Appendix C
Wetlands Statement of Findings

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

FEBUARY 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

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 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."

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 National Park Service (NPS) is the lead agency for preparation of this Statement of Findings.

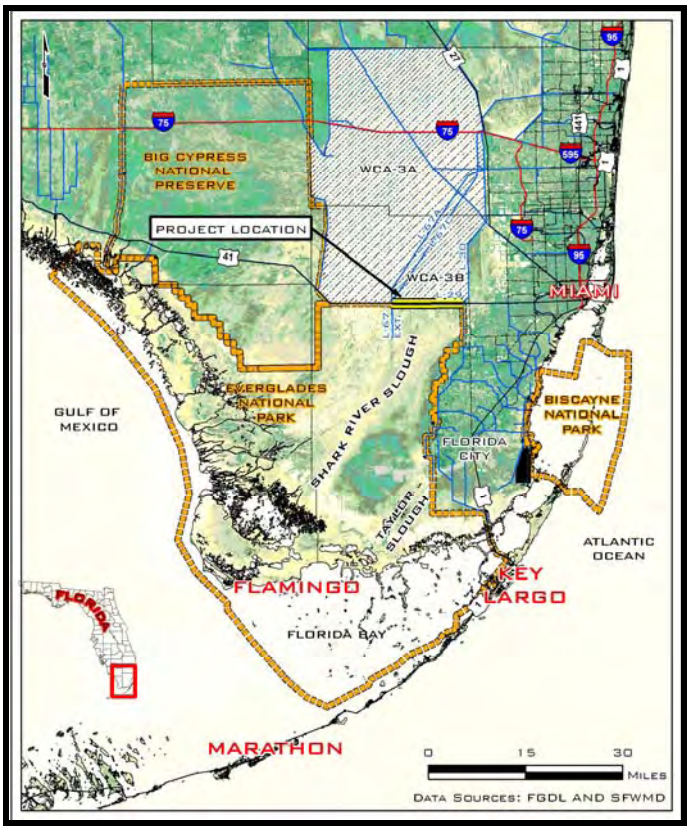

Figure 1 – General Project Location Map

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 Everglades National Park 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 Everglades National Park. With this addition, Everglades National Park 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 Everglades National Park 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 and, for the most part, avoids agricultural land. In 1987, the Ramsar Convention designated Everglades National Park as a Wetland of International Importance (USACE, 2005).

The majority of the land in Everglades National Park is classified as wetland habitat, an integral component of the Everglades National Park 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 filled in with 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 greater Everglades ecosystem include a mosaic of vegetation types, including tree-islands, mangrove forests, cypress swamps, marl prairies, sawgrass marshes, and sloughs that extend from the Kissimmee River basin to Florida Bay.

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. The single most distinctive hydrologic feature of the historical ecosystem was the uninterrupted slow flow of shallow water from the sawgrass plains south of Lake Okeechobee through a rich mosaic of these wetlands to the ocean (Florida Bay/Gulf of Mexico). 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). Eastern portions of Everglades National Park are often too dry and prone to fire, whereas western portions of the park experience extended periods of high water and water ponds in the WCAs north of the Park. The altered hydrologic system contributed to a decline in the functional value of the wetland systems in the greater Everglades system. 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), scheduled for higher water levels, serves as 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 is almost 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 Everglades National Park. 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). The project area, which encompasses a portion of Northeast Shark River Slough, is largely devoid of the historical flows. Without benefit of natural surface water flows from the north and largely dependent on the rainfall within this portion of the basin, the area is plagued with altered hydrology. Persistent drought and fire 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 from natural conditions. It is estimated that approximately 250,000 acres of the Park are infested with exotic species (SFERTF, 2008). Exotic plant infestations in Everglades National Park 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 Everglades National Park 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 to the north followed by the WCA-3B. These wetland systems are hydrologically connected via a series of 19 culverts beneath the roadway. The culvert opening size and the level of water in the L-29 Canal affect the ability to move water across the Tamiami Trail. The 19 sets of drainage culverts (see ***Figure 2***) 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 Everglades National Park.

Figure 2 – One of 19 Sets of Existing Culverts, Looking South from L-29 Levee

Figure 3 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).

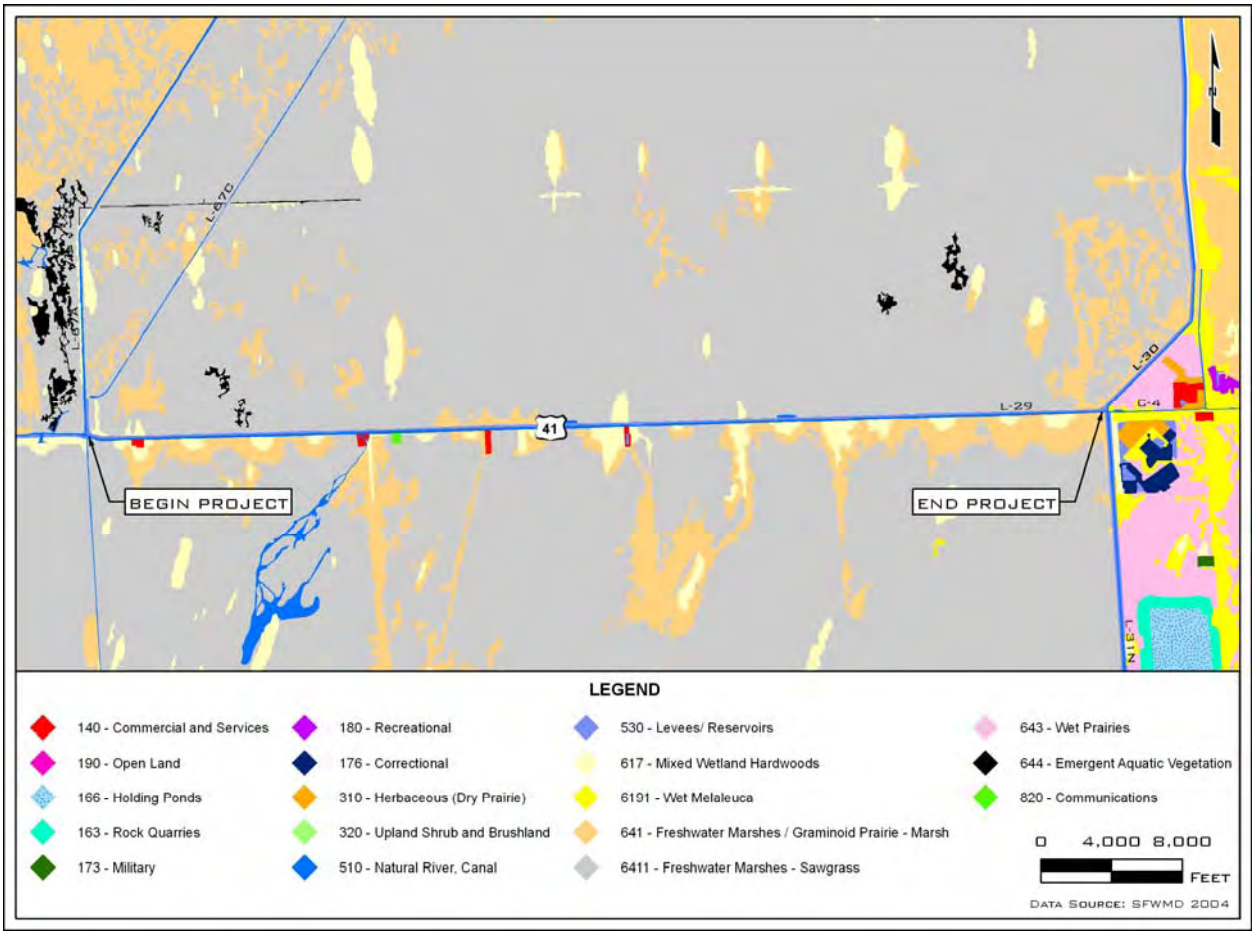

Figure 3 – Approximate limits and classifications of wetlands/surface waters along the project corridor

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 (FLUCFCS – 610, 618, 6411, 6412, 6417,)

USFWS – PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded), PSS3/1C (Palustrine, Scrub-Shrub, Broad-Leaved Evergreen/Broad-Leaved Deciduous, Seasonally Flooded), PEM1F (Palustrine, Emergent, Persistent, Semipermanently Flooded), PSS1/EM1F (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/Emergent, Persistent, Semipermanently Flooded), PSS3C (*Palustrine, Scrub-Shrub, Broad-Leaved Evergreen, Seasonally Flooded),*

Vegetation within the immediate project area has been impacted by human disturbances such as the Tamiami Trail roadbed and culvert construction/maintenance activities 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 4***). These vegetation halos appear to have become exacerbated over time (have become larger 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.

