and visual stimuli from traffic and construction along the Tamiami Trail and Krome Avenue.

For the West Preferred Corridor, the likelihood of noise and visual stimuli causing nest or colony abandonment for the Tamiami Colony Complex and the 3B-Mud East colony is considered unlikely. The risks for behavioral disturbance are considered to be of the "lowest potential" (Pandion Systems,

2010). Any behavioral disturbance, if it occurs, will be limited to a few individuals and of short duration. There is no empirical data to suggest adverse effects to the wood storks in the colonies or foraging wood storks.

For the West Secondary Corridor, the risks for behavioral disturbance are also considered "lowest potential" (Pandion Systems, 2010).

In comparing the two western transmission line corridors, although the risks for behavioral disturbance are considered "lowest potential" in both corridors (Pandion Systems, 2010), the exposure will be somewhat lower in the West Preferred Corridor than the West Secondary Corridor. This is because the West Secondary Corridor involves closer proximity of construction and maintenance activities to the wood stork colonies, and if construction occurs when the birds are nesting, some temporary disturbance to nesting activities for wood storks closest to this West Secondary Corridor could occur.

5.3.5 Comprehensive Everglades Restoration Plan Targets

The ecological risk assessment addressed two primary issues related to the Comprehensive Everglades Restoration Plan (CERP) and impacts on the wood stork population of the Everglades, using CERP wood stork performance measures and indicators as follows:

- Increase in the number of nests within the Everglades study area.
- Earlier timing of nesting within the Everglades.

The number of nests within the Everglades study area is not anticipated to be impacted by this Project. Further, this Project is not anticipated to affect the timing of wood stork nesting within the Everglades. While there may be impacts to individual wood storks, no population level risks are anticipated, and no risks to wood stork CERP targets will occur from this Project.

5.3.6 Summary of Risk to Wood Storks

Based on risk analysis, collisions of wood storks have a "moderate potential" for harm (Pandion Systems, 2010). Because of the information on reports of collision mortality in wood storks and their demonstrated avoidance behavior, the actual level of injury and mortality is considered low compared to other wading birds that show a higher number of incidents of injury and mortality for collisions. The destruction of habitat is considered to have a "lower potential" for harm (Pandion Systems, 2010). A small amount of foraging habitat, approximately 239 acres, is likely to be excavated and filled to construct within the West Preferred Corridor. The "lowest potential" risk levels are associat-

ed with electrocutions, nesting habitat loss, and behavioral disturbance of nesting and/or foraging wood storks (Pandion Systems, 2010).

It is also noted that SFWMD's own wading bird data over the last several years show vastly fluctuating wood stork nesting, all attributable to hydrology. These fluctuations in wood stork numbers will continue into the future based on hydrology and will continue to be influenced by CERP or other water management projects, with or without the proposed FPL Project in place.

Based on information provided in the previous paragraphs, it is concluded that the construction of the transmission lines associated with this Project will not adversely affect the regional wood stork population.

5.4 Florida Manatee

Construction activity within the existing Turkey Point barge turning basin is limited to a 0.1-acre area of dredging in association with the construction of the equipment barge unloading area. This area lacks the attributes of areas designated as essential manatee habitat as described in the Miami-Dade County Manatee Protection Plan (Miami-Dade County, 1996) such as seagrass beds, warm and freshwater water sources, aggregation areas, travel corridors, aquatic preserves, refuges, and sanctuaries that are frequently used by manatees for feeding, resting, mating, nursing, cold shelter, and travel. No dredging or enlargement of the existing barge channel will be required to facilitate delivery of equipment to the turning basin. The maximum size of any vessel using the existing channel and proposed barge unloading facility will not exceed the dimensions of existing oil barges servicing the Plant. No adverse impacts to manatees are expected, as manatees are not known to congregate or occur within the existing turning basin, construction will be conducted in accordance with the FWC Standard Manatee Conditions for In-Water Work, and no collisions or adverse impacts to manatees have occurred in association with barge deliveries at the Plant.

With regard to potential manatee occurrence within canals located in the reclaimed water pipeline corridor and East Preferred Corridor, no impacts are anticipated due to the temporary nature of disturbance associated with pipeline installation, adherence to FWC's Standard Manatee Conditions for In-Water Work, potential for pipeline installation through horizontal directional drilling, and ability of transmission line facilities to span areas of open water canals.

5.5 Everglade Snail Kite

Snail kite impacts are expected to be limited to potential habitat loss, primarily foraging habitat. In areas where FPL's West Preferred Corridor falls within the snail kite consultation area, habitat loss may occur wherever transmission line fill pads or access road improvements are made. The fill pads will occur approximately every 500 to 1,000 ft, depending on final right-of-way location and design of structure pads and roads. The remainder of habitat under the transmission lines will be left undisturbed for the most part, since the habitat consists of herbaceous marsh, primarily sawgrass. FPL does not need to clear low-growing herbaceous vegetation to construct or operate the transmission lines. Therefore snail kites will still be able to forage along much of the constructed transmission line right-of-way. FPL has a similar 500-kV line (Levee-Midway) that has been constructed and operating in a similar fashion in snail kite critical habitat to the north of this Project without documented impacts to the bird. FPL's final USACE 404 permit application and revised Project mitigation plan will address the quantity of impacts and proposed mitigation to compensate for those wetland impacts associated with this Project.

Nesting habitat for the snail kite consists of shrubs and tree islands usually over water to deter predators. FPL's SCA for this Project contains the proposed corridors on aerial photographs and vegetation coverages and shows there will be the potential for little impact to tree islands, which may serve as future nest sites. Many of the tree islands crossed by the West Preferred Corridor contain melaleuca as the dominant tree species, thereby reducing the quality of the nesting habitat available within the West Preferred Corridor.

The most important factor to snail kite nesting and foraging success is hydrology, as universally agreed to by all snail kite experts. The biological opinion for the Everglades Restoration Transition Plan Phase I (USFWS, 2010c) describes in great detail the importance of water levels on maintaining foraging and nesting habitat for this bird. FPL's Project must be constructed in accordance with USACE, FDEP, and SFWMD hydrological standards and regulations. Additionally FPL recognizes the significance of the ongoing CERP projects and the fact that hydrology is being altered in the WCA 3B and ENP, among other areas crossed by the Project. FPL will have to design to anticipated hydrological regimes consistent with those agencies' review and permitting standards. FPL will not be permitted to alter hydrology in the areas crossed by the transmission lines, so impacts from altered water levels will not occur from this Project.

Some discussion has occurred regarding potential impacts from collision or behavioral changes due to the lines being in place. The literature, as well as FPL's own bird mortality database, has not documented snail kite mortality due to collisions with powerlines. This is probably attributable to the low and hovering style flight behavior of foraging birds, as well as their keen eyesight. Snail kite collisions are therefore not considered a potential impact of this Project. Behavioral disturbance may be a possibility if construction activities were to occur near any active nesting locations. However, this is judged to be a minor possibility due to the currently known nesting locations and the preclearing surveys, conservation, and monitoring measures proposed in Section 6.0.

5.6 Florida Panther

Breedlove, Dennis, & Associates, Inc. (2009), completed an assessment of estimated impacts to Florida panther habitats for the Turkey Point 6 & 7 Project. The results of this study are discussed in the following paragraphs. The entire report can be viewed at (from 3rd Completeness) http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Turkey_Point/Units_6_7/Completeness/TransmissionLine/FPL_TL_Completeness_Response/FPL_TP_3rd_Completeness_Response_TL/09%20MDC%2012-11-09%20Cover%20Letter%20and%20supplemental%20analysis%20submi.pdf.

The proposed West Preferred Corridor will traverse 12.53 miles of the Florida panther primary zone and 9.44 miles of the secondary zone. The West Secondary Corridor will traverse 14.52 miles of the primary zone and 9.75 miles of the secondary zone. The panther primary and secondary zones are components of the panther focus area, an area established by USFWS (2007b) for use in determining projects that are subject to consultation with USFWS under Section 7 of the Endangered Species Act of 1973.

Installation of the proposed transmission lines will result in the placement of fill in wetlands within the panther primary and secondary zones. Filling wetlands will result in alteration of panther habitats as natural, mostly herbaceous wetlands vegetation is converted to elevated berms for access roads and structure pads. These berms will support herbaceous or shrubby old-field vegetation. The altered habitats have value because they provide sources of forage and high-water refuge for deer, the principal prey species of panthers, and because panthers either use or are indifferent to linear landscape features, such as the dirt roads or jeep trails that will be maintained on the fill placed in the right-of-way. Therefore, habitat for panthers will be altered, but areas affected by fill within the right-of-way will not result in the loss of panther habitat.

Analyses of Florida panther occurrence and habitat use in the vicinity of existing transmission lines and other linear features led to the conclusion that construction of the proposed new transmission lines and associated structures, fill pads, and unimproved transmission line access roads within the panther focus area would not result in long-term effects on Florida panthers and their habitats. Available data indicate that Florida panthers do not avoid transmission line rights-of-way, but rather panthers do occur on linear features that include transmission line rights-of-way at a greater frequency than random and may use them as movement pathways or to access prey. The benefits of transmission line rights-of-way to panther conservation cannot be quantified or represented by USFWS methodology. FPL believes no mitigation should be required since the Project will not result in a loss of habitat, only a conversion from one type of habitat to another.

Conversely, the proposed temporary road improvements that are needed to enhance access to the Turkey Point Plant Site during construction are expected to result in direct and temporary losses of panther habitats. FPL estimated the number of panther habitat units that USFWS may require for mitigation for the direct and temporary losses of panther habitat due to improvements to roads accessing the Site. The amount of mitigation recommended for impacts to panther habitat will be negotiated with USFWS. FPL will work with USFWS, USACE, and other appropriate agencies to determine mitigation recommendations for the temporary losses of panther habitats after a final design for Project features has been achieved consistent with the conditions of site certification.

6.0 CONSERVATION MEASURES

6.1 Preclearing Surveys

Before land clearing and construction activities occur, FPL will conduct an assessment for listed species, which will note all habitat, occurrence, or evidence of listed species. FPL will coordinate with FWC and USFWS to obtain and follow the current survey protocols for listed species that may occur within the Site and associated facilities prior to conducting detailed surveys, consistent with the approved conditions of certification. Listed species to be included in this survey will include those species listed as endangered, threatened, or of special concern by FWC or those listed as endangered or threatened by USFWS, as well as the bald eagle. Wildlife surveys will be conducted in the reproductive or "active" season for each species that falls before the projected clearing activity schedule unless otherwise approved by FWC or USFWS. For species that are difficult to detect, FPL may make the assumption that the species is present and plan appropriate avoidance/mitigation measures after consultation and approval from FWC and USFWS.

Specifically, FWC has already requested as conditions of certification for this Project the following specific survey requirements:

- FPL shall coordinate with FWC to obtain and follow the current survey protocols for listed species that may occur within the transmission line rights-of-way, and accessible appropriate buffers as defined by the listed species' survey protocols, prior to conducting detailed surveys.
- Surveys shall be conducted prior to clearing and construction in accordance with the survey protocols. The results of those detailed surveys shall be provided to FWC in a report, and coordination shall occur with FWC on appropriate impact mitigation methodologies.
- This survey shall be conducted in accordance with USFWS/FWC guidelines and methodologies by a person or firm that is knowledgeable and experienced in conducting flora and fauna surveys for each potentially occurring listed species.
- This survey shall identify any wading bird colonies within the Project that may be affected.
- This survey shall identify locations of breeding sites, nests, and burrows for listed wildlife species. Nests and burrows may be recorded with global positioning system (GPS) coordinates, identified on an aerial photograph, and submitted with the final listed spe-

cies report. Although nests and burrows may be recorded individually with GPS, FWC prefers that any applicable protection radii surrounding groups of nest sites and burrows be included, rather than around individual nests and burrows, and be physically marked so that clearing and construction shall avoid impacting them.

- This survey shall include an estimate of the acreage and percent cover of each existing vegetation community (FLUCFCS at the third degree of detail), including a wildlife-based habitat classification scheme such as the Comprehensive Wildlife Conservation Strategy (FWC, 2005), Descriptions of Vegetation and Land Cover Types (FWC, 2004), or Natural Communities Guide (FNAI, 1990) of each community contained within the transmission line right-of-way prior to land clearing and construction activities using a geographic information system.

Specifically for each of the six species, FPL is proposing or has already committed to the following survey methods.

6.1.1 American Crocodile

American crocodiles may utilize wetlands, open water, and adjacent spoil areas of the Site, nuclear administration building, training, building and parking area, FPL reclaimed water treatment facility, and construction access roadways east of the L-31E Canal. Prior to construction, all areas proposed for construction will be surveyed for presence of American crocodiles, consistent with the approved conditions of certification. Preclearing surveys for crocodiles will be completed no more than 48 hours prior to the start of construction in a particular construction zone and will include both daytime and nighttime (eyeshine) surveys. Crocodiles found in designated construction zones will be removed by authorized FPL personnel under existing permits from USFWS. Routine monitoring surveys for crocodiles at the Plant will continue as discussed in Section 6.2.

6.1.2 Eastern Indigo Snake

Within the areas of the Site and associated facilities, eastern indigo snakes may utilize disturbed upland spoil and fill areas, pine rockland, or edges of wetlands. Eastern indigo snakes use underground refugia, which may include burrows of the gopher tortoise, armadillo, cotton rat, or land crabs. In South Florida, indigo snakes are most active from June through November. Surveys will be conducted for eastern indigo snakes consistent with the requirements of USFWS, FWC, and approved conditions of certification. Additionally FPL will be required by FWC to perform gopher tortoise surveys

in appropriate habitats and would therefore be required to identify any commensal species, such as the indigo snake.

6.1.3 Wood Stork

To identify the baseline conditions that may indicate the potential for impacts to wood storks and help quantify potential mitigation for such impacts, FPL will perform preconstruction surveys and studies along the west transmission line right-of-way. The surveys will identify any wood stork colonies in addition to any found from agency records in the vicinity of the Project right-of-way consistent with the requirements of USFWS and approved conditions of certification.

Specifically FWC has requested as conditions of certification, the following wading bird/wood stork surveys:

> "In order to identify the baseline conditions that may indicate the potential for impacts to wood storks and other wading birds, and to help quantify potential mitigation for such impacts, FPL will be required to perform the following pre- and post-construction studies:
>
> 1. Preconstruction follow flight surveys shall be conducted during nesting for the currently known wood stork colonies along Tamiami Trail (East 1, East 2, and West) and the 3B- Mud East Colony using fixed wing aircraft. The follow flight surveys shall be conducted both prior to and during the fledging period. The surveys would ascertain flight line corridors for the wood storks in terms of direction, numbers of birds, and altitudes. These data would be compared to existing data for the Tamiami Trail and 3B-Mud East colonies collected to date. The survey design shall be submitted to FWC for review prior to implementation.
>
> 2. A postcertification, preclearing aerial survey shall be conducted via fixed wing or rotary wing aircraft, between the months of December and May, once it is confirmed by FWC, USFWS or SFWMD that wading birds are nesting in the area of the proposed transmission line right-of-way. The surveys shall employ a series of two transects, along each side of the right-of-way. To minimize disturbance to the colonies, the flight(s) shall be conducted at altitudes no less than 300 feet.
>
>   a. This survey shall identify any wood stork/wading bird colonies in addition to any found from agency records that may be affected within one-half mile of the project right-of-way.
>
>   b. Center locations of all wood stork and wading bird colonies shall be delineated with a wide area augmentation system enabled GPS unit.
>
>   c. All wood stork and wading bird colonies shall be ground inspected, as aerial identification of intermediate-sized and dark -plumaged wading birds (little blue heron, tricolored heron, glossy ibis) is difficult at best

and because they tend to nest below the vegetation canopy, making species identification all but impossible. To avoid flushing birds from their nests, identification of species shall be made using binoculars and surveys shall follow the protocols in Rodgers and Smith (1995)."

6.1.4 Florida Manatee

Preclearing surveys for manatees are not proposed; rather, manatee observers will be used where appropriate in accordance with the Standard Manatee Conditions for In-Water Work (FWC, 2012b). Manatee observers will be approved by FWC for the Project prior to beginning work.

6.1.5 Everglade Snail Kite

A survey for snail kites will be conducted consistent with approved conditions of certification within those portions of the west transmission line right-of-way that meet the USFWS criteria for suitable habitat for snail kites. Where suitable habitat is present, survey procedures will be used to document the occurrence of snail kites, in accordance with the USFWS South Florida Ecological Services Office Draft Snail Kite Survey Protocol, May 18, 2004. Specifically, FWC has also requested the following conditions of certification:

1. "A survey (USFWS South Florida Ecological Services Office Draft Snail Kite Survey Protocol, May 18, 2004a) is necessary when the project site is within the snail kite consultation area and suitable habitat is present. The following criteria can be used to judge the adequacy of the habitat for snail kites.

    - Appropriate foraging habitat present (paspalidum [*Paspalidium geminatum*], spikerushes [*Eleocharis* spp.], panicum [*Panicum* spp.], or beakrushes [*Rhynchospora* spp.]).

    - Perching and/or nesting substrate present (i.e., willows [*Salix caroliniana*], melaleuca [*Melaleuca quinquenervia*], or pond cypress [*Taxodium ascendens*]; or sawgrass [*Cladium jamaicense*], cattail [*Typha* spp.], giant bulrush [*Scirpus validus*], or reed [*Phragmites australis*]), respectively.

    - Appropriate water depth (0.2 to 1.3 meters deep) under nesting substrate.

    - Nesting substrate an adequate distance (more than 150 meters) from upland.

    - Proximity of nearest wading bird colony.

2. If suitable habitat is present or snail kites are reported on the transmission line right-of-way, the following survey procedures shall be used to document their occurrence. To maximize the chances of finding snail kites the survey shall be conducted in January to May during the breeding season. A visual survey of suitable habitat shall be made for birds and nests. A boat may be needed for the survey as the best nesting habitat may be a considerable distance (more than

150 meters) from uplands. Check small trees, such as, willow, melaleuca, and pond cypress along the open water edge for nests or perching birds. If snail kites are observed, then nests can be located through the bird's behavior. When flushed from a nest the adult tends to circle upward, whereas non-nesting birds that are flushed fly more horizontally away from the disturbance (Bennetts *et al.*, 1988). Nests also can be found by following kites carrying sticks, adults carrying apple snails, aerial courtship displays, vocalizations of adults or begging calls of the young, and through a thorough search of areas where adults are repeatedly observed (Bennetts *et al.*, 1988)."

6.1.6 Florida Panther

Portions of the West Preferred Corridor and temporary construction access roadway improvements corridors are within the USFWS Florida panther consultation area. However, specific preclearing surveys for the panther are not proposed in these areas, as extensive radio-telemetry tracking data are available for Florida panthers. Preclearing surveys for other listed species via ground and aerial reconnaissance will be performed, and any panther sign or individual observations will be noted. For species that are difficult to detect, such as the panther, FPL assumes the species may potentially occur and plans appropriate avoidance measures after consultation with FWC and USFWS.

6.2 Conservation and Monitoring Plans

The following provides details of the existing FPL crocodile management program and the Project's proposed species-specific conservation and monitoring measures to avoid, minimize, and mitigate for any impacts to threatened and endangered species.

6.2.1 American Crocodile Management Program

FPL initiated a formal comprehensive crocodile management program for the industrial wastewater facility in the early 1980s consisting of a combination of the following:

- Habitat preservation and creation of habitat suitable for crocodile nesting and basking.
- Establishment of exclusion zones at known nesting sites (nest sanctuaries).
- Daytime and nighttime monitoring surveys to document nesting activity and utilization of the industrial wastewater facility.
- Capture and tagging of hatchlings using American Veterinary Identification Devices microchip technology.
- Relocation of hatchlings to low-salinity habitat during early life stages to increase survival.
- Recapture, monitoring, and release of individuals to document growth and survival.

FPL has been issued Federal Fish and Wildlife Permit No. TE092945-2 by USFWS (Appendix C) to capture American crocodiles for marking, recapture, scientific data collection purposes, and relocation as necessary. In addition to the monitoring and habitat enhancement activities that directly benefit the crocodile, FPL also has enacted an extensive crocodile awareness program to educate the public as to the status of the crocodile in South Florida. These existing activities will continue throughout the construction and operation phases of the new Units 6 & 7.

The management program has been extremely successful, evidenced by the annual increase in active nests and the number of hatchlings produced. The number of successful nests has increased dramatically, with an average of 0.7 additional successful nest per year from 1978 to 1999 (Tucker *et al.*, 2004). Additionally, the number of hatchlings has increased at a rate of 13 (±2) per year within the Turkey Point Plant property (Tucker *et al.*, 2004). Figure 16 depicts nest locations documented between 1978 and 2009. Not all of these nests are currently active. However, new nest sites are discovered on a regular basis. Figure 17 illustrates nest locations documented during the 2010 and 2011 surveys.

FPL administers the site in accordance with a management program for crocodiles that was initially established in 1983 and revised in 1991, 2007, and 2009. The management program addresses the following:

- Constraints on vehicular traffic within the industrial wastewater facility at night and during critical periods of the nesting season.
- Constraints on road maintenance and construction activities at night, during critical periods of the nesting season, and within known crocodile crossing sites.
- Identification and avoidance of nest site sanctuaries.
- Population monitoring program (nests, hatchlings, hatchling growth, and survival).
- Training requirements for Site personnel handling hatchlings and using equipment in the area.

