Appendix D
Wetlands Statement of Findings

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National Park Service
U.S. Department of the Interior

Everglades National Park

Florida

STATEMENT OF FINDINGS FOR EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

Tamiami Trail Modifications: NEXT STEPS
EVERGLADES NATIONAL PARK

OCTOBER 2010

Recommended:

_____ _____
Dan Kimball, Superintendant, Everglades National Park Date

Certified for Technical Accuracy and Servicewide Consistency:

_____ _____
Bill Jackson, Chief, Water Resources Division Date

Approved:

_____ _____
David Vela, Southeast Regional Director Date

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1.0 INTRODUCTION

The National Park Service (NPS) has prepared and made available for public review, an Environmental Impact Statement (EIS) for the Tamiami Trail Modifications: Next Steps Project. The purpose of the Tamiami Trail Modifications: Next Steps project, developed as part of the 2009 Omnibus Appropriations Act passed by Congress on March 10, 2009, is: "To immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries to Everglades National Park (ENP) Project (16 U.S.C. SS 410r-S), including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail (U.S. Highway 41) to restore more natural water flow to ENP and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas."

The project area consists of a 10.7-mile stretch of the portion of U.S. Highway 41 known as Tamiami Trail located in Miami-Dade County, Florida (See ***Figure 1***). The western terminus of the project corridor is at the S-333 water control structure near the L-67 Extension Levee, and the eastern terminus is at the S-334 water control structure near the L-30 Levee and Canal and the L-31N Levee. The L-29 Canal (Tamiami Canal) runs along the north side of Tamiami Trail. The L-29 Levee runs along the north side of the L-29 Canal. The levee comprises the southern boundary of WCA-3B. Everglades National Park borders the roadway on the south side of the project corridor.

Since the Preferred Alternative in the EIS would result in adverse impacts to existing wetlands, a Statement of Findings (SOF) in accordance with procedures described in *Procedural Manual 77-1: Wetland Protection*, has been prepared. The NPS is the lead agency for preparation of this SOF.

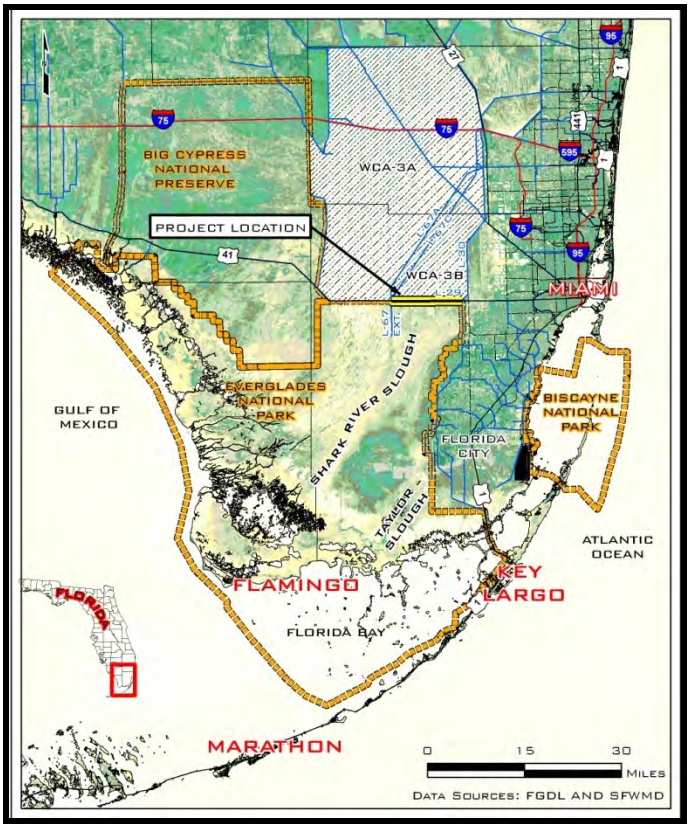

Figure 1 – General Project Location Map

2.0 WETLANDS OF EVERGLADES NATIONAL PARK

The historic Everglades were a broad, shallow wetland with water flowing very slowly over 3,900 square miles from Lake Okeechobee to the mangrove zone at the southern tip of Florida. The flow that naturally occurred over this region was influenced by rainfall and a relatively low surface relief and provided the necessary conditions for the development of the Everglades ecosystem (USACE, 2008).

Everglades National Park was authorized by Congress on May 10, 1934, and dedicated by Harry S. Truman on December 6, 1947. The enabling legislation provided the fundamental purpose of the park as being:

> *…permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in this area.*

The original 460,000 acres in 1947 was expanded to 1.4 million acres by 1958. Recognizing ENP as a nationally and internationally significant resource, Congress passed the "Everglades National Park Protection and Expansion Act" (PL 101-229) in 1989. Section 101(b) states that the purpose of the Act is to:

> *...increase the level of protection of the outstanding natural values of Everglades National Park and to enhance and restore the ecological values, natural hydrologic conditions, and public enjoyment of such area...*

This law authorized the acquisition of additional land, including the portion of the project area just south of Tamiami Trail, to benefit the natural resources of ENP. With this addition, ENP is now approximately 1.5 million acres in size, making it the third largest unit of the National Park System in the lower 48 states (USACE, 2008).

Because ENP possesses "outstanding universal values," it was designated by the United Nations Educational, Scientific, and Cultural Organization as an International Biosphere Reserve in 1976 and subsequently as a World Heritage Site in 1979. The site includes historic Everglades that have been limited in manmade influences. In 1987, the Ramsar Convention designated ENP as a Wetland of International Importance (USACE, 2005).

The majority of the land in ENP is classified as wetland habitat, an integral component of the ENP landscape. The Everglades ecosystem is thought to have been formed over the last 5,000 years as sea levels rose and precipitation increased, promoting water retention in a shallow inland basin, and the portion of the basin south of Lake Okeechobee accumulated peat (Gleason and Stone, 1984). The result of peat accumulation in this bedrock basin was the formation of a peat surface, level in the east-west direction, and with a slight north-to-south downward slope. The concavity of the bedrock, coupled with the east-west levelness of the peat, resulted in thicker peat deposits in the middle of the basin and thinner deposits along the edges. By the 1880s, peat had accumulated to about 21 feet above sea level along the south shore of Lake Okeechobee (Meigs, 1879), and had formed the northern edge of a north-to-south elevation gradient that is now less than three inches per mile. The southward flow of water down this gradient is thought to have formed to maintain the ridge and slough pattern so characteristic of the Everglades (Kushlan, 1993). Wetlands of the modern Everglades ecosystem include a mosaic of vegetation types, including tree-islands, mangrove forests, cypress swamps, marl prairies, wet prairies, sawgrass marshes, and degraded ridges and sloughs (see ***Figure 2***) that extend from the Kissimmee River basin to Florida Bay.

Figure 2 – Degraded Everglades Ridge and Slough Habitat

Prior to drainage and development, the ecosystem was characterized by its large spatial extent, a diversity of habitats, and a hydrologic regime featuring dynamic storage of water and unconfined sheet flow over much of the ecosystem south of Lake Okeechobee. A distinctive hydrologic feature of the historical ecosystem was the uninterrupted sheetflow of water from the sawgrass plains south of Lake Okeechobee through a rich mosaic of freshwater wetlands that ultimately discharged to the Gulf of Mexico and the Atlantic Ocean. Drainage and compartmentalization efforts during the 20th century for flood control and water supply purposes interrupted this flow, as well as altering water levels, distribution, and seasonal timing (SCT, 2003). The altered hydrologic system contributed to a decline of the functional value of wetlands in the Everglades ecosystem. Although serving as a critical transportation connection across southern Florida, the Tamiami Trail, which was completed in 1928, is an impediment to flow, slowing and blocking water flow south into Northeast Shark River Slough and the southern Everglades, adversely affecting the Park's natural resources. Additional blockage of direct flows occurred with the 1962 construction of the L-28 and L-29 levees which enclosed WCA-3. The WCA-3 was then separated by the L-67A and L-67C levees into independent units, WCAs 3A and 3B, in an effort to reduce ground water seepage through the porous Biscayne aquifer. Enlargement of the L-29 Canal as part of the central and C&SF project also contributed to flow restriction. The western unit, WCA-3A (approximately 786 square miles), functions as wildlife habitat and a major water supply reservoir. The eastern unit, WCA-3B (approximately 128 square miles), with lower water levels, reduces the head difference to the developed areas to the east. The northern end of the impoundment WCA is shallow and quick to dry, while the southern end may be permanently inundated. This same gradient exists to a lesser extent from the west (where flow of water into the adjoining Big Cypress National Preserve is unimpeded) to the east (Gunderson, 1994).

Compartmentalization, reduced water deliveries, altered distribution, and alterations of the cyclical patterns of water deliveries have reduced downstream sheet flows and suppressed the natural processes and functions within Northeast Shark River Slough. The L-29 Canal and adjacent levee create a damming effect severely restricting water deliveries into ENP. Stage restrictions within the L-29 Canal due to roadbed limitations further contribute to reduced water deliveries, affecting plant communities within the slough (NPS, 2008). Nearly 50 percent of the Everglades wetlands have been lost to draining for agricultural and economical development (SFERTF, 2008). Without benefit of natural surface water flows from the north and largely dependent on the rainfall within this portion of the basin, the area has altered hydrology. Persistent drought and fire beyond natural frequencies have also altered the ecosystem. Thus, the existing condition of the wetlands, and their associated functions, in and near the project area are severely degraded. It is estimated that approximately 250,000 acres of the Park are infested with exotic species (SFERTF, 2008). Exotic plant infestations in ENP may be exacerbated by soil disturbance, increased nutrients, and hydrological modification. Although the ecosystem has been adversely affected by development and long-term water management activities, the remaining portions of the Everglades ecosystem are still defined as wetlands, by both the NPS and by the USACE (NPS, 2008).

3.0 WETLANDS OF THE PROJECT AREA

The proposed Tamiami Trail project corridor is located at the northeastern extent of ENP stretching from the L-31N Canal (eastern terminus) west to the L-67 Extension Canal (western terminus) for approximately 10.7 miles. The wetland systems in the vicinity of the project corridor include the Northeast Shark River Slough to the south and the L-29 Canal and WCA-3B to the north (see ***Figure 3)***. These wetland systems are hydrologically connected via a series of 19 culverts beneath the roadway. The culvert capacity, the level of water in the L-29 Canal, and other operational restrictions affect the ability to move water across the Tamiami Trail. The 19 sets of drainage culverts (see ***Figure 4***) beneath the Tamiami Trail continue to provide flow to the project area during much of the year (based on the stage of water in the L- 29 Canal). Wetland vegetation is present downstream of all the culvert sets. In addition, some exotic vegetation is present at most of the outlets, with the majority of vegetation cover by native species. Although the flows are altered from the natural pattern, the hydrology, soils, and vegetation of the project area are indicative of a wetland environment (NPS 2008). Surface waters located within the project corridor includes the L-29 Canal, L-67 Extension Canal, L-31N Canal, L-30 Canal, L-67A Canal, Blue Shanty Canal, and several unnamed narrow canals/linear waterways running south from the roadway corridor into ENP.

Figure 5 shows the approximate limits and wetland/surface water classifications of each distinct wetland/surface water type along the project corridor, based on the available Florida Land Use, Cover, and Forms Classification System (FLUCCS) Geographic Information System (GIS) data layers (SFWMD, 2004).

Figure 3 – View of the Tamiami Trail Project Corridor (Facing West)

Figure 4 – One of 19 Sets of Existing Culverts (Facing South from L-29 Levee)

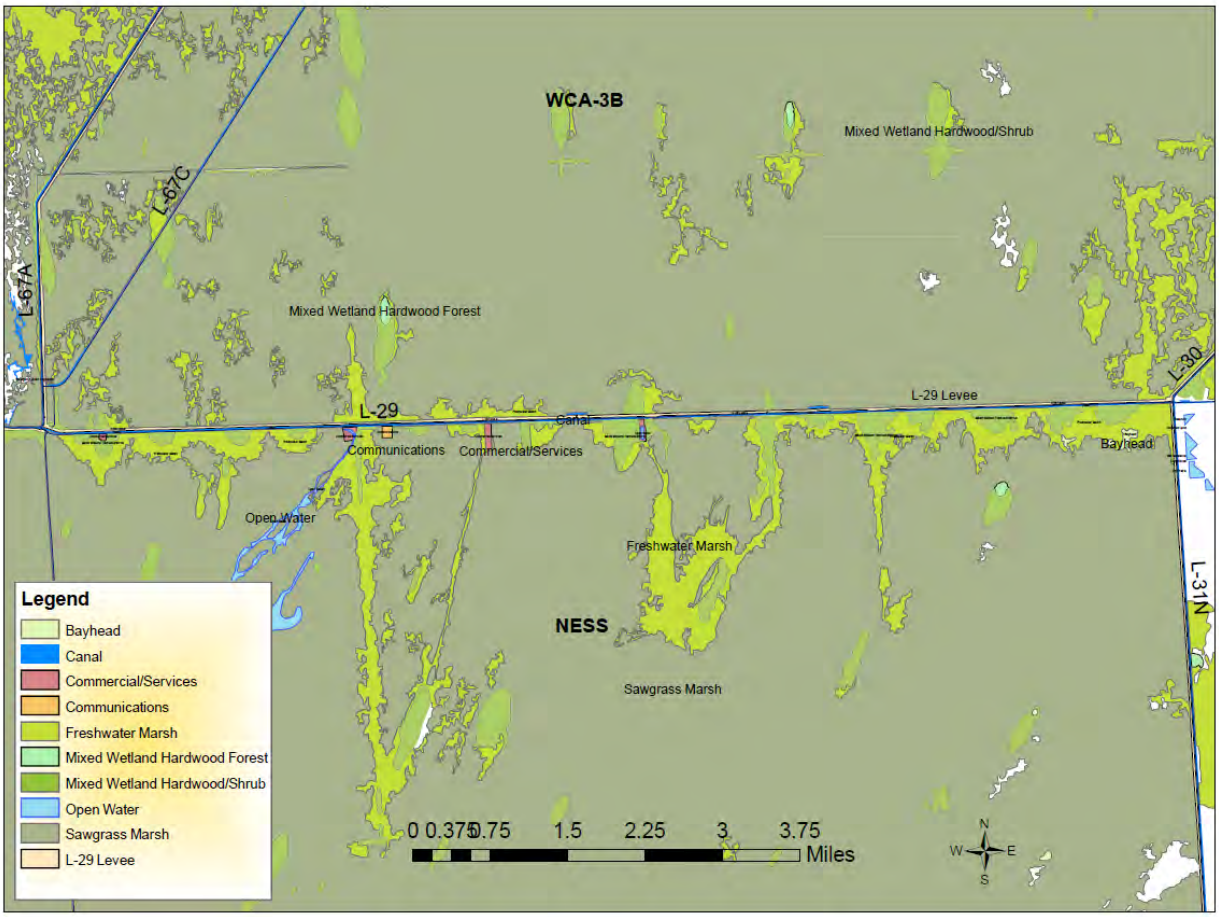

Figure 5 – Approximate limits and classifications of wetlands/surface waters along the project corridor

Detailed characterizations of wetland/surface water areas located within and adjacent to the Tamiami Trail project corridor are as follows:

Northeast Shark River Slough – South of Tamiami Trail

Vegetation within the immediate project area has been impacted by human disturbances such as the Tamiami Trail roadbed and culvert construction/maintenance activities, altered hydroperiods and hydropatterns, and nutrient loading from the releases of the S-333 control structure located in the L-29 Canal near the western terminus of the project corridor. Flows into the project area are channelized through the 19 sets of culverts beneath Tamiami Trail forming distinct "vegetation halos" or transitional vegetation progression just downstream of most of the culvert sets (evident upon visual examination of aerial photographs – see ***Figure 6***). These vegetation halos appear to have become exacerbated over time (as evidenced through a review of historical aerial photography) by the influx of high levels of sediments and nutrients that are being continuously funneled through the culvert sets.

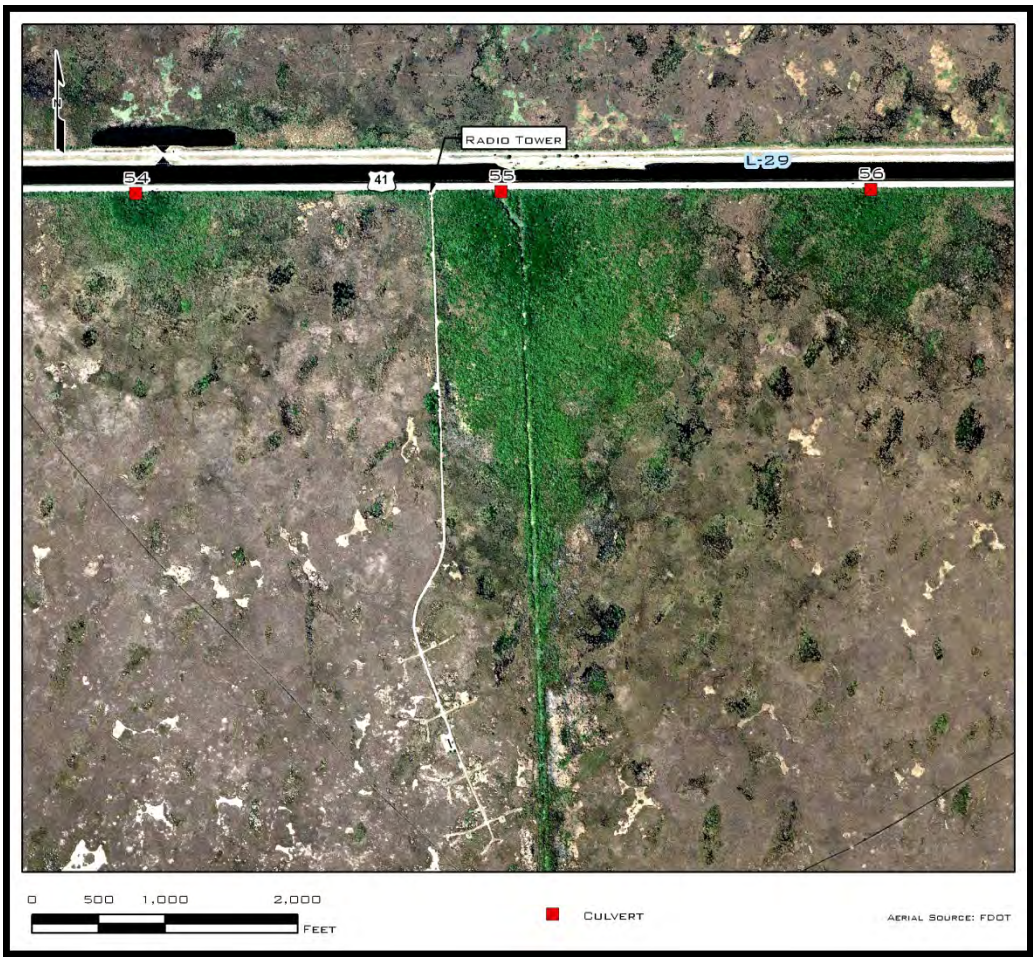

Figure 6 – Vegetation Halo South of Tamiami Trail at a Culvert

Vegetation assemblages within the vegetation halos south of the Tamiami Trail culvert sets vary depending on site conditions. Some of the halos contain a distinct plume of an overgrown woody wetland community dominated by pond apple (*Annona glabra*) and Carolina willow (*Salix caroliniana*) directly south of the culvert sets. Cattail (*Typha* sp.) is also a common component of these areas immediately downstream of the culvert sets and at the downstream edge of the vegetation halos. Lesser components included swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), wax myrtle (*Myrica cerifera*), myrsine (*Rapanea punctata*), giant leather fern (*Achrostichum danaeifolium*), strangler fig (*Ficus aurea*), sea-myrtle (*Baccharis halimifolia*), cocoplum (*Chrysobalanus icaco*), and Peruvian primrosewillow (*Ludwigia peruviana*) (***Figure 7***). The vegetation eventually transitions into a more uniform sawgrass community downstream within Northeast Shark River Slough. Exotic invasive vegetation species are largely restricted to the open water pools immediately downstream of the culvert sets including hydrilla (*Hydrilla verticillata*), water lettuce (*Pistia stratiotes*), torpedo grass (*Panicum repens*) and Peruvian primrosewillow. In addition, Brazilian-pepper (*Schinus terebinthifolius*) occurs in varying densities in disturbed, drier soils adjacent to the road and in the forested wetland areas where it grows on the bases of native trees. Old World climbing fern (*Lygodium microphyllum*) also occurs in low densities in the forested wetland areas (NPS, 2008).