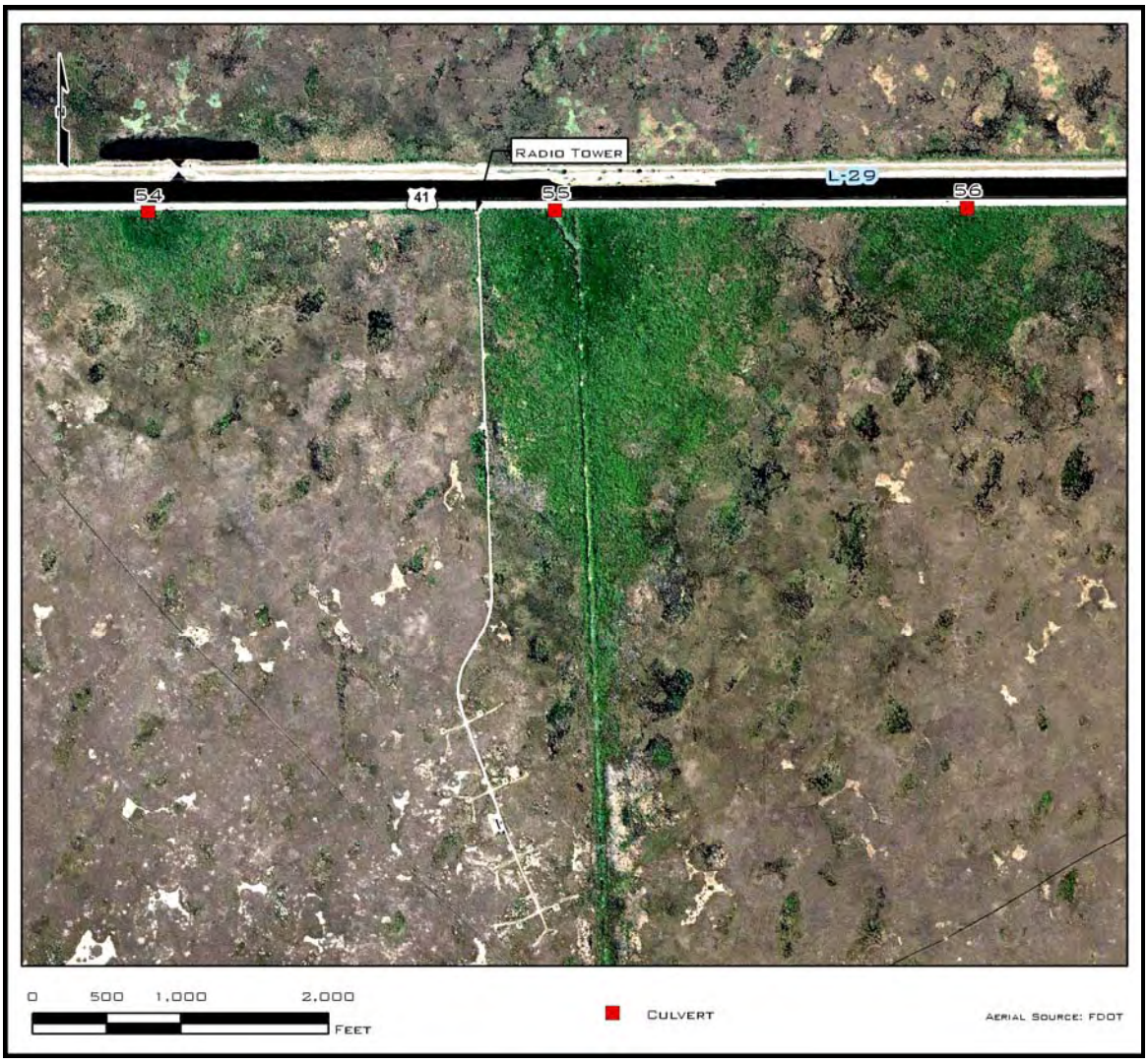

Figure 4 – Vegetation Halo South of Tamiami Trail at Culvert

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 (*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 5***). 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 5 – 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, wax myrtle, myrsine, giant leather fern, and Peruvian primrosewillow (***Figure 6***).

Figure 6 – 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 prairie/marsh community typical of Northeast Shark River Slough (the northeastern portion of the greater Shark River Slough) (***Figure 7***). Historically, Shark River Slough was a 30-mile-wide expanse of relatively shallow 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, 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 hairawn muhly (*Muhlenbergia capillaris*) dominate, 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 7 – 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 prairie/marsh, 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 slough consists of a mosaic of mixed-species patches of several more or less distinct types including sawgrass, hairawn muhly, spikerush (*Eleocharis* spp.), bayheads, and cattails, interwoven by monotypic stands of sawgrass, which in places exceeds two meters in height. The boundaries between

these units are generally abrupt and are controlled by topography, hydrology, soil depth, 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 lack 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 Greater Everglades, less subject to drydown events (Stober, 2001). Paleoecological seed data indicates that native ENP slough communities were once dominated by white waterlily and banana lily 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).

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*,* spikerush, and beakrush *(Rhynchospora* spp.*)* 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, it has been hypothesized that flow volumes in the pre-drainage ridge and slough system were largely responsible for maintaining the sharply discreet community and elevation differences between the ridges and sloughs (Sklar et al., 2000). The sloughs, deeper than the ridges, were the primary habitat for aquatic animals during dry periods, and were the most important wading bird foraging habitats in the Everglades. 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. Substantial increases in levels of total phosphorus in water and soil have converted both ridge and slough communities into extensive beds of cattails (Davis et al., 1994; Sklar et al., 2000). 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).

L-29 Canal – North of Tamiami Trail (FLUCFCS – 510)

USFWS – R2UBHx (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Excavated)

The L-29 Canal exists along the north side of the entire length of the Tamiami Trail project corridor (***Figure 8***). 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 sproradically 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 8 – L-29 Canal Facing West along the Tamiami Trail Project Corridor

Water Conservation Area 3B (FLUCFCS – 610, 618, 6411, 6412, 6417)

USFWS – PEM1Fh (Palustrine, Emergent, Persistent, Semipermanently Flooded, Diked/Impounded), PEM1Ch (Palustrine, Emergent, Persistent, Seasonally Flooded, Diked/Impounded), PSS1/EM1Fh (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/Emergent, Persistent, Semipermanently Flooded, Diked/Impounded), PSS3/1Ch (Palustrine, Scrub-Shrub, Broad-Leaved Evergreen/Broad-Leaved Deciduous, Seasonally Flooded, Diked/Impounded)

WCA-3B, located to the north of the L-29 Levee along the entire length of the project corridor, is managed by USFWS as the Francis S. Taylor Wildlife Management Area. The area is predominantly a region composed of sawgrass ridges, deepwater sloughs, cattail marshes, wet prairies, and scattered tree/shrub islands and has historically been used to assist in the management of water levels and flow quantities (***Figure 9***). A cypress forest fringes its western border extending south to Tamiami Trail. The area provides nesting and foraging habitat for many terrestrial and aquatic species. The tree/shrub islands are composed of tropical hardwood species rising slightly above the elevation of the sawgrass ridges. Although seemingly small, the 1.5 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. Smaller, circular tree islands likely formed on floating “batteries” of peat that were colonized by hardwoods. 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 9 – View of WCA 3B from the L-29 Levee (Facing North)

4.0 PURPOSE OF AND NEED FOR ACTION AND PROJECT OBJECTIVES

As mentioned in the introduction the Mod Waters project seeks to restore more natural fresh water flows to Everglades National Park in an effort to restore wetland habitats within the park. The Tamiami Trail project is a major component of the Mod Waters project and is intended to remove additional impediments to flow into the park and the Northeast Shark River Slough.

Purpose of the Project

“Purpose” is an overarching statement of what the project must do to be considered a success. 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

"Need for Action" describes why action is required. It summarizes the most important points of the planning issues and provides the reasons the project is needed at this time.

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."

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 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 (LRR) and consists of a 1-mile eastern bridge and elevation of the remaining roadway to allow for 8.5 feet stages in the L-29 Canal.