FPL also has been active in removing exotic plants, particularly Brazilian pepper and Australian pine, as recommended by USFWS (1999). FPL is currently implementing many of the plan's recommendations for the American crocodile, including:

- Conducting a long-term monitoring program.
- Conducting a mark-recapture program to quantify growth and survival.

- Protecting nesting, basking, and nursery habitat.
- Maintaining current nesting sites.

FPL's efforts have resulted in a significant increase in the number of crocodile nests and hatchlings in the industrial wastewater facility over nearly three decades, from 2 nests and 20 hatchlings in 1978 to 24 known nests and 548 hatchlings in 2009. The nesting habitat and refugia maintained by FPL within the industrial wastewater facility has been responsible for virtually the entire increase in population of the American crocodile reported in South Florida through 2004 (Tucker *et al.*, 2004). Creation of additional nesting habitat and restoration of thousands of acres of wetlands within the EMB have further contributed to the ongoing success of the regional crocodile population.

The following subsections outline the management and monitoring programs for the American crocodile at the Turkey Point Plant.

6.2.1.1 Maintenance and Preservation of Nesting, Basking, and Nursery Habitat

Since nesting was discovered within the industrial wastewater facility in 1976, FPL has enacted a series of management activities to improve the quality of habitat available to the crocodile and preserve known nesting sites. Natural nesting habitat includes sites with sandy shorelines or raised marl creek banks adjacent to deep water (USFWS, 1999). Berms within the industrial wastewater facility consist of spoils materials dredged from the construction of the adjacent canals, including peat and marl soils that are preferred nesting substrate. Success of nests in South Florida is dependent primarily on the maintenance of suitable egg cavity moisture throughout incubation (USFWS, 1999), as well as the effects of predation. The industrial wastewater facility cooling canals act as barriers for some crocodile nest predators such as raccoons. Flooding or desiccation can result in nest failure. The consistent water levels present within the industrial wastewater facility increase the percentage of successful nests.

Encroachment of exotic vegetation has degraded thousands of acres of wildlife habitat in South Florida, primarily Australian pine, melaleuca, and Brazilian pepper (USFWS, 1999). Control of exotic vegetation is crucial for the creation and preservation of crocodile nesting and basking habitat. Basking habitat is characterized by raised, relatively open areas with surrounding native vegetation. Since exotic species often regrow quickly and invade new areas, continual efforts to control exotic vegetation are required to maintain suitability of nesting sites.

Although American crocodiles have salt glands that excrete excess salt and physiological mechanisms to reduce water loss (Dunson, 1970, 1980, and 1982; Evans and Ellis, 1977; Dunson and Mazzotti, 1989; Mazzotti, 1989), maintenance of an osmotic balance requires access to low-salinity water for juveniles (USFWS, 1999). Hatchling crocodiles are particularly susceptible to osmoregulatory stress and may need to have water with salinity less than 4 ppt available at least once per week to increase growth until reaching approximately 200 grams in weight (Mazzotti *et al.*, 1986; Mazzotti and Dunson, 1984). Frequent rainfall typically provides a sufficient amount of fresh water, although hatchlings occasionally die during periods of low rainfall. To increase hatchling survival, FPL releases some tagged hatchlings to low-salinity environments, such as the depressional areas on top of the industrial wastewater facility berms designed to retain fresh water and provide refugia for juveniles.

Existing nesting sites and newly discovered successful nesting sites are protected as sanctuaries. Nest site sanctuaries extend the entire width of the berm and typically are 100 meters in length. The boundaries of each sanctuary are clearly marked with 14- by 15-inch signs that state "FPL CROCODILE NESTING AREA" to inform maintenance personnel of their locations (Figure 18). Maintenance activities, including clearing of exotic vegetation, burning, or dredging within 300 yards of a nest sanctuary during the nesting season (March 1 to September 30) must be coordinated by the FPL Land Utilization Site Superintendent in consultation with the FPL Senior Environmental Specialist.

6.2.1.2 Constraints on Traffic, Maintenance, and Construction

Disturbance is one of the major factors adversely affecting the success of crocodiles in South Florida, either directly through road kills or indirectly, by intimidating individual crocodiles from returning to their preferred habitat (Ogden, 1978a; Kushlan, 1988). Disturbance has the greatest effect during the nesting season when females make frequent trips to the nest. Observations suggest that repeated close human presence may cause female crocodiles to abandon nests or relocate nest sites (Kushlan and Mazotti, 1989).

Traffic, maintenance, and construction activity during reproductive periods may discourage courtship and mating within the industrial wastewater facility and surrounding canals. Nighttime traffic may result in abandonment of nests or death of hatchling crocodiles dispersing from the industrial wastewater facility to the interceptor ditch (Wilcox and Mazzotti, 1990). Blocking crocodile berm-crossing points impedes travel and may result in the termination of nesting activity by females. To minimize the disturbance of crocodile activity and still allow for the construction of the Project, required maintenance of the industrial wastewater facility and surrounding vicinity, and placement of

spoil materials, the following constraints on vehicular traffic, maintenance, and construction will be followed:

- Minimize vehicular traffic (particularly heavy equipment) in the industrial wastewater facility south of SW 359th Street, with the exception of the Units 6 & 7 Site and berms adjacent to one north-south canal and the southern perimeter berm.
- Minimize vehicular disturbance along the southern perimeter berm from June to August, corresponding to the hatching and posthatching life stages.
- With the exception of the berms adjacent to one north-south canal, SW 359th Street, and the Units 6 & 7 Site, minimize vehicular activity (except necessary security patrols, maintenance, and monitoring) at night within the industrial wastewater facility during all times of the year.
- Do not allow routine road maintenance or construction for canal berm roads during daytime hours between March and September or at night during any time of the year.
- Do not block known crocodile crossing sites with fill, and do not create barriers at known crossing points, including leaving construction materials or equipment overnight.
- Minimize boating within the canals during all times of the year.
- Ensure that site personnel are trained in crocodile habitat protection techniques.

To further reduce the potential for vehicular impacts associated with construction and operation of the Project, FPL is proposing to install a system of wildlife underpasses to allow crocodiles to move safely under the primary access road to the Plant when traveling between the industrial wastewater facility and the test cooling canals and associated freshwater ponds on the berms to the north (Figure 19). The proposed crossings will be bottomless culverts constructed of precast concrete with wing walls to divert wildlife through the openings (Figure 20). Chain link fencing with mesh size small enough to prohibit passage of juvenile crocodiles or other suitable fencing (3 meters high) will also be installed on either side of the primary access road to the Plant from the L-31E Canal east along the length of the test cooling canal area to facilitate utilization of the underpasses and discourage attempts to cross the access road. This wildlife underpass design is similar to those used successfully in other parts of the country for control of the movement of wildlife and should significantly reduce and/or eliminate the probability of traffic mortalities associated with the Site access road.

6.2.1.3 Population Monitoring

Monitoring of the number and location of nests, production of hatchlings, and their growth and survival has been conducted within the Turkey Point Plant property since 1978. Surveys are conducted to identify nest locations, nest sites are revisited during the hatching period, and each hatchling is captured, permanently marked for identification, measured, weighed, sexed, and released. Permanent identification through American Veterinary Identification Device allows for the recapture of individuals after several years to document survival and growth rates.

Surveys are conducted throughout the year, with different surveys conducted in different seasons based on crocodile behavior and life history. The population monitoring program at the Plant involves surveys conducted during the breeding, nesting, hatching, and juvenile phases of the crocodile's life cycle, as well as ongoing surveys documenting crocodile activities.

6.2.1.4 Public Outreach and Education

Public education is required to provide accurate biological information and stimulate interest in the conservation of the American crocodile (USFWS, 1999). As part of FPL's commitment to raising public awareness about the threatened American crocodile in South Florida, FPL publishes extensive information in both electronic and written formats, which is made available free of charge to environmental groups, schools, regulatory agencies, and the general public. In addition, FPL has made the Turkey Point Plant available to major media groups such as National Geographic, the Discovery Channel, CNN, and numerous newspapers and television series for filming educational documentaries and preparing articles about the American crocodile and the success of the breeding population within the industrial wastewater facility.

6.2.1.5 Units 6 & 7 Crocodile Conservation and Monitoring Plan

The conservation and monitoring plan for the Project addresses specific actions to be taken prior to the initiation of clearing, during construction, and following construction to ensure that adverse impacts to the crocodiles are avoided.

The conservation and monitoring plan is designed to ensure that crocodiles will not be adversely impacted as a result of the Project. The plan involves continuation of the existing Turkey Point Threatened and Endangered Species Management Program, expansion of the scope to include the Site, and addition of specific actions preconstruction, during construction, and postconstruction as follows:

A. Preconstruction:

- Preclearing surveys will be conducted throughout the Site to locate any individual crocodiles utilizing the Site. Day and night surveys will be conducted twice monthly at the Site prior to initiation of construction activities. Individuals may be live-captured by nonharmful means by authorized FPL personnel and relocated to the cooling canals within the industrial wastewater facility. Captured crocodiles will be processed and held only long enough to transport them to a suitable release site within the canals.
- The existing American crocodile protection/education plan will be utilized by the Project for all construction personnel to follow. A program of lectures, brochures, videos, and informational signs will be utilized for all construction personnel to become familiar with the crocodile's protected status under federal law. Information included in the education materials will include, at a minimum:
  a. A description of the American crocodile, its habitat and behavior, and protective status under federal law.
  b. Instructions not to injure, harass, or kill this species.
  c. A description of the appearance of crocodile indicators, such as tail drags and claw marks, by which construction personnel can become familiar with the identification of crocodile utilization of the construction areas.
  d. Directions to cease clearing activities if crocodiles are observed within the Site and allow the crocodiles sufficient time to move away from the Site prior to resuming clearing.
  e. Telephone numbers of FPL Environmental Specialists to be contacted immediately upon observation of crocodiles and/or crocodile indications in the construction areas.
- Preparation of a preconstruction monitoring report for submittal to USFWS and FWC. The monitoring report will include a summary of all surveys; documentation of crocodiles and/or crocodile indications observed at the Site; approximate size, location, and behavior of individuals observed; summaries of any relocations conducted; and identification of relocated individuals.

B. During Construction:

It is likely that intense human activity during construction will discourage crocodile utilization of the Site and vicinity. A perimeter wall will be installed around the Plant area in the early phases of construction and should prevent crocodile intrusion into that area.

In addition, to avoid adverse impacts and document utilization of the Site during construction, the following activities will be conducted during construction:

- Education of construction personnel, as described previously, including installation of signs along the perimeter of the construction site alerting personnel as to the crocodile's protected status under federal law; instructions to avoid injury, harassment, or killing of any crocodiles; and contact numbers to inform FPL Environmental Specialists of crocodile observations.
- Weekly monitoring surveys within the construction areas. Both day and night surveys will be performed, and any crocodiles within the Site will be live-captured through nonharmful means by authorized FPL personnel and released to the canals.
- Daily monitoring surveys in the active construction zone by a contractor trained by FPL's Environmental Specialists. Observations of any crocodile indications or individual crocodiles will be documented and immediately reported to the supervising contractor and FPL's Environmental Specialists. If crocodiles are observed within the active construction zone, all work will cease immediately, and the individuals will be live-captured through nonharmful means by authorized FPL personnel, processed, and released to the cooling canals within the industrial wastewater facility. Minimization of traffic disturbance and installation of wildlife underpasses and small-diameter mesh fencing along the primary access road, as described in Section 6.2.1.2 (Constraints on Traffic, Maintenance, and Construction), will occur during the construction phase. Spoils material from the Site will be transported via truck using the roads adjacent to one north-south canal. The use of the roads adjacent to this one north-south canal ensures that traffic associated with the transport of spoils materials will be routed so as to avoid disturbance of nesting sanctuaries. Spoils material will be deposited along the berms of one north-south canal and the berm on the southern boundary of the industrial wastewater facility (Figure 6), avoiding areas of crocodile nesting habitat and juvenile nursery areas. Trucks transporting spoils materials will abide by the vehicular constraints outlined in this plan.
- Preparation of monthly monitoring reports for submittal to USFWS and FWC summarizing results of the weekly day/night surveys conducted within the Site as well as results of the daily surveys conducted within the active construction zone.

C. Postconstruction

Following construction, the Site will become part of the overall Turkey Point Threatened and Endangered Species Monitoring and Management Program. Although highly unlikely due to the level of human activity and surrounding barriers, any nuisance crocodiles observed within the Project will be captured and relocated to the cooling canals within the industrial wastewater facility.

A summary of postconstruction activities follows:

- The Site will remain part of the overall Turkey Point Crocodile Monitoring and Management Program.
- Mitigation activities will be designed to benefit crocodiles through habitat enhancement and creation activities designed to improve crocodile habitat within and adjacent to the industrial wastewater facility, including creation of additional, low-salinity juvenile refugia areas upon selected berms, substrate enhancement to create suitable nesting habitat upon selected berms that have not historically supported crocodile nests, and construction of an additional crocodile nesting and foraging sanctuary (Sea Dade Canal Crocodile Sanctuary) south of the industrial wastewater facility within the EMB.

6.2.2 Eastern Indigo Snake

Adverse impacts to the eastern indigo snake will be minimized through traffic control and wildlife fencing along construction access roads as discussed in Section 8.0, wildlife training of all Project contractors, posting of informational signage, and continued presence of native habitat adjacent to areas of proposed construction.

FPL will comply with the USFWS (2004b) standard protection measures for eastern indigo snakes, including posting of informational signs along the access roads to contain the following information, at a minimum:

- A description and photograph of the eastern indigo snake, its habits, and protection under federal law.
- Instructions not to injure, harm, harass, or kill this species.
- Directions to cease clearing activities and allow the species sufficient time to move away from the Site on its own before resuming clearing.

- Telephone numbers of pertinent agencies to be contacted if a dead individual is encountered. The dead specimen should be thoroughly soaked in water and then frozen.

Construction personnel will receive mandatory wildlife training to include identification of protected species potentially occurring within the construction areas/access roads and notice to stop work and notify FPL environmental managers if eastern indigo snakes are observed within the work area.

6.2.3 Wood Stork

The conservation and monitoring plan for the wood stork involves mitigation to offset impacts to suitable foraging habitat within CFAs, updating FPL's systemwide avian protection plan (APP), installation of protective features on transmission line facilities to prevent electrocutions and within the vicinity of wood stork colonies to reduce potential for collisions, and monitoring as part of a mitigation effectiveness study.

A preliminary evaluation of the loss of wood stork foraging habitat within the CFAs associated with the West Preferred Corridor and proposed mitigation to provide equal or greater wood stork foraging habitat value was conducted in accordance with USFWS wood stork foraging assessment methodology contained within the 2010 USFWS South Florida Wood Stork Effect Determination Key (see Section 5.3.1). FPL proposes to mitigate for wetland impacts within the West Preferred Corridor through purchase of mitigation credits from the Hole-in-the-Donut (HID) mitigation bank. A preliminary assessment of mitigation at the HID was conducted in accordance with USFWS guidance based on the acreage of wetland restoration, evaluation of the pre- and postrestoration condition of vegetative communities and hydroperiods relative to suitable wood stork foraging habitat, and resulting increase in prey biomass available for wood storks (Appendix A).

Data from the HID Year 11 Final Annual Biological Monitoring Report (Everglades Research Group, Inc., 2009) was used to identify the acreage of restored wetlands by hydroperiod class (3,677 acres), which was used to quantify the total annual prey biomass generated within the HID restoration areas (7,724 kg/yr). An average of 0.93 kg/yr per acre was calculated for restoration of short hydroperiod wetlands, and an average of 3.52 kg/yr per acre was calculated for restoration of long hydroperiod wetlands. The Project's proposed contribution to HID restoration (308 acres) corresponds to an increase of approximately 649 kg/yr of wood stork prey biomass. When compared to the impacts within the West Preferred Corridor, this represents a net increase in prey biomass within short hydroperiod wetlands of approximately 126 kg/yr and a deficit (approximately 121 kg/yr) in prey biomass within

long hydroperiod wetlands. The focus of restoration on short hydroperiod wetlands is advantageous, as short hydroperiod wetlands may provide a more important prenesting foraging food source and a greater early nestling survivor value for wood storks when compared to long hydroperiod wetlands (Flemming *et al.*, 1994; Ceilley and Bortone, 2000), and because a larger percentage of wetland fill and excavation impacts permitted in South Florida are in short hydroperiod wetlands (USFWS, 2010d).

The assessment of wood stork foraging habitat impacts and mitigation will be revised following final transmission line design. Wetland impact location, type, and extent will be updated, and specific parcels within the HID may be identified in consultation with HID managers and USFWS to adjust the proportion of short and long hydroperiod wetland restoration funded through FPL's contribution.

FPL (2006) has a systemwide APP in place for its transmission line and distribution facilities. FPL is currently updating that APP in consultation with USFWS's Vero Beach and Havana, Florida, offices. The revised APP will address, among other things, methods and standard operating procedures to protect listed and migratory birds. The document is being drafted using the APP Guidelines (Avian Power Line Interaction Committee [APLIC], 2005 and updates). The APP will address the following issues with respect to protecting avifauna:

- Proper siting of electric utility structures.
- Use of approved avian-adapted construction design standards.
- Timely repair and retrofitting of problematic structures.
- Regulatory compliance procedures.
- Employee training in avian protection.
- Personnel safety procedures.
- Coordination with regulatory agencies.

Consistent with the requirements of USFWS, FWC, the APP, and approved conditions of certification, FPL will install perch discouragers along the new transmission line facilities. Additionally, FPL will install flight diverters on overhead ground wires along portions of the transmission lines that are within 0.5 mile of active wood stork colonies including the four colonies along Tamiami Trail. Flight diverters have been shown to reduce mortality due to collisions, while perch discouragers are installed on transmission line structure pole tops and arms to reduce risks of electrocution from perching or nest building and streamers (defecation).

FPL will conduct preconstruction wading bird and wood stork aerial surveys including follow flight surveys as described in Section 6.1.5. That data, along with current SFWMD wading bird report data, will be used to identify where conservation measures need to be implemented. Survey protocols and data will be provided in consultation with all appropriate wildlife agencies.

During and postconstruction of the transmission lines, FWC has requested the following conservation and monitoring conditions of certification:

> "For the currently known wood stork colonies along Tamiami Trail (East 1, East 2, and West) and the 3B Mud East Colony, and for any newly identified wood stork colonies within one-half mile from the corridor as a result of the above-referenced, post-certification pre-clearing survey, FPL shall implement the following measures:
>
> a. Flight Diverters—FPL will install spiral/corkscrew design bird flight diverters (or other mutually agreeable design flight diverters) on the Overhead Ground Wires (OGW) of each transmission line from a point one-half mile south of the Tamiami Trail colonies to a point one half mile north of the 3B Mud East Colony, and between points one half mile in either direction from any newly identified colonies. The point one-half mile shall be identified from the actual colony boundary to adhere to the USFWS Wood Stork Guidelines for activities within the primary boundary. Flight diverters have been shown to reduce mortality and will be installed according to the manufacturers' instructions.
>
> b. Perch Discouragers—FPL will also install perch discouragers at transmission structure pole tops and arms to address risks from nest building and streamers (defecation) and reduce the exposure and potential risk of electrocutions.
>
> c. Mitigation Effectiveness Study—FPL will fund a monitoring study during the first wood stork nesting season after construction along the marked stretch of the transmission lines near the currently known wood stork colonies, similar to the study performed by Frederick and Deng (1997) on the FPL Levee-Midway Transmission Line. The results will be used to determine effectiveness of wood storks (and other wading birds) in avoiding the new transmission line facilities, and especially if effectiveness of marked sections of lines is significantly different from unmarked lines. (Frederick, P., and J. Deng. 1997. Bird-Strike Mortality on the Everglades Section of the Levee-Midway Powerline. Florida Power & Light Co. 27 pp.)
>
> The surveys shall generally be performed as follows:
>
> (1) Specific study protocols including mortality monitoring and sampling biases protocols will be developed in conjunction with FWC, USFWS, and SFWMD biologists using Avian Power Line Interaction Committee (APLIC) guidelines for mitigating bird collisions with power lines.

(2) Surveys will be conducted on a regular frequency sufficient to detect mortality, such as every other day, in the mornings and in the evenings.

(3) Any dead or injured birds found will be identified, located with GPS, and collected for necropsy (if dead).

(4) Surveys will be conducted along the marked stretch of transmission line right-of-way in 100m transects, with each transect separated by 100m. Transects shall be centered on any observed flight lines as identified in the pre-construction follow-flight surveys. Transect width shall include the right-of- way width and any visible dimension on either side.