Figure 7 – Typical view of the vegetation assemblage at culvert just south of the Tamiami Trail Roadway Corridor (Facing South)

Along the south side of the Tamiami Trail roadway between the vegetation halos at the culvert sets, the habitat consists of a narrow fringe of woody hardwoods dominated by pond apple and Carolina willow with Brazilian-pepper in the more elevated areas. The narrow woody fringe transitions to freshwater marsh dominated by cattail and sawgrass within approximately 10 to 40 feet from the roadway. Lesser components of the woody fringe include swamp bay, dahoon holly, wax myrtle, myrsine, giant leather fern, and Peruvian primrosewillow (***Figure 8***).

Figure 8 – View of the narrow fringe of woody hardwoods along the south side of the Tamiami Trail Roadway Corridor (Facing West)

Just south of the narrow woody hardwood fringe along the roadway, the habitat transitions to the sawgrass freshwater marsh community (the northeastern portion of the greater Shark River Slough) (***Figure 9***). Historically, Shark River Slough was a 30-mile-wide expanse of water moving downstream through the low-gradient wetland landscape. The pattern of water flow was regionally uniform across a broad expanse and lacked any central drainage channel or dendritic drainage pattern. The slough collected flows from the eastern portion of the Everglades, including the western side of the Atlantic Coastal Ridge and moved that water to the southwest through the mangrove estuaries of the southwestern coast into Florida Bay. Marl prairies, fire-maintained marshes that are intermittently flooded, currently flank both sides of Shark River Slough. A unique feature of the marl prairies is the high species richness of the plant communities. Sawgrass (*Cladium jamaicense)* and muhly grass (*Muhlenbergia capillaris*) are some of most abundant species, although more than 100 species of mostly herbaceous plants have been reported. Higher elevation tropical hammock and pine forests occur as islands within the prairie landscape. These tree islands support plants of West Indian origin that are unique to South Florida and contain the highest number of rare plant species in South Florida (USACE, 2005).

Figure 9 – View of the Northeast Shark River Slough just south of the Tamiami Trail Roadway Corridor (Facing South)

The dominant habitats within Northeast Shark River Slough are emergent wetlands [sawgrass marsh, degraded ridge and slough habitat (freshwater marsh), and forested and open water habitats (mixed wetlands – hardwoods and shrubs)]. The primary functions of these wetlands include surface and subsurface water storage, support of the biogeochemical processes (nutrient cycling, peat accretion, etc.), support of characteristic plant community, and providing habitat for native fish and wildlife. These functions appear to be retained, although degraded, following the drainage and compartmentalization efforts. The vegetation in the degraded slough consists of a mosaic of mixed-species patches of several more or less distinct types including sawgrass, muhly grass, spikerush (*Eleocharis* spp.), bayheads, and cattails, interwoven by monotypic stands of sawgrass, which in places exceeds two meters in height. The boundaries between plant communities are thought to be influenced by an interplay of parameters including topography, hydrology, soil depth, water quality, and fire, to name a few (Davis, 1943; Craighead, 1971; and Herndon et al., 1991).

The deep water slough vegetation community is typically dominated by submerged and floating aquatic plants such as bladderworts (*Utricularia* spp.), white waterlily (*Nymphaea odorata)*, big floating heart (*Nymphoides aquatica*), and spatterdock (*Nuphar advena*) (Lodge, 2005). In the USEPA ecosystem assessment of the Everglades (R-EMAP), Stober (2001) noted plant associations across the deep water slough Everglades dominated by white waterlily. However, Stober (2001) only noted one sampling location in ENP sloughs containing white waterlily; the paucity of white waterlily is thought to result from inadequate water depths and hydroperiods caused by artificial draining of the marsh community. This is consistent with vegetation surveys conducted by Davis (1943), Gunderson (1994), and Olmstead and Armentano (1997). White waterlily is more abundant in deeper slough habitats of the Loxahatchee National Wildlife

Refuge and WCA-2 and WCA-3 of the Everglades, less subject to drydown events (Stober, 2001). Paleoecological seed data indicates that native ENP slough communities were once dominated by white waterlily and big floating heart prior to the widespread artificial draining of slough communities (Saunders et al., 2007). Thus, white water lily is considered an ecological indicator of restoration progress in the degraded slough habitat within the Everglades. Field studies indicate that white water lily slough vegetation communities are characterized by a near continuous hydroperiod, minimal dry down events, and average annual water depths ranging from approximately 0.8 ft – 3.5 ft (Richards et al, 2009; Givnish et al., 2008; Stober et al, 2001; Powers et al., 2005; Goodrick, 1984; David, 1996; Zaffke, 1983). During experimental mesocosm experiments, white water lily exhibited a negative response to dry down conditions (to ground surface) evidenced by reduced leaf production, cessation of flowering, and miniaturized leaves (Richards et al, 2009). White water lily flower production was highest at the deepest experimental mesocosm depth treatment of 2.5 ft; flower production was 60% higher at this depth as compared to the shallowest treatment of 0.49 ft (Saunders et al, 2008). Mesocosm experiments also showed significantly higher white water lily total leaf biomass in the deeper water treatments of 2.5 ft and 1.48 ft as compared to the shallowest treatment of 0.49 ft (Richards et al, 2009). Comprehensive compilation of historical evidence indicates that pre-drainage water depths in Everglades sloughs had an average annual depth of approximately 2 ft (McVoy et al., in press). Based on compilation of the field, mesocosm, and historical evidence, white water lily slough vegetation communities are characterized by a nearly continuous hydroperiod, few dry down events average annual dry season depths of approximately 1.5 – 2.0 ft and average annual wet season depths of approximately 2.0 – 3.0 ft (RECOVER, 2009). A list of plant species known or anticipated to occur in the project area is provided in ***Table 1***.

The predrainage Everglades ridge and slough system was a network of discreet elevated sawgrass strands (ridges) with wide expanses of open water sloughs encompassing WCA-3B and Shark River Slough dominated by white waterlily (RECOVER, 2009) interspersed with tree islands (SCT, 2003; Gunderson, 1994; and Gunderson and Loftus, 1993). The ridges and sloughs were organized in a pattern oriented parallel to the direction of flow; thus, the flow volumes in the pre-drainage ridge and slough system likely helped maintain the sharply discreet community and elevation differences between the ridges and sloughs (Sklar et al., 2000). The sloughs, deeper than the ridges, provided critical refuge for wildlife during dry periods. The historic slough vegetation communities were characterized by floating, submerged, and some emergent species found in areas with the longest hydroperiods and deepest water that normally did not dry down.

The reduced water storage capacity of the managed Everglades, and the compartmentalization of the northern and central ridge and slough system, have slowed flow rates, have created areas that are either overdrained or are more deeply flooded than was the case in the pre-drainage system, have substantially altered the affects of fire on the marsh communities, and have altered the rates and magnitude of flooding and drying events suppressing the natural processes and functions within Northeast Shark River Slough. As a result, sawgrass has invaded sloughs and wet prairies, beakrush communities have been lost, woody plants have invaded marsh communities, and the extent and species composition of marsh communities has become extensively altered. The paleoenvironmental seed record has shown that deep water slough plant communities such as those dominated by deep water slough species such as white waterlily within Northeast Shark River Slough have largely been replaced by vast stretches of sawgrass following compartmentalization and other water management practices (Saunders et al., 2008). While the relevant sampling points for the Saunders et al. (2008) site were located south of the affected environment, it is reasonable to assume this would also apply to the affected environment since the Northeast Shark River Slough was historically a connected expanse of ridge and slough habitat (NPS, 2008).

Table 1 – Representative Plants Found in the Northeast Shark River Slough with the Potential to Occur in the Project Area

Common Name	Scientific Name
Pond apple	*Annona glabra*
Pickerelweed	*Pontederia cordata*
Spatterdock	*Nuphar advena*
American white waterlily	*Nymphaea odorata*
Blue waterhyssop	*Bacopa caroliniana*
Leafy bladderwort	*Utricularia foliosa*
Marsh mermaidweed	*Proserpinaca palustris*
Giant leather fern	*Acrostichum danaeifolium*
Southern shield fern	*Thelypteris kunthii*
Sawgrass	*Cladium jamaicense*
Southern cattail	*Typha domingensis*
Southern beaksedge	*Rhynchospora microcarpa*
Knotted spikerush	*Eleocharis interstincta*
Maidencane	*Panicum hemitomon*
Carolina willow	*Salix caroliniana*
Gulf Coast spikerush	*Eleocharis cellulosa*
Tracy's beakrush	*Rhynchospora tracyi*
Muhly grass	*Muhlenbergia capillaris*
Spreading beaksedge	*Rhynchospora divergens*
Bluejoint panicgrass	*Panicum tenerum*
Alligator lily	*Hymenocallis palmeri*
Florida little bluestem	*Schizachyrium rhizomatum*
Spadeleaf	*Centella asiatica*
Kissimmeegrass	*Paspalidium geminatum*
Bulltongue arrowhead	*Sagittaria lancifolia*
Gulfdune paspalum	*Paspalum monostachyum*
Southern cutgrass	*Leersia hexandra*
Wand goldenrod	*Solidago stricta*
Rosy camphorweed	*Pluchea baccharis*
Arrowfeather threeawn	*Aristida purpurascens*
Meadow jointvetch	*Aeschynomene pratensis*
Water cowbane	*Oxypolis filiformis*

Common Name	Scientific Name
Falsefennel	*Eupatorium leptophyllum*
Green arrow arum	*Peltandra virginica*
Big floatingheart	*Nymphoides aquatica*
Perennial saltmarsh aster	*Symphyotrichum tenuifolium*
Turkey tangle fogfruit	*Phyla nodiflora*
Glade lobelia	*Lobelia glandulosa*
Smallfruit primrosewillow	*Ludwigia microcarpa*

(NPS, 2008)

L-29 Canal – North of Tamiami Trail

The L-29 Canal exists along the north side of the entire length of the Tamiami Trail project corridor (***Figure 10***). The canal and right-of-way are maintained by the SFWMD and kept clear of most woody vegetation. Scattered small stands of cattail and common reed occur along the banks along with transgressive individuals of pond apple despite periodic suppression activities by the SFWMD. The canal is predominantly open water with spatterdock often occurring sporadically in an approximate 10 to 15 wide zone along the south bank. Submerged vegetation is dominated by hydrilla, an invasive exotic species. The canal is a conveyor and equalizer for water flows prior to passage into ENP (USACE, 2005). Water deliveries to eastern ENP are controlled by the stage in L-29 Canal, as pressure from the water within the canal (hydraulic head) is required to force water through the culvert sets and into the Park. As canal stage increases, more water is forced beneath the road. However, canal stage is strictly controlled due to potential flooding within residential or agricultural areas of Miami-Dade County or potential damage to Tamiami Trail (USACE, 2005). Stage restrictions within the L- 29 Canal due to roadbed limitations and operational limitations further contribute to reduced water deliveries, affecting plant communities and topographic structure within Northeast Shark River Slough.

Figure 10 – L-29 Canal along the Tamiami Trail Project Corridor (Facing West)

Water Conservation Area 3B

WCA-3B, located to the north of the L-29 Levee along the entire length of the project corridor, is managed by FFWCC as the Francis S. Taylor Wildlife Management Area. The area is predominantly a region composed of sawgrass ridges, degraded sloughs, cattail marshes, wet prairies, and scattered tree/shrub islands (***Figure 11***). The tree/shrub islands are composed of tropical hardwood species rising above the elevation of the sawgrass ridges. Although seemingly small, the two to three foot difference in elevation between ridge surface and slough bottom was highly significant in the pre-drainage Everglades. During the typical annual rise and fall of wet and dry season water levels, this elevation difference allowed sloughs to remain water-filled throughout the year, while adjacent ridges would be exposed a few months of the year. In the pre-drainage system, native species were adapted to the multiple habitats provided by the tree islands, ridges, and sloughs. Aquatic organisms depended on the sloughs as extensive areas that would remain inundated throughout all but exceptionally dry years (USACE, 2005). The larger tear-drop shaped tree islands were typically developed where there was bedrock near the surface over which peat had accumulated. Common plant species include swamp bay, sweetbay (*Magnolia virginiana*), dahoon holly, wax myrtle, Carolina willow, red maple (*Acer rubrum*), strangler fig, and pond apple. A dense shrub layer is typically found beneath the canopy commonly of cocoplum, but can include other tropical hardwood species.

Figure 11 – View of WCA-3B from the L-29 Levee (Facing North)

4.0 PURPOSE OF AND NEED FOR ACTION AND PROJECT OBJECTIVES

Purpose

The project purpose was developed as part of the 2009 Omnibus Appropriations Act passed by Congress on March 10, 2009. The NPS proposes:

"To immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. SS 410r-S), including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail (U.S. Highway 41) to restore more natural water flow to Everglades National Park and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas."

Need for Action

The need for the action is the same as cited in the Mod Waters Tamiami Trail Modification 2003 GRR/SEIS, 2005 RGRR/SEIS, and 2008 LRR/EA:

"In its current condition, the segment of Tamiami Trail located between S-334 on the east and S-333 on the west has inadequate capacity to deliver the volumes of water required to restore ENP and in Northeast Shark River Slough without risking damage to the roadbed and its eventual degradation and causing a backwater impact on WCA-3B potentially drowning tree islands. The recommended plan must address: (1) measures to increase conveyance of water to Northeast Shark River Slough, and (2) modifications to the existing roadbed, if any, required to allow this conveyance."

More precise needs based on specific language in the 2009 Omnibus Appropriations Act are:

(1) to increase potential ecological connectivity (additional bridging) between marshes in Northeast Shark River Slough in ENP and marshes north of the trail,

(2) to restore natural marsh flow patterns (flow rates and distributions) associated with unobstructed flows (removal of roads, canals, and levees) between marshes, and

(3) to restore ridge and slough habitat in ENP by reconnecting sloughs severed by the existing road.

Project Objectives

"Objectives" are specific purpose statements that describe what must be accomplished to a large degree for the action to be considered a success (*Director's Order 12*).

Based on a consideration of the purpose for the project, the problems occurring and the opportunities available to accomplish restoration goals, the following project objectives were developed by the NPS ENP staff:

- Restore more natural water flow to ENP
    - Construct additional bridging and road raising of the Tamiami Trail to provide for unconstrained flows to Northeast Shark River Slough and Florida Bay
- Restore ecological connectivity
    - Improve ecological connectivity by removing obstructions to sheet flow
    - Enhance unobstructed movement of animals between the north and south of Tamiami Trail
- Restore habitat within ENP

- Restore slough vegetation and the deep water sloughs
- Restore processes that produce and maintain ridge and slough communities in ENP east of the L-67 Extension

5.0 ALTERNATIVES CONSIDERED

Five action alternatives, along with the No-Action Alternative, were fully analyzed in the Tamiami Trail Modifications: Next Steps EIS. The action alternatives that were analyzed involved combinations of different lengths of bridging and scenarios of access to private property along the 10.7-mile project corridor. After carefully evaluating all alternatives, Alternative 6e was chosen as the Environmentally Preferred Alternative as it maximized the amount of bridging along the project corridor while providing the most cost-effective scenario of access to privately held parcels. The alternatives studied are described below:

No-Action Alternative

The No-Action Alternative is authorized by the 2008 Limited Reevaluation Report/Environmental Assessment and consists of construction of a 1-mile eastern bridge with the remaining road raised to allow an increase in the allowable stage in the L-29 Canal from 7.5 ft-NGVD to 8.5 ft-NGVD.

All of the following action alternatives assume the 1-mile eastern bridge (2008 LRR) has been constructed. The lengths of the bridges, transition areas between the bridges and the roadway, and the roadway are separated in the descriptions.

Action Alternatives

Alternative 1

This alternative includes 4 bridges (for a total of 2.2 miles of bridges): a 0.56-mile bridge (Bridge A1) located between the Osceola Camp and the Lincoln Financial Radio Tower; a 0.45-mile (Bridge B1) located between the Lincoln Financial Radio Tower and Everglades Safari Park facility; a 0.51-mile bridge (Bridge C1) located between the Everglades Safari Park facility and Frog City; a 0.38-mile bridge (Bridge E1) located between Frog City and Gator Park; and a 0.26 ConSpan (ConSpan H1) located just west of Coopertown, at control structure S-355B. The bridges and ConSpan would create a conveyance opening through Tamiami Trail by removing the sections of the existing highway and embankment. Bridges would be constructed approximately 50 feet south of the existing roadway right-of-way to maintain motor vehicle traffic during bridge construction. The remaining highway embankment (approximately 4.99 miles) would be reconstructed to raise the crown elevation to 13.13 feet.

Alternative 2a

The bridge configurations include: (1) a 0.56 mile bridge located between the Osceola Camp and the Lincoln Financial Radio Tower, (2) a 0.45 mile bridge located between the Lincoln Financial Radio Tower and Everglades Safari Park, (3) a 0.51 mile bridge located between Everglades Safari Park and the Airboat Association, (4) a 0.38 mile bridge located the Airboat Association and the Tiger Tail Camp, (5) a 0.26 mile ConSpan located between the Coopertown facility and the Salem Communications radio tower, (6) a 0.53 bridge located between the Salem Communications radio tower and the existing one-mile bridge and , (7) a 0.66 mile bridge located between the existing 1-mile bridge and the S-334 structure.

Alternative 2a would involve creating conveyance openings through Tamiami Trail by removing 3.3 miles of the existing highway and embankment. Bridges would be constructed approximately 50 feet south of the existing roadway right-of-way to maintain motor vehicle traffic

during bridge construction. The remaining highway embankment would be reconstructed to raise the crown elevation to 13.13 feet.

Alternative 4

This alternative includes 2 bridges: A1 and B1 (for a total of 1.0 mile), as described for Alternative 1. The bridges would create a conveyance opening through Tamiami Trail by removing the sections of the existing highway and embankment. Bridges would be constructed approximately 50 feet south of the existing roadway right-of-way to maintain motor vehicle traffic during bridge construction. The remaining highway embankment (approximately 7.80 miles) would be reconstructed to raise the crown elevation to 13.13 feet.

Alternative 5

Alternative 5 consists of 3 bridges; bridges A1, B1, and C1 (for a total of 1.5 miles) as described for Alternative 1. The bridges would create a conveyance opening through Tamiami Trail by removing the sections of the existing highway and embankment. Bridges would be constructed approximately 50 feet south of the existing roadway right-of-way to maintain motor vehicle traffic during bridge construction. The remaining highway embankment (approximately 6.57 miles) would be reconstructed to raise the crown elevation to 13.13 feet.

Alternative 6e (Preferred Alternative)

Alternative 6e is the maximum bridging option and consist of 5.5 miles of bridges and elevating the remaining roadway. The bridge configurations include: (1) a 2.60 mile bridge located between the Osceola Camp and the Airboat Association, (2) a 0.4 mile bridge located between the Airboat Association and the Tiger Tail Camp, (3) a 1.8 mile bridge located between the Tiger Tail Camp and the existing one-mile bridge, and (4) a 0.7 mile bridge located between the existing 1-mile bridge and the S-334 structure. Bridges would be constructed approximately 50 feet south of the existing roadway right-of-way to maintain motor vehicle traffic during bridge construction and avoid impacts to infrastructure north of the project area. The remaining highway embankment would be reconstructed to raise the crown elevation to 13.13 feet.