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 Jefferson Pilot Radio Tower; a 0.45-mile (Bridge B1) located between the Jefferson Pilot 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.. The bridges would be constructed approximately 50 feet south of the centerline of the existing roadway to maintain motor vehicle traffic during bridge construction... The remaining highway embankment would be reconstructed to raise the crown elevation to 12.3 feet, the minimum required based on the design high water of 9.7 feet and the roadway cross section geometry.

Alternative 2a

The bridge configurations include: (1) a 0.56 mile bridge located between the Osceola Camp and the Jefferson Pilot Radio Tower, (2) a 0.45 mile bridge located between the Jefferson Pilot 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 Radio One Tower, and (6) a 0.53 bridge located between the Radio One Tower and the existing one-mile bridge and , and (4) 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 centerline of the existing roadway to maintain motor vehicle traffic during bridge construction.. The remaining highway embankment would be reconstructed to raise the crown elevation to 12.3 feet, the minimum required based on the design high water of 9.7 feet and the roadway cross section geometry

Alternative 4

This alternative includes 2 bridges: A1 and B1 (for a total of 1.0 miles), as described for Alternative 1. The bridges would be constructed approximately 50 feet south of the centerline of the existing roadway to maintain motor vehicle traffic during bridge construction.

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 be constructed approximately 50 feet south of the centerline of the existing roadway to maintain motor vehicle traffic during bridge construction.

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 1.8mile 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

6.0 WETLAND FUNCTIONS OF THE PROJECT AREA

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 a characteristic plant community, and providing suitable habitat for native fish and wildlife. 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.

Palustrine emergent wetlands downstream of the culvert openings provide water storage, support for biogeochemical processes, and fish and wildlife habitat. The water storage function has been degraded by the damming effect of the Tamiami Trail and altered sheetflow 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 sawgrass community by supporting growth of cattails. This species is common downstream of the culvert openings, but would not occur in a healthy sawgrass community. Thus, the sawgrass habitat has been degraded from natural conditions, but is still home to a variety of fishes, birds, reptiles, amphibians, and invertebrates.

The palustrine forested and open water wetlands in the project area provide water storage, a forest vegetation community, support for biogeochemical processes, and fish and wildlife habitat.

The water storage function has been degraded through the damming effect of the Tamiami Trail and altered sheetflow timing and distribution. The vegetation community is degraded by invasion of Brazilian pepper (*Schinus terebinthifolius*). This invasive exotic species makes up five to 30 percent of forest cover in the area.

Forested and open water habitats 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.

The Northeast Shark River Slough is a main water flow-way for the central and southern Everglades. Although this area has been degraded and its size reduced by development and regional water management activities, the dominant vegetation types are the palustrine emergent/open water (sawgrass and cattails) and palustrine scrub/shrub/forested (willow and pond apple) (Lodge 2005).

7.0 SPECIAL STATUS SPECIES

Six federally-listed animal species have the potential to occur in the vicinity of the project area. These species, and their status, are outlined in the table below. [Note: The American alligator (*Alligator mississippiensis*), Federally-listed due to similarity of appearance, is not discussed in this section due to its listing solely from similarity of appearance].

Table 1 – Federally-Listed Threatened and Endangered Species with Potential to Occur in the Tamiami Trail Project Area

Common Name	Scientific Name	Federal Status	Designated Critical Habitat in Park	Effect Determination	Reason
Mammals					
Florida panther	*Puma concolor coryi*	Endangered	No Federally designated critical habitat	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.
West Indian manatee	*Trichechus manatus*	Endangered	Portions of Everglades National Park are within federally designated critical habitat. The Tamiami Trail project area is not within critical habitat.	May affect, but is not likely to adversely affect	No manatees observed in the project area for 20 years. No work in the L-29 Canal.
Reptiles					
Snail kite	*Rostrhamus sociabilis plumbeus*	Endangered	Portions of Everglades National Park are within designated critical habitat, including the Tamiami Trail project area	May affect, but is not likely to adversely affect	No snail kites or apple snails observed within the project area. Monitoring of nest construction and usage. Implementation of USFWS draft snail kite management plan.
Eastern indigo snake	*Drymarchon corais couperi*	Threatened	No Federally designated critical habitat	May affect, but is not likely to adversely affect	No sightings within project area. Implement standard construction precautions.
Birds					
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	Endangered	No Federally designated critical habitat	May affect, but is not likely to adversely affect	No Critical Habitat within project area. Nearest nesting site 10 miles south of project area.

Common Name	Scientific Name	Federal Status	Designated Critical Habitat in Park	Effect Determination	Reason
Wood stork	*Mycteria americana*	Endangered	No Federally designated critical habitat	May affect, and is likely adversely affect	Temporary nesting colony impacts; temporary and permanent management zone impacts. Implementation of USFWS approved construction guidelines.

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 10*** for a map depicting the Primary, Secondary, and Dispersal zones for the Florida Panther, as designated by the USFWS.

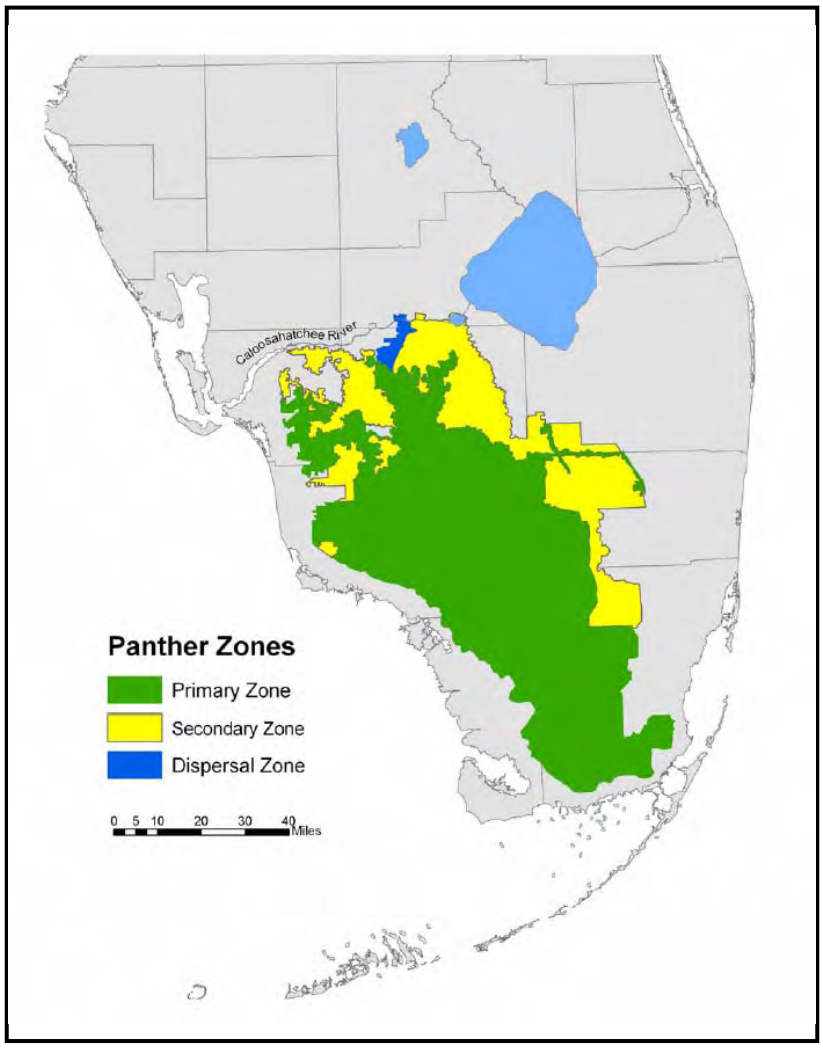

Figure 10 – USFWS Designated Florida Panther Priority Habitat Zones (Kautz et al., 2006)

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 (Everglades National Park), 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. ***Figure 11*** shows panther radio collar telemetry data points collected between 1981 and 2009 in relation to the project area.