(5) Observations of flight behavior of any birds crossing the lines will also be recorded. A protocol for visual observations similar to the Frederick and Deng studies will be developed.

d. Postsurvey Review—After the Mitigation Effectiveness Study has been conducted, the results will be presented to FWC. If mortality to wood storks reasonably related to collisions with the transmission lines is documented to impact the wood stork population and as determined by the USFWS Biological Opinion, FPL and the Study Investigator will meet with FWC to discuss the results of the Mitigation Effectiveness Study. The populations considered in determining impacts will be the four colonies (Tamiami East 1, East 2, and West, and the 3B Mud East) and other colonies found within one-half mile of the transmission right-of-way, based on the SFWMD's annual wading bird survey that year. If in the judgment of the FWC the wood stork population of the four colonies that year was not within "ten-year average" ranges, FPL may be required to resurvey the right-of-way in that vicinity during an additional nesting season. If the post-survey review shows that mortality to wood storks within the colonies due to collision with the transmission lines exceeds that portion of the colonies' population that is allowed by the USFWS Biological Opinion, additional mitigation measures such as, but not limited to, different configurations or greater density of flight diverters, or additional monitoring, or a combination may be required by FWC."

6.2.4 Florida Manatee

FWC's Standard Manatee Conditions for In-Water Work (Appendix B) will be followed for in-water activity located where waters are accessible to manatees, including the equipment barge unloading area expansion, transmission lines, or pipelines. Culverts constructed as part of the Project will be constructed in accordance with the CERP Interagency Manatee Task Force Manatee Conservation Plan (CERP, 2003), as applicable.

At least 60 days prior to the beginning of in-water construction located where waters are accessible to manatees, FPL will contact FWC to determine whether observers will be required, how many observ-

ers will be needed, and who those observers will be. If observers are recommended, manatee observers will be onsite during in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 ft of any in-water construction activity.

If a cofferdam is used during in-water construction to minimize release of sediment, the area inside (behind) the cofferdam will be checked for the presence of manatees during and after installation of the barrier before further work occurs to ensure manatees have not been entrapped.

Following Project completion, a report summarizing manatee sightings, collisions, or injuries will be submitted to FWC's Imperiled Species Management Section within 30 days following Project completion.

6.2.5 Everglade Snail Kite

The conservation plan for the snail kite focuses on avoidance and minimization of impacts to suitable snail kite foraging and nesting habitat and replacement of the loss of habitat through the Project's mitigation plan. In the event that preclearing surveys determine the Project has the potential to impact snail kites, FPL will consult with FWC and USFWS for appropriate mitigation. Specifically, FPL will include the following conservation measures along its rights-of-way:

- Minimizing clearing of tree islands.
- Minimizing herbaceous wetland impacts.
- Avoiding nesting sites with temporal and/or spatial buffers.
- Monitoring nest sites during construction.
- Educating FPL staff and contractors.
- Controlling exotic plants within right-of-way.

FWC has requested in its proposed conditions of certification that, if snail kites are documented along the corridor as a result of the preclearing surveys, FPL will consult with the affected agencies and develop a detailed mitigation plan to be followed by monitoring and corrective actions, if required. The USFWS Draft Snail Kite Management Guidelines (2006b) will be followed if nesting is documented within the certified corridor.

6.2.6 Florida Panther

The conservation plan for the Florida panther involves incorporation of wildlife protection features within temporary construction access roadways as discussed in Section 8.0, including fencing, a 6-ft

box culvert wildlife underpass, reduced speed limits on both temporary construction access roadways and transmission line access roads, wildlife training of construction personnel, and compensatory mitigation to offset impacts to panther habitat, if required.

FPL will take proper precautions during clearing and construction to protect panthers from accidental injury during construction and report any panther observations (dead or alive) by employees or contractors within 24 hours to FWC after verification by a qualified expert. Construction policies and practices identified by FWC to protect panthers will be used whenever feasible, including limiting speeds on temporary construction access and transmission line access roads to 45 miles per hour (mph), consistent with approved conditions of certification.

Breedlove, Dennis, & Associates, Inc. (2009), estimated the impacts to Florida panther habitat for the Project using USFWS methodology. The proposed western transmission lines, associated structures, fill pads, and unimproved access roads are expected to only temporarily affect Florida panther habitat during the construction phase. Available data demonstrate that Florida panthers coexist with transmission line rights-of-way, off-road vehicle trails, dirt roads, and canal levees in other areas of their range, and panthers occur on these features at a frequency greater than their random occurrence within panther home ranges. Elevated fill areas may be expected to improve foraging and high-water refuge opportunities for deer, the principal prey species of panthers. The long-term functionality of panther habitats within and adjacent to the new western transmission line corridor will be maintained without adverse effect.

Loss of panther habitat associated with the temporary construction access roadway improvements is expected to be minimized in some areas and temporary in others, as FPL intends to restore publicly owned rights-of-way to pre-Project configurations, and improvements on SW 359th Street will be returned to an 18-ft drivable transmission line access road upon completion of construction. The temporary construction access roadway improvements are proposed in an area at the urban fringe of the primary zone, and there are very few acres of habitat that could be accessed in the future by panthers moving north or east of the proposed roadways. Moreover, panthers have not been confirmed in the vicinity in more than 20 years, and the likelihood of future panther occurrence in the area would be low. Unqualified members of the public may have claimed to have observed panthers in the vicinity without the observations having been verified by a qualified panther expert.

Installation of wildlife protection features described in Section 8.0, panther crossing signs, and reduced speed limits will minimize the likelihood of future panther collisions with motor vehicles in the event that panthers do move into this area at some time in the future. Moreover, training will be provided to construction personnel to increase their awareness of and need to avoid Florida panthers and other listed species of wildlife, including notice to stop work and notify FPL environmental managers if protected species are observed within the work area. FPL will work with USFWS and other appropriate agencies to determine actual mitigation recommendations for the direct and temporary loss of panther habitats after a final design for linear Project features has been achieved, consistent with the conditions of site certification.

6.3 Mitigation

Impacts to wetlands providing habitat for threatened and endangered species will be compensated through the enhancement, restoration, and preservation of more than 800 acres of habitat consistent with the regional restoration goals of the CERP within the Biscayne Bay Coastal Wetlands study area, as well as supporting the continued restoration activities at the EMB and the HID mitigation bank.

Mitigation activities proposed within the Biscayne Bay Coastal Wetlands area include restoration, enhancement, and preservation of more than 800 acres of wetland parcels adjacent to the L-31E Canal, which will benefit regional ecosystem restoration plans. The conveyance of some of these FPL mitigation parcels to the public trust would connect the restored lands with state and federal environmentally protected lands to the east, completing acquisition of an important segment of the Biscayne Bay Coastal Wetlands project. The proposed wetland restoration, enhancement, and preservation will provide an increase in suitable wildlife habitat, specifically benefitting wading birds and shorebirds.

Details regarding the proposed wetland mitigation activities are provided in the refined wetland mitigation plan (SCA Appendix 10.4, Section 2, Attachment E, Rev. 2, July 2011), which is publicly available from the FDEP Siting Office at http://publicfiles.dep.state.fl.us/siting/outgoing/FPL_Turkey_Point/Units_6_7/Completeness/Plant_Associated_Facilities/5th_Round_Completeness/Attachments/5-MDC-A-25%20Mitigation%20Plan.pdf. As part of the wetland mitigation plan, impacts to suitable wood stork foraging habitat within wood stork CFAs will be offset through the proposed purchase of mitigation credits from the HID mitigation bank (see Section 6.2.3 and Appendix A).

As construction will impact potential crocodile foraging and basking habitat on the Site, FPL will conduct habitat enhancement and creation activities designed to improve crocodile habitat within and adjacent to the industrial wastewater facility, including creation of additional, low-salinity juvenile refugia areas upon selected berms, substrate enhancement to create suitable nesting habitat on selected berms that have not historically supported crocodile nests, and construction of an additional crocodile nesting and foraging sanctuary (Sea Dade Canal Crocodile Sanctuary) south of the industrial wastewater facility within the EMB.

FPL will also create a system of wildlife underpasses along the access road north of the industrial wastewater facility to facilitate safe passage for crocodiles and other species. Additional wildlife protection features, such as fencing, enlarged culverts, and a 6-ft box culvert wildlife underpass, will be incorporated into the temporary construction access roadway improvements on SW 359th Street between the L-31E Canal and SW 137th Avenue.

6.3.1 Sea Dade Canal Crocodile Sanctuary

The proposed Sea Dade Canal Crocodile Sanctuary involves creation of wetlands impacted by historical dredging and filling, topographic grading and planting, creation of low-salinity ponds for juvenile crocodile refugia, and creation of habitat conditions with suitable nesting substrate specifically benefitting the crocodile. The approximately 6.4-acre area is located southwest of the industrial wastewater facility, adjacent to the Sea Dade Canal and an existing meteorological tower (Figure 21). The target community is modeled after the successful crocodile sanctuary created on previously filled land within the EMB in 2008. Figure 22 presents a postenhancement conceptual design. Similar to the design used at the EMB crocodile sanctuary, areas of previously filled uplands within the Sea Dade Canal Crocodile Sanctuary will be graded and connected to existing borrow pond areas to create an open water lagoon habitat. The proven mixture of peat, marl, and sand will be used along the slopes and banks to create ideal crocodile nesting substrate. The lagoon will be connected to the Sea Dade Canal on the eastern edge near the existing access road. It will be connected to the western borrow pond, and a second connection to the Sea Dade Canal will also be constructed within the western borrow pond to facilitate wildlife access to the sanctuary. Perched ponds designed to collect rainwater and provide low-salinity juvenile crocodile refugia will be created surrounding the primary lagoon. Nesting mounds of peat, marl, and sand will be constructed adjacent to and surrounding the low-salinity ponds. In addition to providing a nesting sanctuary for crocodiles, the area will provide potential foraging habitat for wading birds, including wood storks, through the creation of shallow freshwater ponds suitable for tactile feeding.

Along with creation of the Sea Dade Crocodile Sanctuary, FPL will continue habitat enhancement and construction of depressional areas on the berms within the southern portion of the industrial wastewater facility during construction and operation of the Project, which will further increase the quality of habitat for the crocodile and promote juvenile survival and growth through provision of additional areas of low-salinity refugia.

6.3.2 Access Roadway Wildlife Protection Features

Additional mitigation activities designed to reduce, eliminate, and mitigate potential impacts to threatened and endangered species include wildlife protection features on roadways. Wildlife protection features are proposed on SW 359th Street east of the L-31E Canal to reduce potential impacts of construction traffic on crocodiles, while wildlife protection features proposed on SW 359th Street west of the L-31E Canal are designed to discourage mammalian and herpetofauna access to the temporary construction access roadways.

The proposed wildlife underpasses associated with SW 359th Street east of the L-31E Canal will ameliorate the potential impacts of construction traffic on crocodiles between the industrial wastewater facility and the test cooling canals. The proposed wildlife crossings will be bottomless culverts constructed of precast concrete with wing walls to guide the crocodiles through the openings. Fence barriers will be installed and trenched into the ground on either side of the access road from the L-31E Canal east along the length of the test cooling canal area to promote use of the wildlife underpasses.

Most research on the use of highway underpasses by wildlife has focused on hoofed mammals (Reed *et al.*, 1975; Singer and Doherty, 1985; Foster and Humphrey, 1995). However, there is ample evidence of wildlife underpass benefits with regard to reduction in reptile and amphibian mortality in Florida. On U.S. Highway 441 through Paynes Prairie State Preserve in Alachua County, a wildlife underpass system was constructed consisting of an approximately 1-meter-tall concrete wall located parallel to the roadway with eight culverts to allow wildlife movement underneath the roadway. Alligator, snake, turtle, and frog mortality declined dramatically after construction of the underpass (Barichivich and Dodd, 2002).

Alligators have been documented utilizing the wildlife underpasses installed as part of the upgrade of Alligator Alley (Interstate 75) in Southwest Florida from two lanes to four (Foster and Humphrey, 1995). Most of the underpasses along Alligator Alley consist of two bridges constructed of concrete

with a 3-meter-high chain link fence topped with three strands of barbed wire to prohibit animals from entering the highway right-of-way. Given the use of wildlife underpasses by alligators, it is expected that crocodiles will adapt to using the proposed wildlife underpasses at the Turkey Point Plant property.

In addition to the crocodile underpasses discussed previously, FPL is also proposing to install wildlife protection fencing, enlarged culverts, and a 6-ft box culvert wildlife underpass in association with the temporary construction access roadway improvements along SW 359th Street from the L-31E Canal to SW 137th Avenue to reduce the probability of impacts to nonlisted as well as listed species of wildlife. Fencing 8 ft in height will be installed on either side of the temporary construction access roadway improvements on SW 359th Street to reduce and/or eliminate the potential for wildlife vehicular collisions (Figure 23). Geotextile fabric or similar fine-mesh material will be installed along the base of the fencing to prevent small herpetofauna from passing through the fence. Enlarged arch culverts (20- by 28-inch) will be installed along SW 359th Street from the L-31E Canal to SW 137th Avenue to allow for passage of smaller herpetofauna, mammals, or fish.

In addition, FPL will construct a 6-ft box culvert wildlife underpass suitable for larger fauna (Figures 24 and 25). Although wildlife corridors are typically natural linear features that connect areas of significant habitat separated or surrounded by human development, such conditions do not occur within the proposed temporary construction access roadway improvements corridor. Similar habitats occur both north and south of the existing transmission line access road on SW 359th Street, although the prevalence of exotic vegetation increases northward toward SW 344th Street. The presence of upland limestone roadways and ditches provides linear features that may be used as preferred wildlife travel paths, while areas of forested wetlands may provide additional cover for wildlife movements. FPL has proposed locating the 6-ft box culvert wildlife underpass in an area of mixed wetland hardwoods that extends across both sides of the existing access road (Figure 26). Compared to the adjacent, relatively open sawgrass marsh landscape, the mixed wetland hardwood tree canopy provides increased cover and is located near a north-south upland limestone roadway that leads to a relatively large excavated ditch.

6.3.3 Avian Protection

Avian mitigation will be provided consistent with FPL's existing APP and the current revisions to that document. Among other things, FPL will utilize placement of perch discouragers on the tops of new 230-kV lines and above transmission line towers, including those proposed for this Project.

Perch discouragers will minimize listed and migratory bird species from perching or building nests on the structures, which in turn will minimize mortality due to electrocution.

Flight diverters will be installed on overhead ground wires where the lines will occur within 0.5 mile of active wading bird or wood stork colonies. These devices greatly enhance the visibility of the overhead ground wires, thereby minimizing collisions as birds fly over the lines. The conductors are normally visible to most birds, but as they flare over them, they may encounter the thinner, less visible overhead ground wires. Avoiding or minimizing collisions through the installation of flight diverters will result in decreased potential for injury or mortality to birds crossing the lines.

As discussed in detail in Section 6.2.3, FPL will be required to fund independent postconstruction monitoring studies of the rights-of-way near existing wood stork colonies. If unacceptable levels of collisions of wading birds/wood storks are observed, FPL will be required to implement additional mitigation measures in consultation with the regulatory agencies. These measures may include additional flight diverters, increased density of flight diverters, additional postconstruction surveys and monitoring, or other measures as deemed appropriate by FWC and USFWS.

7.0 CONCLUSIONS

FPL has preserved (both historically and in planning this Project), to the maximum extent practicable, all habitat identified as critical to threatened and endangered species. The Turkey Point Threatened and Endangered Species Management Program addresses measures to be taken during construction and operation necessary to protect threatened and endangered species and their habitat, including avoidance of active nesting areas, incorporation of fencing and wildlife underpasses in access road design, and mitigation to compensate for loss of potential foraging or nesting habitat.

Through commitments to avoid, minimize, and mitigate potential impacts to threatened and endangered species and their habitats, the Project is not likely to affect the majority of federally listed and candidate species covered in Table 1 of Section 1.0 of this document. The Project is not likely to affect the following species covered in this BA: eastern indigo snake, Florida manatee, Everglade snail kite, and Florida panther, for all the reasons provided in the discussions of each and summarized in the following subsections.

Listed species that may be affected by the Project are limited to the American crocodile and wood stork, both being potentially affected through loss of potential foraging and nesting habitat or direct impacts to the animals themselves. Due to the Project's avoidance, minimization, and mitigation efforts, it is concluded that the Project is not likely to adversely affect the wood stork. The Project's mitigation efforts have been designed to offset the potential impacts to listed species through habitat creation, restoration, enhancement, and preservation to fully replace the loss of potential listed species' foraging and nesting habitat associated with construction of the Project. Although the Project's proposed traffic constraints, wildlife underpasses, and fencing will reduce the potential for incidental take during construction, the Project may adversely affect the American crocodile due to the size of the proposed workforce, duration of construction, and increased crocodile population within the industrial wastewater treatment facility. The estimated level of incidental take is not likely to result in jeopardy to the American crocodile.

The following subsections summarize the likelihood of effect based on the habitat preferences, status within the Project area, avoidance and minimization efforts, wildlife protection features, and mitigation measures proposed for each species.

7.1 Species Not Likely to be Affected

The Project is not likely to affect the eastern indigo snake, Florida manatee, Everglade snail kite, or Florida panther.

Impacts to the eastern indigo snake are not anticipated due to the use of wildlife protection features in temporary construction access roadway design and operation, adherence to USFWS's standard protection measures for the eastern indigo snake, lack of documented common occurrence within the Project area, and lack of significant impacts to upland habitats, including gopher tortoise burrows preferred by the eastern indigo snake. There is no designated critical habitat for the eastern indigo snake.

No impacts to manatees or to their federally designated critical habitat are expected, as manatees are not known to congregate or occur within the existing turning basin; construction will be conducted in accordance with FWC's Standard Manatee Conditions for In-Water Work; no collisions or impacts to manatees have occurred at the Turkey Point Plant; and the existing manatee protection plan for the Plant will continue to be followed during construction and operation of the Project. With regard to potential manatee occurrence within canals located in the reclaimed water pipeline corridor and East Preferred Corridor, no impacts are anticipated due to the temporary nature of disturbance associated with pipeline installation, adherence to FWC's Standard Manatee Conditions for In-Water Work, and ability of transmission line facilities to either span areas of open water canals or be installed through use of horizontal directional drilling methods.

The Project is located outside the federally designated critical habitat for the snail kite. Any impacts to suitable snail kite foraging or nesting habitat will be offset through wetland restoration, enhancement, and preservation associated with the Project's mitigation plan. The Project will implement survey protocols to detect presence of birds or nesting along the proposed right-of-way in order to implement any spatial or temporal avoidance, if required.

No impact to the Florida panther is anticipated due to lack of recent documented occurrences within the Project area, increase in development associated with Homestead and Florida City since the last panther telemetry points were recorded within the vicinity of the Site and associated facilities, incorporation of wildlife protection features into temporary construction access roadway design, enforcement of 45-mph speed limits, wildlife training for construction personnel, and installation of wildlife

crossing and protected species information signage. There is no designated critical habitat for the Florida panther.

Impacts to listed or candidate species of plants will be avoided and minimized through use of preclearing surveys, modification of linear facility design to the greatest extent practicable, and relocation of individuals where feasible. No population-level impacts to listed species of plants are anticipated; avoidance and minimization efforts will support the continued existence of viable populations of threatened and endangered plants during construction and operation of the Project.

7.2 Species that may be Affected but Not Likely to be Adversely Affected

Listed species that may be affected but not likely to be adversely affected within the Site and associated facilities are limited to the wood stork, which may be affected through loss of potential foraging habitat, as well as the potential for injury or mortality due to collisions with the transmission line components. Although the wood stork may be affected, due to the Project's avoidance, minimization, and mitigation efforts, it is not likely that significant impacts will occur. The Project's mitigation efforts have been designed to offset the potential impacts to listed species through habitat creation, restoration, enhancement, and preservation that fully replaces the loss of potential listed species habitat associated with construction of the Project. The Project is not anticipated to jeopardize the continued existence of the regional population of wood storks.

Although the Project may affect the wood stork, due to the commitment to compensate for the loss of foraging habitat within wood stork CFAs and reduce the potential risk for interactions with transmission line facilities through installation of flight diverters and perch discouragers, the Project is not likely to adversely affect the wood stork population or its continued existence in South Florida. FPL will compensate for wetland impacts within wood stork CFAs through mitigation that provides for equal or greater wood stork foraging habitat value, in accordance with USFWS guidance. Flight diverters and perch discouragers will be installed on the transmission line facilities consistent with the requirements of USFWS and the approved conditions of certification. FPL will commit to extensive pre- and postconstruction monitoring studies, and implement additional mitigation if warranted.

Due to the location of the West Preferred Corridor within the CFAs of nine wood stork colonies and recommended maximum secondary protection zones (2,500 ft) of two colonies, the wood stork may be affected through loss of foraging habitat and potential increased risk of collision. FPL will com-

pensate for wetland impacts within wood stork CFAs through mitigation that provides for equal or greater wood stork foraging habitat value, measured as the estimated prey biomass available on an annual basis. The assessment of mitigation will be conducted in accordance with USFWS guidance based on the acreage of wetland restoration, evaluation of the pre- and postrestoration condition of vegetative communities and hydroperiods relative to suitable wood stork foraging habitat, and the resulting increase in prey biomass available for wood storks.

Consistent with the requirements of USFWS and approved conditions of certification, FPL will install perch discouragers along the transmission line facilities to reduce the potential risk of electrocutions. As also proposed, and consistent with FWC-recommended conditions of certification, FPL will install flight diverters on overhead ground wires on the transmission lines from points along the line within 0.5 mile of any active wood stork colony. This will be implemented for the Tamiami Trail complex of colonies at a minimum. Activities conducted near wood stork colonies will adhere to USFWS wood stork guidelines.