6.0 WETLAND FUNCTIONS OF THE PROJECT AREA

The Northeast Shark River Slough is a main water flow-way for the southern Everglades. The dominant vegetation types within Northeast Shark River Slough are mixed wetland hardwood-mixed shrubs and sawgrass.

The primary functions of the wetlands in the project area include surface and subsurface water storage, support of the biogeochemical processes (nutrient cycling, peat accretion, etc.), support of freshwater marsh plant communities, and providing habitat for native fish and wildlife. Mixed wetland hardwoods-shrubs and sawgrass marsh downstream of the culvert openings provide water storage, support for biogeochemical processes, and fish and wildlife habitat. All of these functions are currently degraded in the project area as a result of regional flood control and water management, and the presence of invasive plant and animal species. The vegetation community is degraded by invasion of exotic plant species such as Brazilian pepper (*Schinus terebinthifolius*). The water storage function has been degraded by the damming effect of the Tamiami Trail and altered sheet flow distribution and timing.

Nutrients (nitrogen and phosphorus) flowing into the wetlands from the L-29 Canal are taken up by vegetation in the park. Phosphorus, in particular, alters the natural ridge and slough habitat by supporting excessive growth of cattails. Alterations in the natural hydroperiods and hydropatterns have altered the microtopography within the historic ridge and slough habitat of the Everglades including Northeast Shark River Slough. While the historic ridge of the ridge and

slough habitat of Northeast Shark River Slough has been degraded from natural conditions it is still home to a variety of fishes, birds, reptiles, amphibians, and invertebrates.

Forested and open water freshwater wetlands are used by a variety of birds, fishes, and other wildlife. However, the habitat has been degraded by previous described disturbances and altered hydrologic processes. This habitat has also been altered by excavation and filling during Tamiami Trail construction and repairs. Aquatic habitat in the open water wetland (ponds) is degraded by the presence of numerous exotic fish species and elevated nutrient levels.

7.0 SPECIAL STATUS SPECIES

This section provides a summary of the state and federally listed species that are anticipated or have the potential to occur in the Tamiami Trail study area within Northeast Shark River Slough and anticipated impacts to special status species upon construction of an action alternative.

The following references were consulted for inclusion of applicable information into this section: ENP; the Draft South Florida and Caribbean Parks Exotic Plant Management Plan and Preliminary Draft EIS; Section 7, Endangered Species Act (ESA) consultation with the USFWS and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA-NMFS); USFWS Endangered Species website; USFWS Critical Habitat Portal; NOAA-NMFS, Office of Protected Resources Web site; the Florida Fish and Wildlife Commission Web site; and the Florida Department of Agriculture and Consumer Services (FDACS) Web site.

Animals and plants Federally classified as endangered or threatened are protected under the Endangered Species Act of 1973, as amended. According to the Endangered Species Act of 1973, "endangered species" means any plant or animal species in danger of extinction throughout all or a substantial part of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future throughout all or a substantial part of its range. "Proposed Species" are animal or plant species proposed in the Federal Register to be listed under Section 4 of the ESA. "Candidate Species" are species for which the USFWS and NOAA-NMFS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. Everglades National Park provides habitat for a number of Federally-listed threatened and endangered animal species, including candidate species.

State and Federally-listed species having the potential to occur in and around the project study area are described in ***Table 2***. [Note: The bald eagle (*Haliaetus leucocephalus*) was delisted in 2007; The American alligator (*Alligator mississippiensis*) is Federally-listed due to its similarity of appearance with the federally listed crocodile (*Crocodylus acutus*), and is discussed in the section below].

Table 2 – State and Federally Listed Species with the Potential to Occur in the Tamiami Trail Project Area

Taxonomic Group/Species	Common Name	Federal Status	State of FL Status	Breeding in West NESRS, ENP
Mammals				
Mustela vison evergladensis	Everglades mink		T	u
Trichechus manatus	West Indian manatee	E	E	
Felis concolor coryi	Florida panther	E	E	
Birds				

Taxonomic Group/Species	Common Name	Federal Status	State of FL Status	Breeding in West NESRS, ENP
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	E	E	
Aramus guarauna	limpkin		SSC	X
Caracara cheriway	caracara, Audubon's crested	T	T	
Cistothorus palustris	marsh wren		SSC	
Egretta caerulea	little blue heron		SSC	X
Egretta rufescens	reddish egret		SSC	
Egretta thula	snowy egret		SSC	X
Egretta tricolor	tricolored heron		SSC	X
Eudocimus albus	white ibis		SSC	X
Falco sparverius paulus	American kestrel		T	
Grus canadensis pratensis	Florida sandhill crane		T	X
Mycteria americana	wood stork	E	E	X
Patagioenas leucocephala	white-crowned pigeon		T	
Platalea ajaja	roseate spoonbill		SSC	
Rostrhamus sociabilis plumbeus	Everglade snail kite	E	E	X
Reptiles				
Alligator mississippiensis	American alligator	T	SSC	X
Drymarchon corais	eastern indigo snake	T	T	u

(E = endangered, T = threatened, SSC = state of Florida listed species of special concern, u = unknown)

West Indian Manatee

The West Indian manatee, listed as endangered under the ESA, is a fully aquatic herbivorous mammal. Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail. They are typically grey in color (color can range from black to light brown) and occasionally spotted with barnacles or colored by patches of green or red algae. The muzzle is heavily whiskered and coarse, single hairs are sparsely distributed throughout the body. Adult manatees, on average, are about nine feet long (3 meters) and weigh about 1,000 pounds (200 kilograms). At birth, calves are between three and four feet long (1 meter) and weigh between 40 and 60 pounds (30 kilograms). The West Indian manatee is typically found in coastal or estuarine waters, bays, rivers, and lakes, but may be found in inland canals during winter months. Manatees are grazers and require sheltered coves for feeding, resting, and calving. The manatee occurs in ENP's marine and estuarine systems and spends approximately five hours a day feeding. Submerged aquatic vegetation, such as seagrasses, is a major component of the manatee's diet, and although manatees appear to tolerate marine and hypersaline conditions, they are most frequently found in fresh or brackish waters. Changes in freshwater flow on salinity patterns, submerged vegetation, and the overall quality of the foraging habitat in

Florida Bay and elsewhere in the Park are, along with water temperature, important influences on the distribution and abundance of manatees in the area. Increases in salinity are generally considered to result in less favorable conditions for manatees, although manatees move freely through a wide range of salinities. Manatees may or may not need freshwater to survive, but are frequently reported drinking freshwater from natural sources as well as hoses, sewage outfalls, and culverts in marine and estuarine areas. For the period of record of over 20 years, there has been only one record of a manatee utilizing the L-29 Canal adjacent to Tamiami Trail.

Florida Panther

The Florida panther was listed as endangered under the ESA in 1967. The Florida panther is a large, pale brown or buff cat with white underparts and tail tip. Mature males weigh between 100 to 150 pounds and would reach 7 feet from nose to tip of tail. Females are smaller – from 50 to 100 pounds and up to 6 feet in length. They subsist on mammalian prey consisting of white-tailed deer, wild hogs, and raccoon and, in some areas, small game. The Florida panther primarily utilizes upper dry land habitats such as hardwood hammocks, pine flatwoods, and thicket swamps near wetlands. Although it does not like extremely wet places, it would wade across waterways if necessary to find food and drier land. A panther's home range covers 20 to over 450 square miles, with a historic range from eastern Texas through the southeastern states. The only known self-sustaining population occurs in South Florida, generally within the Big Cypress Swamp region. It is estimated that approximately 100 individuals of this subspecies remain in the wild population in South Florida (USFWS, 2008).

Per the USFWS *Florida Panther Recovery Plan, Third Revision* (2008):

> *Three priority zones were identified as important for panther habitat conservation: (1) Primary Zone – lands essential to the long-term viability and persistence of the panther in the wild; (2) Secondary Zone - lands contiguous with the Primary Zone, currently used by few panthers, but which could accommodate expansion of the panther population south of the Caloosahatchee River; and (3) Dispersal Zone - the area which may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al. 2006). The Primary Zone is currently occupied and supports the breeding population of panthers. Although panthers move through the Secondary and Dispersal Zones, they are not currently occupied by resident panthers. Some areas of the Secondary Zone would require restoration to support panthers. These zones vary in size, ownership, and land cover composition.*
>
> *The Primary Zone is 3,548 mi^2 (9,189 km^2) in size, 73% of which is publicly owned, and includes portions of the [Big Cypress National Preserve], ENP, Fakahatchee Strand Preserve State Park, [Florida Panther National Wildlife Refuge], Okaloacoochee Slough State Forest, and Picayune Strand State Forest. This zone's composition is 45% forest, 41% freshwater marsh, 7.6% agriculture lands, 2.6% prairie and shrub lands, and 0.52% urban lands. The Secondary Zone is 1,269 mi^2 (3,287 km^2) in size, 38% of which is public land. This zone's composition is 43% freshwater marsh, 36% agriculture, 11% forest, 6.1% prairie and shrub lands, and 2.3% low-density residential areas and open urban lands. The Dispersal Zone is 44 mi^2 (113 km^2) in size, all of which is privately owned. This zone's composition is 49% agriculture (primarily improved pasture and citrus groves), 29% forest (wetland and upland), 8.8% prairie and shrub land, 7.5% freshwater marsh, and 5.1% barren and urban lands (Kautz et al. 2006).*

Refer to ***Figure 12*** for a map depicting the Primary, Secondary, and Dispersal zones for the Florida Panther, as designated by the USFWS.

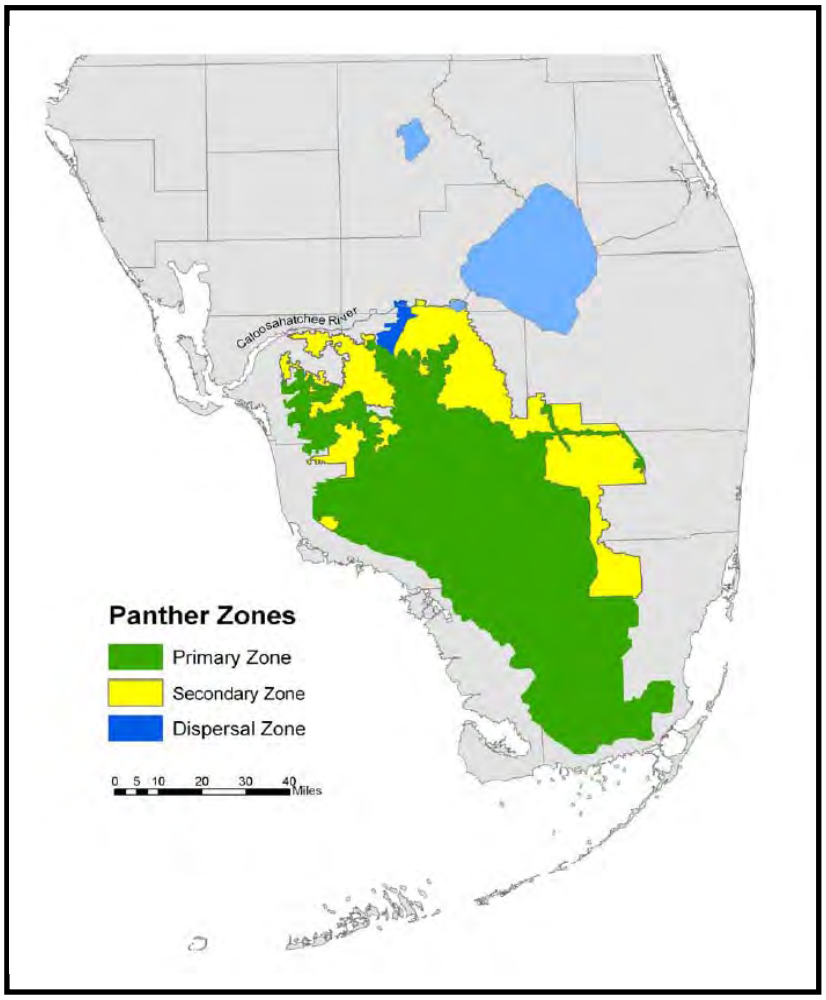

Figure 12 – USFWS Designated Florida Panther Priority Habitat Zones (Kautz et al., 2006)

The USFWS also developed Standard Local Operating Procedures for Endangered Species (SLOPES) for the Florida panther (April 18, 2000). According to the SLOPES, the USFWS designated a Panther Consultation Area in South Florida that extends from Monroe and Miami-Dade Counties north to Charlotte and Glades Counties, including portions of Collier, Broward, Palm Beach, Lee, and Hendry Counties. Within the designated Panther Consultation Area (PCA) are Panther Preservation Areas (PPA) ranked as Priority 1 and 2. Also included are areas otherwise designated as Conservation Lands, such as national preserves (Big Cypress), national parks (ENP), state parks (Collier-Seminole), SFWMD Water Conservations Areas (WCA-1, -2, -3), etc.

Throughout the occupied range of the panther, the ENP population represents at least 11 percent of the panther population known to the USFWS. According to radio collar telemetry data, two panthers in ENP have been documented crossing the Shark River Slough into Big Cypress National Preserve; however, no Florida panther activity has been recorded in the project area in the past six years.

Radio telemetry data collected within the Florida Everglades from 1981-2003 from over 57,000 radiolocations of 100 Florida panthers and eight introduced Texas cougars (*Puma concolor stanlyana*) provides evidence that panthers actively selected forested habitats and avoided open water wetlands within their home range (Cox et al., 2006). The habitat within Northeast Shark River Slough, ENP was included in the radio telemetry studies and was classified as the

open water wetland habitat that panthers actively avoid (Cox et al., 2006). However, panthers have been recorded in Northeast Shark River Slough, ENP and are known to use a mosaic of habitats while they select their home range and traverse through less preferred habitats to reach more preferred forested habitats (Cox et al., 2006). The radio telemetry studies provide evidence that panthers are avoiding crossing the Tamiami Trail from ENP to WCA-3B in the location of the Tamiami Trail Modifications: Next Steps Project (***Figure 13***) (Cox et al., 2006). It is possible that the Tamiami Trail is acting as a barrier to Florida panther movements.

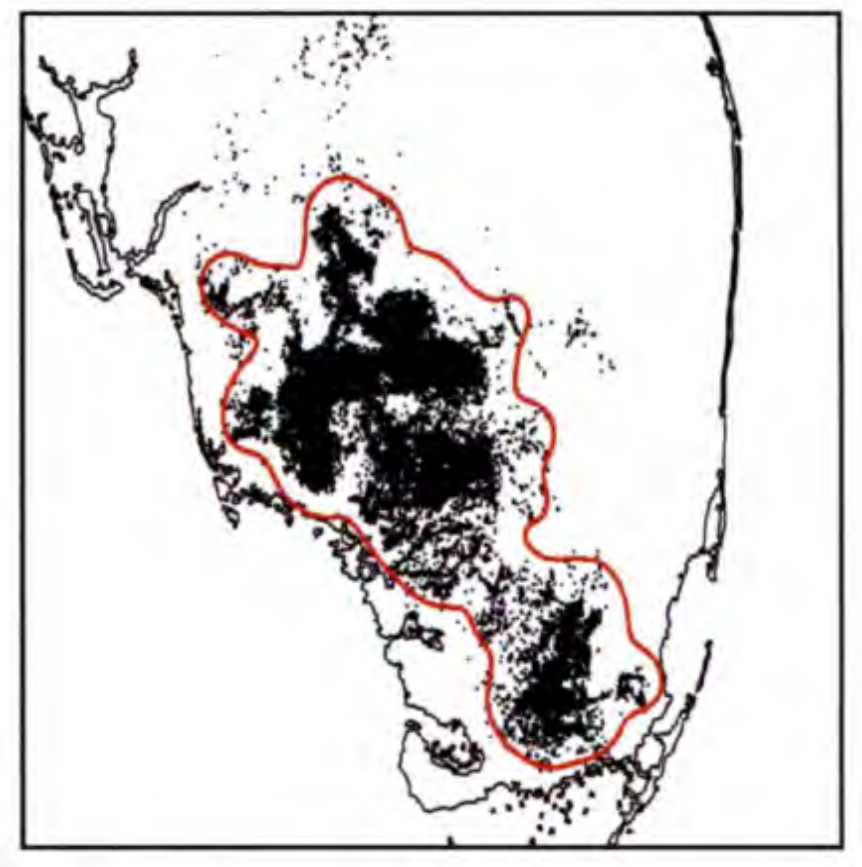

Figure 13 – Radio telemetry locations of Florida panthers from 1981 to 2003 (Figure courtesy of Cox et al, 2006).

Cape Sable Seaside Sparrow

The Cape Sable seaside sparrow is one of eight extant subspecies of seaside sparrow in North America. Its distribution is limited to the short-hydroperiod wetlands at the bottom of the greater Everglades system, on the southern tip of mainland Florida. In the 1930s, Cape Sable was the only known breeding range for the sparrow. Areas on Cape Sable that were occupied by Cape Sable seaside sparrow in the 1930s have experienced a shift in vegetative communities from freshwater vegetation to mangroves, bare mud flats, and salt-tolerant plants such as *Batis maritima* and *Borrichia frutescens*. The hurricane of 1935 is believed to have initiated the succession of the plant community on Cape Sable from one dominated by freshwater plants to one dominated by salt tolerant plants. Sea level rise, reduced freshwater flows to the area resulting from upstream water management practices, and another hurricane in 1960 were also likely factors in this habitat change. As a result, the Cape Sable seaside sparrow no longer uses this area. The currently preferred nesting habitat of the Cape Sable seaside sparrow appears to be a mixed marl prairie community that often includes muhly grass. These short-hydroperiod,

mixed marl prairies contain moderately dense, clumped grasses with open space permitting ground movements by the sparrow. Sparrows tend to avoid tall, dense, sawgrass-dominated communities, spikerush marshes, extensive cattail monocultures, long hydroperiod wetlands with tall, dense vegetative cover, and sites supporting woody vegetation. The birds also avoid sites with permanent water cover. The suitability of short-hydroperiod, mixed marl prairie communities for the sparrow is driven by a combination of hydroperiod and periodic fires. Fires prevent hardwood species from invading these communities and prevent the accretion of dead plant material, both of which decrease the suitability of habitat for Cape Sable seaside sparrows.

The Cape Sable seaside sparrow was first provided protection when it was listed on March 11, 1967, under the Endangered Species Preservation Act of 1967 (32 Federal Register 4001). That protection was continued under the Endangered Species Conservation Act of 1969. The sparrow and all other species listed under the Endangered Species Conservation Act were the first species protected under the Act of 1973, as amended. The Cape Sable seaside sparrow inhabits six distinct subpopulations called A, B, C, D, E, and F. Critical habitat for this species was designated on August 11, 1977 (42 FR 42840). Currently, the critical habitat includes areas of land, water, and airspace in the Taylor Slough vicinity of Collier, Miami-Dade, and Monroe Counties. Much of this area is within the boundaries of ENP. Because this was one of the first critical habitat designations under the Act, there were no primary constituent elements defined. The designated area encompasses about 197,260 acres (79,828 hectares), and includes portions of subpopulations B through F. The Cape Sable seaside sparrow Subpopulation A is the only area occupied by sparrows that does not have associated designated critical habitat. This subpopulation flanks the area west of Shark River Slough and is in the direct path of discharge from WCA-3A through the S-12 discharges. Water levels within the subpopulation are also thought to be affected by discharges from the upstream S-343A and S-343B structures and water concentrations within WCA-3A. This subpopulation, once estimated to be the largest subpopulation besides Subpopulation B, is thought to provide a critical role to the overall survival of the species.

