3.0 EXISTING AND FUTURE CONDITIONS

3.1 Introduction

This section of the report describes the conditions as they currently exist (see ***Figure 3-1*** project area map); it provides a summary of the 2005 RGRR/SEIS discussion of the affected environment, which is unchanged. It is to these baseline conditions that the alternative actions are compared and evaluated.

The study team assumed that future without project conditions would be similar to existing conditions; therefore, the sections of this report describing existing conditions also represent the future without project conditions. The future without project conditions are the conditions expected in the project area if no project is implemented.

The team does not expect significant ecosystem improvements without construction of a MWD Tamiami Trail project. Language within WRDA 2000 prohibits construction of several significant CERP components, including WCA-3 Decompartmentalization, until MWD construction is complete.

However, formulation of the WCA-3 Decompartmentalization Project will be based on what this Tamiami Trail Modification Project is authorized to build. The two projects have different authorizing laws and different sources of funding, and will not be combined for analysis.

Other CERP components and other non-CERP restoration projects would be allowed to proceed. The authorization, construction, and initial operation of these allowable potential CERP or non-CERP restoration projects are uncertain. Some of those projects would provide additional water for the natural system, but the amount of water they could deliver to ENP would be limited by Tamiami Trail and the 7.5-foot stage constraint in the L-29 Canal.

The future without project conditions for this planning study is synonymous with the No Action alternative under NEPA.

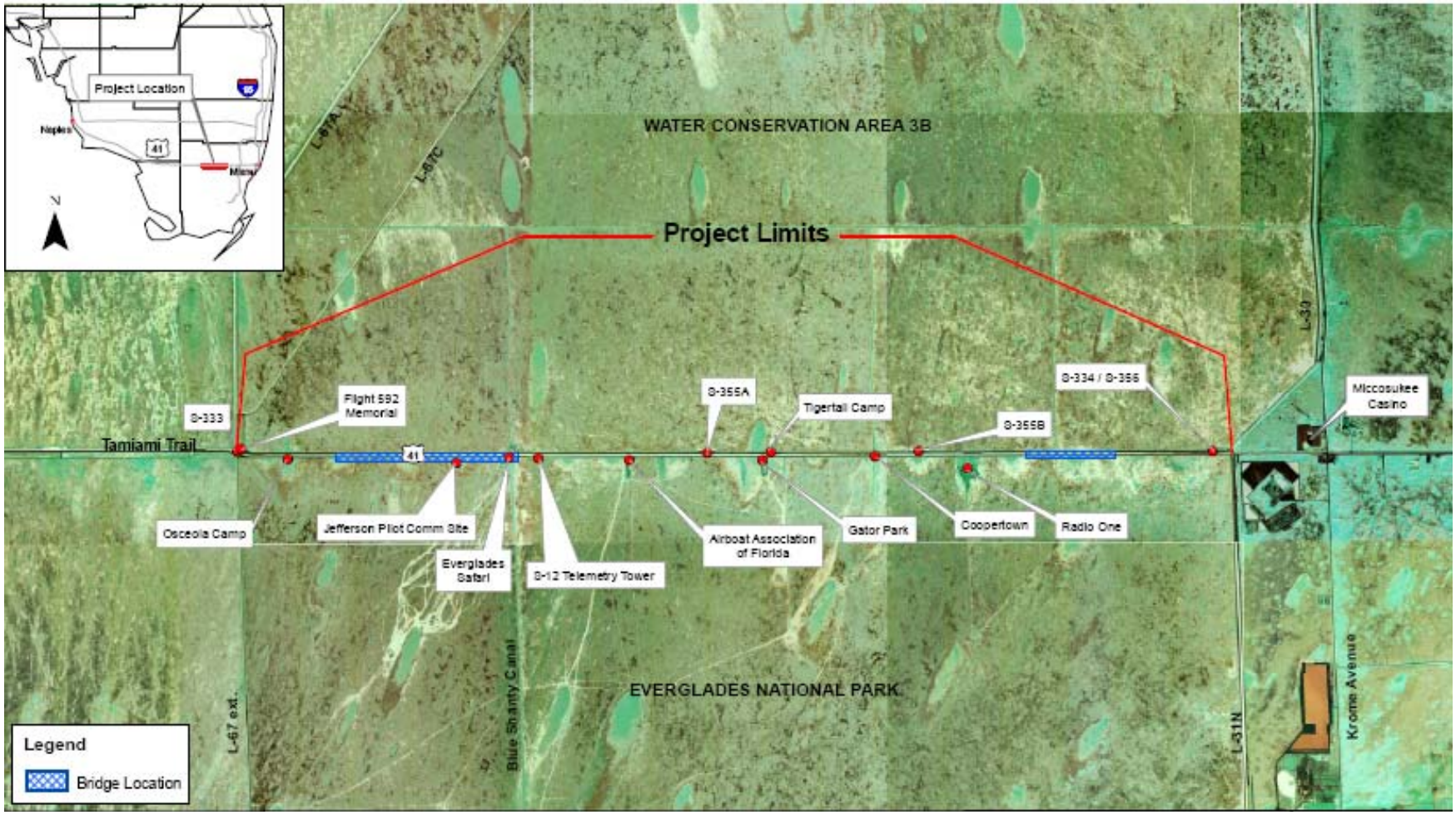


FIGURE 3-1: PROJECT AREA

3.2 Geology and Soils

Florida bedrock is primarily limestone with stratigraphic thicknesses of more than 5,000 feet in the south. The Lower East Coast, which is located on the Atlantic Coastal Ridge, is underlain primarily by thin sand and limestone that are highly permeable and moderately well drained. The soil of the Tamiami Trail project area is mainly of the Lauderhill-Dania-Pahokee Association, which consists of nearly level, poorly drained soils containing organic material eight to more than 51 inches deep over limestone bedrock. These soils extend west from the Atlantic Coastal Ridge into the Everglades. Typically, the soils are black to dark brown muck underlain by soft porous limestone. These soils are characterized by high subsidence, ponding, excess humus, and low strength.