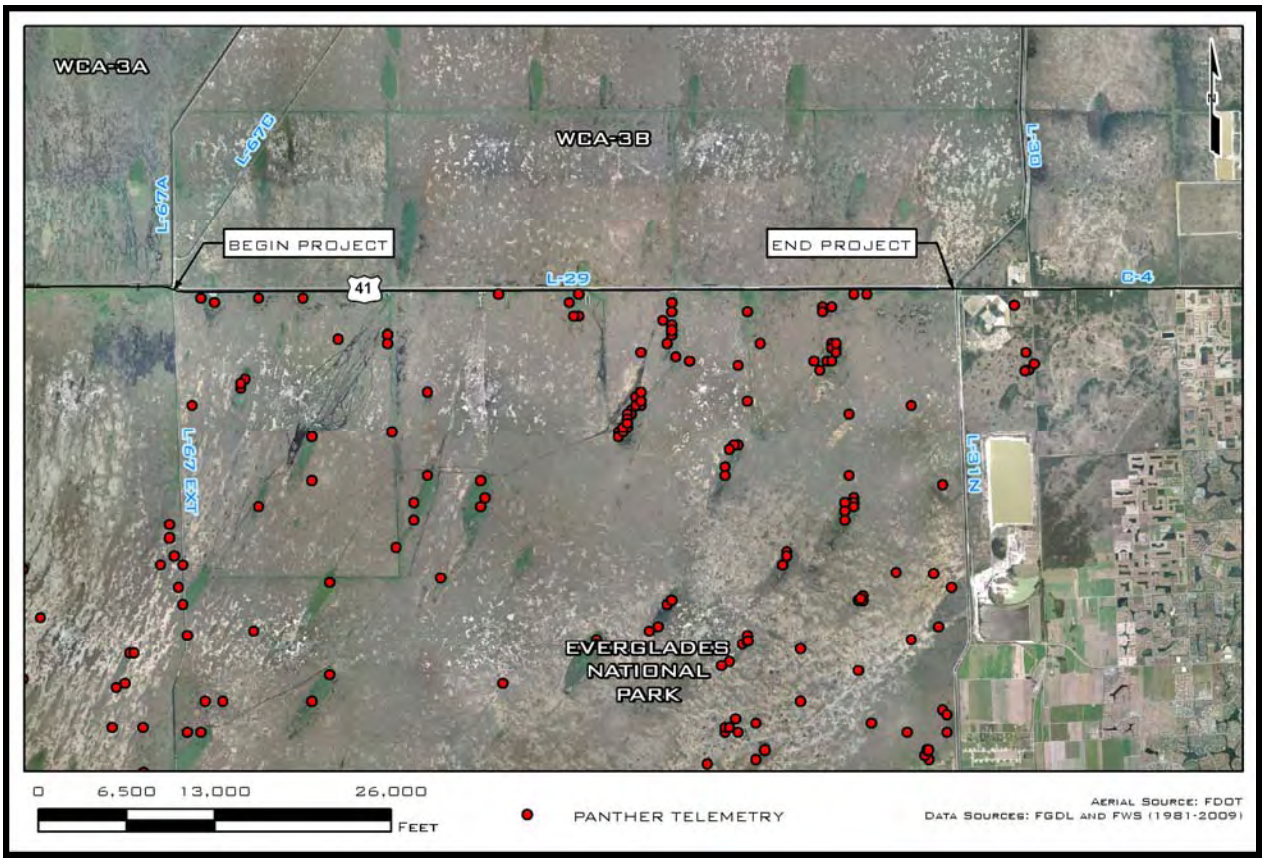

Figure 11 – Florida Panther Radio Collar Telemetry Data Points

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. A linear strip of native and exotic woody vegetation would be removed along the highway for construction of the transition roadways and the bridges. Therefore, because of the impacts to this strip of vegetation formal USFWS consultation under Section 7 of the ESA would be necessary to assess the effects of habitat loss associated with implementation of any of the action alternatives (Alternatives 1 through 6e). However, the USFWS considers this to be low quality potential panther habitat and habitat for panther prey species due to proximity of the highway and the infestation of exotic vegetation.

Beneficial effects to the Florida panther would be realized with the implementation of any of the action alternatives through increased habitat connectivity and reduced habitat fragmentation. Implementation of any of the action alternatives would link primary panther habitat in Northeast Shark River Slough to secondary habitat in WCA-3B via passage underneath bridges. Panther-vehicle collisions on busy roadway such as Tamiami Trail are a significant source of mortality and pose an on-going threat (USFWS, 2008). Since all of the action alternatives include some type and length of bridging which would allow panthers to traverse under Tamiami Trail, this threat of panther-vehicle collisions would be greatly reduced with the implementation of any of the action alternatives.

Due to the lack of recent panther activity within the project area, the small size and poor quality of panther habitat proposed to be impacted, and the increased habitat connectivity provided by

the bridging proposed under any of the action alternatives, additional mitigation for loss of panther habitat is not expected to be required for this project. Project mitigation for loss of wetland habitat in general is addressed in the discussion of wetland impacts and mitigation in Section 4.3.3.3. Additionally, in conjunction with the implementation of any of the action alternatives, all project construction personnel would be provided with environmental training with the intent of reducing impacts on special status species such as the Florida panther.

Therefore, because of the lack of recent panther activity, the small size and poor quality of panther habitat proposed to be impacted, and the 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 is not likely to adversely affect the Florida panther.

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.

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, manatee protection procedures will be followed during construction. There would be no activities that would occur in the canal during construction. Therefore, the implementation of any of the action alternatives may affect, but is not likely to adversely affect the West Indian manatee.

Snail Kite

The snail kite, listed as endangered under the ESA in 1967, is a medium-sized hawk with a wingspan of about 45 inches. The adult males are slate gray with 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 snail kites resemble the females, only they are darker in color and their eyes are brown. Their beaks are slender and very hooked. 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, which requires nearly

continuous flooding of wetlands for greater than one year. Suitable habitats for the 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 cypress, 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 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 snail kite in 2006. According to the USFWS, snail kite nesting does not occur randomly within wetland systems. Instead, there are generally areas within wetlands, where snail kite nesting is concentrated. The density of kite nests, frequency of nesting within each area, and the sizes of these "priority 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 will occur within these areas, though new nesting areas may become active. Per the USFWS *Draft Snail Kite Management Guidelines* (2006), at the end of each nesting season, primary snail kite nesting areas will be delineated based on the current year's nest locations and nesting in the previous 10 years (USFWS, 2006).

The breeding season can vary from year to year depending on rainfall and water levels. Ninety-eight percent of nesting attempts occur from December through July, with 89 percent initiated between January and June. WCA-3A is the largest and most consistently utilized (as measured by numbers of birds observed during annual surveys from 1970 to 1994) of the designated critical habitat for the kites. Snail kites have increasingly moved their nesting activity to areas of higher elevations in WCA-3A over the past two decades, presumably as the traditional nesting vegetation has been degraded by sustained high water levels due to water management practices. Higher water levels have resulted in the conversion of wet prairies (preferred foraging habitat for snail kites) to aquatic sloughs in selected sites in that area, along with losses of interspersed herbaceous and woody species essential for nesting habitat.

Since the mid-1990s, the geographic range of the 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 snail kite reproduction occurred in WCA-3A (Cattau et al, 2009). However, no snail kites were fledged out of WCA-3A in 2001, 2005, 2007, or 2008; only two 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 snail kite nesting but this area no longer constitutes productive breeding grounds (Cattau et al., 2009). Since the loss of the productive snail kite breeding grounds in Lake Okeechobee and WCA-3A, the majority of the 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 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 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 snail kite survival and contribute to overall population declines (Cattau et al, 2009). 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 snail kite nest. These buffer zones will 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 renest, and often renest 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 will 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 will 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).

Figure 12 depicts recent snail kite nesting locations and protection zones in relation to the proposed project area.