The Cape Sable seaside sparrow Subpopulation A drastically declined approximately 84% from an estimated 2,608 birds in 1992 to only 432 birds in 1993 (Pimm et al, 2002). To prevent extirpation of the remaining Cape Sable seaside sparrow Subpopulation A, the USFWS issued a biological opinion (BO) providing recommendations to the USACE on how to better manage water levels in nesting habitat. The USACE responded by developing changes in water management operations that are still currently in effect. The decline of Subpopulation A has been attributed to upstream water management practices and a recent analysis by ENP scientists indicated that this decline cannot be attributed solely to rainfall increases (Kotun presentation, Cape Sable seaside sparrow Symposium, 2009).

Survey and nesting monitoring within Subpopulation A indicate this is an extant, functional subpopulation but that no significant recovery of the subpopulation has occurred since the massive crash in 1993 (Virzi et al, 2009). In 2009, 19 pairs of breeding pairs were detected in Subpopulation A. The 2009 survey revealed few unmated males in Subpopulation A, and no significant differences in clutch sizes, adult return rates, or proportion of early to late nesters as compared to the largest and most stable Subpopulation, Subpopulation B (Virzi et al, 2009).

Audubon's crested caracara

Audubon's crested caracara is a raptor that is approximately 50-64 cm long and has an approximate wingspan of 120 cm (USFWS, 1999). This species is characterized by its crest, naked face, elongate neck and unusually long legs. The distribution of the Audubon's crested caracara ranges includes Florida, southwestern Arizona, northern Baja California, through

Mexico and Central America to Panama, including Cuba and the Isle of Pines (USFWS, 1999). Previously this species was relatively common in Florida from northern Brevard County, south to Fort Pierce, Lake Okeechobee, and Hendry County (USFWS, 1999). The Audubon's crested caracara is now mainly found in a five-county area north and west of Lake Okeechobee (USFWS, 1999).

The preferred habitat of the Florida population consists of dry or wet prairie areas containing cabbage palms; however, this species is also found in wooded habitats (USFWS, 1999). This species is typically found in association with improved pasture areas and appears to prefer to nest in cabbage palms near open land (USFWS, 1999). The Audubon's crested caracara is considered an accidental within freshwater marshes of ENP with no regular pattern of occurrence and fewer than 10 reported records of occurrence within ENP (Loughlin et al., 1990). Aububon's crested caracara has the potential to occur and forage within Northeast Shark River Slough.

Wood Stork

The wood stork is a large, long-legged wading bird, standing about 50 inches tall, with a wingspan over 60 inches. It has white plumage and a short, black tail. Their bill is black, thick at the base, and curved. Their U.S. range consists of parts of Florida, Georgia, and South Carolina. Wood storks forage mainly in shallow water in freshwater marshes, swamps, lagoons, ponds, tidal creeks, flooded pastures and ditches, where they are attracted to falling water levels that concentrate food sources (mainly fish). Wood storks use thermal drafts for soaring, and may travel over 80 miles from nest to foraging sites. These birds eat small fish and probe with their bills for their food in shallow water. Highly social, these birds nest in large rookeries and feed in flocks. They are long-lived and first breed at approximately 4 years old. In South Florida, nesting occurs as early as October, with young leaving the nest in February or March. Much of the decline in wood stork populations is attributed to loss of habitat by destruction of wetlands and alteration of the natural hydroperiods and hydropatterns that characterized the pre-drainage Everglades. To minimize adverse effects to the wood stork due to any loss of wetlands, the USFWS recommends that any lost foraging habitat resulting from a project be replaced with construction of new wetlands or enhancement of existing wetlands within the Core Foraging Area (CFA) which USFWS defines as an approximate radius of 18.6 miles from the rookery.

Overall nesting colony trends in ENP have indicated an increasing wood stork colony in ENP since 1985 with peak nesting years occurring in 1994, 2000, 2007, and 2009 (Cook and Kobza, 2009) (***Figure 14***). 2009 marked a banner year for wood stork production in south Florida, with the largest nesting success since the predrainage period (Cook and Kobza, 2009). There were an estimated 6,452 wood stork nests in south Florida in 2009, constituting a 203% increase over the last decade (Cook and Kobza, 2009). The lack of dry season rainfall and reversals likely allowed for the optimal foraging conditions during 2009 that lead to such a successful breeding season (Cook and Kobza, 2009).

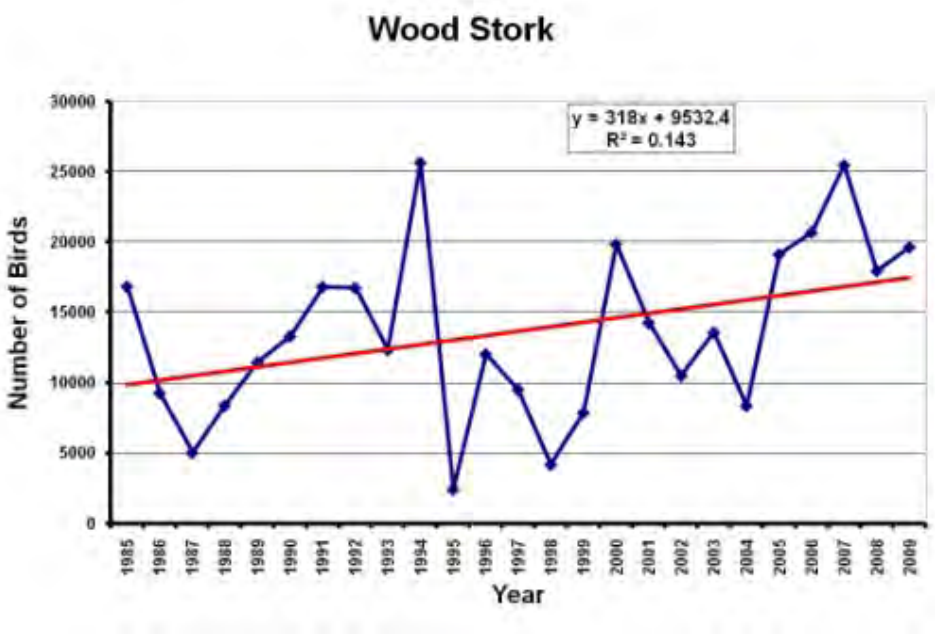

Figure 14 – Wood Stork Nesting Colony Trends in ENP

Three wood stork rookeries occur at pond apple stands along the south side of the Tamiami Trail project study area: the Tamiami Trail West Rookery and the Tamiami Trail East 1 and Tamiami Trail East 2 Rookeries (see ***Figure 15***). The pond apple forest creates a visual barrier between the rookeries and Tamiami Trail and the storks appear to have become somewhat acclimated to highway traffic noise.

Based on photographs and observations during SRF wading bird surveys of the Tamiami colonies in 2010, the Tamiami colony boundaries were delineated by the NPS. Using the NAIP (2007) GIS layer and the 2010 SRF wading bird survey information, the wading bird colonies were manually digitized into a GIS shape file depicting the estimated wood stork colony locations using ArcMap (v. 9.3). The revised GIS shape file also contains the estimated wood stork primary and secondary management zones for each of the respective Tamiami Colonies. A primary management zone buffer of 1,000 ft surrounding the boundary of each of the Tamiami colonies was designated. A 1,500 ft buffer surrounding the boundary of the primary management zone was designated to delineate the boundary of the secondary management zone. The revised management zone delineations meet the requirements described in the Draft USFWS Habitat Management Guidelines for the wood stork in the southeastern United States (2006).

The primary and secondary management zones are designed to protect wood stork nesting, roosting, and foraging activities and place restrictions on certain human activities, such as construction activities, during the active wood stork nesting season.

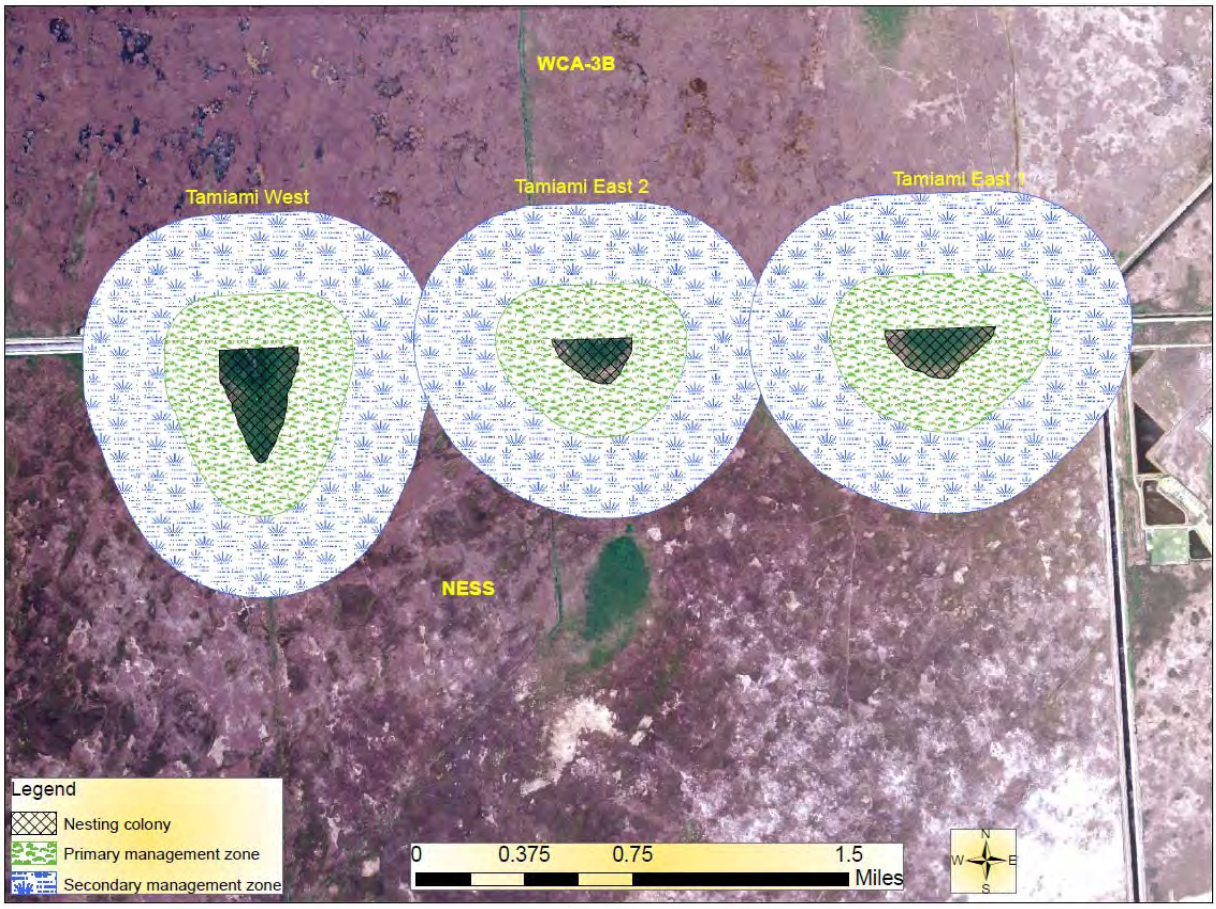

Figure 15 – Wood Stork Colonies and Management Zones along the Project Corridor

Everglade snail kite

The Everglade snail kite, listed as endangered under the ESA in 1967, is a medium-sized hawk with a wingspan of approximately 45 inches. The adult males are slate gray with a black head and wing tips, a white patch at the base of a square tail, and red legs. The female has a buff-colored body, heavily streaked with dark lines, a white line above the eye, a white tail patch, yellow legs, and red eyes. Immature Everglade snail kites resemble the females, only they are darker in color and their eyes are brown. Their beaks are slender and very hooked. Everglade snail kites require long hydroperiod wetlands that remain inundated throughout the year. This preference is associated with the freshwater apple snail (*Pomacea paludosa*), its primary food source. Suitable habitats for the Everglade snail kite include freshwater marsh and shallow, vegetated lake margins where apple snails can be found. Preferred nesting habitat includes small trees and shrubs such as willow, bald cypress, pond apple, sweet bay, dahoon holly, southern bayberry, and elderberry. During dry periods when suitable shrubs and trees experience dry conditions, herbaceous species such as sawgrass, cattail, bulrush, and common reed are used for nest sites. Critical habitat for the Everglade snail kite was designated in 1977 and includes WCA-1, -2, and -3A, and portions of ENP, as well as Lake Okeechobee shorelines and portions of the St. Johns marsh.

The USFWS drafted management guidelines for the Everglade snail kite in 2006. According to the USFWS, Everglade snail kite nesting does not occur randomly within wetland systems. Instead, there are generally areas within wetlands, where Everglade snail kite nesting is

concentrated. The density of kite nests, frequency of nesting within each area, and the sizes of these "priority Everglade snail kite nesting areas" are highly variable, but identifying these areas may help to focus management actions. In most years, the majority of kite nesting is anticipated to occur within the priority management zones, though new nesting areas may become active. Based on compilation of the 2000-2009 Everglade snail kite nesting data in Florida, the USFWS identified snail kite priority management zones. Snail kite priority management zones are designated in Northeast Shark River Slough, ENP (***Figure 16***).

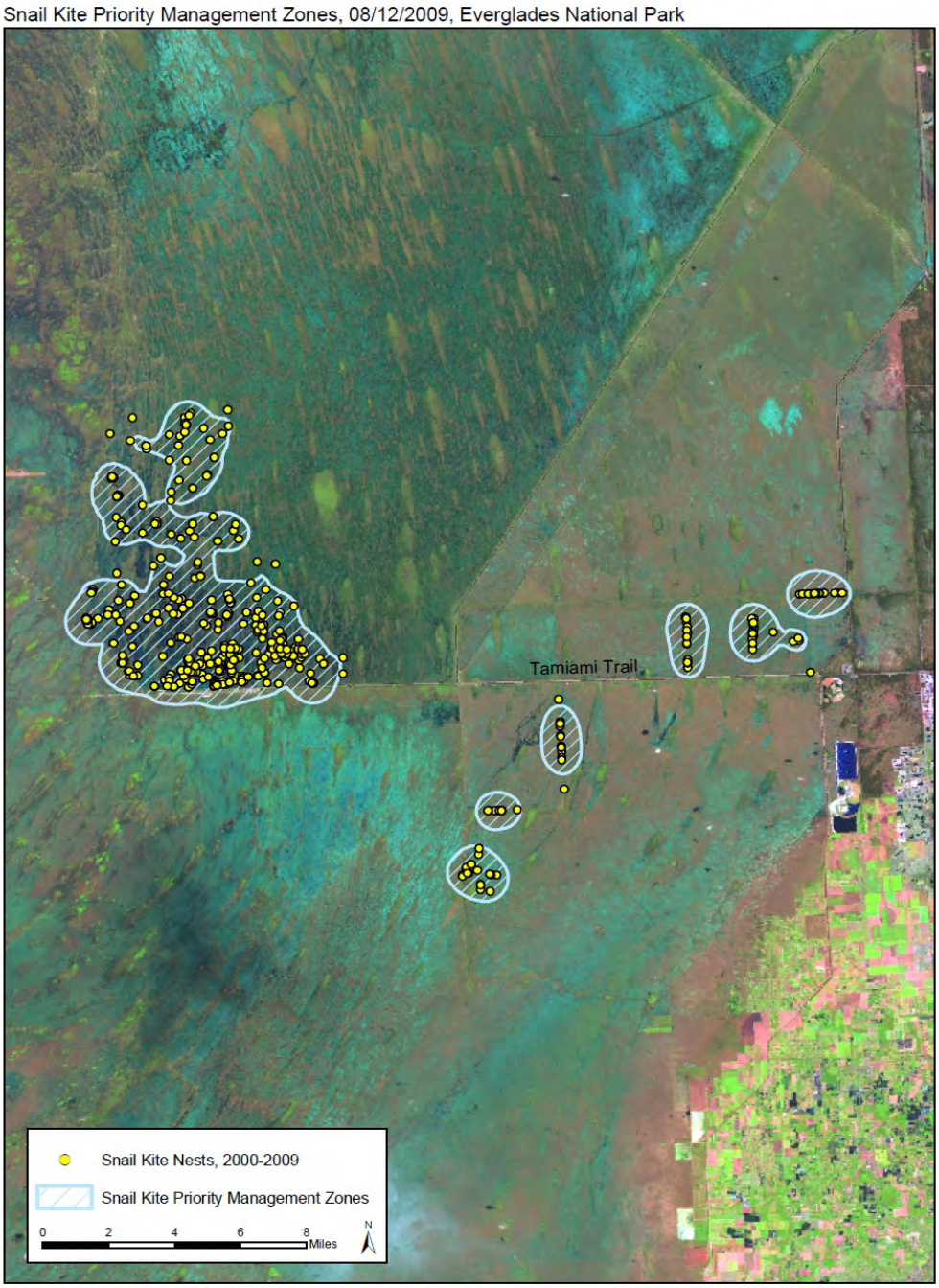

Figure 16 - Everglades snail kite priority management zones near Tamiami Trail based on data collected 2000-2009 *(figure source: USFWS)*

Since the mid-1990s, the geographic range of the Everglade snail kite has been reduced to the Everglades, Lake Okeechobee, Loxahatchee Slough, the Kissimmee River, and the Upper St. Johns River watersheds (Cattau et al, 2008). During 1992-2001 the majority of successful Everglade snail kite reproduction occurred in WCA-3A (Cattau et al, 2009). However, no Everglade snail kites were fledged out of WCA-3A in 2001, 2005, 2007, or 2008; only two Everglade snail kites from the same nest fledged out of WCA-3A in 2009 (Cattau et al, 2009). During 1985 – 1995 Lake Okeechobee once provided a productive breeding site for Everglade snail kite nesting but this area no longer constitutes productive breeding grounds (Cattau et al., 2009). Since the loss of the productive Everglade snail kite breeding grounds in Lake Okeechobee and WCA-3A, the majority of the Everglade snail kite nesting has most recently occurred in the Kissimmee Chain of Lakes, namely Lake Tohopekaligo (Toho); this area accounted for the majority of the successful nesting attempts from 2005-2009 (Cattau et al., 2009).

Reproductive declines throughout the geographic range of the Everglade snail kite have been attributed to natural disturbances such as droughts, anthropogenic water management practices, and long-term habitat degradation. Another contributing factor linked to the lack of successful nesting and fledgling success is the aging Everglade snail kite population that is known to be less reproductively viable and less capable of responding to poor environmental conditions such as drought (Cattau et al, 2009). The spread of the exotic apple snail may also limit juvenile Everglade snail kite survival and contribute to overall population declines (Cattau et al, 2009). Everglade snail kite recovery is thought to be dependent upon maintaining hydrologic conditions that support nesting and foraging conditions and provide suitable conditions for its primary prey, the native apple snail. The long-term recovery of this species will be dependent on reducing habitat fragmentation, and improving environmental and ultimately habitat conditions throughout the remaining range of its habitat from the Kissimmee Chain of Lakes to Everglades National Park.

The USFWS *Draft Snail Kite Management Guidelines* (2006) dictate that nest protection buffers be established around every active Everglade snail kite nest. These buffer zones would be in effect from when kites begin nest building through the time when breeding activity is no longer observed at the site. Because kites can re-nest, and may re-nest in the same area as previous attempts, buffer zones may remain in place past the time when fledglings leave the area if adult kites continue to show breeding activity, including courtship, in the general area (USFWS, 2006).