Once the transmission lines are constructed, FPL will fund a monitoring study to be conducted during the first wood stork nesting season along the stretch of lines near active colonies. The study parameters and methods will be developed in conjunction with USFWS, FWC, and SFWMD. Results of the study will be presented to these agencies. If the survey results are judged by the agencies to not be within the 10-year average population level of the four colonies, FPL may be required to resurvey the following nesting season. If mortality or injury is judged to be at unacceptable levels to birds, additional mitigation will be required and implemented. This may be in the form of additional numbers of flight diverters, additional density of flight diverters, additional monitoring, or a combination of these.

Based on the Project's avoidance and minimization efforts, commitment to compensate for the loss of foraging habitat within wood stork CFAs, installation of flight diverters and perch discouragers to reduce the potential risk for interactions with transmission line facilities, and extensive pre- and postconstruction monitoring, the Project is not likely to adversely affect the wood stork population or its continued existence in South Florida.

7.3 Species that may be Affected and Likely to be Adversely Affected

Listed species that may be affected and are likely to be adversely affected as a result of the Project are limited to the American crocodile, because of the potential for accidental interaction during construc-

tion activities. Although the American crocodile may be adversely affected, due to the Project's avoidance, minimization, and mitigation efforts, no adverse impacts to American crocodile critical habitat are anticipated, and the potential for incidental take during construction and operation will not pose any jeopardy to the continuation of the species.

The conservation and management plan for preconstruction, during construction, and postconstruction periods includes restrictions on traffic, installation of fencing and wildlife underpasses on construction access roads, and habitat restoration designed to minimize the potential for adverse impacts to the crocodile at the Site and associated facilities. Reasonable and prudent measures proposed to minimize the potential for incidental take include traffic constraints (discussed in Section 6.2.1.2), access road wildlife protection features (Section 6.3.2), and Project's conservation and monitoring plan (Section 6.2.1.5). Despite these measures, the increased crocodile population within the industrial wastewater facility coupled with the Project's peak construction workforce of up to 4,000 employees and up to 36 construction trucks per hour increases the potential for accidental interactions during construction of the Project. Although the potential for impact during construction exists, the Project is not likely to jeopardize the continued existence of the crocodile, and no reduction in the size or health of the crocodile population is anticipated.

Construction at the Site will impact approximately 250 acres of low-quality wetlands within the industrial wastewater facility. Although this area is located within the USFWS-designated critical habitat area for the crocodile, historical monitoring of the crocodile population within the industrial wastewater facility indicates occasional observations of basking crocodiles along the perimeter of the Site but no use of the Site for nesting and limited potential for foraging due to the altered and highly variable hydrology and limited food supply. As construction will impact potential crocodile foraging and basking habitat at the Site, FPL will conduct habitat enhancement and creation activities designed to directly benefit juvenile and nesting crocodiles within and adjacent to the industrial wastewater facility. These efforts include creation of additional juvenile low-salinity refugia areas on selected berms, vegetative restoration, substrate enhancement to create suitable nesting habitat on selected berms that have not historically supported crocodile nests, and construction of the Sea Dade Crocodile Sanctuary providing nesting and foraging habitat south of the industrial wastewater facility within the EMB.

Spoils materials generated from Site preparation will be added to areas of existing spoils along the southern boundary of the industrial wastewater facility and the berms adjacent to one north-south ca-

nal. These spoils areas do not contain suitable nesting habitat, nor do they contain any low-salinity refugia for juvenile crocodiles; therefore, no adverse impacts to the breeding population due to placement of spoils material are anticipated.

Construction of the FPL reclaimed water treatment facility at the potential alternative location will impact approximately 3 acres of excavated canals and ditches that provide potential crocodile habitat. No significant adverse impact to crocodiles is anticipated due to construction of the reclaimed water treatment facility within the potential alternative location, as large areas of similar excavated open water habitat occur to the east (test cooling canals under conservation easement) and south (interceptor ditch).

7.4 Incidental Take

Section 9 of the Endangered Species Act of 1973 and federal regulation pursuant to Section 4(d) of this Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct. "Harm" is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by USFWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Sections 7(b)(4) and 7(0)(2), taking, that is incidental to and not intended as part of the agency action, is not considered to be prohibited taking under the Endangered Species Act of 1973 provided that such taking is in compliance with the terms and conditions of the project-specific USFWS incidental take statement.

The amount or extent of take anticipated is determined by USFWS. As part of the 2006 biological opinion associated with the renewal of the operating licenses for existing Turkey Point Units 3 and 4 (Service Consultation Code 41420-2006-F-0125, as amended August 1, 2006), USFWS anticipated the incidental take of two American crocodiles between May 2006 through May 2011 and thereafter one American crocodile per year. The incidental take was expected to be in the form of accidental direct mortality resulting from ongoing operations at the Turkey Point Power Facility site. USFWS determined that this level of anticipated take is not likely to result in jeopardy to the species. The

terms and conditions of the biological opinion include installation of four speed limit signs labeled as "Speed Limit 5 MPH" at approximately 500-ft intervals along the existing roadway between the industrial wastewater facility and the test canals on the Turkey Point Power Plant site.

The current incidental take amount has not been exceeded at any time since 2006. Between May 2006 and May 2011, two individuals were killed as a result of vehicular trauma (May 27 and December 3, 2006). Since December 2006, one individual was killed as a result of vehicular trauma (November 16, 2011).

Based on the increased potential for accidental impact during the 10-year construction of the Project, an evaluation of incidental take separate from operation of the existing Turkey Point Facility is requested. The fencing, wildlife underpasses, traffic constraints, and conservation and monitoring plan proposed for the Units 6 & 7 Project provide reasonable and prudent measures to minimize the potential for incidental take during construction of the Project and ongoing operations at the Turkey Point Power Facility. Based on the current status of the population at the Turkey Point Facility, implementation of reasonable and prudent measures, and proposed habitat restoration activities, the Project is not likely to result in jeopardy to the species.

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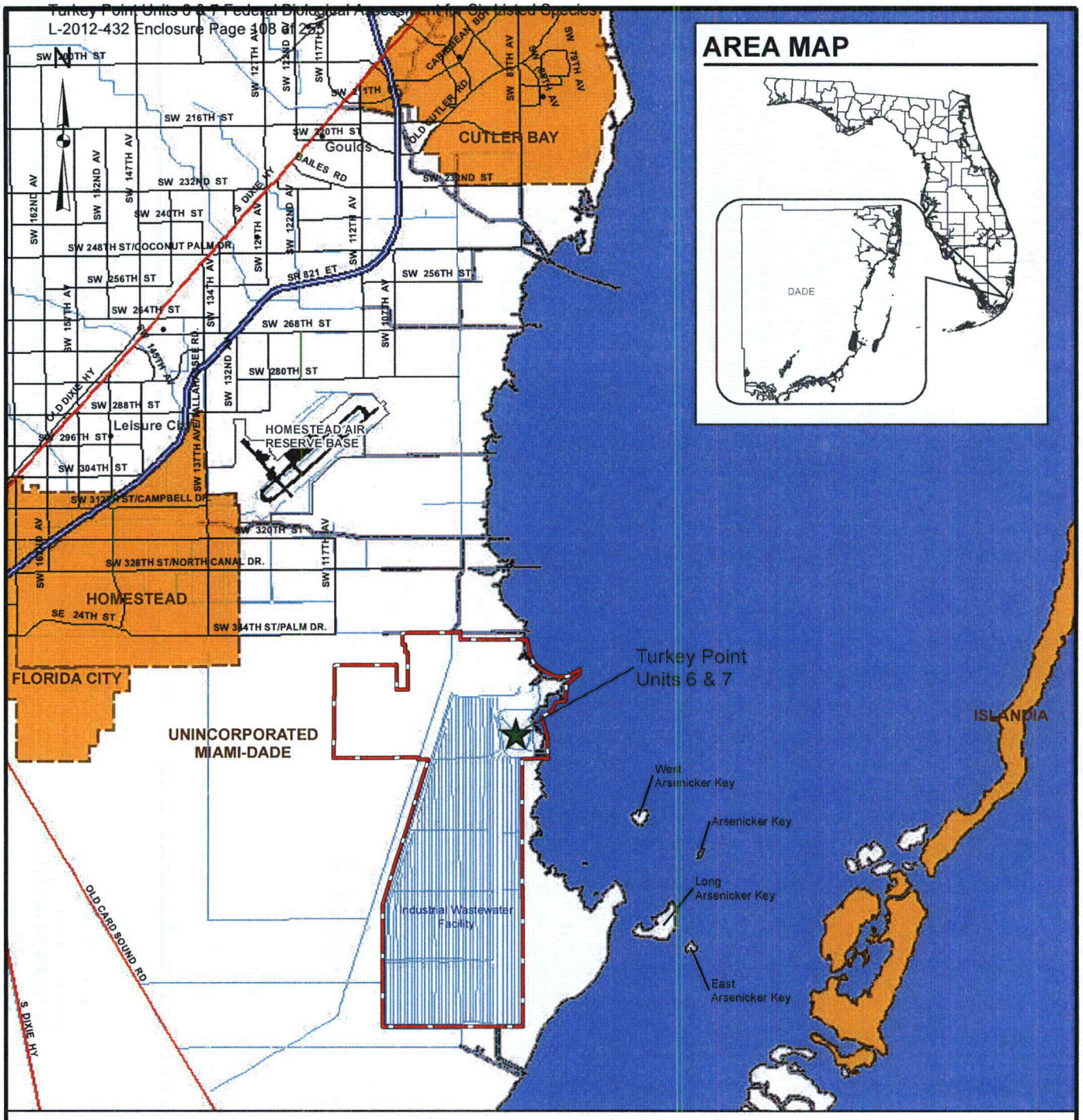
FIGURES



LEGEND

- Turkey Point Units 6 & 7
- Turkey Point Plant Property Boundary
- Municipal Boundaries

REFERENCES

1. Local City Boundaries, Municipal Boundaries, Major Roads, Miami-Dade County GIS, 2006.

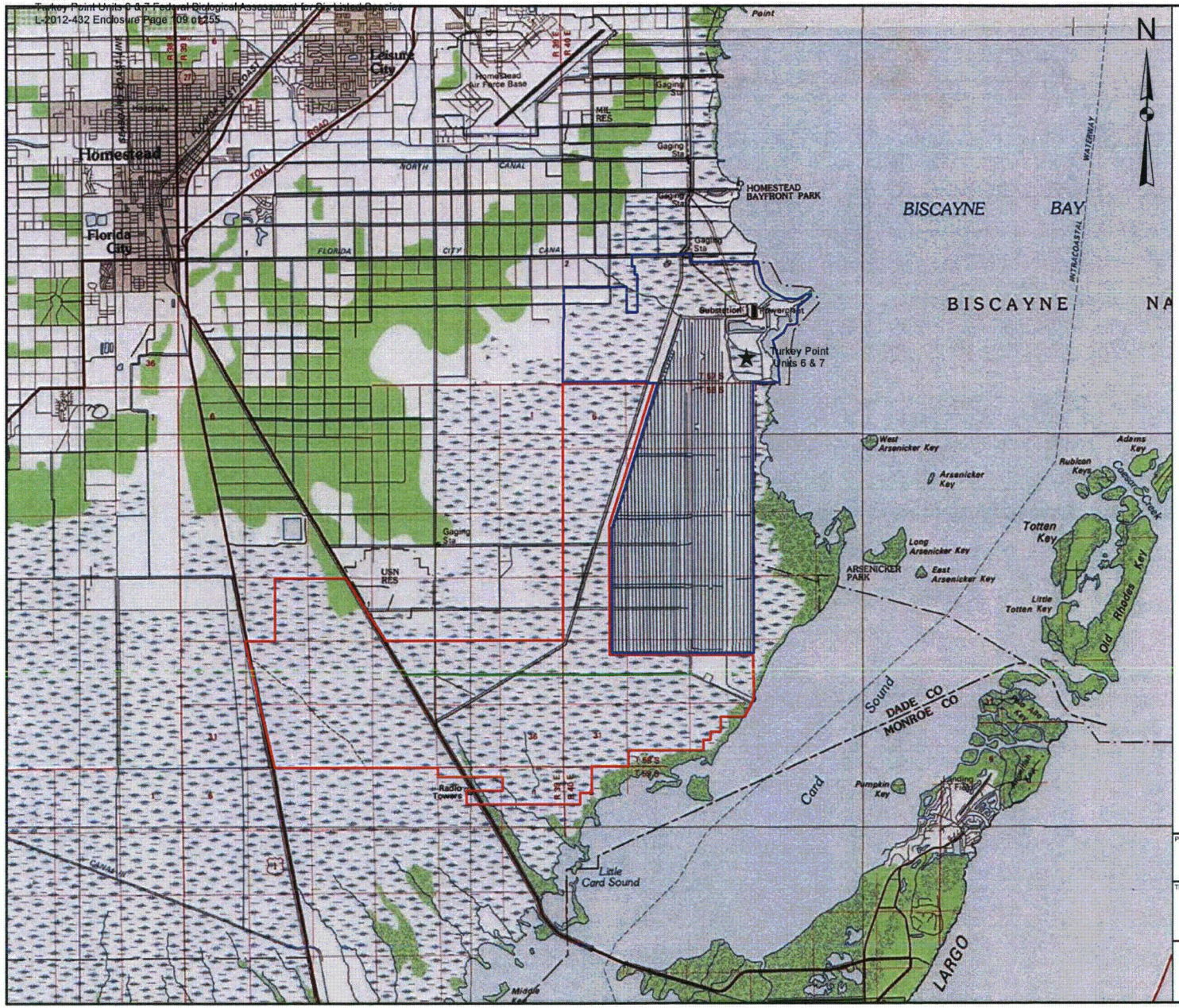
PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT

TITLE: LOCATION OF TURKEY POINT PLANT

FPL

FILE No. 08387584_U001
REV. 0
PLOT DATE 9/10/2012

FIGURE 1



LEGEND

- ★ Turkey Point Units 6 & 7
- Turkey Point Plant Property Boundary
- Everglades Mitigation Bank

REFERENCES

8,000 4,000 0 Feet

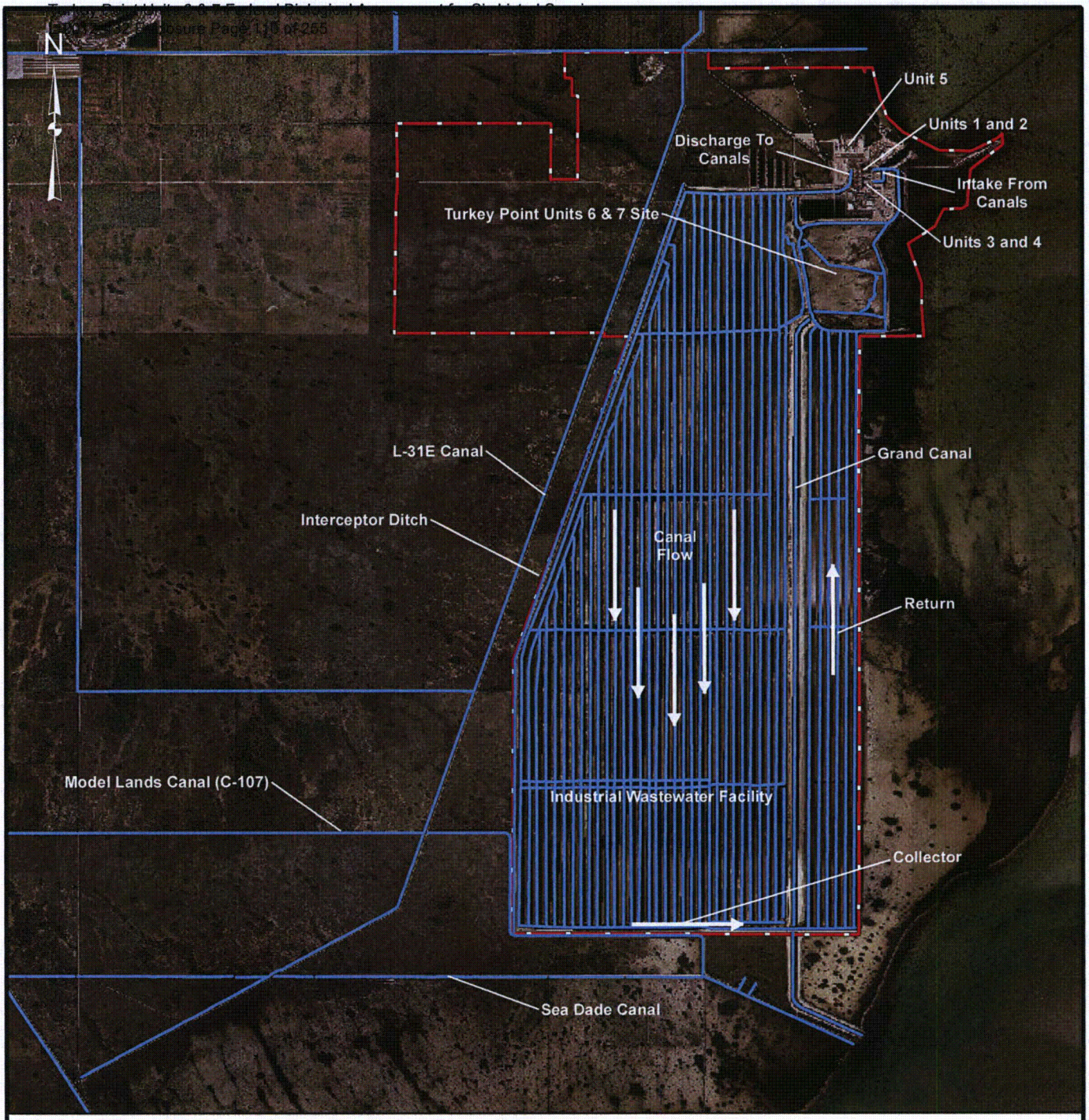
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
UNITS 6 & 7 SITE LOCATION AND EVERGLADES MITIGATION BANK

FPL

FILE No. 08387584_U002
REV. 0
PLOT DATE 9/10/2012

FIGURE
2



5,400 0 Feet

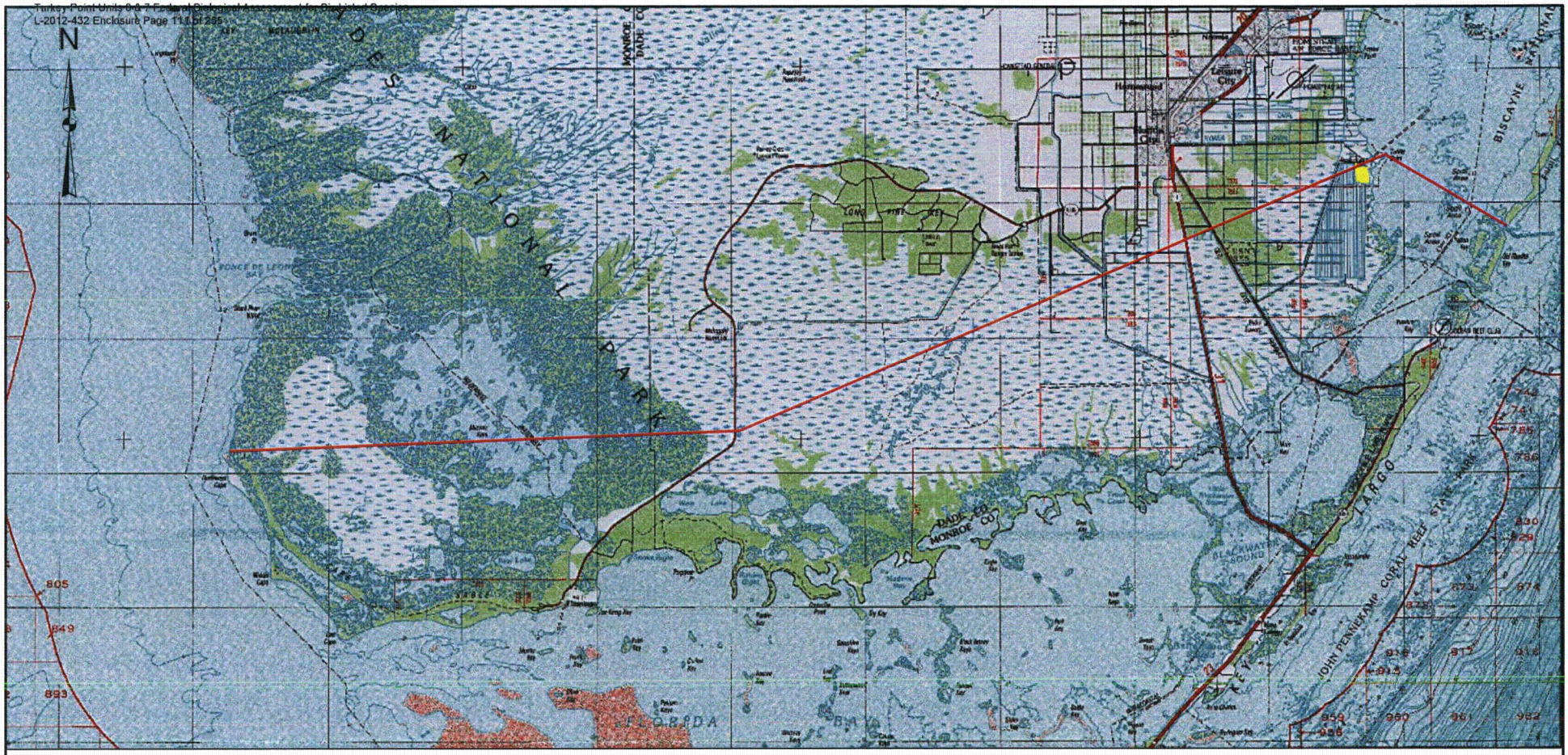
LEGEND

- Canals
- Turkey Point Plant Property Boundary

REFERENCES

1. Imagery, Miami-Dade County, 2007.

PROJECT	TURKEY POINT UNITS 6 & 7 PROJECT
TITLE	TURKEY POINT INDUSTRIAL WASTEWATER FACILITY
FPL	FILE No. 08387584_U003
	REV. 0
	PLOT DATE 9/10/2012
	FIGURE 3



LEGEND

- Northern Boundary of Designated Critical Habitat for American Crocodile
- Turkey Point Units 6 & 7 Site

4.5 2.25 0 Miles

REFERENCES

1. Topographic Image, USGS, 2001.
2. American Crocodile Boundary, USFWS, 2005

PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT

TITLE: AMERICAN CROCODILE DESIGNATED CRITICAL HABITAT BOUNDARY

FPL

FILE No. 08387584_P004
REV. 1
PLOT DATE 7/18/2011

FIGURE 4

900 0 Feet

LEGEND

- Proposed Fence Line
- Proposed Water Line
- Proposed Parking Roads
- Turkey Point Units 6 & 7 Plant Area
- Turkey Point Units 6 & 7 Site
- Proposed Storage Areas
- Proposed Parking Area
- Substation Areas
- Bridges

REFERENCES

1. Imagery, Miami-Dade County, 2007.

PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT

TITLE: UNITS 6 & 7 AERIAL PLOT PLAN

FPL.