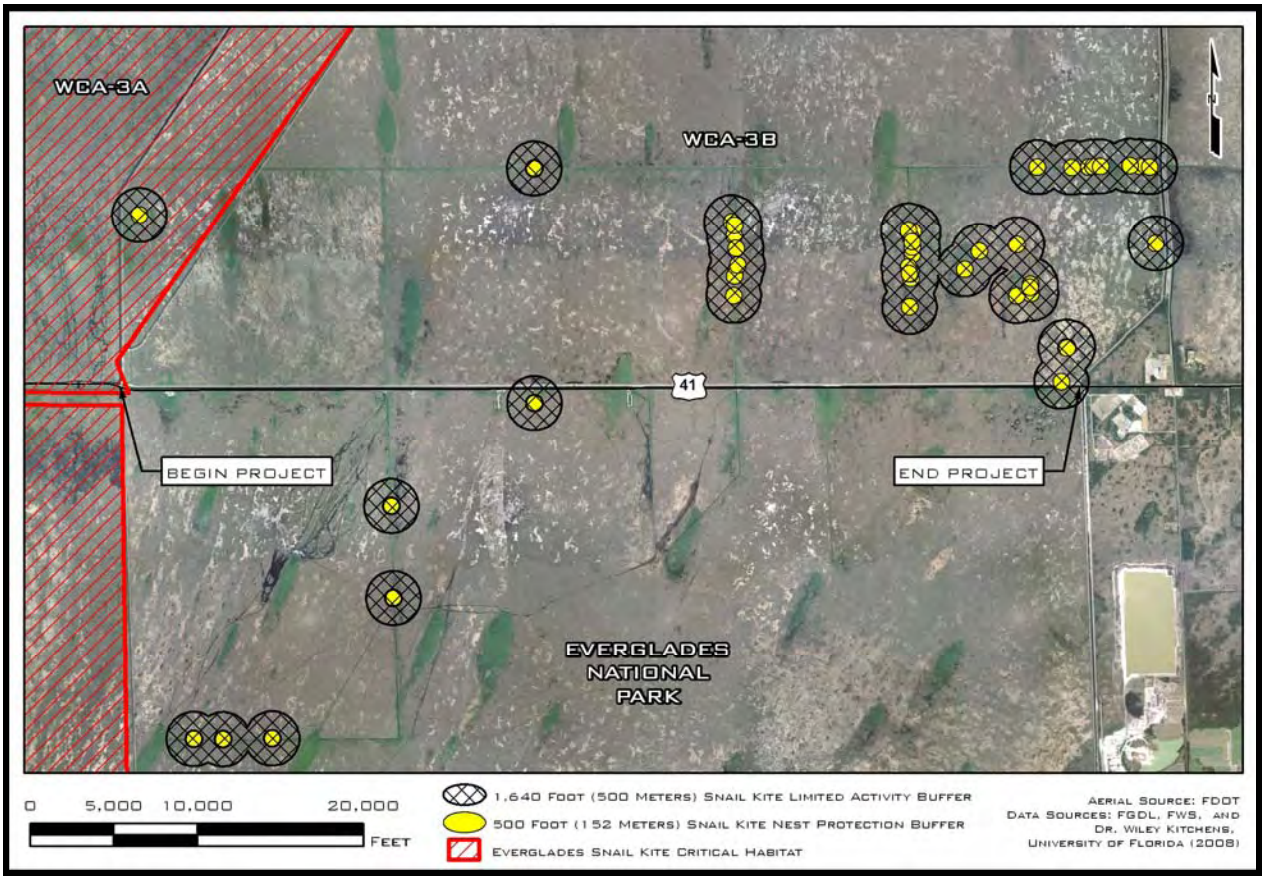

Figure 12 – Snail Kite Nesting Locations and Protection Zones

Based on snail kite nesting data , the proposed project would impact currently designated USFWS snail kite Priority Management Zone habitat, however there will be no impacts to designated snail kite Critical Habitat.

Two nests previously used by snail kites have Priority Management Zones that fall within the project boundary. (refer to ***Figure 12*** above for location of the nests). One nest, located in the western portion of the project area is in close enough proximity to the existing road to have both the Limited Activity Buffer Zone (1,640 feet) and the No-Entry Buffer Zone (500 feet) fall within the project boundary. The second nest, located in the eastern portion of the project area only has the Limited Activity Buffer Zone fall within the project boundary. Snail kites do not utilize these nests every year and these Priority Management Zones would only be in effect should snail kites utilize the nests. There have been no snail kite nests found within the construction footprint. It should be noted that the NPS will actively monitor snail kite nesting during the construction of the project and should the two existing nests be utilized or a new nesting site be found the USFWS snail kite management guidelines will be implemented. Table 2 lists estimated impacts to snail kite Priority Management Zones for each action alternative should both existing nest sites be utilized at the same time.

Table 2 - Impacts to Snail Kite Priority Management Zones

Alternative	Temporary Priority Management Zone Impacts (acres)	Permanent Priority Management Zone Impacts (acres)
1	0.35	1.07
2a	0.35	1.07
4	0.35	1.07
5	0.35	1.07
6e	1.05	2.95

Due to the temporary impacts to snail kite priority management zone habitat short-term, minor, adverse, localized impacts to the snail kite would be expected with implementation of any of the proposed action alternatives should snail kites nest within 1,640 feet of the project area.. However, short-term adverse impacts are expected to be limited to the timeframe of construction and 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 snail kite habitat,long-term, minor, adverse, localized impacts to the snail kite would be expected with implementation of any of the proposed action alternatives. However, during a February 2010 site visit by NPS personnel, no snail kites or apple snails were observed in the proposed project area. Additionally, per surveys conducted by NPS, it is rare to find native apple snail eggs in the location of the Old Tamiami Trail Canal adjacent to the proposed project area (personal communication, Jeffrey Kline, NPS, February 2010). Snail kite activity (nest construction and usage) will be monitored during all stages of construction and the USFWS *Draft Snail Kite Management Guidelines* (2006) will be followed during all phases of project construction. Therefore, the implementation of any of the proposed action alternatives may affect but is not likely to adversely affect the snail kite.

<u>Eastern Indigo Snake</u>

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 and would readily utilize disturbed areas and populated residential areas; however, their preferred habitat is dry pineland 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 generally found in and near hardwood hammocks, and has shown no preference for disturbed sites. Eastern indigo snake protection measures have also established by the USFWS for all construction activities.

This species may be in the project area, although there are no known sightings. Because the indigo snake could potentially be found the area affected by construction activities, *Standard Protection Measures for the Eastern Indigo Snake* will be implemented during construction. The "Standard Construction Precautions for the Eastern Indigo Snake" would be adopted in the project design. 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

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 use 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. The CSSS 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 CSSS 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 CSSS Subpopulation A, the USFWS issued a biological opinion (BO) providing recommendations to the USACE on how to control water levels in nesting habitat. The USACE responded by developing changes in water management operations that are still currently in effect. The goals are to keep subpopulations (particularly Subpopulation A) dry during a portion of the breeding season and to keep habitat for the subpopulations B, C, D, E, and F from excessive drying to prevent unnatural fire frequencies. 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, 2009 CSSS 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).

A Federally endangered species, the Cape Sable seaside sparrow, occupies habitat that is susceptible to alterations in hydroperiods. Excessive discharges from the WCA's can flood sparrow nesting habitat, while lack of freshwater flows can lead to devastating fires that render marsh habitat unusable to the sparrow. As part of the USFWS 1999 BO regarding USACE water management practices, Reasonable and Prudent Alternatives (RPAs) were developed to "preclude jeopardy" to the Cape Sable seaside sparrow. A USFWS BO of November 17, 2006, evaluated additional RPAs and action alternatives for water management actions to avoid jeopardy to the Cape Sable seaside sparrow. All alternatives considered in this EIS would be capable of passing sufficient flow through their respective hydraulic openings to satisfy the RPAs of the 1999 and 2006 BOs for the Cape Sable seaside sparrow. The closest occupied Cape Sable seaside sparrow nest lies ten miles south of the project area. Construction activities would have no effect on this species. There is no designated critical habitat located within the project area, so none would be affected. Because construction and operation of the proposed project will have no direct affect on the Cape Sable seaside sparrow It is concluded that the action alternatives may affect, but are not likely to adversely affect, the Cape Sable seaside sparrow.

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 stork 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 80 miles from nest to feeding areas. These birds eat small fish and probe with their bills for their food in shallow water no more than about 10 inches deep. Highly social, these birds nest in large rookeries and feed in flocks. They are long-lived and first breed at 4 years old. In South Florida, nesting occurs as early as October, with young leaving the nest in February or March. The decline in wood stork populations is attributed mostly to loss of habitat by destruction of wetlands and control of the flows that originally created the 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 is a radius of 18.6 miles from the rookery.

Overall nesting colony trends in ENP have indicated an increasing population size of wood storks since 1985 with peak nesting years occurring in 1994, 2000, 2007, and 2009 (SFWBR 2009) (***Figure 13***). 2009 marked a banner year for wood stork production in south Florida, with the largest nesting success since the predrainage period (SFWBR 2009). There were an estimated 6,452 wood stork nests in south Florida in 2009, constituting a 203% increase over the last decade (SFWBR 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 (SFWBR, 2009).