- No-entry Buffer Zone - A 500-foot (~150 meter) radius no-entry buffer zone would be established around all active nests that are discovered. The purpose of this buffer zone is to protect kites from direct disturbance that may affect the fate of nesting (USFWS, 2006).
- Limited Activity Buffer Zone - A 1,640-foot (500 meter) radius limited-activity buffer zone would be established around all active kite nests. This buffer zone is intended to maintain and protect foraging opportunities and habitat conditions around each nest to allow the nest to succeed. The goal is to maintain habitat conditions for the entire nesting period similar to those that were present when the birds selected the site (USFWS, 2006).

Eastern Indigo Snake

The Eastern Indigo snake is a large, non-poisonous snake that may reach up to eight feet in length. The snake gets its name from its shiny, blue-black color. Its diet consists mainly of other snakes, amphibians, small mammals, and occasionally birds and sea turtles. This species occurs throughout Florida and along the coastal plain of Georgia. The eastern indigo snake is found in a variety of habitats but prefer dry pineland habitat bordered by water. The project area consists of large expanses of wetland, which are not particularly attractive as habitat to this snake. The decline in populations is attributed to loss of habitat to agriculture, and also collecting for the pet trade. The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. Little is known about the specific habits and niche of the Eastern indigo snake in the Park. This species is found in and near hardwood hammocks. Standard Protection Measures for the East Indigo Snake (USFWS, 2004) have been developed that provide protective mitigation measures for the eastern indigo snake during construction activities.

Other State-Listed Species

The state of Florida lists a variety of plant and animal species as endangered, threatened, species of special concern, or commercially exploited. The state defines these species under the Florida Endangered and Threatened Species Act as follows:

Animals

- A threatened species is any species of fish and wildlife naturally occurring in Florida which may not be in immediate danger of extinction, but which exists in such small populations as to become endangered if it is subjected to increased stress as a result of further modification of its environment.
- Endangered species are defined as any species of fish and wildlife naturally occurring in Florida, whose prospects of survival are in jeopardy due to modification or loss of habitat; over utilization for commercial, sporting, scientific, or educational purposes; disease; predation; inadequacy of regulatory mechanisms; or other natural or manmade factors affecting its continued existence.
- Species of special concern are those that in the foreseeable future may become a threatened species unless additional protective measures or management measures are implemented. Species of special concern may already meet some criteria for threatened species but there may not be enough data yet available to elevate them to a threatened status.

Plants

- "Threatened plants" means species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.
- "Endangered plants" means species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the federal Endangered Species Act of 1973, as amended,

Table 3 –Other Listed Wildlife Species with Potential to Occur in the Tamiami Trail Project Area

Common Name	Scientific Name	State Status
Everglades mink	*Mustela vison*	Threatened
The Everglades mink is a medium size member of the weasel family with a long slender body, short legs, and a long tail. The fur is dark brown over the body and blackish brown at the tip of the tail. Some individuals have a white patch on the chin or chest. The mink utilizes a variety of wetland habitats including freshwater marsh, cypress swamp, and forested wetlands. The south Florida distribution includes Southern Collier County, mainland Monroe County, and Miami-Dade County. Recent camera monitoring efforts have not detected minks within Northeast Shark River Slough, ENP. However, it is possible that the camera monitoring methods used did not detect minks even though they are present in Northeast Shark River Slough. Therefore, minks still have the potential to occur in Northeast Shark River Slough.		
limpkin	*Aramus guarauna*	Species of Special Concern
The limpkin is a somewhat large bird, 66 cm (26 in) long, with a wingspan of about 102 cm (40 in) and a weight of about 1.1 kg (2.4 lb). Its plumage is drab—dark brown with an olive luster above. The feathers of the head, neck, wing coverts, and much of the back and underparts (except the rear) are marked with white, making the body look streaked and the head and neck light gray. The limpkin occurs from peninsular Florida (and formerly the Okefenokee Swamp in southern Georgia) and southern Mexico through the Caribbean and Central America to northern Argentina. In South America it occurs widely east of the Andes; west of them its range extends only to the Equator. It inhabits freshwater marshes and swamps, often with tall reeds, as well as mangroves. In the Caribbean, it also inhabits dry brush land. While considered relatively uncommon in ENP, this species has previously been observed within freshwater marshes of ENP and has also previously bred within ENP (Loughlin et al., NPS, 2006). Therefore, limpkins have the potential to occur and potentially to breed and forage within Northeast Shark River Slough.		
marsh wren	*Cistothorus palustris*	Species of Special Concern
Two recognized subspecies of the marsh wren breed within coastal marshes of Florida and are listed as Species of Special Concern by the state, The Worthington's marsh wren (*C. palustris griseus*) breeds within cordgrass marshes of Duval and Nassau counties while the Marian's marsh wren subpopulation (*C. palustris marianae*) is located in black needlerush marshes on the Gulf coast (FFWCC, 2003). Marsh wrens have been observed within freshwater marshes of Florida but are not currently breeding in these areas (FFWCC, 2003). Marsh wrens have previously been observed within the freshwater marshes of ENP and therefore, have the potential to occur within Northeast Shark River Slough (Loughlin et al., 1990; NPS, 2006).		
little blue heron	*Egretta caerula*	Species of Special Concern
The little blue heron is a wading bird found along the Atlantic coast from Massachusetts to Florida, and is most abundant along the Gulf of Mexico. This species ranges up to 30 inches in height and would have a wingspan of approximately 3 feet. Adults have a purple head and neck, with a slate-gray body. The long neck is held in an "S" curve at rest and in flight. Young are all white, with a blue bill and green legs. Little blue herons feed during the day on fish, reptiles, crustaceans, and insects. The long bill is used to jab and eat the prey. Little blue herons are common throughout the project area. This species nests within the Tamiami colonies and uses habitats within Northeast Shark River Slough for foraging and roosting.		
reddish egret	*Egretta rufescens*	Species of Special Concern
The reddish egret is approximately 30 inches in length with a wingspan of 46 inches. The dark morph breeding adult is characterized by a pink bill with a black tip and cobalt blue legs with shaggy plumes on the head while the white morph adult generally resembles a little blue heron or a snowy egret (Dunn and Alderfer, 2008). This species disperses along the Gulf coast in the post-breeding phase		

Common Name	Scientific Name	State Status
and is found casually inland to the Midwest, through the southwest and up the Atlantic coast to New England (Dunn and Alderfer, 2008). Although not reported as breeding within Northeast Shark River Slough, ENP, reddish egrets have previously been observed within the freshwater marshes of ENP and therefore, have the potential to occur within Northeast Shark River Slough (Loughlin et al., 1990; NPS, 2006).		
snowy egret	*Egretta thula*	Species of Special Concern
The snowy egret is a small white heron, about 2 feet tall, with an approximate 3 foot wingspan. This species is distinguished by a black bill and legs, with yellow feet. Both male and female have the same coloring. Snowy egrets breed in shared colonies in salt marshes, ponds and shallow bays. Prey includes aquatic organisms and insects, such as shrimp, fish, frogs, and insects. They forage by walking slowly or standing motionless and striking at the prey. The species was reduced from common to rare by 20th century plume hunting. Snowy egrets are common throughout the project area. This species nests within the Tamiami colonies and uses habitats within Northeast Shark River Slough for foraging and roosting.		
tricolored heron	*Egretta tricolor*	Species of Special Concern
The tricolored heron is a wading bird found from Massachusetts to the Gulf Coast. Reaching 30 inches in height, its slate-gray plumage is complemented by a white belly and a white chin stripe. During most of the year, the bill is yellow with a black tip and its legs are yellow. During mating season the bill turns bright blue and the legs are bright pink. Its diet consists primarily of fish, but may include small reptiles, amphibians, insects, and crustaceans. This species usually breeds in brackish and saltwater coastal areas, in mixed colonies with other herons. Nests are close to the ground. Tricolored herons are common throughout the project area. This species nests within the Tamiami colonies and uses habitats within Northeast Shark River Slough for foraging and roosting.		
white ibis	*Eudocimus albus*	Species of Special Concern
The white ibis is a medium-sized wading bird approximately 25 inches in length with a wingspan of approximately 38 inches (Dunn and Alderfer, 2008). Its feathers are entirely white, except for dark wing tips. The face is bare and pink, blending into a long, curved bill. It has long pink legs and webbed toes. Barriers, marshes, coastal islands and inland lakes are the preferred habitat and nesting sites. White ibis probe for aquatic crustaceans and insects using their bill. White ibis are common in the project area. This species nests within the Tamiami colonies and uses habitats within Northeast Shark River Slough for foraging and roosting.		
American kestrel	*Falco sparverius paulus*	Endangered
The American kestrel is approximately 10.5 inches in length and has a wingspan of approximately 23 inches (Dunn and Alderfer, 2008). This subspecies inhabits open pine savannahs, sandhills, prairies, freshwater marshes, hammocks, mangrove forests, and pastures in Florida and the southeastern United States (Loughlin et al., 1990; FWC, 2010). Because this species has been previously observed in freshwater marshes of ENP (Loughlin et al., 1990), this subspecies has the potential to occur and forage within Northeast Shark River Slough.		
Florida sandhill crane	*Grus canadensis pratensis*	Threatened
The Florida sandhill crane stands approximately up to four feet tall and a wingspan of nearly 6.5 ft. This bird is characterized by its long-neck and feathers that clump at its rear (Brandt and Chafin, 2003). The Florida sandhill crane is distributed within peninsular Florida, although not as observed south of Lake Okeechobee and also found within southeastern Georgia (Okefenokee Swamp) (Brandt and Chafin, 2003). This subspecies inhabits prairies, freshwater marshes, and grassed areas including pastures, golf courses, and highway medians (Brandt and Chafin, 2003). While considered relatively uncommon in ENP, this species has previously been observed within freshwater marshes of ENP and has also previously bred within ENP (Loughlin et al., NPS, 2006). Therefore, this species has the potential to occur, forage, and breed within Northeast Shark River Slough.		

Common Name	Scientific Name	State Status
white-crowned pigeon	*Patagioenas leucocephala*	Threatened
The white-crowned pigeon is approximately 13.5 inches in length and is characterized by is white-topped head and large, square tail (Dunn and Alderfer, 2008). This species is found within the Florida Everglades and the Florida Keys and generally overwinters on Caribbean Islands (Dunn and Alderfer, 2008). While this species is not breeding within the freshwater marshes of ENP, this species has been observed within the freshwater marshes of ENP (Loughlin et al., 1990; NPS, 2006). Therefore, this species has the potential to occur within Northeast Shark River Slough.		
roseate spoonbill	*Ajaia ajaja*	Species of Special Concern
Roseate spoonbills are typically found in the coastal marshes, mudflats, and mangrove keys from Florida to coastal Texas. These large wading birds stand almost 3 feet tall and have a wingspan in excess of 4 feet. The term 'roseate' refers to the brilliant pink color of the adult bird. This species is often found in small groups with other wading birds. To feed, roseate spoonbills immerse their bill tips in water and swing their heads from side to side. Their diet consists of small fishes, crustaceans, mollusks, slugs and aquatic insects. Roseate spoonbills often nest in rookeries with herons, ibis, and other wading birds. They construct their nests of sticks, in trees or bushes, 5 - 15 feet off the ground. Northeast Shark River Slough provides foraging habitat for roseate spoonbills; however, this area is generally not used for nesting by roseate spoonbills.		
American alligator	*Alligator mississippiensis*	Threatened
The alligator is a large mostly black crocodilian with a broad round snout and no prominently visible tooth in the lower jaw when the mouth is closed. It is distinguished from the American crocodile which has a prominently displayed tooth on the lower jaw when the mouth is closed and is lighter in color with dark crossbands or spots on the back, tail and legs. The alligator is found in most permanent bodies of fresh water including lakes, ponds, canals, marshes, and rivers, and occasionally wanders into brackish water conditions. American alligators area known to breed and forage within Northeast Shark River Slough.		

(NPS, 2010 ; FFWCC, 2004 ; Hipes et al., 2001)

Everglades mink

Everglades mink were not detected in a recent wildlife camera monitoring study conducted near the Tamiami Trail culverts. However, it is possible that the Everglades minks are in the project area and they were not detected in the camera monitoring study. Should any Everglades minks be detected in the project area, the FFWCC and the USFWS will be notified. Because of the limited potential for occurrence of this species, it is concluded that any of the action alternatives may affect, but are not likely to adversely affect, the Everglade mink.

West Indian Manatee

For the period of record of over 20 years, there has been only one record of a manatee utilizing the L-29 Canal adjacent to Tamiami Trail. Therefore, it is highly unlikely that a manatee would be encountered in the project area. However, The Guidelines for Manatee Conservation During Comprehensive Everglades Restoration Plan Implementation (CERP Interagency Manatee Task Force, 2006) would be followed during all phases of construction. Therefore, the implementation of any of the action alternatives may affect, but are not likely to adversely affect the West Indian manatee.

Florida Panther

According to radio collar telemetry data, no Florida panther activity has been recorded in the project area in the past six years. The status and activities of uncollared panthers is unknown (USFWS 2008). Under the recent USFWS panther consultation protocols, any loss of habitat

greater than five acres in the primary habitat zone must undergo formal consultation. The primary habitat zone for the panther extends north through Northeast Shark River Slough to the southern edge of Tamiami Trail. Because construction of any of the Tamiami Trail Modifications: Next Steps project alternatives would impact more than five acres of primary panther habitat, formal USFWS consultation under Section 7 of the ESA is required.

Radio telemetry data collected within the Florida Everglades from 1981-2003 from over 57,000 radio locations of 100 Florida panthers and eight introduced Texas cougars (*Puma concolor stanlyana*) provides evidence that panthers actively select forested habitats and avoid open water wetlands within their home range (Cox et al., 2006). The habitat within Northeast Shark River Slough, ENP was included in the radio telemetry studies and was classified as the open water wetland habitat that panthers actively avoid (Cox et al., 2006). However, panthers have been recorded in Northeast Shark River Slough, ENP and are known to use a mosaic of habitats while they select their home range and traverse through less preferred habitats to reach more preferred forested habitats (Cox et al., 2006).

The radio telemetry studies provide evidence that panthers are avoiding crossing the Tamiami Trail from ENP to WCA-3B in the location of the Tamiami Trail Modifications: Next Steps Project (Cox et al., 2006). It is possible that the Tamiami Trail is acting as a barrier to Florida panther movements. A study conducted in Banff National Park, Canada provides evidence that open span bridges with fencing provide a preferred cougar (*Puma concolor*) crossing structure type at highways as compared to five other types of crossing structures that were evaluated (Gloyne and Clevenger, 2001). While the Tamiami Trail Modifications: Next Steps project is not comparable to the benefits described in the Gloyne and Clevenger (2001) study, replacing the Tamiami Trail roadway with open span bridges such as those described in the Tamiami Trail Modifications: Next Steps preferred alternative may improve panther movements between WCA-3B and NESRS, ENP, especially when implemented with other Everglades restoration projects such as the WCA-3A Decompartmentalization.

However, it remains relatively uncertain if the Tamiami Trail Modifications: Next Steps bridging project will provide any benefits to the Florida panther since they may not be in project area and the freshwater marshes within Northeast Shark River Slough are clearly not their preferred habitat (Cox et al., 2006). Also, even with the open span bridges described in the Tamiami Trail Modifications: Next Steps project, panthers may avoid the Tamiami Trail altogether or prefer to cross on the drier, unbridged portions of the Tamiami Trail roadway. It is uncertain if fencing along the unbridged portions of the roadway would be needed to ensure panthers would cross beneath the open span bridges as compared to the unbridged roadway portions.

In summary, our evaluation indicates that the habitat impacted by construction of the Tamiami Trail Modifications: Next Steps project is not preferred panther habitat and the Tamiami Trail may be acting as a barrier to panther movements north of the Tamiami Trail. The open span bridges in the preferred alternative may provide some benefit to improve Florida panther movements between WCA-3B and NESRS, ENP. NPS will continue to coordinate with the USFWS to mitigate for the loss of panther habitat if needed.

Therefore, because of the lack of recent panther activity, the small size and poor quality of panther habitat proposed to be impacted, and the potential increased habitat connectivity provided by the bridging proposed under any of the action alternatives, the implementation of any of the proposed action alternatives may affect, but are not likely to adversely affect the Florida panther.

American Alligator

Construction related activities associated with all action alternatives would likely cause alligators to abandon man altered waterways in the project area for more natural habitats within the Northeast Shark River Slough. However, because construction activities would be restricted to the immediate vicinity of the highway, it is concluded that the proposed project may affect, but is not likely to adversely affect the American alligator.

Eastern indigo snake

This species has the potential to occur in the project area, although there are no known occurrences in the project area. Because the eastern indigo snake could potentially be found the area affected by construction activities, The Standard Protection Measures for the East Indigo Snake (USFWS, 2004) would be followed during all phases of project construction. It is concluded that any of the action alternatives may affect, but are not likely to adversely affect, the eastern indigo snake.

Cape Sable Seaside Sparrow

There is no designated Cape Sable seaside sparrow critical habitat located within the construction footprint area, so no Cape Sable seaside sparrow habitat is anticipated to be impacted by construction of any of the action alternatives. The closest occupied Cape Sable seaside sparrow habitat is approximately ten miles south of the project area and no Cape Sable seaside sparrows are anticipated to be in the project area. Therefore, we anticipate that construction activities would not likely affect this species. Because construction of the proposed project is not anticipated to have a direct effect on the Cape Sable seaside sparrow nor its habitat, it is concluded that the action alternatives may affect, but are not likely to adversely affect, the Cape Sable seaside sparrow. It should be noted that no operational plan has been developed for the Tamiami Trail Modifications: Next Steps infrastructure so it is not possible to anticipate potential affects that an operational plan in association with the Tamiami Trail Modifications: Next Steps infrastructure may have on the Cape Sable seaside sparrow and its associated habitat.

Wood Stork

Based on photographs and observations during SRF wading bird surveys of the Tamiami colonies in 2010, the Tamiami colony boundaries were re-delineated. Using the NAIP (2007) GIS layer and the 2010 SRF information, the wading bird colonies were manually digitized into a GIS shape file depicting the estimated wood stork colony locations using ArcMap (v. 9.3). The revised GIS shape file also contains the estimated wood stork primary and secondary management zones for each of the respective Tamiami Colonies. A primary management zone buffer of 1,000 ft surrounding the boundary of each of the Tamiami colonies was designated. A 1,500 ft buffer surrounding the boundary of the primary management zone was designated to delineate the boundary of the secondary management zone. The revised management zone delineations meet the requirements described in the Draft USFWS Habitat Management Guidelines for the wood stork in the southeastern United States (2006).

To estimate the amount of habitat lost from the wood stork primary and secondary management zones, we intersected the NPS wood stork management zone delineation GIS layer with the USACE Tamiami Trail Modifications: Next Steps design GIS layer in ArcMap (v. 9.3). ***Table 4*** summarizes the results of our analysis.

Table 4 –Estimated Impacts to Tamiami Trail Wood Stork Colonies

Alternative	Temporary Colony Impacts (Acres)	Permanent Colony Impacts (Acres)	Temporary Primary Management Zone Impacts (Acres)	Permanent Primary Management Zone Impacts (Acres)	Temporary Secondary Management Zone Impacts (Acres)	Permanent Secondary Management Zone Impacts (Acres)
Tamiami West						
1	0.33	0.51	0.46	2.53	1.41	2.15
2a	1.32	1.55	1.40	3.20	2.31	3.13
4	0.33	0.50	0.46	1.88	0.35	1.05
5	0.33	0.50	0.46	1.88	0.35	1.05
6e	1.66	1.02	2.31	2.51	2.57	2.23
Tamiami East 2						
1	0.00	0.00	0.00	0.00	0.00	0.00
2a	1.67	0.18	2.33	0.35	2.13	0.37
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00
6e	0.00	0.00	0.00	0.00	0.00	0.00
Tamiami East 1						
1	0.46	0.80	0.35	1.64	0.04	0.11
2a	1.96	2.13	1.39	3.01	1.29	1.87
4	0.46	0.80	0.35	1.64	0.11	0.04
5	0.46	0.80	0.35	1.64	0.04	0.11
6e	1.93	2.02	1.39	2.47	0.94	0.77

Note: Impacts in the primary management zone in this table refer to impacts within the primary management zone surrounding the nesting colony itself.