FILE No. 08387584_P005

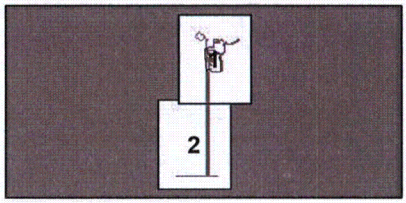
REV. 1

PLOT DATE 7/18/2011

FIGURE 5

LEGEND

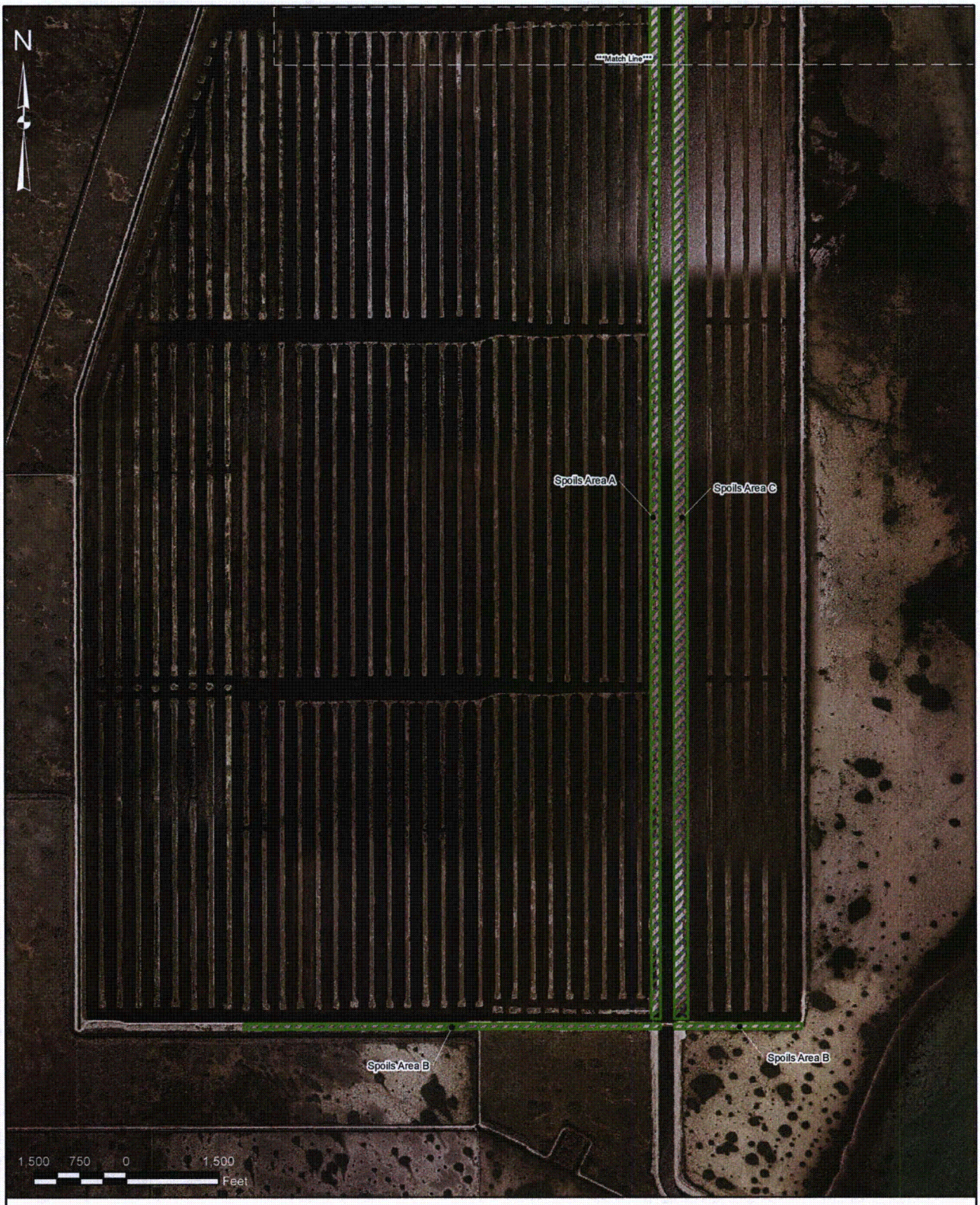
- Turkey Point Units 6 & 7 Site
- Associated Non-Linear Facilities
- Construction Areas / Facilities
- Spoil Areas



REFERENCES

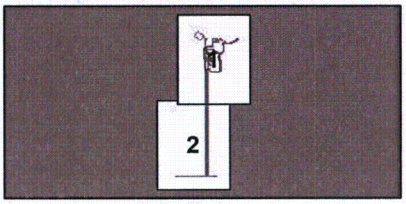
1. Imagery, Miami-Dade County, 2007.

FIGURE 6	PLOT DATE 7/18/2011	REV. 1	FILE No. 0838754_P006	TITLE: ASSOCIATED NON-LINEAR FACILITIES, CONSTRUCTION AREAS, SPOIL AREAS, SITE AND ADJACENT PROPERTIES Sheet 1 of 2	PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT	FPL



LEGEND

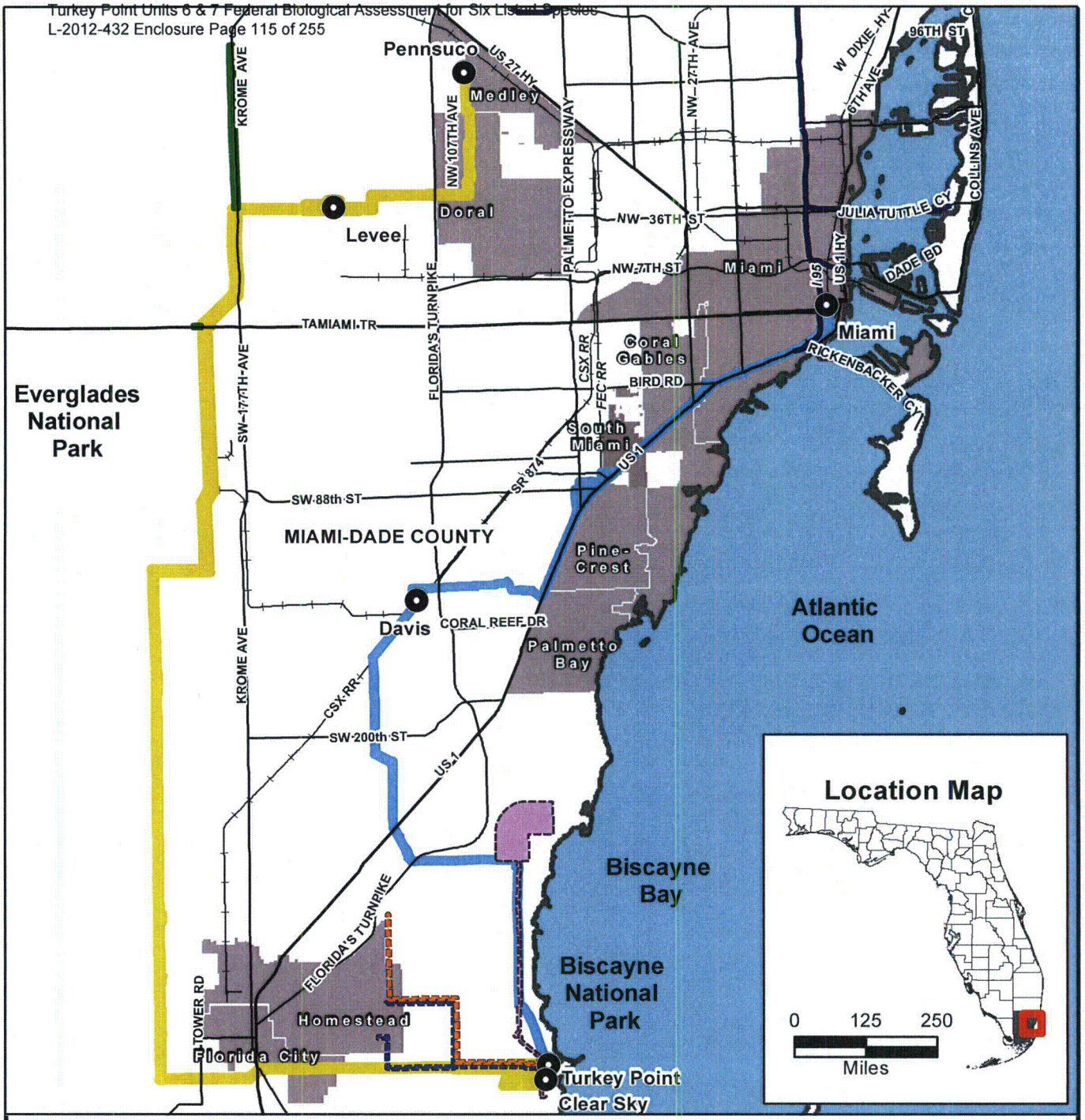
- Turkey Point Units 6 & 7 Site
- Associated Non-Linear Facilities
- Construction Areas / Facilities
- Spoil Areas



REFERENCES

1. Imagery, Miami-Dade County, 2007.

FIGURE 6	PLOT DATE: 7/19/2011	REV.: 1	FILE No.: 0838758A_P006	TITLE: ASSOCIATED NON-LINEAR FACILITIES, CONSTRUCTION AREAS, SPOIL AREAS, SITE AND ADJACENT PROPERTIES Sheet 2 of 2	PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT	FPL.



LEGEND

- FPL Substation
- East Preferred Transmission Corridor
- West Preferred Transmission Corridor
- Access Corridors
- Reclaimed Water Pipeline Corridor
- Potable Water Pipeline Corridor
- Roadway Improvement Corridors
- Turkey Point Plant Property
- Turkey Point Units 6 & 7 Site
- Interstate Highway
- US Highway
- Major Road
- Railroad
- Municipalities

REFERENCES

US Census, 2000; FDOT, 2005; Miami-Dade County, 2008.

N

PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT

TITLE: LINEAR FACILITIES PROPOSED FOR CERTIFICATION

FPL

FILE No. 090531-0100
REV. 0
PLOT DATE 7/19/2011

FIGURE 7

File: M:\acad\080489\Water_Roads_Routes.mxd

LEGEND

- Turkey Point Units 6 & 7 Plant Area
- Turkey Point Units 6 & 7 Site
- Associated Non-Linear Facilities
- Land Use / Land Cover
  - 437 - AUSTRALIAN PINE
  - 510 - CANAL
  - 511 - DITCHES
  - 531 - OPEN WATER
  - 534 - RESERVOIRS < 10 ACRES
  - 542 - EMBAYMENTS NOT OPENING DIRECTLY INTO THE ATLANTIC OCEAN
  - 612 - MANGROVE SWAMPS
  - 612 / 618 - MANGROVE SWAMPS / WILLOW AND ELDERBERRY
  - 612-A - MANGROVE HEADS
  - 612-B - DWARF MANGROVES
  - 617 - MIXED WETLAND HARDWOODS
  - 617-P - MIXED WETLAND HARDWOODS-PLANTED
  - 619-AP - EXOTIC WETLAND HARDWOODS / AUSTRALIAN PINE
  - 641 - FRESHWATER MARSHES
  - 6411 - MARSH SAWGRASS
  - 650 - NON-VEGETATED MUD FLAT
  - 740 - DISTURBED LANDS
  - 743 - UPLAND SPOIL AREAS
  - 743-WET - WETLAND SPOIL AREAS
  - 744 - FILL AREAS / ROADWAYS
  - 814 - ROADS AND HIGHWAYS
  - 831 - ELECTRIC POWER FACILITIES

REFERENCES

1. Imagery, Miami-Dade County, 2007.
2. Land Use, SFWMD & Golder Associates Inc., 2004 / 2009

950 475 0
Feet

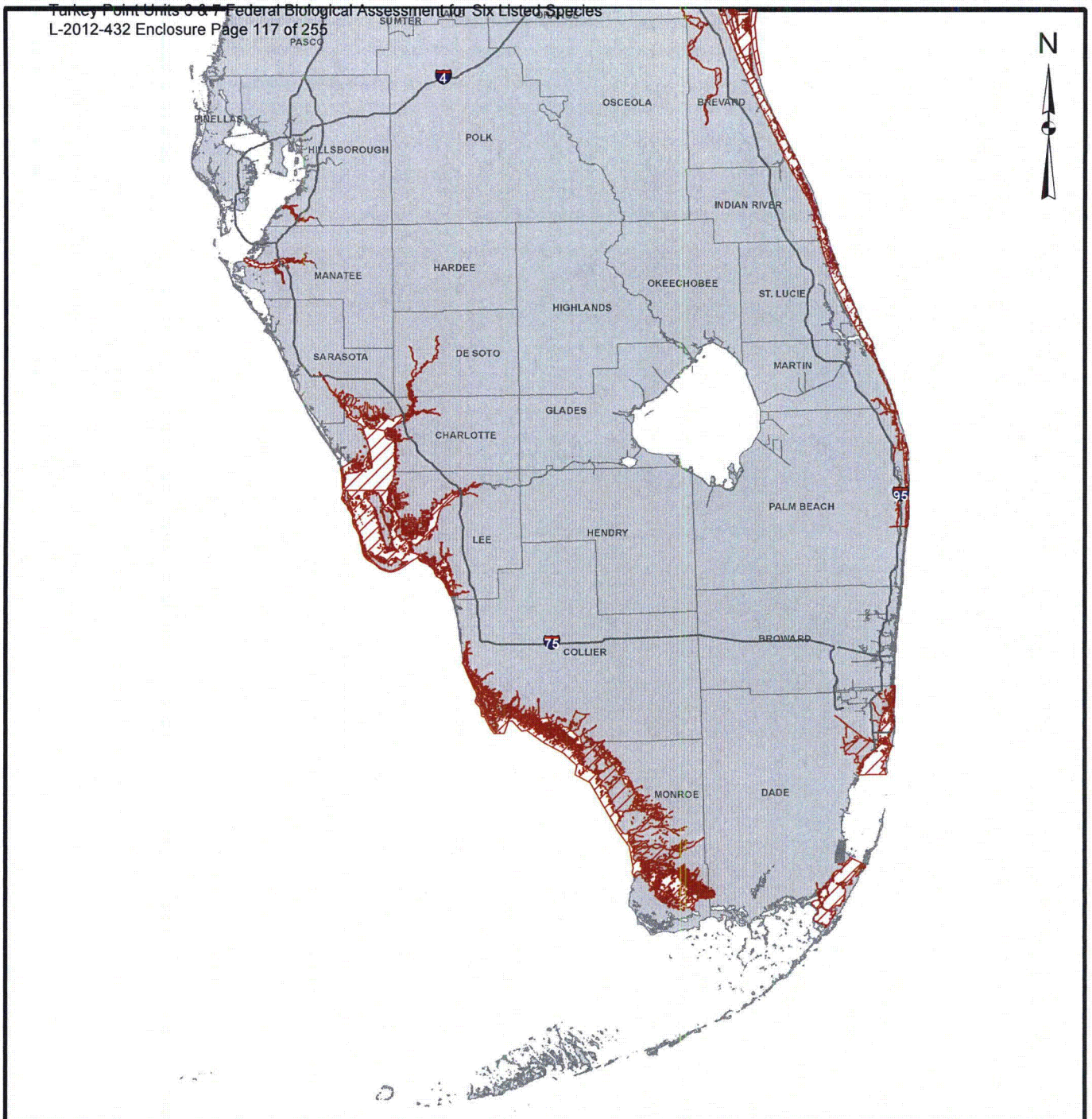
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
VEGETATIVE COMMUNITIES & LAND USE MAP
ASSOCIATED NON-LINEAR FACILITIES

FPL

FILE No. 08387584_P007
REV. 1
PLOT DATE 7/19/2011

FIGURE
8



LEGEND

West Indian Manatee Critical Habitat

REFERENCES

1. West Indian Manatee Critical Habitat, USFish and Wildlife Service, 2003.

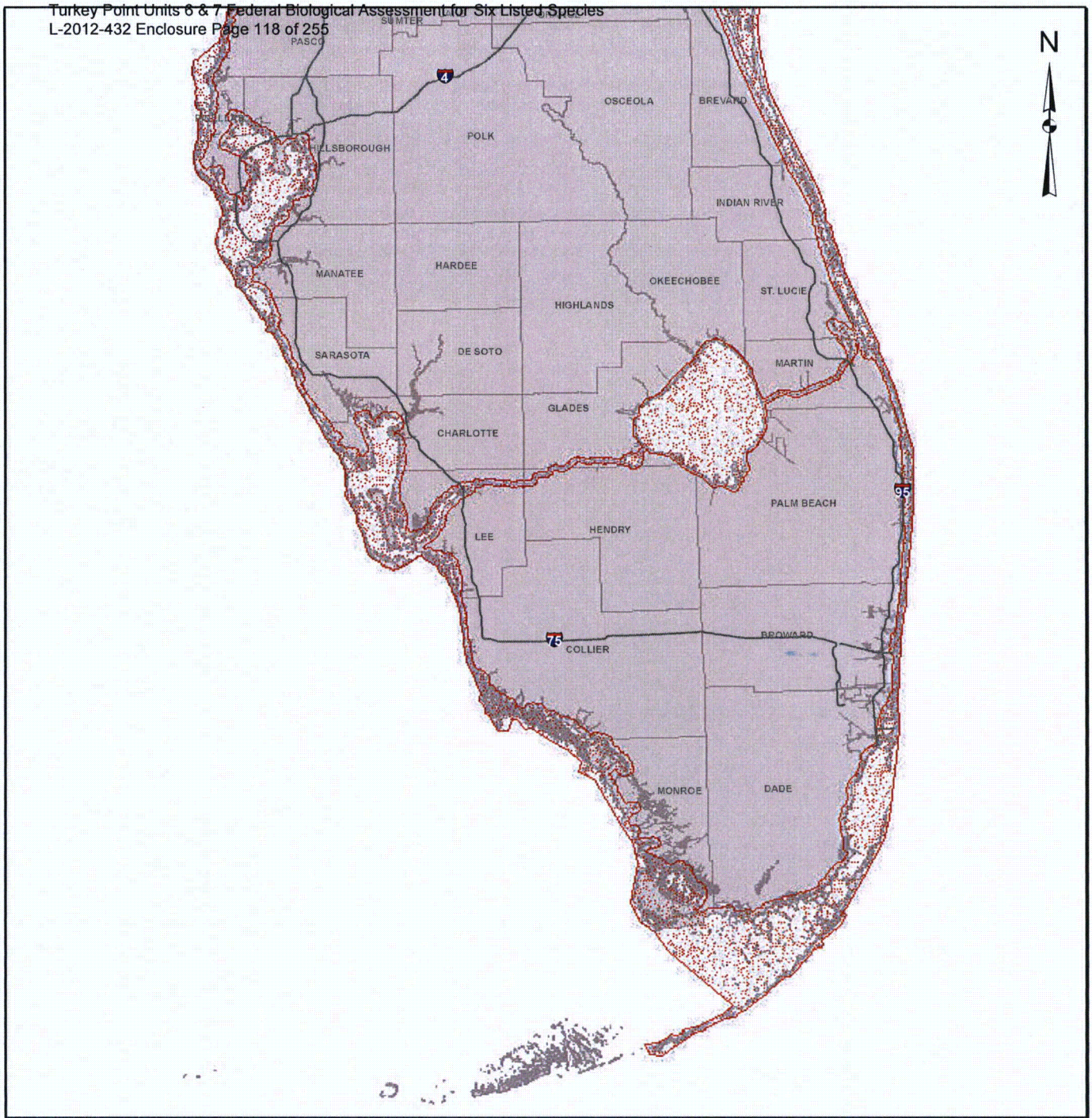
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
WEST INDIAN MANATEE CRITICAL HABITAT