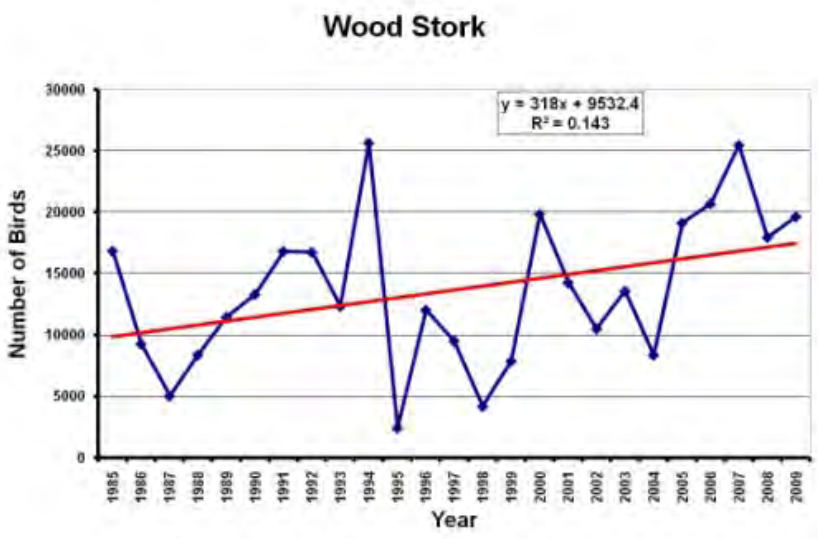

Figure 13 – Wood Stork Nesting Colony Trends in ENP

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 14***). 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.

The USFWS, using the Habitat Management Guidelines for the Wood Stork in the Southeast Region (Guidelines) (Ogden 1990) and based on recent photography during nesting season, have identified primary and secondary restriction zones for the Tamiami Trail East and West rookeries. These zones are designed to protect stork nesting activities and behaviors and place restrictions on certain human activities during the stork nesting season. The primary zone is the most critical area and must be managed according to the guidelines to insure the colony survives. For the West Colony, a core area that contains nesting habitat has been designated by USFWS to have a radius of 385 feet from the center of the colony. The primary zone for the West Colony extends an additional 1,300 feet in all directions from the core area for a radius of 1,585 feet. The USFWS has designated the primary zone for the East Colony as a 1,300-foot radius from the colony center. The secondary zone may be used by wood storks for collecting nesting material and for roosting, loafing, and feeding (especially important for newly fledged young). The secondary zone of the West Colony extends an additional 1,000 feet beyond the primary zone for a total radius of 2,885 feet from the center of the colony. For the Tamiami East Colony, the secondary zone extends 1,200 feet beyond the primary zone for a total radius of 2,500 feet. Approximately 3,700 linear feet of the Tamiami Trail are located within the primary

zone of the Tamiami West Colony; none lies within the primary zone of the East Colony. In addition, approximately 5,000 linear feet of the highway lies within the secondary zones of the colonies. The following guidelines apply to the restriction zones:

- **Primary Zone:** 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. Woodstork activity will be monitored by the NPS through Systematic Reconnaissance Flights (SRF).
- **Secondary 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, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with. The NPS will monitor and determine the active status of wood storks through SRF.
- **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.

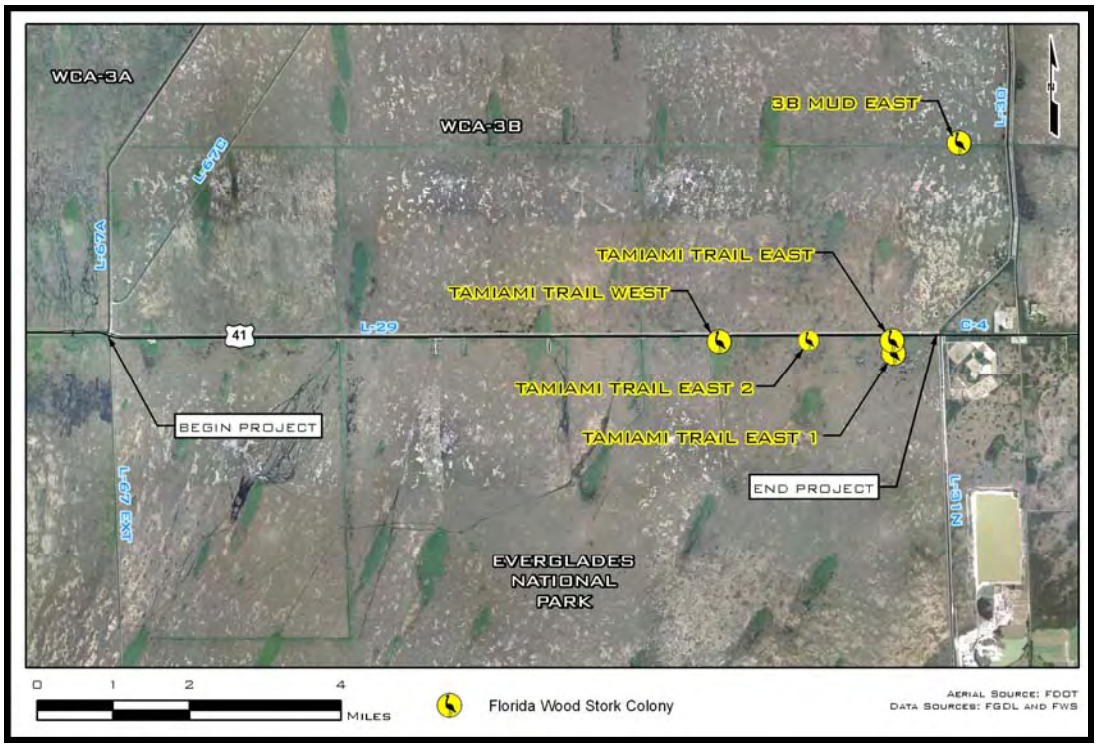

Figure 14 – Wood Stork Rookeries along the Project Corridor

There are three nesting wood stork colonies located in the vicinity of Tamiami Trail: the Tamiami West Colony and the Tamiami East Colony1 and Tamiami East Colonny 2. The USFWS has applied the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Ogden, 1990) to designate primary and secondary management zones for all colonies. The primary zone is the most critical area and must be managed according to recommended guidelines to insure the colony's survival. Restrictions in the secondary zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The USFWS has designated the primary zone for the Tamiami West Colony as the distance of 1,300 feet extended in all directions from the core area of the colony; the secondary zone includes the area between the 1,300 and 2,500 foot radii. The primary zone of the Tamiami East Colony extends 1,000 feet from the center of the colony; the secondary zone is the area between 1,000 feet and 2,000 feet from the colony center. The existing Tamiami Trail runs through about 3,700 feet of the primary zone and 2,050 feet of the secondary zone of the Tamiami West Colony. Approximately 3,000 feet of the highway lies in the secondary zone of the East Colony. Highway construction would occur within these respective zones. All action alternatives (1-6e) would involve construction activities within the secondary management zone of the Tamiami East Colony. Impacts to the Tamiami West Colony include direct temporary impacts to the core area of the colony itself associated with Alternatives 2a and 6e (see ***Table 4***). Temporary and permanent impacts to the primary and secondary zones of the Tamiami West Colony resulting from project construction are also greatest with implementation of Alternatives 2a and 6e.

Table 4 – Impacts to Tamiami Trail Wood Stork Colonies

Tamiami East Colony						
Alternative	**Temporary Nesting Colony Impacts (Acres)**	**Permanent Nesting 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)**
1	0.00	0.00	0.00	0.00	0.73	2.16
2a	0.00	0.00	0.00	0.00	0.73	2.16
4	0.00	0.00	0.00	0.00	0.73	2.16
5	0.00	0.00	0.00	0.00	0.73	2.16
6e	0.00	0.00	0.00	0.00	3.03	4.16
Tamiami West Colony						
Alternative	**Temporary Nesting Colony Impacts (Acres)**	**Permanent Nesting 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)**
1	0.00	0.00	0.84	3.43	1.06	1.44
2a	0.14	0.00	2.69	5.20	1.89	2.33
4	0.00	0.00	0.84	2.53	0.24	0.70
5	0.00	0.00	0.84	2.53	0.24	0.70
6e	0.06	0.00	4.24	4.27	1.99	2.05

Direct impacts within the secondary zones could impact wood stork foraging and loafing habitat, while impacts within the primary zone could impact wood stork nesting and fledging behaviors. Impacts to the core rookery area could reduce the amount of available of nesting habitat and disturb nesting activity. Filling of wetlands within the project area also reduces foraging habitat within the 18.6-mile core foraging area (CFA) for the rookeries.