All action alternatives (1-6e) would involve construction activities within the primary and secondary management zones of the Tamiami West and Tamiami East 1 colonies that include permanent habitat loss within each respective colony. Because of the location of the respective project alternatives and colony locations, impacts to wood stork habitat are not directly related to bridge length. Only Alternative 2a would impact the primary and secondary management zones of the Tamiami East 2 Colony. Permanent loss of wading bird nesting, loafing, roosting, and foraging habitat would result from implementation of any of the project alternatives. Direct impacts within the secondary zones could impact wood stork foraging and loafing habitat, while impacts within the primary zone could impact foraging, loafing, nesting and fledging behaviors. Impacts to the colonies could reduce the amount of available of nesting habitat. Filling of wetlands within the project area also reduces foraging habitat within the 18.6-mile core foraging area (CFA) for the two rookeries.

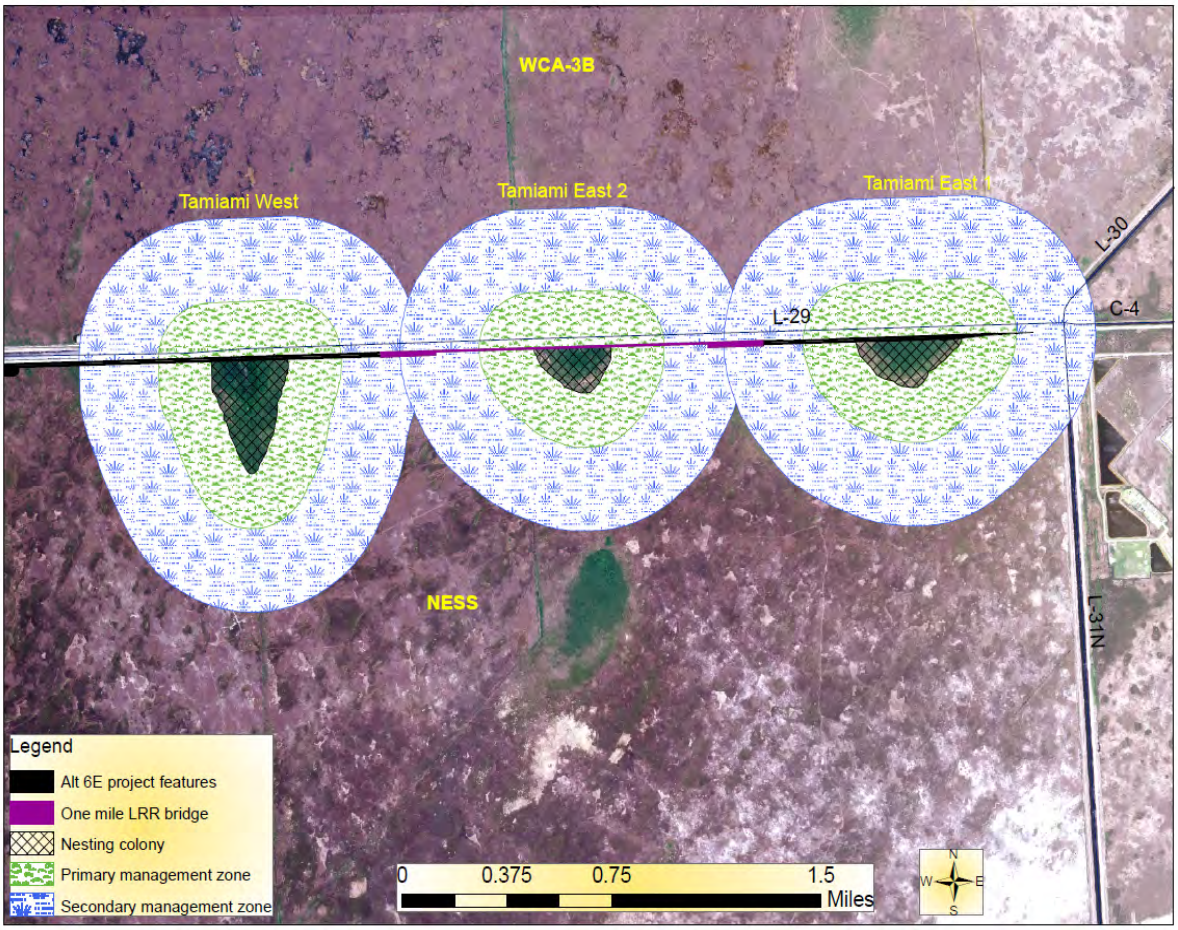

Figure 17 - Wood stork colonies and management zones in relation to Alternative 6e

In order to minimize impact to wood storks the following guidelines would be implemented during project construction:

- The following protective measures for wood storks will be implemented:
  - Primary Zone (the wood stork colony and a 1,000 ft buffer): From onset of nesting activity through the onset of the rainy season (or when the young have fledged), highway construction (e.g., heavy human/equipment activity, pile driving, blasting) should not be permitted in the reach of the highway affected by that alternative. The NPS SRF surveys will be used to determine the nesting status of wood storks.
  - Secondary Zone (a 1,500 ft buffer surrounding the primary zone): No unauthorized human activity (on foot, airboat, or off-road vehicle) should occur at any time of the year within the reach of highway affected by that alternative on the south side of the highway and particularly during the nesting season.
  - Length of Restrictions: These restrictions shall remain in effect during the construction phase of the Tamiami Trail project.
  - Qualified Observer: Subject to the approval of the USFWS, FFWCC, and NPS, a qualified observer(s) shall be stationed onsite during the

construction phase of the Tamiami Trail project. The observer shall monitor wood stork activity and shall notify USFWS, FFWCC and the NPS if wood stork behavior is modified such that roosting, breeding, nesting, foraging, and/or fledging of young is disrupted or otherwise interfered with.

- Modification of Restrictions: If new information becomes available concerning the wood stork colonies, the NPS, USFWS and FFWCC should immediately contact each other to determine what modifications, if any, are warranted.

State-listed wading birds nesting in the Tamiami Colonies: little blue heron, snowy egret, tricolored heron

The Frog City rookery, which supports nesting by tricolor herons and great egrets, is located in WCA-3B close to the L-29 Levee approximately one-quarter mile west of the Tigertail Camp. Because all alternatives would be located north of the L-29 Levee/Canal, no buffer zone restrictions would need to be applied to the Frog City colony. The colony is protected from construction noise by the approximately 20- foot-high L-29 Levee; the wading birds nesting at this colony have acclimated to continuous highway traffic and noise. Therefore, no adverse impacts to this rookery are anticipated.

The little blue heron, snowy egret, tricolored heron, and white ibis nest within the Tamiami colonies in association with the wood stork. Therefore, please refer to ***Table 4*** for an estimated amount of colony habitat loss that would be incurred by these state-listed wading bird species. Similar to the reasoning provided in the wood stork assessment, there would be a loss of nesting, foraging, loafing, and roosting habitat to state-listed wading birds nesting in the Tamiami colonies. Therefore, it is concluded that implementation of the action alternatives may affect, and is likely to adversely affect state-listed wading birds that nest in the Tamiami colonies.

A 100 meter nest protective buffer zone would be implemented for state-listed wading birds (little blue heron, snowy egret, tricolored heron, and white ibis) in the Tamiami colonies during the construction phase of the project. The NPS will coordinate with the FFWCC and the USFWS to determine the types of construction related activities that would be restricted should this mitigation measure need to be implemented.

Limpkin and Florida sandhill crane

While considered relatively uncommon in ENP (NPS, 2006), the limpkin and the Florida sandhill crane have previously been observed within freshwater marshes of ENP and have also previously bred within ENP (Loughlin et al., NPS, 2006). Therefore, limpkins and the Florida sandhill crane have the potential to occur and potentially to breed and forage within Northeast Shark River Slough. Should active nests of these species be encountered in the project area, NPS will coordinate with the FFWCC and the FWC to develop protective nest buffers. Because of the potential for the limited occurrence of these species within Northeast Shark River Slough and the protective nest buffer protective mitigation measure, we anticipate that implementation of the action alternatives may affect but is not likely to adversely affect the limpkin and the Florida sandhill crane.

Audubon's crested carcara

The Audubon's crested caracara is considered an accidental within freshwater marshes of ENP with no regular pattern of occurrence and fewer than 10 reported records of occurrence within ENP (Loughlin et al., 1990). This species prefers dry or dry or wet prairie areas containing

cabbage palms and is also found in wooded habitats (USFWS, 1999). Because the project area is not their preferred habitat and because of the limited occurrence of this species in the project area, it is concluded that any one of the action alternatives is not anticipated to significantly impact the Audubon's crested caracara.

Marsh wren

Although not reported as breeding within Northeast Shark River Slough, ENP, marsh wrens have previously been observed within the freshwater marshes of ENP and therefore, have the potential to occur within Northeast Shark River Slough (Loughlin et al., 1990; NPS, 2006). Because of the limited use of habitat in the project area, it is concluded that implementation of the action alternatives may affect but is not likely to adversely affect the marsh wren.

American kestrel

Although not reported as breeding within Northeast Shark River Slough, ENP, American kestrels have previously been observed within the freshwater marshes of ENP and therefore, have the potential to occur within Northeast Shark River Slough (Loughlin et al., 1990; NPS, 2006). Because of the limited use of habitat in the project area, it is concluded that implementation of the action alternatives may affect but is not likely to adversely affect the American kestrel.

White-crowned pigeon

While the white-crowned pigeon has been observed within freshwater marshes of ENP, this species is not breeding in the project area. Because of this species' limited use of habitat in freshwater marshes of ENP, it is concluded that implementation of the action alternatives may affect but is not likely to adversely affect the white-crowned pigeon.

Reddish egret and roseate spoonbill

While Northeast Shark River Slough, ENP does not constitute key breeding grounds for reddish egrets or roseate spoonbills, both species have previously been observed within the freshwater marshes of ENP and therefore, have the potential to occur within Northeast Shark River Slough (Loughlin et al., 1990; NPS, 2006). Because of the limited use of habitat in the project area, it is concluded that implementation of the action alternatives may affect but is not likely to adversely affect the reddish egret and the roseate spoonbill.

Everglade Snail Kite

The project construction footprint is not located within Everglade snail kite Critical Habitat; therefore there would be no impacts to Everglade snail kite Critical Habitat.

While no Everglade snail kite nests have ever been reported in the Tamiami Trail Modifications: Next Steps construction footprint area, previous protective nesting buffer areas have fallen within the Tamiami Trail Modifications: Next Steps construction footprint. Everglade snail kites do not necessarily utilize the same nest location every year and to provide protection for any nesting Everglade snail kites during construction of the Tamiami Trail Modifications: Next Steps Project, the Draft Snail Kite Management Guidelines (USFWS, 2006) will be followed during all phases of project construction. Short-term adverse impacts are expected to be limited to the timeframe of construction and Everglade snail kites would be expected to fully return to the areas of temporary impact following completion of construction activities.

Due to the permanent impacts to Everglade snail kite habitat, long-term, minor, adverse, localized impacts to the Everglade snail kite would be expected with implementation of any of the proposed action alternatives. Everglade snail kite activity (nest construction and usage) will be monitored during all stages of construction and the USFWS Draft Snail Kite Management

Guidelines (USFWS, 2006) will be followed during all phases of project construction. Therefore, the implementation of any of the proposed action alternatives may affect but are not likely to adversely affect the Everglade snail kite.

The *Second Report and Initial Recommendations* published by the Miami-Dade CCATF states that global warming would result in many changes to the natural environment, "including changing atmospheric circulation and temperature patterns, changes in rainfall and severe weather, changes in biologic community distribution, increased extinction rates, changes in disease and pest distribution, and changes in sea level" (CCATF, 2008). All these environmental impacts would affect South Florida, Everglades National Park, and the project area within the next century, with the key concern for the low topography project area being rising sea level, "with a very high likelihood" that the sea level would rise an additional 1.5 feet in the next 50 years and a cumulative total of three to five feet within a century (CCATF, 2008). Special status species would be impacted by habitat changes caused by intrusion of saltwater into interior freshwater marshes of the Northeast Shark River Slough and southern ENP. Changing conditions could lead to decrease in populations of special status species, or shifts in habitat ranges.

While implementation of the Tamiami Trail Modifications: Next Steps action alternatives have adverse effects to wood storks and other state-listed birds, implementation of a Tamiami Trail Modifications: Next Steps action alternative in conjunction with other Everglades related projects, such as the CERP and the MWD, is anticipated to provide overall, beneficial, long-term cumulative effects to special status species. Because of the anticipated improved hydrology and ecological connectivity that the Tamiami Trail Modifications: Next Steps in association with other Everglades restoration projects would provide, it is anticipated that the adverse effects from construction of the Tamiami Trail Modifications: Next Steps projects would be outweighed by the long-term cumulative benefits of Everglades restoration projects.

Impacts to special status species would range from short-term to long-term effects and would range in effect from minor to moderate, dependent upon the species. See ***Table 5*** below for a summary of the effect determination (per USFWS guidelines) and associated reasoning for each Federally-listed species with the potential to occur in the project area. Implementation of the Tamiami Trail Modifications: Next Steps action alternative in association with future Everglades restoration projects such as the CERP and the MWD is anticipated to provide long-term beneficial effects to special status species.

Table 5 – Effect Determinations for Federally-Listed Species

Species	Effect Determination	Reason
West Indian manatee	May affect, but is not likely to adversely affect	Species is not anticipated to occur in the project area. No manatees observed in the project area for 20 years.
Florida panther	May affect, but is not likely to adversely affect	Lack of recent usage of project area, poor quality habitat, linkage of Northeast Shark River Slough to WCA-3B via passage underneath bridges. Mitigation for loss of panther habitat will be done as required by the U.S. Fish and Wildlife Service.
eastern Indigo snake	May affect, but is not likely to adversely affect	No sightings within project area. Implement The Standard Protection Measures for the East Indigo Snake (USFWS, 2004).

Species	Effect Determination	Reason
Cape Sable seaside Sparrow	May affect, but is not likely to adversely affect	Species is not anticipated to occur in the project area. No Critical Habitat within project area. Nearest nesting site is approximately 10 miles south of the project area.
wood stork	May affect, and is likely to adversely affect	Habitat impacts to both the primary and secondary management zones of multiple Tamiami colonies. Implement monitoring and construction restrictions in the primary and secondary management zones during the active nesting season.
Everglade snail Kite	May affect, but is not likely to adversely affect	No reported nesting in project construction footprint. Implementation of active monitoring and the USFWS draft snail kite management guidelines (USFWS, 2006).

Since Federally-listed threatened and endangered species are located within the study area and would be affected by the proposed project, a Biological Assessment is required by the USFWS for this project. Through ongoing coordination efforts with the USFWS (see Section 6.2.2), it has been agreed that the requirements for the Biological Assessment can be met through this EIS document.

Additionally, at present an operational plan for manipulation of water levels in the L-29 Canal is being developed in association with the proposed project's infrastructure; however, since it has not been completed, it is not reviewed under this EIS. Full realization of project benefits is dependent upon an operational plan that utilizes the structural capacity of the preferred alternative. Potential benefits that would occur once an operational plan is defined and executed include enhancement of degraded habitats within the Northeast Shark River Slough system, benefiting special status species. It is highly likely that implementation of the preferred bridging alternative in conjunction with the operational plan is self-mitigating, and that permanent and temporary impacts to special status species and their habitats associated with the construction of the proposed project would be offset by the enhancement to special status species' habitats attributed to operation of the completed Tamiami Trail Modification: Next Steps project. However, long-term effects to habitats resulting from operations remain unknown since an operational plan has not yet been developed for the project alternatives.

Because there is uncertainty as to the level of habitat improvements that would be achieved with the operation of the project, mitigation would be conducted at the Hole-in-the-Donut site at ENP if anticipated project benefits do not adequately offset the project's impacts to special status species' habitats. Therefore, there would be no impairment to special status species as a result of implementation of any of the action alternatives.

8.0 WETLAND IMPACTS OF THE PREFERRED ALTERNATIVE

The Preferred Alternative (Alternative 6e) will involve the construction of 4 bridges for a total of 5.5 miles of bridging (see ***Figure 18***) and the remaining highway raised to an elevation of 13.13 feet. Wetland and surface water impacts will be associated with the removal of portions of existing roadway, construction of the bridges, the widening of the existing roadway to accommodate the new higher crown elevation, and construction of temporary work spaces that allow for access of construction equipment to the project site. Avoidance and minimization of wetland impacts is an important consideration thus, impact minimization efforts will be

considered during project design and permitting to reduce impact to adjacent wetlands and surface waters to the maximum extent possible while maintaining safe and sound engineering and construction practices.

The estimated project features engineering design GIS layers were intersected with the FLUCCS (2005) GIS layer in ArcMap (v. 9.3) to estimate the types and quantities of wetland plant communities that would be temporarily and permanently impacted by construction of the Tamiami Trail Modifications: Next Steps project alternatives. The results of this analysis are provided in ***Table 6.*** The results of the GIS analysis for the Preferred Alternative (Alternative 6e) are graphically depicted in ***Figures 19 - 23***. Unavoidable direct wetland impacts resulting from the proposed action alternatives range from an estimated low of 57.5 acres (41.4 acres permanent, 16.1 acres temporary) with Alternative 4 to an estimated high of 89.2 acres (49.2 acres permanent, 40.0 acres temporary) with Alternative 6e, the preferred alternative. While the alternatives with the most bridging are associated with the largest acreage wetland impacts, they also allow for the most on-site wetland restoration associated with the road removal activities. For example, Alternative 6e allows for approximately 41.9 acres of road removal/wetland restoration (nearly a one to one ratio of restoration area to permanent impact area) while road removal/wetland restoration associated with implementation of Alternative 4 is only approximately 7.6 acres (the road removal/wetland restoration area is over five times less than the permanent impact area). Out of all of the alternatives, Alternative 6e provides the maximum amount of road removal/wetland restoration.