FPL

FILE No. 08387584_P016
REV. 1
PLOT DATE 7/19/2011

FIGURE 9



LEGEND

West Indian Manatee Consultation Area

35 0 Miles

REFERENCES

1. West Indian Manatee Consultation Area, US Fish and Wildlife Service, 2003.

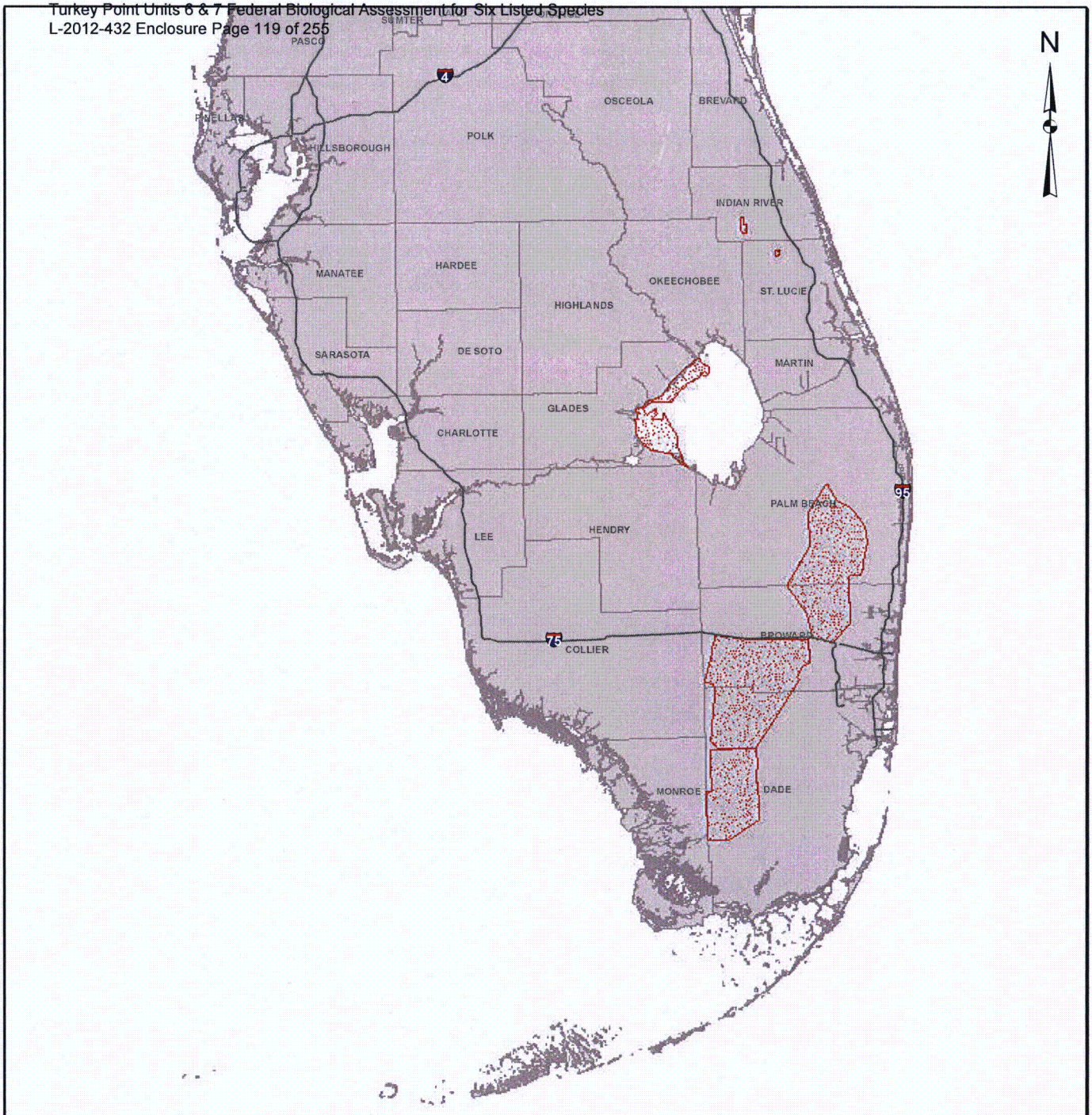
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
WEST INDIAN MANATEE CONSULTATION AREA

FPL.

FILE No. 08387584_P017
REV. 1
PLOT DATE 7/19/2011

FIGURE 10



LEGEND

Everglade Snail Kite Critical Habitat

REFERENCES

1. Everglade Snail Kite, South Florida Service Area, US Fish and Wildlife Service, 2003.

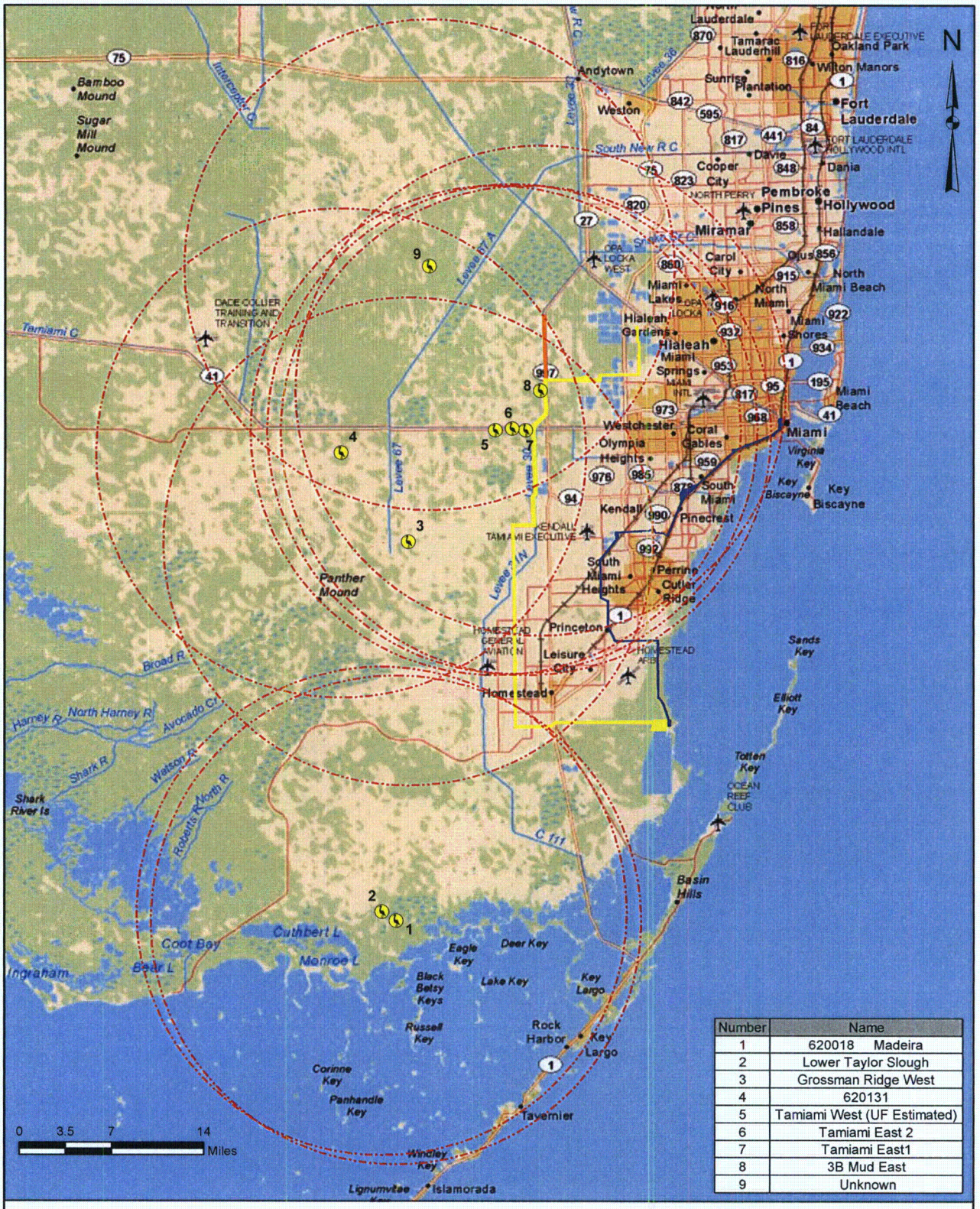
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
EVERGLADE SNAIL KITE CRITICAL HABITAT

FPL.

FILE No. 08387584_P018
REV. 1
PLOT DATE 7/19/2011

FIGURE 11



Number	Name
1	620018 Madeira
2	Lower Taylor Slough
3	Grossman Ridge West
4	620131
5	Tamiami West (UF Estimated)
6	Tamiami East 2
7	Tamiami East1
8	3B Mud East
9	Unknown

LEGEND

- Florida Wood Stork Core Foraging Areas (CFA)
- Florida Wood Stork Colonies with CFA Intersecting Proposed Corridor
- East Preferred Corridor
- West Preferred Corridor
- West Transmission Access Corridors

REFERENCES

1. Wood Stork Colonies, Wood Stork CFA's, ECT, 2010.
2. East Preferred Corridor, West Preferred Corridor, West Transmission Access Corridors,

FIGURE 12

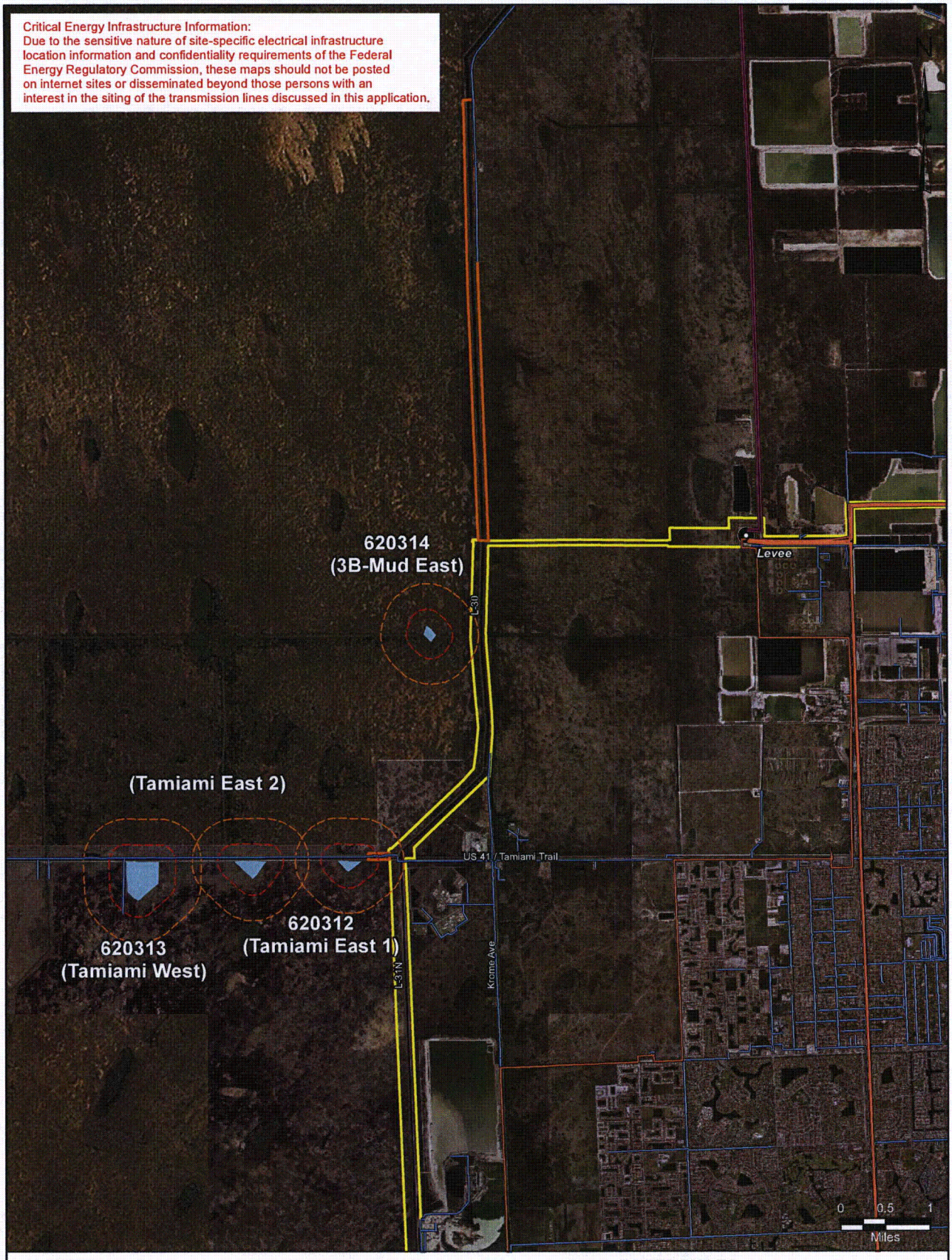
PLOT DATE: 7/19/2011
REV.: 1
FILE No.: 0838758A_P012

TITLE: LOCATION OF WOOD STORK COLONIES WITH THEIR CFA INTERSECTING FPL PREFERRED TRANSMISSION CORRIDORS

PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT

FPL

Path: M:\acad\09053\WoodStorks_Microtowers_rev(pandion)_noTowers0711.mxd



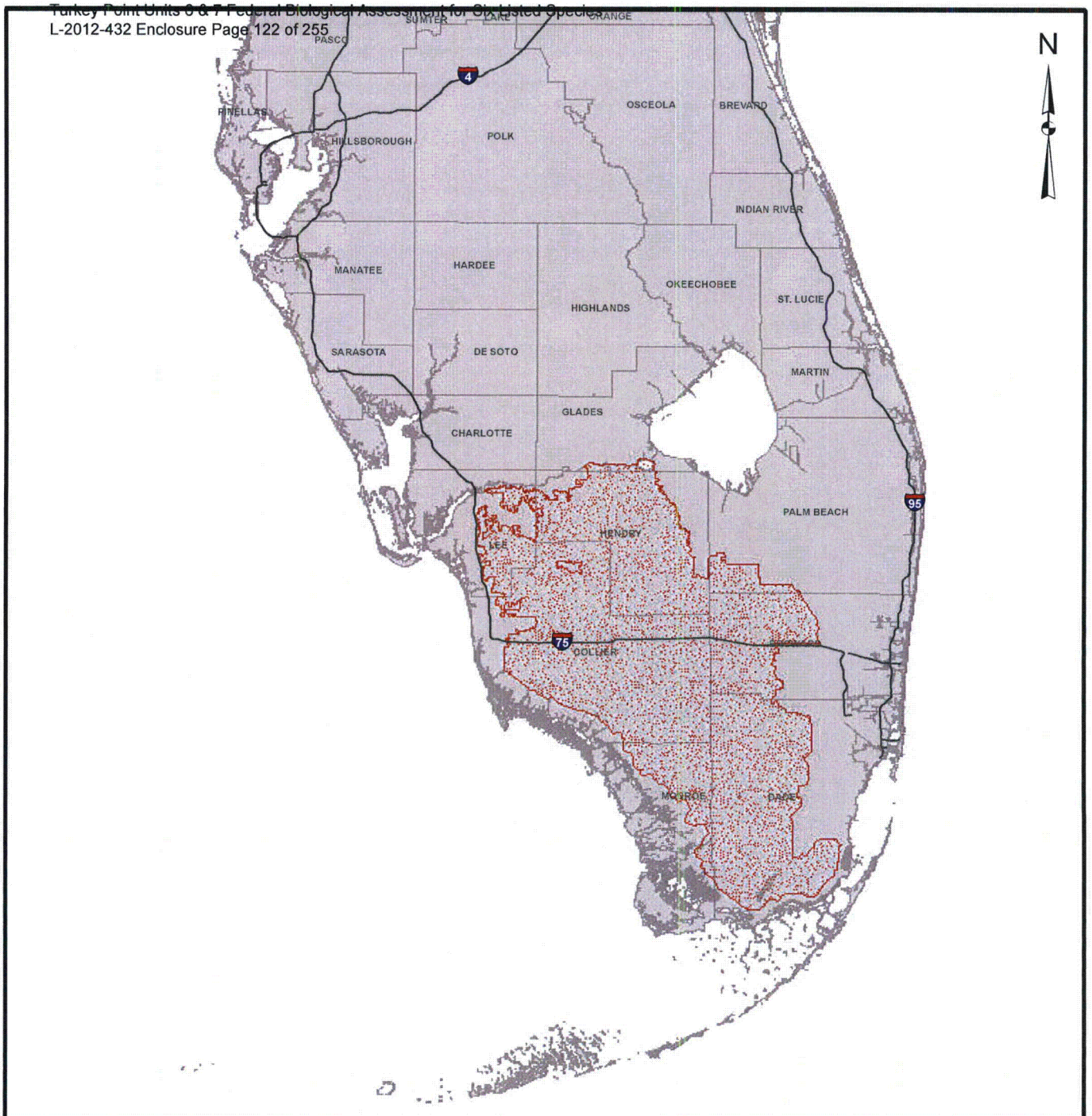
LEGEND

- Overhead Distribution Line
- 500-kV Existing FPL Transmission Line
- 230-kV Existing FPL Transmission Line
- FWC Colony Number
- Wood Stork Nesting Colony
- 1000' From Colony Boundary
- 2500' From Colony Boundary
- West Preferred Corridor
- Access Corridor

REFERENCES

Sources: FWC, 2009; NRCS, 2007; SFWMD, 2003, 2009, 2010; FPL, 2009; Miami-Dade County, 2008, 2009; FCC, 2010; ECT, 2010.