In order to minimize impact to wood storks the USFWS Habitat Management Guidelines for the Wood Stork in the Southeast Region will be implemented during project construction.

All of the Guidelines, restrictions, and recommendations identified in the original Final FWCA Report (USFWS 2003) for the Tamiami East and West wood stork colonies are valid and still apply. The NPS would manage construction activities within the protection zones according to the USFWS "Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Services Consultation Area." Because activities of all action alternatives will take place within the primary zone of the Tamiami West Colony and the secondary zone of the Tamiami East Colony it is concluded that the proposed project may adversely affect the wood stork.

8.0 WETLAND IMPACTS OF THE PREFERRED ALTERNATIVE

The Preferred Alternative will involve the construction of 4 bridges for a total of 5.5 miles of bridging (see ***Figure 15***) and the remaining highway raised to an elevation of 12.3 feet. Under the Preferred Alternative the bridges would create a conveyance opening under Tamiami Trail by removing the sections of the existing highway and embankment under the bridges. The bridges would be constructed over the openings to replace the removed sections of road and maintain motor vehicle traffic. Since the bridges would be constructed to the south of the existing roadway, approximately 50.4 acres of roadway can be removed and restored to wetlands. The remaining highway embankment would be reconstructed to raise the crown elevation to 12.3 feet, the minimum required based on the design high water of 9.7 feet and the roadway cross section geometry. 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. Unavoidable direct impacts (permanent and temporary) were quantified based on the aerial extent of wetlands/surface waters within the proposed construction limits. The resulting quantities are depicted in ***Table 5***:

Figure 15 – Preferred Alternative

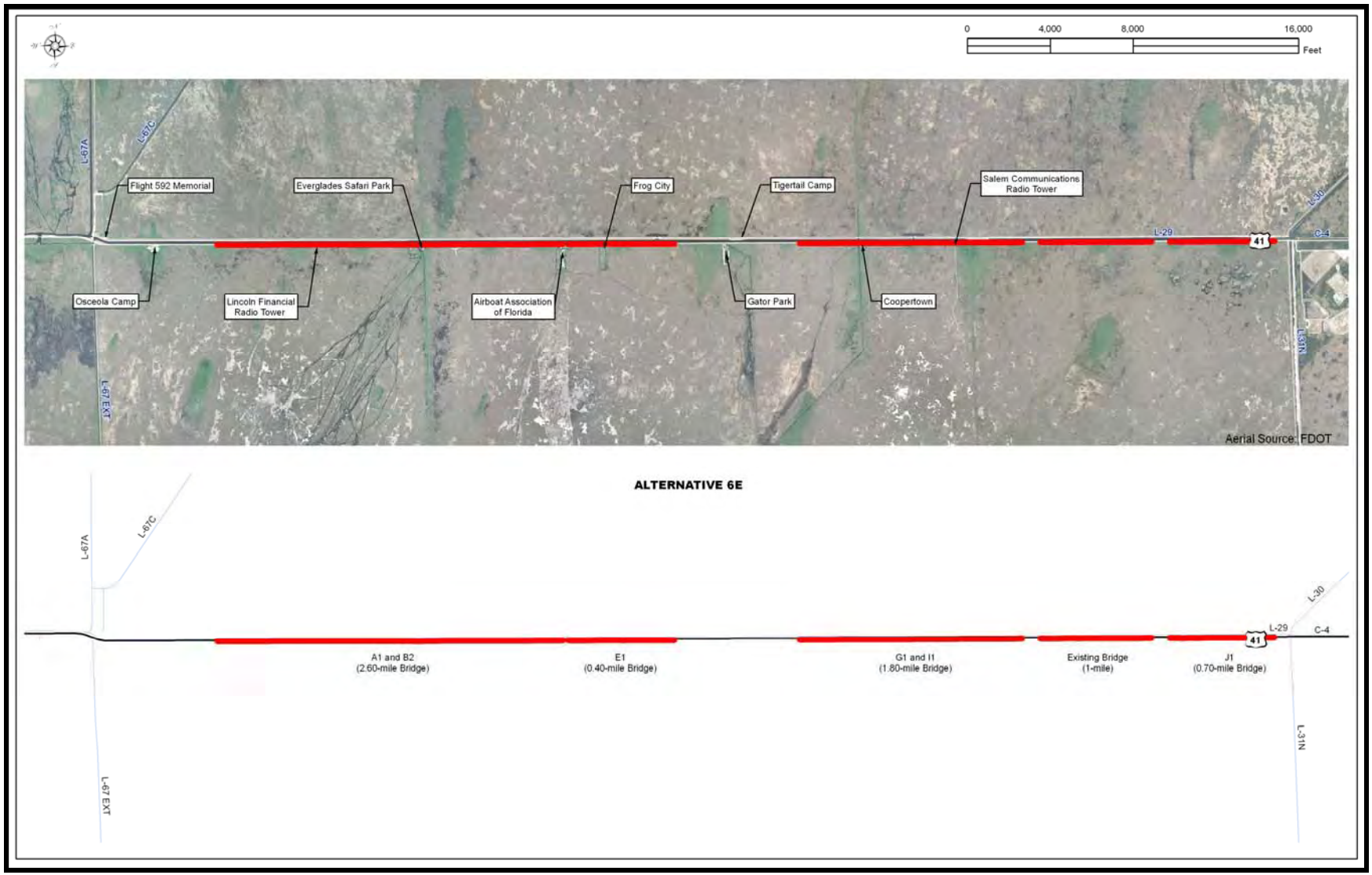

Table 5 – Wetland Impacts

Wetland Type		Permanent Impact – Square Feet	Permanent Impact - Acres	Temporary Impact – Square Feet	Temporary Impact - Acres
ALTERNATIVE 1	Freshwater Marsh	846,806	19.44	460,864	10.58
	Mixed Wetland Hardwood/Shrub	1,051,974	24.15	576,299	13.23
	Sawgrass Marsh	482,209	11.07	182,081	4.18
	Water/Canal/Pond	32,670	0.75	9583	0.22
	Totals	**2,413,659**	**55.41**	**1,228,827**	**28.21**
ALTERNATIVE 2a	Freshwater Marsh	865,537	19.87	482,644	11.08
	Mixed Wetland Hardwood/Shrub	1,125,590	25.84	670,824	15.40
	Sawgrass Marsh	482,209	11.07	182,081	4.18
	Water/Canal/Pond	33,977	0.78	9,148	0.21
	Totals	**2,507,313**	**57.56**	**1,344,697**	**30.87**
ALTERNATIVE 4	Freshwater Marsh	724,402	16.63	416,433	9.56
	Mixed Wetland Hardwood/Shrub	898,207	20.62	426,017	9.78
	Sawgrass Marsh	354,142	8.13	112,385	2.58
	Water/Canal/Pond	28,749	0.66	10,454	0.24
	Totals	**2,005,500**	**46.04**	**965,289**	**22.16**
ALTERNATIVE 5	Freshwater Marsh	757,508	17.39	421,661	9.68
	Mixed Wetland Hardwood/Shrub	957,884	21.99	470,012	10.79
	Sawgrass Marsh	396,396	9.10	185,130	4.25
	Water/Canal/Pond	30,492	0.70	9,147	0.21
	Totals	**2,142,280**	**49.18**	**1,085,950**	**24.93**
ALTERNATIVE 6e	Freshwater Marsh	747,054	17.15	731,372	16.79
	Mixed Wetland Hardwood/Shrub	1,276,743	29.31	846,806	19.44
	Sawgrass Marsh	512,701	11.77	263,538	6.05
	Water/Canal/Pond	43,124	0.99	24,829	0.57
	Totals	**2,579,623**	**59.22**	**1,866,546**	**42.85**

Unavoidable direct wetland impacts resulting from implementation of the Preferred Alternative is approximately 102.07 acres (59.22 acres permanent, 42.85 acres temporary). While this alternative is associated with the largest wetland impact it also allows the most on-site wetland restoration, as the bridges are off-set from the existing roadway to the south, areas of pavement removed to allow flow under the bridges will be restored to wetland grade and allowed to

revegetate naturally. This road removal will provide approximately 50 acres of wetland restoration that will directly offset permanent wetland impacts.