Table 6 – Estimated Permanent and Temporary Wetland Impacts

FLUCCS (2005) Wetland Category		**Permanent Impact (acres)**	**Temporary Impact (acres)**
Alternative 1	Freshwater Marsh	15.8	6.8
	Mixed Wetland Hardwood/Shrub	20.9	10.6
	Sawgrass Marsh	10.8	4.1
	Water/Canal/Pond	0.7	0.2
	Grass/Bare	2.6	0.4
	Totals	**50.7**	**21.9**
Alternative 2a	Freshwater Marsh	17.9	8.3
	Mixed Wetland Hardwood/Shrub	24.4	15.3
	Sawgrass Marsh	10.8	4.1
	Water/Canal/Pond	0.7	0.2
	Grass/Bare	2.7	0.4
	Totals	**56.5**	**28.2**
Alternative 4	Freshwater Marsh	12.9	5.7
	Mixed Wetland Hardwood/Shrub	17.3	7.1
	Sawgrass Marsh	7.9	2.5
	Water/Canal/Pond	0.6	0.2
	Grass/Bare	2.6	0.6

FLUCCS (2005) Wetland Category		Permanent Impact (acres)	Temporary Impact (acres)
	Totals	**41.4**	**16.1**
Alternative 5	Freshwater Marsh	13.7	5.9
	Mixed Wetland Hardwood/Shrub	18.7	8.1
	Sawgrass Marsh	8.9	4.2
	Water/Canal/Pond	0.6	0.2
	Grass/Bare	2.7	0.3
	Totals	**44.5**	**18.6**
Alternative 6e	Freshwater Marsh	14.2	16.3
	Mixed Wetland Hardwood/Shrub	22.0	16.7
	Sawgrass Marsh	9.9	5.8
	Water/Canal/Pond	0.8	0.6
	Grass/Bare	2.4	0.6
	Totals	**49.2**	**40.0**

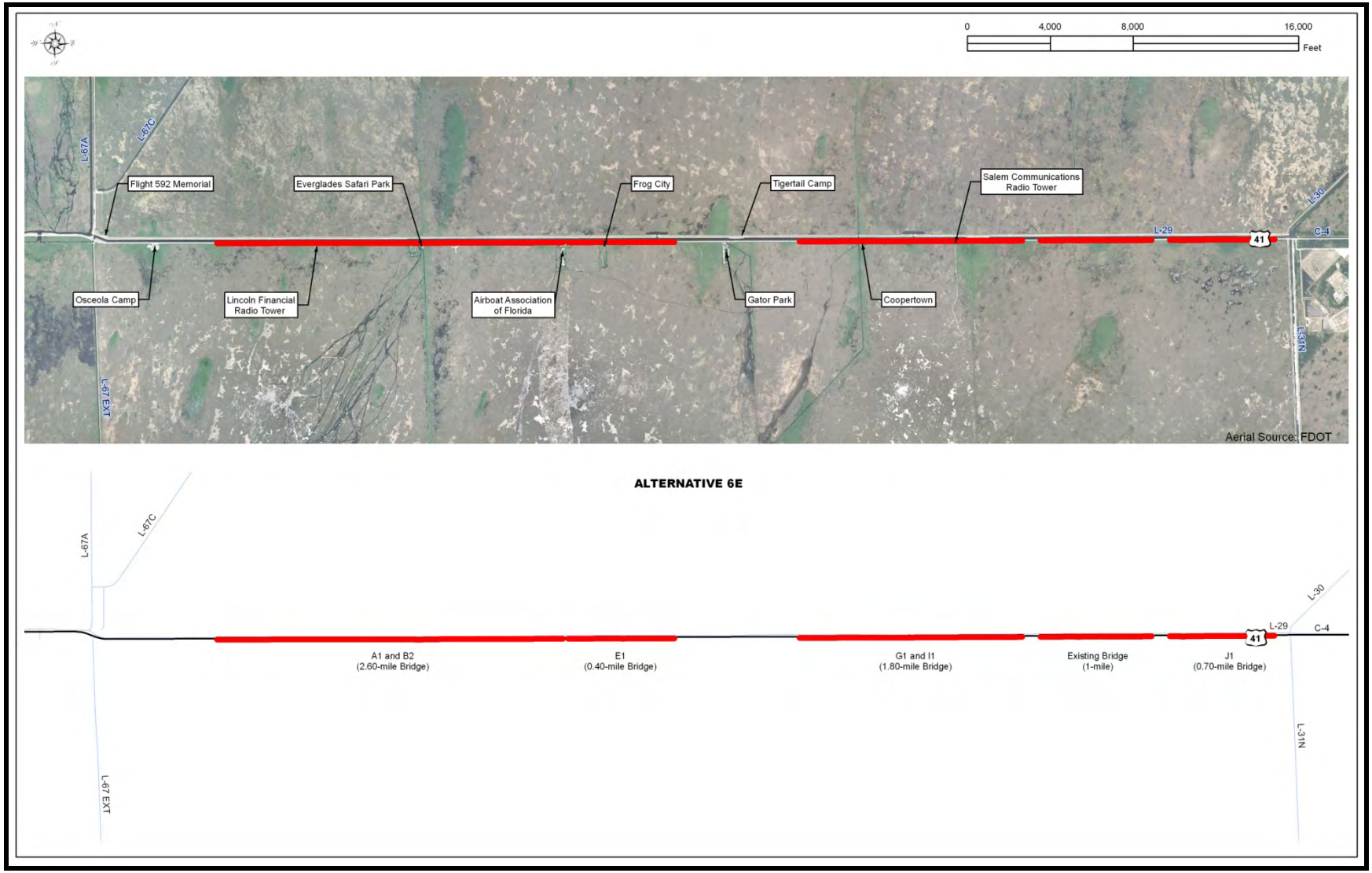

Figure 18 – Preferred Alternative

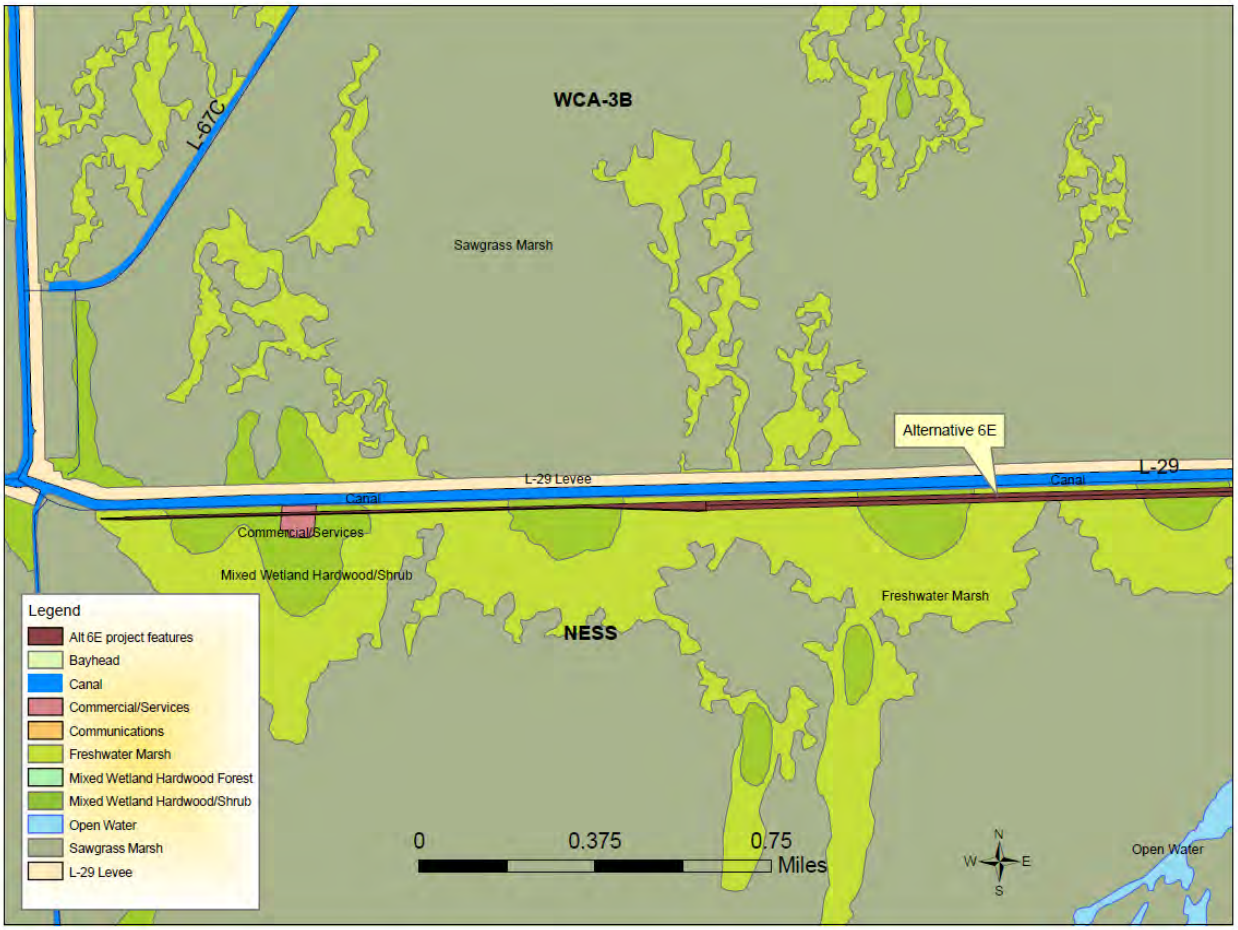

Figure 19 – Vegetation Communities Impacted by the Preferred Alternative (Alternative 6e)

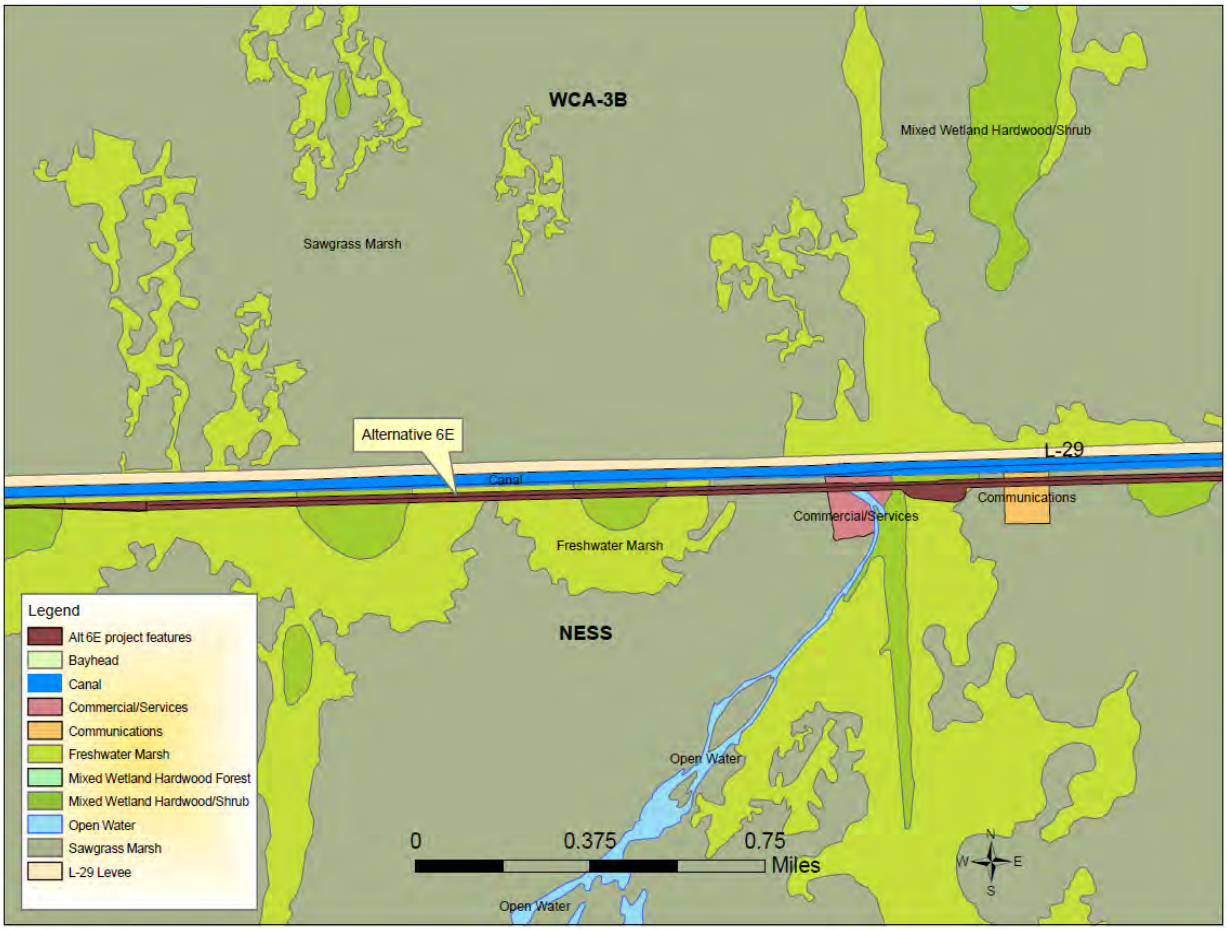

Figure 20 – Vegetation Communities Impacted by the Preferred Alternative (Alternative 6e)

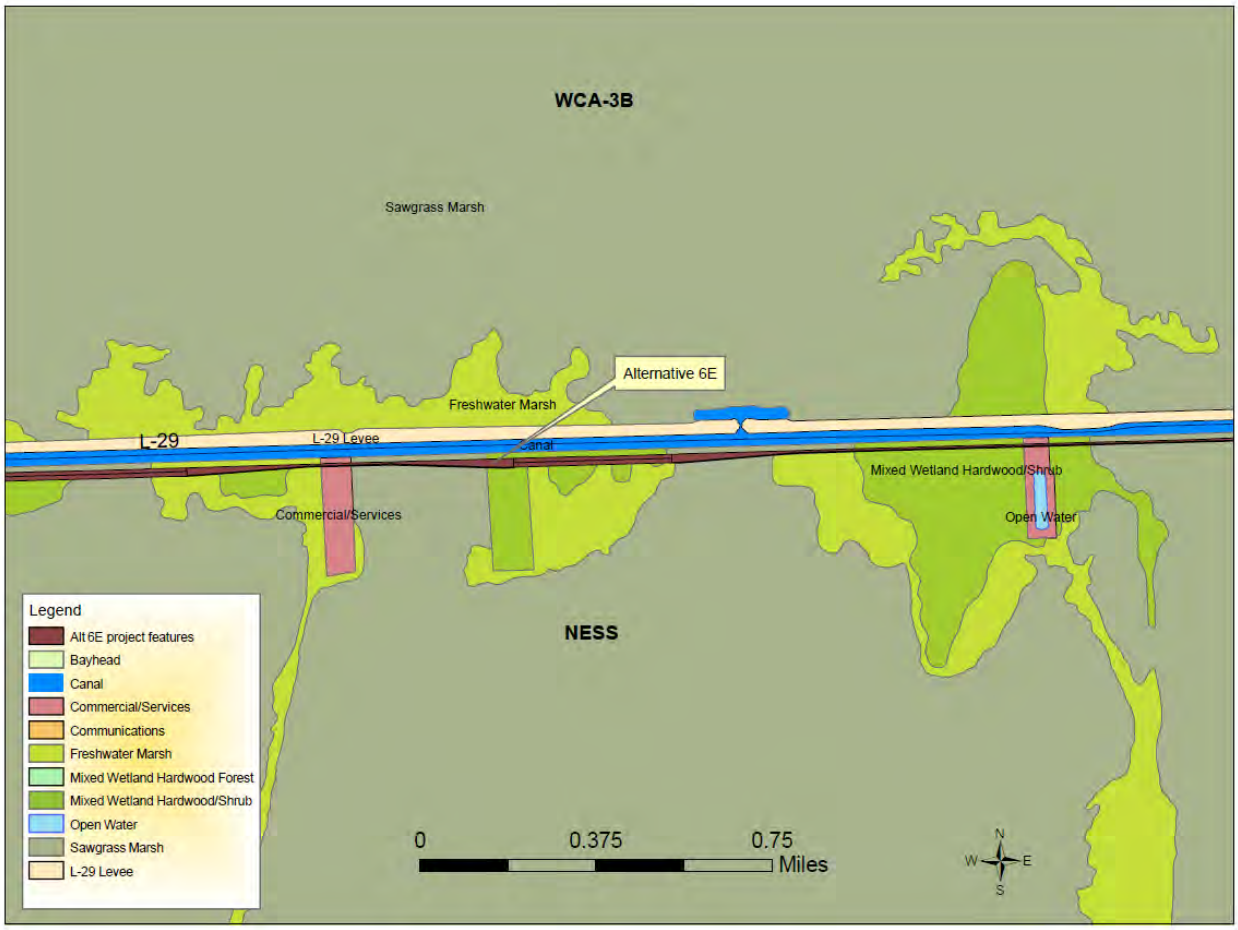

Figure 21 – Vegetation Communities Impacted by the Preferred Alternative (Alternative 6e)

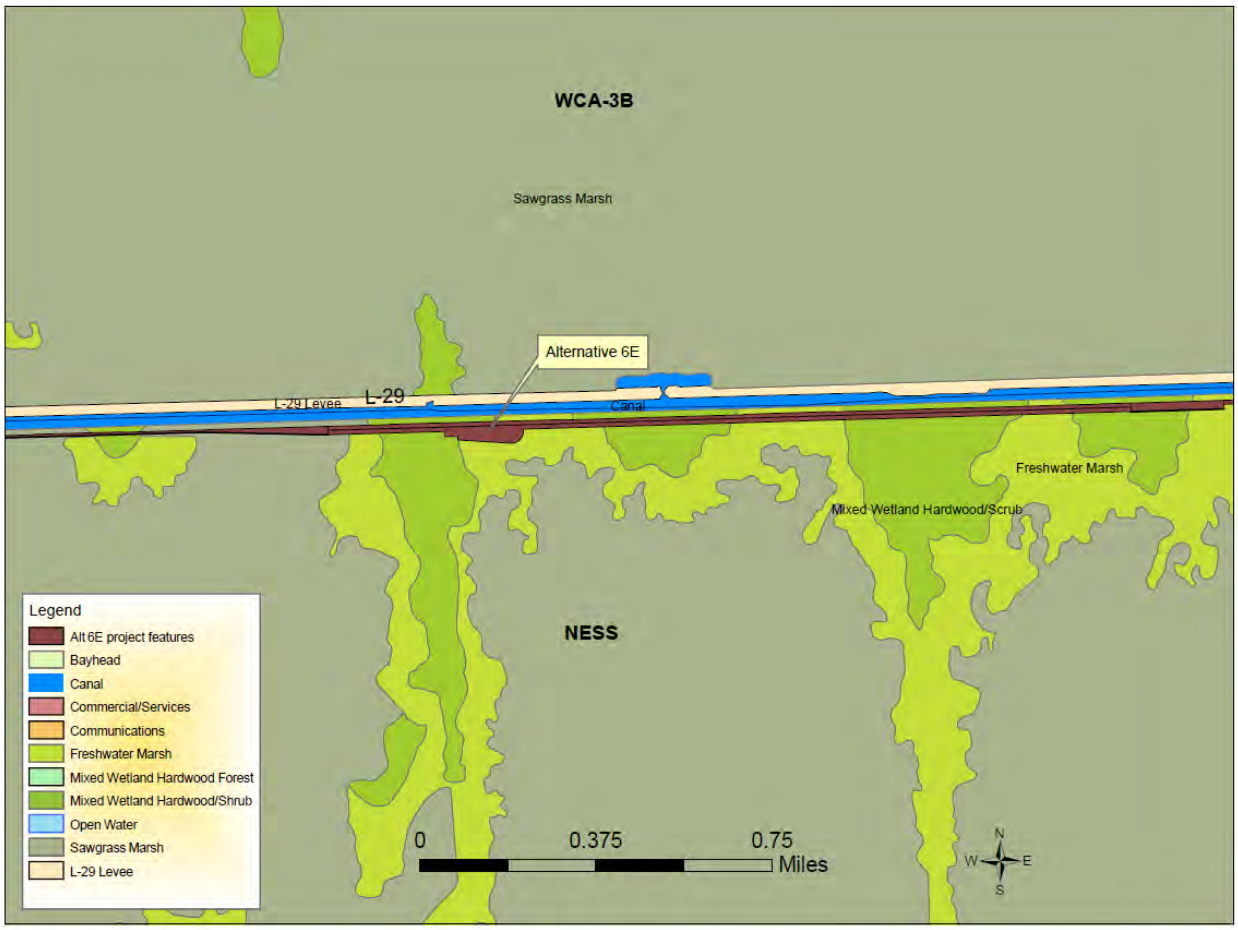

Figure 22 – Vegetation Communities Impacted by the Preferred Alternative (Alternative 6e)