FIGURE 13	PLOT DATE 08/25/2010	REV. 0	FILE No. 09053-0100	TITLE: LOCATION OF WOOD STORK COLONIES	PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT: TRANSMISSION LINES	FPL



LEGEND

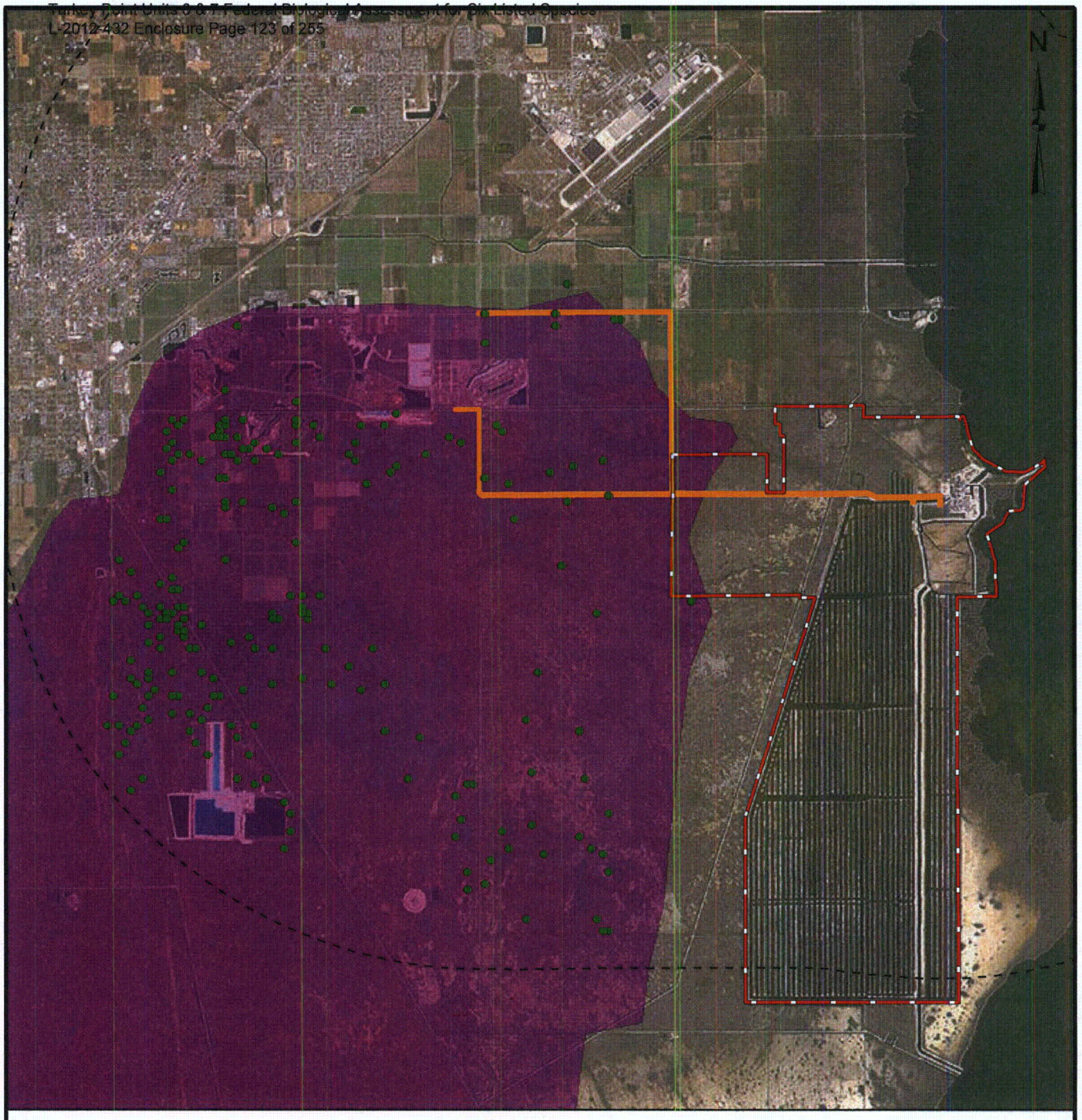
Florida Panther Consultation Area South

35 0 Miles

REFERENCES

1. Panther Consultation Area South, USFWS, 2007

PROJECT	TURKEY POINT UNITS 6 & 7 PROJECT
TITLE	FLORIDA PANTHER CONSULTATION AREA
FPL	FILE No. 08387584_P009
	REV. 1
	PLOT DATE 7/19/2011
	FIGURE 14



LEGEND

- Cat Number 21 (1987 - 1988)
- Turkey Point Plant Property Boundary
- Access Roadway Improvements 5-Mile Buffer
- Access Roadway Improvements
- Florida Panther Consultation Area South

REFERENCES

1. Panther FP21, FWC, ENP, BCNP, 1981-2008
2. Panther Consultation Area Sounth, USFWS, 2007
3. Turkey Point Plant Property, FPL, 2008

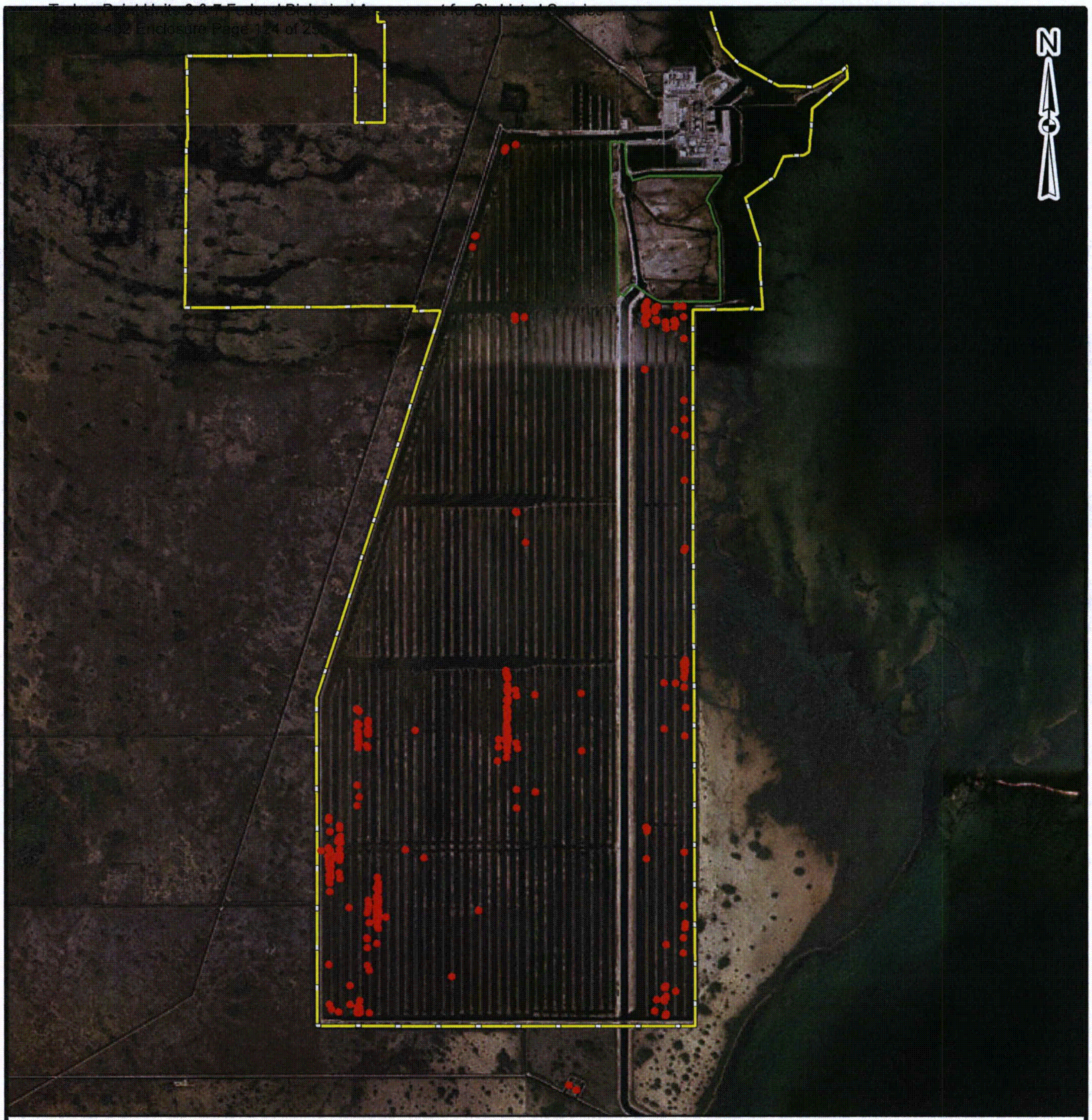
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
PANTHER FP21 RADIO TELEMETRY DATA

FPL

FILE No. 08387584_U006
REV. 0
PLOT DATE 9/10/2012

FIGURE 15



4,500 0
Feet

LEGEND

- Crocodile Nesting Sites
- Turkey Point Plant Property Boundary
- Turkey Point Units 6 & 7 Site

PROJECT
TURKEY POINT UNITS 6 & 7
PROJECT

TITLE
CROCODILE NEST LOCATIONS
1978 - 2009

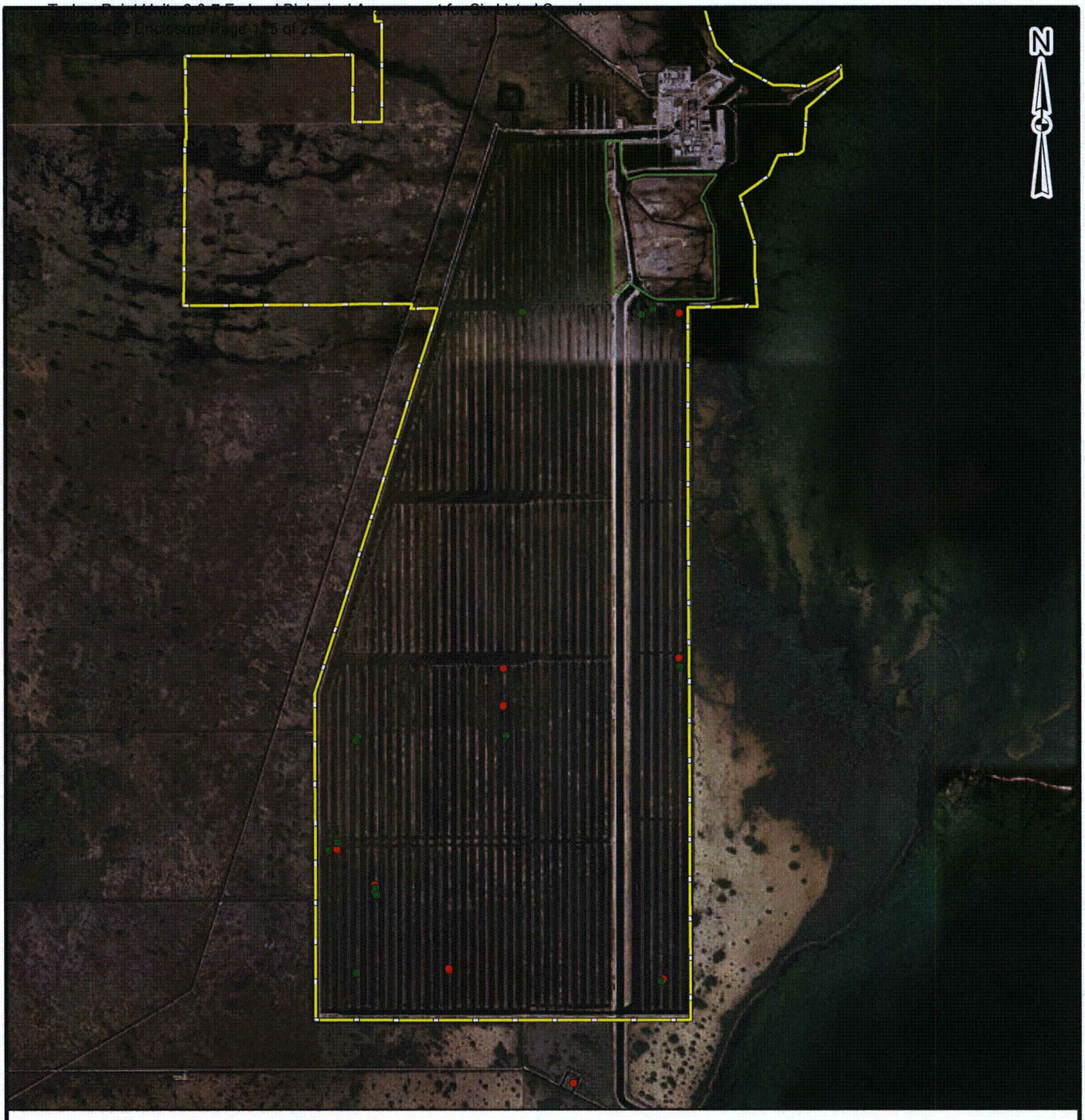
FPL

FILE No. 08387584_U004
REV. 0
PLOT DATE 9/10/2012

FIGURE
16

REFERENCES

1. Crocodile Nest Locations, FPL 1978-2009, Turkey Point Plant Annual Crocodile Report Permit # TE092945-1.



LEGEND

- Turkey Point Units 6 & 7 Site
- Turkey Point Plant Property Boundary

Crocodile Nesting Sites

Year

- 2010
- 2011

REFERENCES

1. Crocodile Nest Locations, FPL 2010 and 2011, Turkey Point Plant Annual Crocodile Report Permit # TE092945-1.

PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
CROCODILE NEST LOCATIONS 2010 AND 2011

FPL.

FILE No. 09387584_U005
REV. 0
PLOT DATE 9/10/2012

FIGURE 17

PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT		
TITLE: **CROCODILE SANCTUARY BOUNDARY MARKER**		
FPL.	FILE No. 08387584_P020 REV. 1 PLOT DATE 7/19/2011	**FIGURE 18**

LEGEND

Proposed Crocodile Underpasses (Approximate Locations)

500 250 0
Feet

REFERENCES

1. Imagery, ESRI Online, 2011

PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
CONCEPTUAL CROCODILE ACCESS ROAD UNDERPASS LOCATIONS

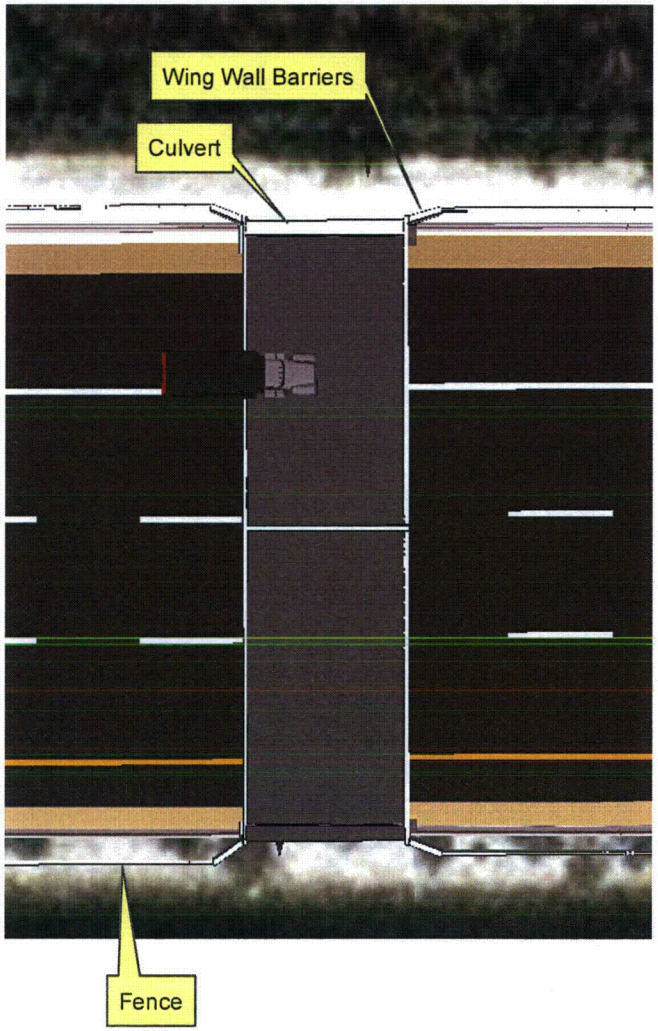
FPL

FILE No. 08387584_P012
REV. 1
PLOT DATE 7/19/2011

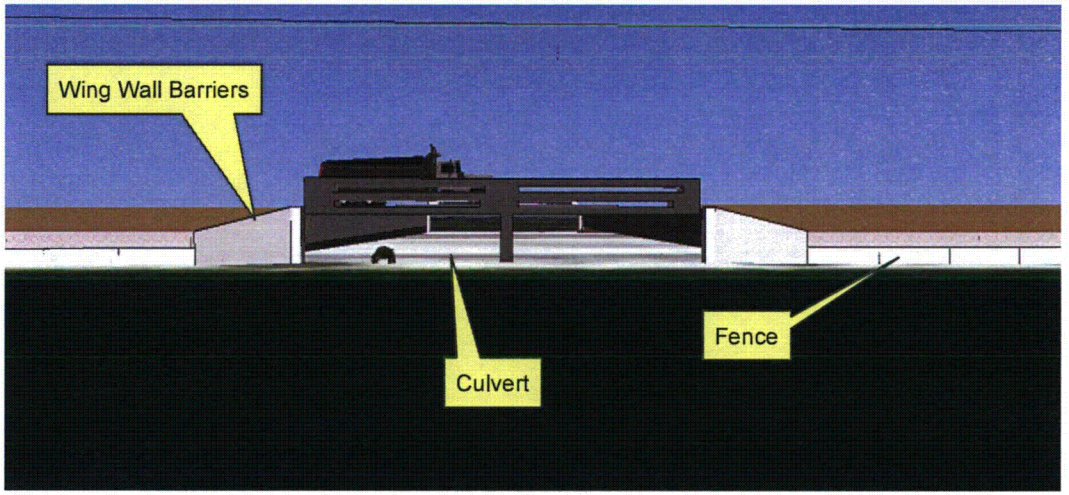
FIGURE 19

G:\PROJECTS\FPL\Turkey_Point\083_87584_FPL_TKY_PT_6_and_7\P_T&E_Mgmt_Plan\Rev1_July_2011_Submittal\MapDocuments\08387584_P021_Rev1_ConceptualCrocUnderpass.mxd

OVERHEAD VIEW



FRONT VIEW



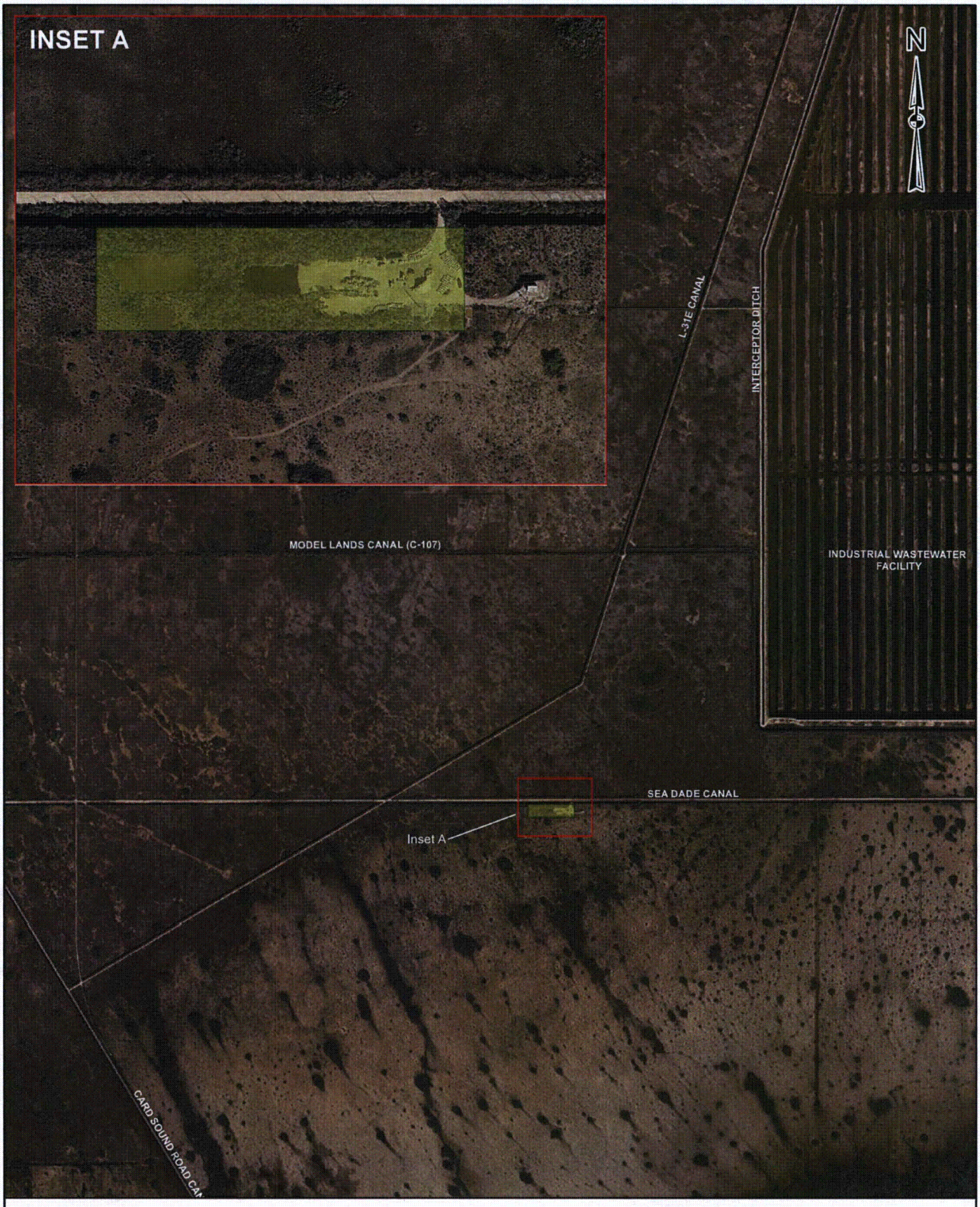
PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
CONCEPTUAL CROCODILE ACCESS ROAD UNDERPASS