Wetland Impact Assessment

A wetlands assessment was conducted for this project to assist in the CBA process. This evaluation was meant to assess 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 functions 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 severly 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 similar 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 (0.62 – Moderate quality conditions). Scores for vegetated areas that will be located in the bridging footprints were scored 11/30 (0.37 – Low quality conditions) 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 are converted to wetlands, these areas were scored 0/30 (Upland conditions) prior to project implementation and 11/30 ((0.37 – Low quality conditions) following project implementation.

For this analysis, the Geographic Information Systems (GIS) layers depicting the project construction features were intersected with the Land Use Land Classification 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 6*** 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 6 – Wetland UMAM Scores

Alternative	Total Bridge Length (miles)	UMAM Score
No-Action	1.0	-42.1
1	3.2	-588.4
2a	4.3	-507.9
4	2.0	-593.6
5	2.5	-572.7
6e	6.5	-194.4

Note: The least negative number represents the least amount of permanent wetland impacts.

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 fence and turbidity barriers. Silt fence 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 (approximately 500 feet if conditions allow) 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 including turbidity above ambient levels, 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.). After construction, temporarily disturbed areas will be restored to pre-existing conditions (e.g. regraded, soil uncompacted, etc) and replanted with native wetland vegetation. 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.

At present an operational plan for manipulation of water levels in the L-29 Canal is being developed, however is not reviewed under the EIS. It is anticipated that specific details of the operational plan will be determined prior to the commencement of construction of the preferred

alternative and the operation plan will be ready for implementation upon completion of construction of the bridging option. 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 anticipated that implementation of the Preferred Alternative in conjunction with the operational plan is self-mitigating, and that permanent and temporary wetland impacts associated with the construction of the proposed project will be offset by the enhancement to wetlands attributed to operation of the completed Tamiami Trail Modification: Next Steps project. Although the Preferred Alternative has the largest amount of wetland impacts of all action alternatives it also has the most potential benefits in terms of wetland enhancement should the expected operational plan be implemented. Road removal associated with the preferred bridging option will allow for approximately 50 acres of on-site wetland restoration. Once the bridges are constructed, roadway would be removed and the former roadbed scraped down to wetland grade and allowed to revegetate naturally. It is expected that once the operational plan is implemented several thousand acres of degraded freshwater marsh wetlands within the Northeast Shark River Slough will show improvement from the enhanced water deliveries. The combination of on-site wetland restoration and downstream wetland enhancement should be adequate to offset permanent and temporary impacts associated with project construction. Monitoring programs that are currently in place at ENP will track the response of the wetlands to the project.

However, at this time, 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 a back-up off-site mitigation plan will be implemented should anticipated project benefits not offset the project's impacts to wetland value and functions. The "back-up mitigation plan would consist of the following: On-site wetland restoration will mitigate for permanent wetland impacts at a ratio of 1.5:1 due to time lag, therefore the 50 acres of on-site mitigation will offset 25 acres of permanent wetland impacts. The remainder of the wetland impacts would be mitigated for at the Hole-in-the-Donut mitigation site (See ***Figure 16*** for a location map) located within the boundaries of ENP. Mitigation ratios would be 1:1 for the 34.22 acres of remaining permanent wetland impacts and 0.25:1 (10.7 total acres) for the temporary wetland impacts as mitigation would be for time lag only. Mitigation would consist of wetland restoration by removing exotic vegetation and scraping down old agricultural lands to wetland grade and allowing natural revegetation of freshwater marsh species to occur.

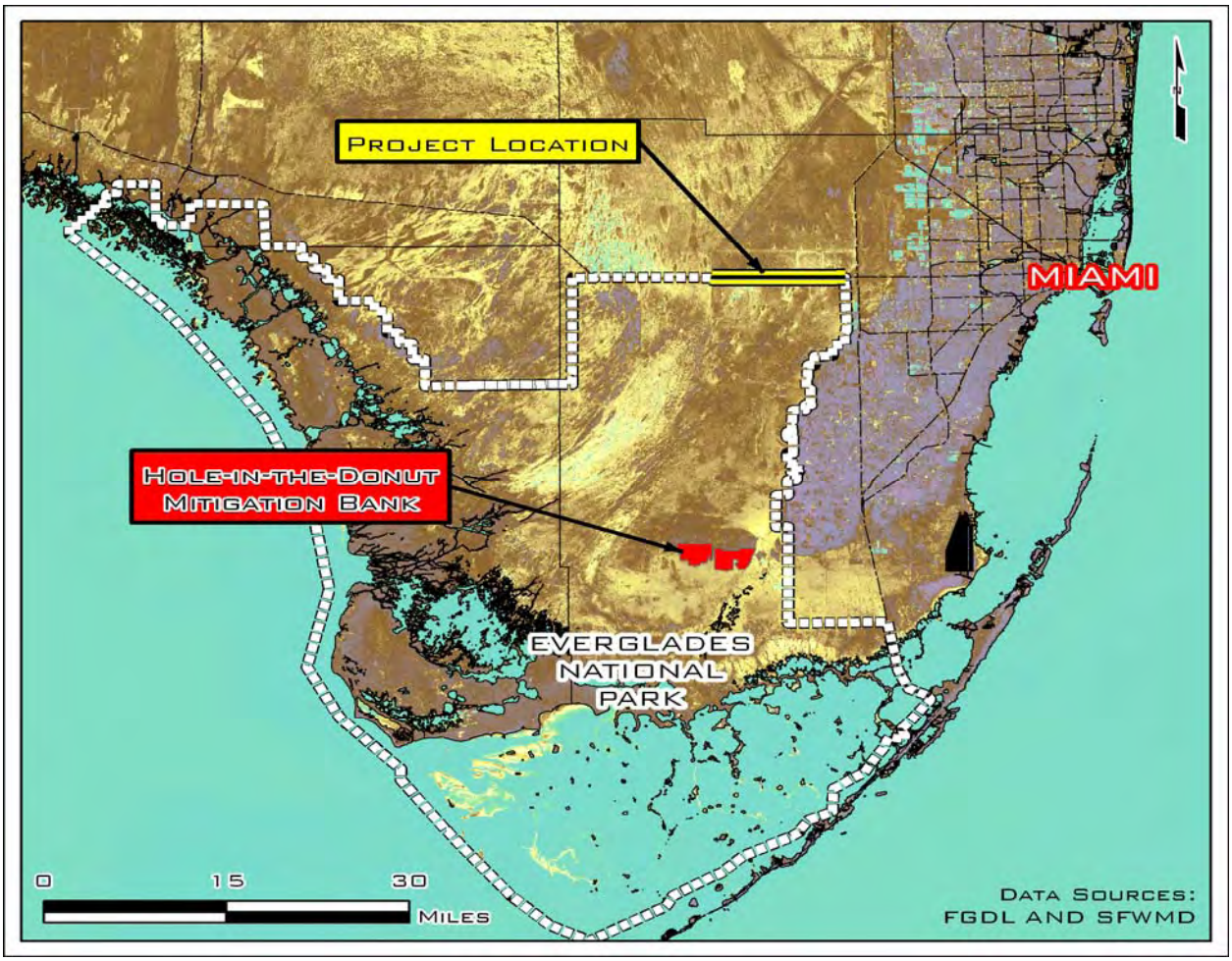

Figure 16 – Hole-In-The-Donut Location Map

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. This review is conducted concurrent with the Environmental Resource Permitting process. Before moving forward with the project an Environmental Resource Permit will be obtained from the State of Florida thus satisfying the Coastal Zone Management Act.

11.0 CONCLUSION

The National Park Service has concluded that the plan, as outlined above, and in detail in the Tamiami Trail Modifications: Next Steps Environmental Impact Statement, 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 ecological connectivity between the Park and the Water Conservation Areas. 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 project would adversely affect up to 102 acres of wetland habitat south of Tamiami Trail by removal of vegetation, filling of wetlands, excavation to bedrock, and placement of bridge pilings and supports. The implementation of the Preferred Alternative in conjunction with the implementation of an anticipated operational plan for manipulation of water levels in the L-29 Canal is expected to have downstream wetland benefits to several thousand acres of wetlands within the Northeast Shark River Slough and 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 function loss would be compensated for by performing mitigation on-site and at the Hole-in-the Donut mitigation site which is located within the boundaries of ENP. Again 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 could once again fully provide 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.

12.0 REFERENCES

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