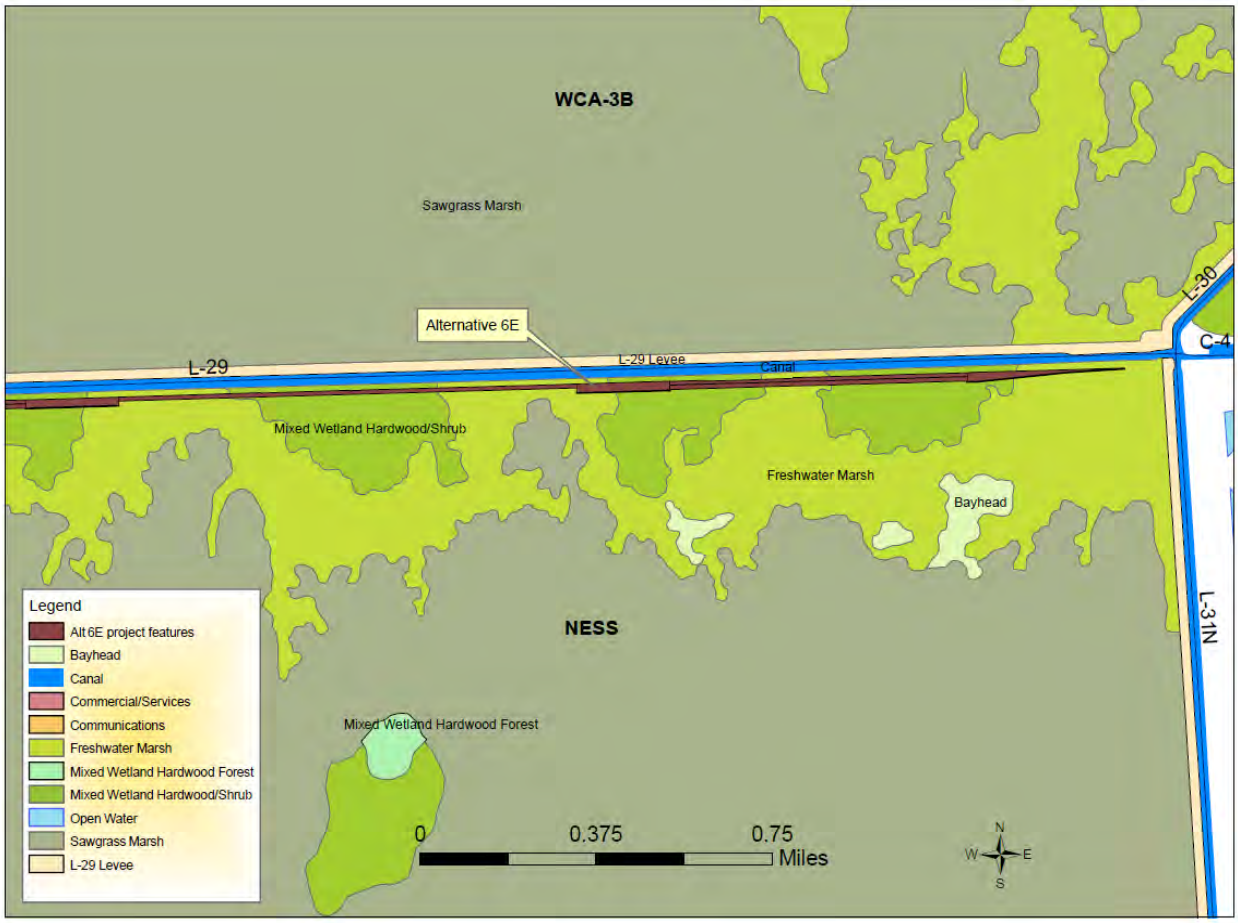

Figure 23 – Vegetation Communities Impacted by the Preferred Alternative (Alternative 6e)

Permanent impacts would result from dredging and filling of wetlands associated with widening of Tamiami Trail to support the new crown elevation, dredging and filling for bridge supports and pilings, and from shading of wetlands associated with the construction of the new bridges. Temporary wetland/surface water impacts are associated with the construction of temporary work spaces so that construction equipment can accesses all areas within the construction zone.

At present an operational plan for manipulation of water levels in the L-29 Canal is being developed, however is not reviewed under this EIS. Full realization of project benefits is dependent upon an operational plan that utilizes the structural capacity of the alternatives. Potential benefits that would occur once an operational plan is defined and executed include enhancement of degraded wetland habitats within the Northeast Shark River Slough system. It is highly likely that implementation of the bridging alternatives in conjunction with the operational plan is self-mitigating, and that permanent and temporary wetland impacts associated with the construction of the proposed project would be offset by the enhancement to wetlands attributed to operation of the completed Tamiami Trail Modification: Next Steps project. However, long-term effects to wetlands resulting from operations remain unknown since an operational plan has not yet been developed for this project alternative. Since there is uncertainty as to the degree future benefits associated with the operation of the project, mitigation would be conducted at the Hole-in-the-Donut mitigation site at ENP if anticipated project benefits not offset the project's impacts to wetland value and functions.

Wetland Impact Assessment

A wetlands assessment was conducted for this project to assist in the CBA process. This evaluation was meant to evaluate the permanent effects (both impacts and benefits) to the functional value of wetlands resulting from the construction-related activities of the project. This evaluation did not assess any potential long-term benefits to wetlands that could result from implementation of the project with a future operational plan.

In Florida, wetland impacts are typically assessed through the Florida Department of Environmental Protection's (FDEP) Uniform Wetland Mitigation Assessment Method (UMAM) which has been adopted by the South Florida Water Management District (SFWMD) on February 2, 2004 and, as of August 1, 2005, has also been adopted by the U.S. Army Corps of Engineers (USACE). The UMAM provides a standardized procedure for assessing the functional value provided by wetlands and other surface waters; the amount that those functions are reduced by a proposed impact; and the amount of mitigation necessary to offset that loss in terms of current condition; hydrologic connection; uniqueness; location; fish and wildlife utilization; time lag; and mitigation risk. In the UMAM analysis, "current" indicates the functional value of the assessment area based on existing conditions per the three categories of indicators of wetland function (location and landscape support, water environment and community structure) scored to the extent that they affect the ecological value of the assessment area. Scores per each category range from ten to zero based on reasonable scientific judgment. A score of ten indicates an optimal level whereas a score of zero indicates a severely diminished or negligible level. The "current" score is determined by summing the scores for each of the indicators and dividing that value by 30 to yield a number between zero and one. The "current" assessment score is calculated twice, providing a functional assessment score without construction (existing conditions) and a functional assessment score with construction (proposed conditions). The "delta" indicates the functional value difference between the existing conditions (without construction) and the proposed conditions (with construction). For example, a negative delta would indicate that a loss in functional value would occur with construction. "Functional Loss" indicates the total calculated loss based on the size of the wetland being impacted and the loss in functional value that would occur (impact area x "Delta").

A UMAM-type tabletop analysis was performed to assess the effects to the functional value of wetlands. With this method, the wetland functional value is scored both prior to implementation of the project and after the project. This method takes into account the value of the landscape, the hydrological characteristics of the area, and the vegetation community composition. Since an official UMAM has not yet been conducted for this project, average UMAM scores that were completed for another project, the Tamiami Trail Pilot Spreader Swales project, within the project area, were used for this analysis. Scores for all vegetated areas prior to project implementation were 18.5/30. Scores for vegetated areas that will be located in the bridging footprints were scored 11/30 after project implementation to account for the functional loss of wetland value to these areas. Areas within road raising, roads and bridging approaches were scored as a 0/30 following project implementation. For areas that were previously road that would be converted to wetlands, these areas were scored 0/30 (Upland conditions) prior to project implementation and 11/30 following project implementation.

For this analysis, the Geographic Information Systems (GIS) layers depicting the project construction features were intersected with the FLUCCS (2005) layer to estimate the amount of permanent effects to wetlands. This acreage was then multiplied by the average UMAM score to assess the effects to the functional value of the wetlands prior to project implementation. The scores were then summed. Next, the effects to wetlands were assessed in the post project implementation conditions. These scores were then summed. The scores were then combined to assess the overall effects to wetlands both prior to and following project implementation. ***Table 7*** below shows the results of the UMAM-type analysis prepared for this project. The "UMAM" score below was calculated per the following equation:

Permanent wetland effects = [UMAM score (after project) x wetland acreage] -

[UMAM score (before project) x wetland acreage)]

Table 7 – Estimated Wetland UMAM Scores

Alternative	Total Bridge Length (miles)	UMAM Score
No-Action	1.0	-42.1
1	3.2	-566.4
2a	4.3	-485.9
4	2.0	-571.6
5	2.5	-550.7
6e	6.5	-98.0

Note: The least negative number represents the least amount of permanent wetland impacts. The LRR one-mile bridge is included within the UMAM score for each of the respective action alternatives.

A full UMAM evaluation of all project wetlands will be undertaken prior to permitting of project wetland impacts.

Avoidance, Minimization, and Mitigation

To minimize wetland resource impacts, BMP's would be implemented during construction. These practices would include employment of staked silt fences and turbidity barriers. Silt fences would be employed prior to commencement of construction around the outer perimeter of each work zone to minimize the potential for impacts to adjacent undisturbed wetlands.

Turbidity barriers would be employed in canals and deep water sites prior to commencement of construction at a sufficient distance from the work zone to create a temporary mixing zone upstream and downstream of the project area to allow for settling of any turbidity generated during construction. Because the project is located in a Outstanding Florida Water (OFW) which has restrictive water quality requirements including no degradation of water quality, all turbidity barriers would remain in place and be inspected daily throughout the construction phase of the project. Additionally, a turbidity monitoring plan would be employed during construction. If monitoring reveals that turbidity levels exceed the standards, construction activities will be immediately halted and shall not resume until corrective actions are employed (e.g. the use of additional turbidity barriers, waiting for rain events to pass, modifications of equipment, etc.). The turbidity barriers and silt fence would be removed at the work areas once turbidity has subsided and all exposed soils are stabilized upon completion of construction.

A water delivery operational plan has not yet been developed to be implemented with the TTM: Next Steps preferred alternative. Full realization of TTM: Next Steps project benefits are dependent upon an operational plan that utilizes the structural capacity of the alternatives. Potential benefits that would occur once an operational plan is defined and executed include enhancement of several thousand acres of degraded wetland habitats within Shark River Slough, ENP. It is anticipated that permanent and temporary wetland impacts associated with the construction of the preferred alternative will be offset by the overall benefits to wetlands upon implementation of the Preferred Alternative in conjunction with future Everglades restoration projects such as the CERP and the MWD.

Although the Preferred Alternative 6e has the largest acreage of wetland impacts of all action alternatives, it also has the most on-site acres of wetlands restored from removal of the existing roadway. Road removal associated with the preferred bridging option will allow for approximately 41.9 acres of on-site wetland restoration. Once the bridges are constructed, the roadway would be removed and the former roadbed scraped down to wetland grade and allowed to re-vegetate naturally. Other wetlands temporarily impacted from construction activities would be re-graded and re-planted as needed.

However, long-term effects to wetlands from hydrological conditions are uncertain because an operational plan has not yet been developed for any of the project alternatives. Because there is uncertainty as to the degree of future benefits associated with the operation of the project, a mitigation plan will be implemented should anticipated project benefits not offset the project's impacts to wetlands. Long-term hydrological and ecological monitoring programs already established in Shark River Slough, ENP include hydroperiod and hydropattern monitoring, wading bird Systematic Reconnaissance Flight (SRF) Surveys, foraging fish monitoring, and vegetation transect monitoring. TTM: Next Steps project effects will be evaluated based on data collected from the long-term hydrological and ecological monitoring programs following project implementation. Anticipated benefits from implementation of the project would include improved hydroperiods and hydropatterns, increased wading bird productivity, an increase in the fish foraging base, and plant communities more characteristic of a ridge and slough habitat.

If project benefits are determined not to outweigh temporary and permanent impacts to wetlands, mitigation for all temporary and permanent wetland losses would be required to ensure a "no-net loss of wetlands" as required per Director's Order #77-1: Wetland Protection (2002), Procedural Manual #77-1 (2008), and NPS Management Policies (2006). The estimated mitigation ratio area would be 1:1 for temporary wetland impacts (***Table 6***) and 2:1 for permanent wetland impacts (***Table 6***). Mitigation at the Hole-in-the-Donut site would consist of wetland restoration by removing exotic vegetation and scraping down soils of former farmland to wetland grade and allowing natural re-vegetation of freshwater marsh communities. The Hole-in-the-Donut is a permitted and approved wetlands mitigation site by the USACE and the FDEP.

Park scientists continually monitor the restoration progress at the Hole-in-the-Donut site. Based on the results of the more than 10 year monitoring program, more than 4,000 acres of pine rockland habitat has been restored and the exotic Brazilian pepper has been eradicated in these restoration sites.

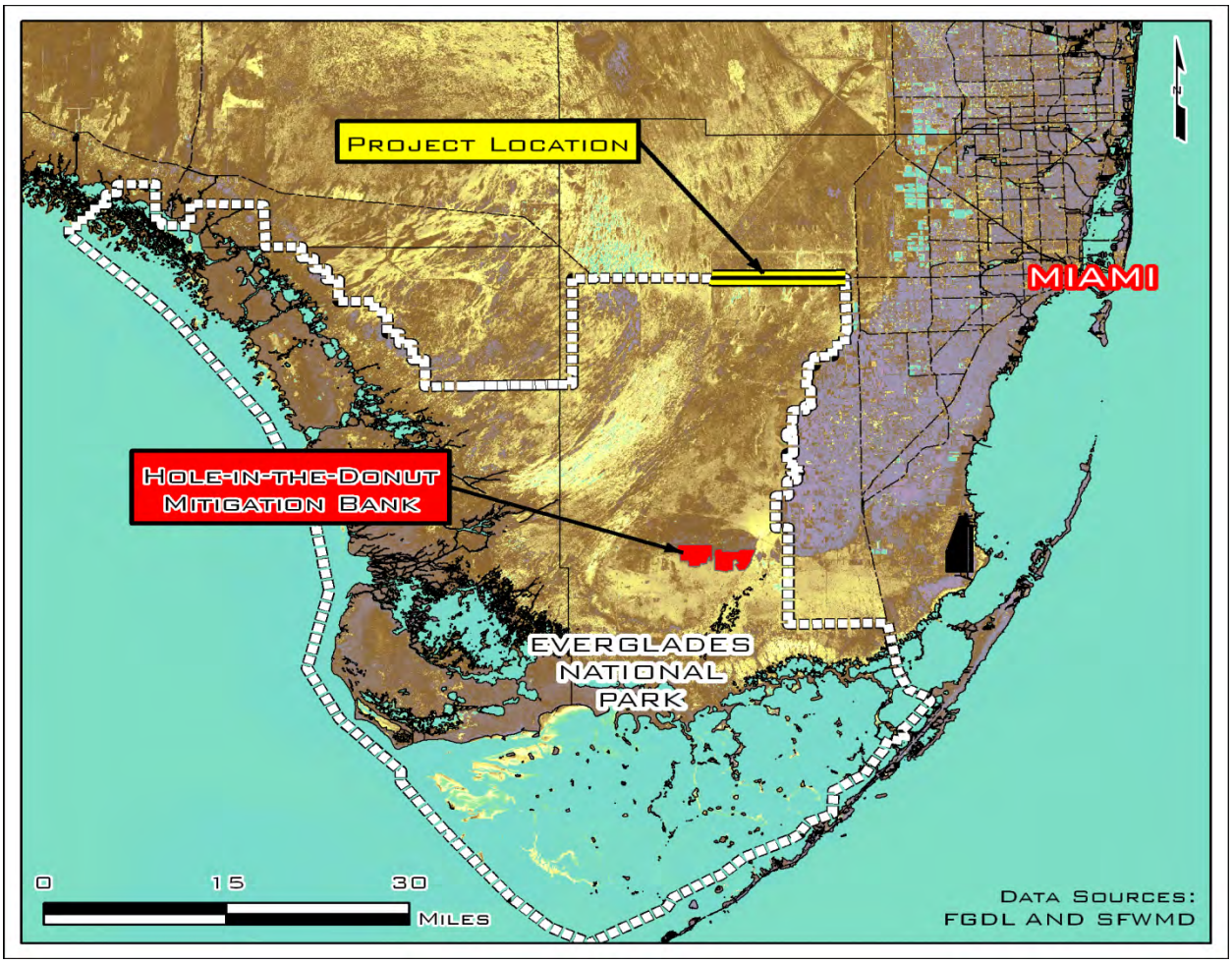

Figure 24 – Hole-In-The-Donut Location Map

9.0 JUSTIFICATION FOR USE OF WETLANDS

There are no practicable non-wetland alternatives for the construction component of the proposed action (Preferred Alternative). The purpose of the project is to construct bridges along Tamiami Trail provide for conditions to increase and distribute surface water flows into the wetland environments of the Northeast Shark River Slough and ENP once an operation plan is implemented. The areas adjacent to the roadway, and the park lands to the south, are all designated wetlands. Alternative, non-wetland locations would not meet the project's goals and objectives. The preferred alternative provides the longest length of bridging which in turn provides the most capacity for water flows to the Northeast Shark River Slough and ENP and the largest amount of ecological connectivity of all the action alternatives.

10.0 COMPLIANCE

Clean Water Act Section 404

The proposed actions impact waters of the United States as defined by the Clean Water Act and are therefore subject to review by the U.S. Army Corps of Engineers. The Clean Water Act Section 404 regulates the discharge of dredged or fill material into waters of the United States. Before moving forward with this project, a Section 404 permit will be obtained.

Coastal Zone Management Act

The proposed actions impact coastal resources as defined by the Coastal Zone Management Act (CZMA) (16 U.S.C. §§1451 et. seq.) and are therefore subject to review by the Florida Department of Environmental Protection under the Florida Coastal Management Program (FCMP), the State of Florida's federally approved management program. The State of Florida's coastal zone includes the area encompassed by the state's 67 counties and territorial seas. Therefore, federal actions occurring throughout the state are reviewed by the State for consistency with the FCMP. However the State has limited its federal consistency review of federally licensed and permitted activities to the federal licenses or permits specified in Section 380.23(3)(c), Florida Statutes. The State's consistency review for this project was performed as part of the Draft EIS for this project. The Florida State Clearinghouse letter dated August 2, 2010, provided the following statement of consistency with the FCMP: "Based on the information contained in the Draft EIS and enclosed state agency comments, the state has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activity's compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process under Section 373.428, *Florida Statutes*."

11.0 CONCLUSION

The NPS has concluded that the plan, as outlined above, and in detail in the Tamiami Trail Modifications: Next Steps EIS, would help to restore more natural water flow to Everglades National Park and Florida Bay for the purpose of restoring habitat within the Park and the potential ecological connectivity between the Park and Water Conservation Area 3. Hydrologic analyses show that the existing roadbed and culverts beneath it impede natural flow, quantify, timing, and distribution. This project will remove a major physical impediment to surface water flows reaching the Northeast Shark River Slough.

The implementation of the Preferred Alternative in conjunction with the implementation of a future operational plan is anticipated to have downstream benefits to wetlands in Shark River Slough, ENP that would compensate for the loss of wetland values and function within the project footprint and thus would meet the NPS no-net wetland loss policy. If implementation of the operational plan does not have the anticipated benefits to downstream wetlands, wetland acreage and functional loss would be compensated for by performing mitigation at the Hole-in-the Donut mitigation site. Mitigation would be performed to the level as to meet the no-net wetland loss policy of the NPS. The implementation of the Preferred Alternative would result in moderate, adverse, short-term, localized effects to wetlands associated with construction of temporary work areas. Additionally, implementation of the action alternatives would result in moderate, adverse, long-term, localized effects to wetlands associated with permanent filling of

wetlands in conjunction with raising the crown of Tamiami Trail and construction of bridges. Potential benefits that would occur once an operational plan is defined and executed include enhancement of several thousand acres of degraded wetland habitats within the Northeast Shark River Slough system that would improve water storage, nutrient cycling, and wildlife habitat functions.

The NPS finds that the proposed action (preferred Alternative) is consistent with the service-wide no net loss of wetland policy and is acceptable under Executive Order 11990 for the protection of wetlands.

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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