FPL

FILE No. 08387584_P021
REV. 1
PLOT DATE 7/19/2011

FIGURE 20



LEGEND

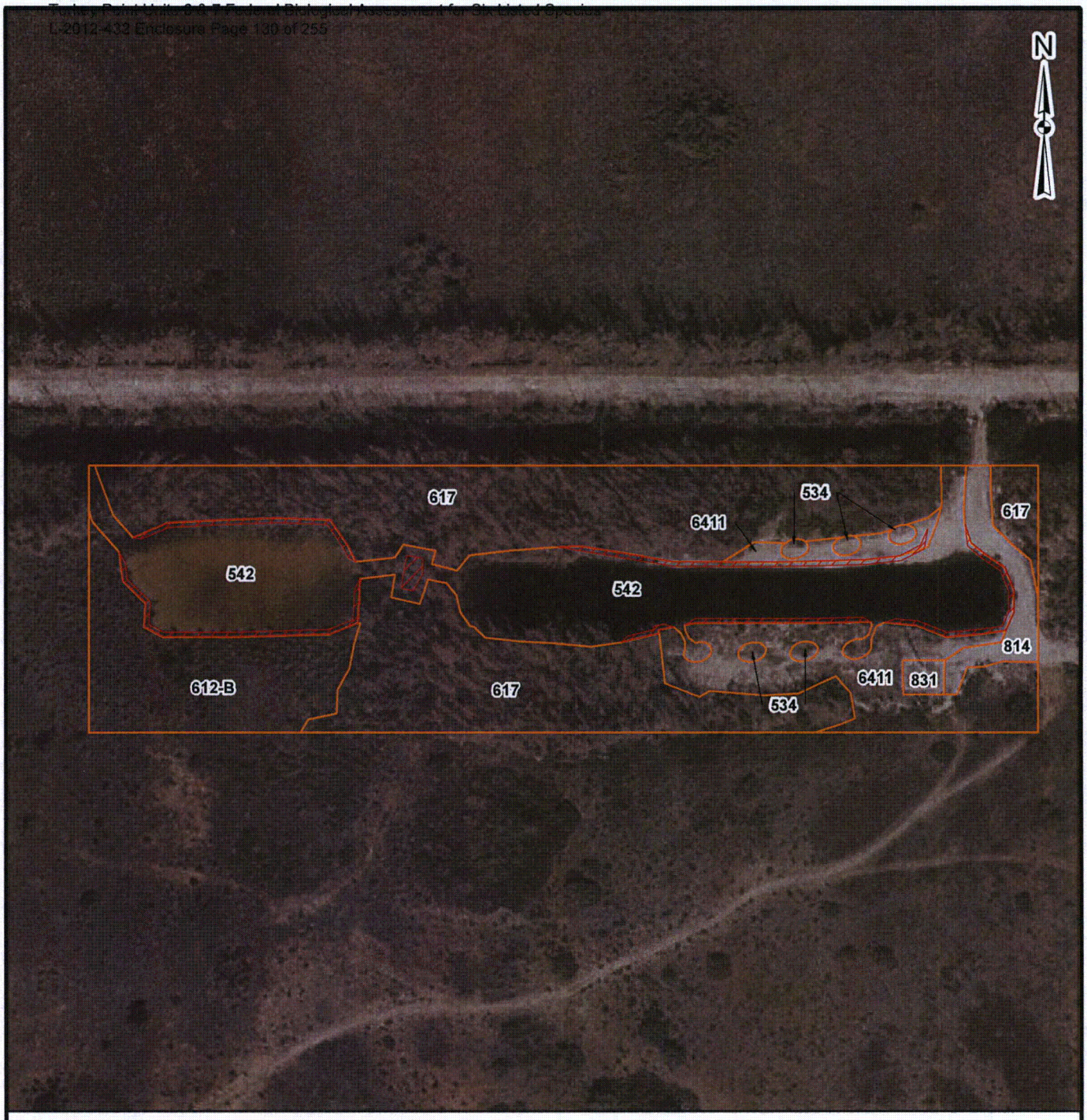
Sea Dade Canal Crocodile Sanctuary

REFERENCES

1. Imagery, Miami-Dade County, 2007.

0 1,000 2,000 Feet

FIGURE 21	PLOT DATE 7/19/2011	REV. 1	FILE No. 0838754_P013	TITLE: SEA DADE CANAL CROCODILE SANCTUARY AERIAL MAP	PROJECT: TURKEY POINT UNITS 6 & 7 PROJECT	FPL



LEGEND

- Nesting Substrate
- Post Restoration Land Use
  - 534 - Low Salinity Ponds
  - 542 - Saline Lagoon
  - 612-B - Dwarf Mangroves
  - 617 - Mixed Wetland Hardwoods
  - 6411 - Sawgrass
  - 814 - Roads and Highways
  - 831 - Electrical Power Facilities

150 0 Feet

REFERENCES

1. Aerial Imagery, FDOT, 2007.
2. Sea Dade Canal Crocodile Sanctuary, Nesting Substrate, Golder Associates Inc., 2011.

PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

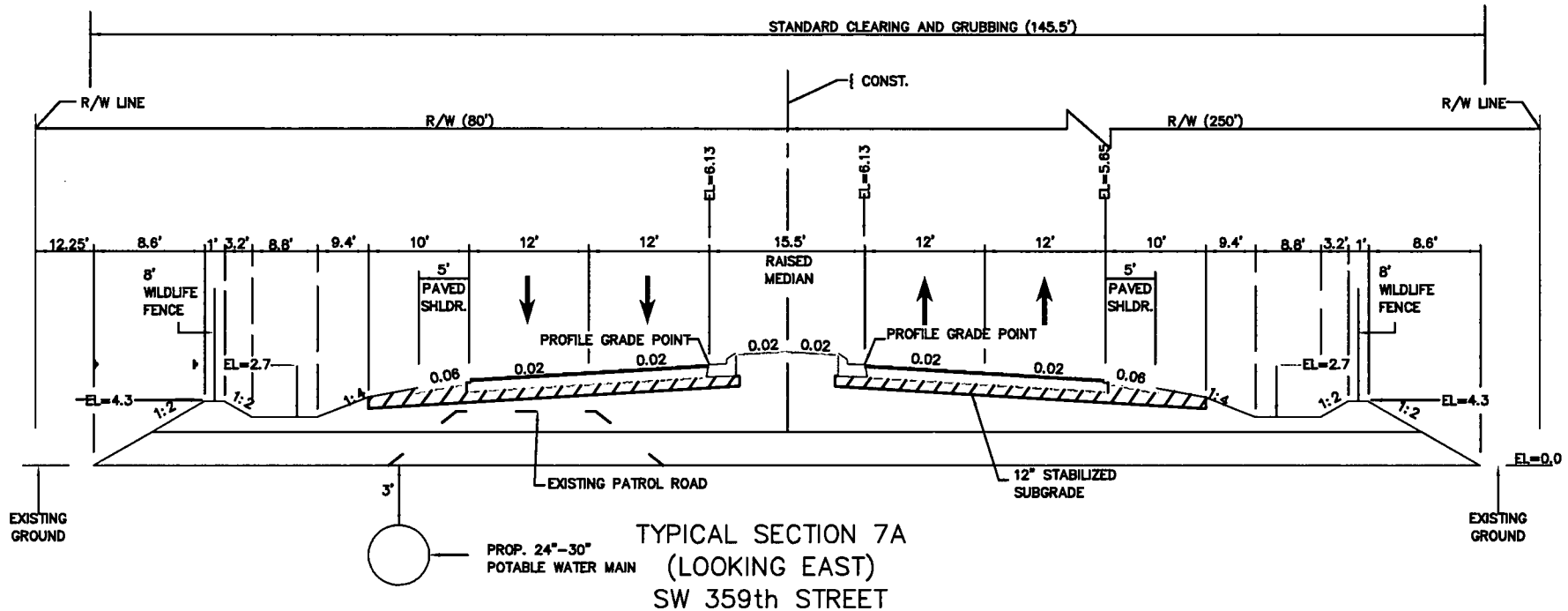
TITLE
SEA DADE CANAL CROCODILE SANCTUARY CONCEPTUAL DESIGN

FPL

FILE No. 08387584_P014
REV. 1
PLOT DATE 7/19/2011

FIGURE 22

Drawing file: 09387652C100_HDR_RoadsSections.dwg Jul 30, 2012 - 1:01pm



TYPICAL SECTION 7A
(LOOKING EAST)
SW 359th STREET
(FROM SW 117th AVENUE TO TURKEY POINT POWER PLANT FACILITY)
DESIGN SPEED = 45 MPH

TYPICAL SECTION NOTES:

1. STORM WATER MANAGEMENT: OPEN SYSTEM TREATMENT AND ATTENUATION WILL BE PROVIDED BY PROPOSED ROADSIDE SWALES (BOTH SIDES OF ROADWAY). WATER QUANTITY/QUALITY SFWMD CRITERIA WILL BE APPLIED.
2. SEE FIGURE W9.2.0-10 FOR ROAD PLACEMENT IN RELATION TO TRANSMISSION FACILITIES.

A PRELIMINARY PAVEMENT DESIGN CONSISTING OF LIMEROCK BASE (12"), TYPE S-1 STRUCTURAL COURSE (2"), AND FRICTION COURSE (1") SHALL BE USED FOR CONCEPT ANALYSIS ONLY.

FIGURE 23

PROJECT No.	093-87652		
FILE No.	09387652C100		
REV. 0	SCALE AS SHOWN		
DESIGN	HDR	06/30/11	
CADD	NRL	07/30/12	
CHECK	KAB	07/30/12	
REVIEW	KFK	07/30/12	

TITLE

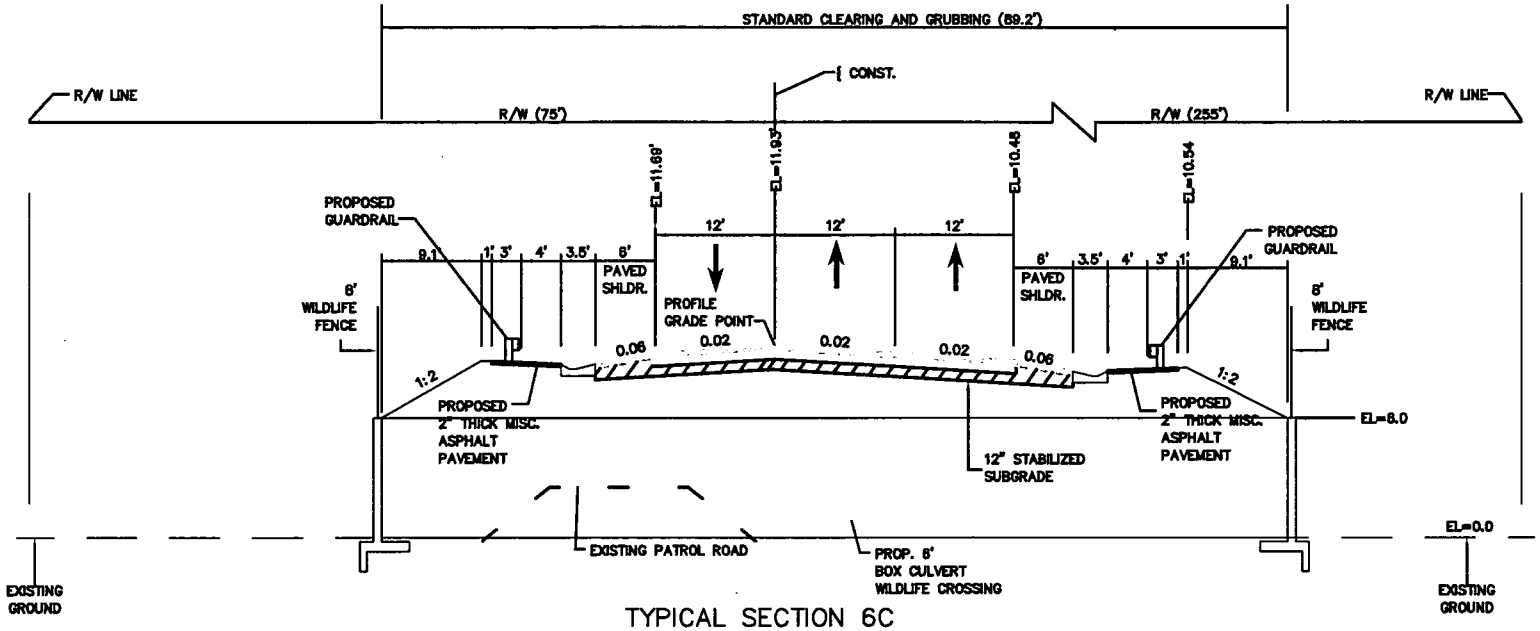
TYPICAL CROSS-SECTION SW 359th STREET WITH WILDLIFE FENCING AND CULVERTS

PROJECT

TURKEY POINT UNITS 6 & 7 PROJECT

FPL

Drawing file: 09387652C100_HDR_RoadsSections.dwg Jul 30, 2012 - 1:01pm



TYPICAL SECTION 6C
TYPICAL SECTION SHOWING WILDLIFE CROSSING
(LOOKING EAST)
SW 359th STREET
WILDLIFE CROSSING
DESIGN SPEED = 45 MPH

TYPICAL SECTION NOTES:

1. 10-FT SHOULDER TOTAL WIDTH (5-FT PAVED) WAS PROVIDED PER FDOT PLANS PREPARATION MANUAL VOL. 1, TABLE 2.3.3 FOR A MULTILANE NORMAL VOLUME HIGHWAY.
2. STORM WATER MANAGEMENT: OPEN SYSTEM TREATMENT AND ATTENUATION WILL BE PROVIDED BY PROPOSED ROADSIDE SWALES (BOTH SIDES OF ROADWAY). WATER QUANTITY/QUALITY SFWMD CRITERIA WILL BE APPLIED.
3. SEE FIGURE W9.2.0-10 FOR ROAD PLACEMENT IN RELATION TO TRANSMISSION FACILITIES.

A PRELIMINARY PAVEMENT DESIGN CONSISTING OF LIMEROCK BASE (12"), TYPE S-1 STRUCTURAL COURSE (2"), AND FRICTION COURSE (1") SHALL BE USED FOR CONCEPT ANALYSIS ONLY.

FIGURE 24

REVIEW	KFK	07/30/12
CHECK	KAB	07/30/12
CADD	NRL	07/30/12
DESIGN	HDR	06/30/11
REV. 0	SCALE AS SHOWN	
FILE No.	09387652C100	
PROJECT No.	093-87652	

TITLE

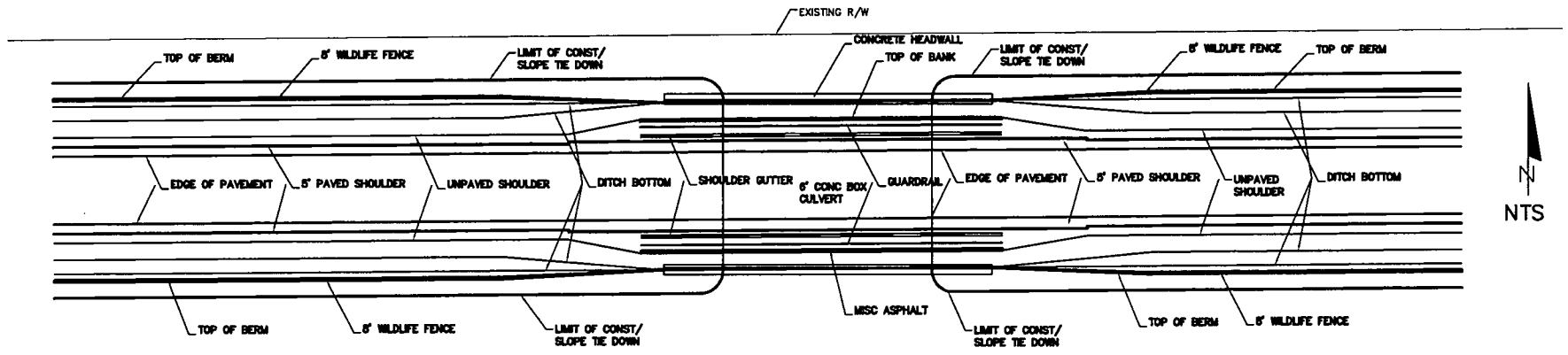
TYPICAL CROSS-SECTION SW 359th STREET WILDLIFE UNDERPASS

PROJECT

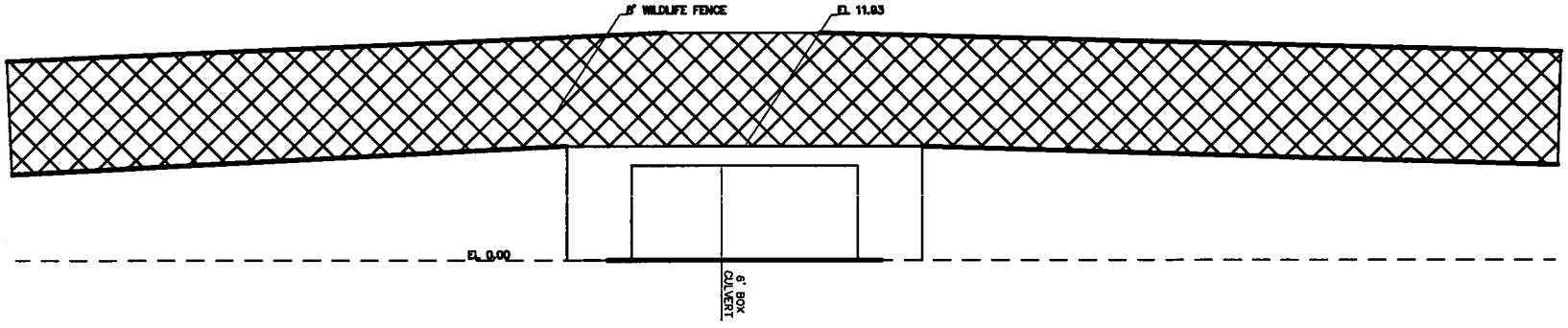
TURKEY POINT UNITS 6 & 7 PROJECT

FPL

Drawing file: 09387652C101_HDR_RoadsSections.dwg Jul 30, 2012 - 1:25pm



OVERHEAD VIEW



VIEW LOOKING THROUGH CULVERT

FIGURE 25

PROJECT No.	093-87652
FILE No.	09387652C101
REV. 0	SCALE AS SHOWN
DESIGN	HDR 06/30/11
CADD	NRL 07/30/12
CHECK	KAB 07/30/12
REVIEW	KFK 07/30/12

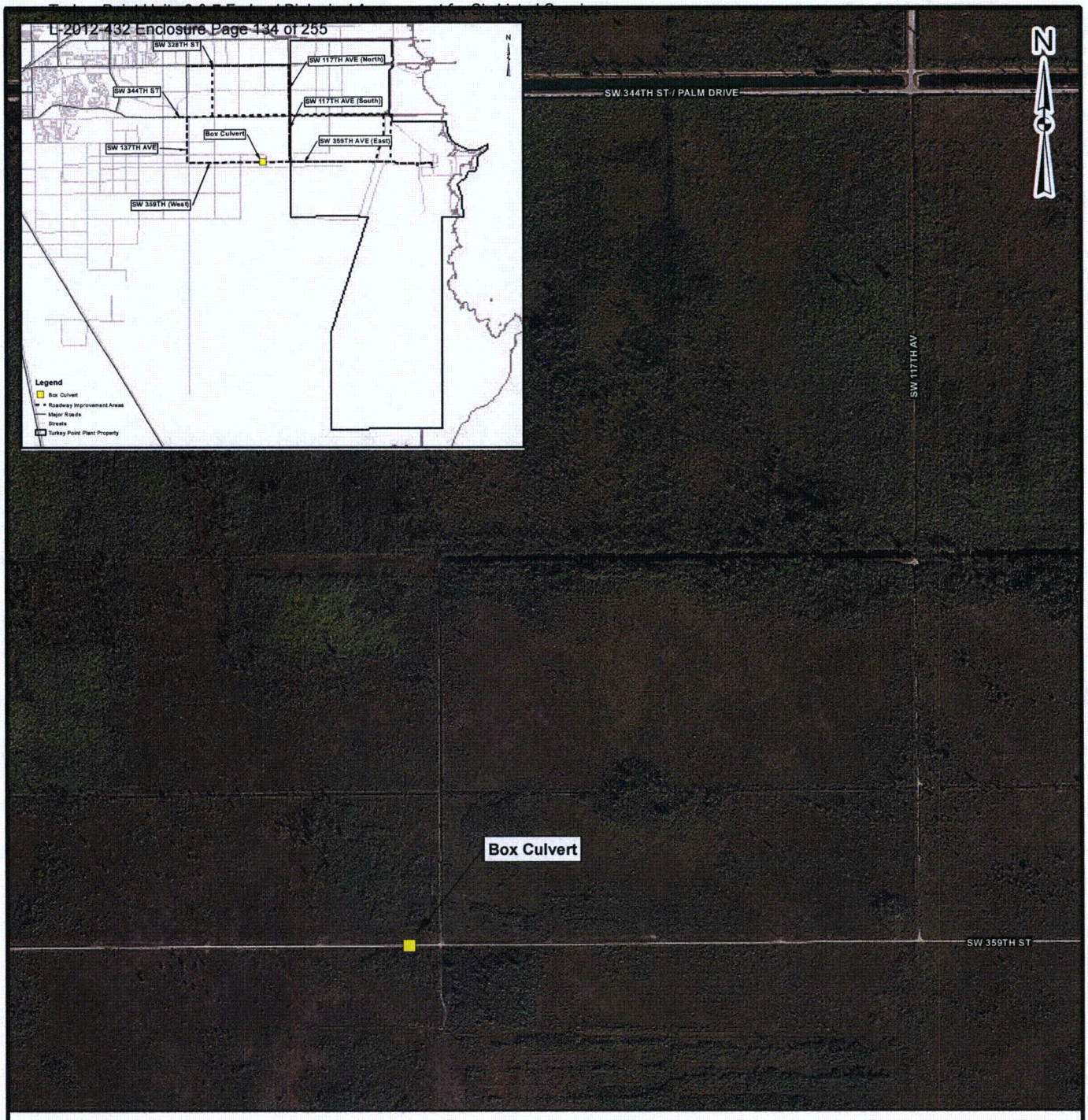
TITLE

TYPICAL CROSS-SECTION SW 359th OVERHEAD VIEW - WILDLIFE UNDERPASS

PROJECT

TURKEY POINT UNITS 6 & 7 PROJECT

FPL



LEGEND

- Box Culvert

800 0 Feet

PROJECT
TURKEY POINT UNITS 6 & 7 PROJECT

TITLE
PROPOSED LOCATION FOR WILDLIFE UNDERPASS

FPL.

FILE No. 08387584_P015
REV. 1
PLOT DATE 7/19/2011

FIGURE 26

REFERENCES

1. Wildlife Underpass Proposed Location, Golder Associates Inc., 2011.