3.3 Surface Waters

Major characteristics of south Florida hydrology are local rainfall, evapotranspiration, canals, and water control structures, flat topography, and the highly permeable Biscayne Aquifer. Water introduced from either direct rainfall or canals is rapidly removed by evapotranspiration, seepage into the aquifer, or canal and overland surface drainage to the Atlantic Ocean, Florida Bay, or the Gulf of Mexico.

Levees and canals constructed during the last 50 years under the C&SF project have divided the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The natural areas consist of the three WCAs located north of Tamiami Trail and ENP to the south of the highway. Water flow in the vicinity of the project is primarily from WCA-3A through control structures to the L-29 Canal, and from the canal through culverts into ENP.

The WCAs provide detention for water from the agricultural area and parts of the east coast region and for flood discharge from Lake Okeechobee to the sea. Detention of water helps prevent floodwaters from inundating the east coast urban areas; provides a water supply and detention for east coast urban and agricultural areas and ENP; improves the water supply for east coast communities by recharging underground freshwater reservoirs; reduces seepage; and may ameliorate saltwater intrusion in coastal aquifers. While the WCAs may reduce the severity of the drainage of the Everglades caused by the major canal systems, thus reducing impacts to fish and wildlife caused by the major drainage systems, the levees surrounding the WCAs still function to impound the Everglades, precluding the historic flow patterns. The C&SF system makes it difficult to provide natural timing, volume and distribution. In wet periods, water is impounded in the WCAs and then discharged to Everglades or coastal canals. During dry periods, water can flow through the canals to coastal areas and bypass the ENP wetlands.

The maintenance of water levels in the WCAs essentially represents the seasonal and monthly limits of storage. The levels vary from high stages in the late fall and winter to low stages at the beginning of the wet season. This permits the storage of runoff during the wet season and the release of stored water to ENP during the dry season and maintains elements of the habitat essential to fish and wildlife. The distribution of water for flood control and water supply varies seasonally. The schedules for the WCAs include a minimum water level below which water releases are not permitted unless water is supplied from another source. When water levels fall below the minimum levels, transfers of water from Lake Okeechobee or the WCAs are made to meet water supply demands.

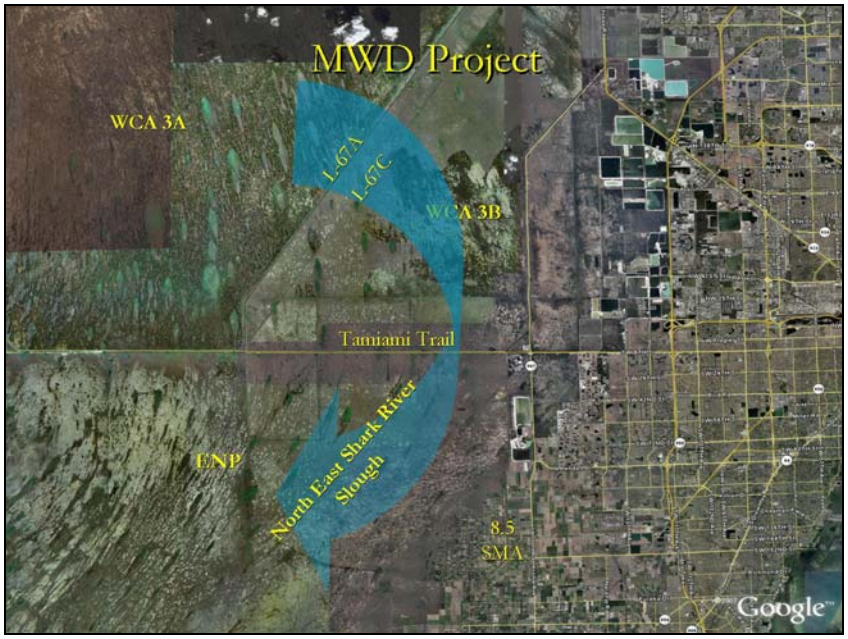


FIGURE 3-2: SHARK RIVER SLOUGH PATH

Shark River Slough, a wide, curving flow-way, began south of Lake Okeechobee. Its original course was southeast from the Lake, gradually curving south and then southwest (through what are now WCAs-2 and 3 [*Figure 3-2*]). It trends southwest inside ENP and its center of drainage is within the 10.7-mile stretch of Tamiami Trail. It is one of the principal pathways for water to slowly drain from the area south of Lake Okeechobee southward to the tidewaters of the Everglades. Shark River Slough is a broad, shallow, natural drainage way at a slightly lower elevation than the surrounding Everglades. The width varies based on season, but can range from a several thousand feet to over 40 miles, depending on rainfall and hydrologic conditions. The construction of Tamiami Trail and WCA-3 impounded and altered the slough, effectively creating a

barrier through the everglades, between the northern everglades and ENP. ***Figure 1-6*** shows the current configuration of the L-29 Levee and Canal.

The primary source of water from the northern part of the C&SF system to NESRS is WCA-3A. WCA-3A is very large and thus primarily rain fed, though it also receives water deliveries from the north, as well as storm runoff from western Broward County. WCA-3A discharges into the L-29 Canal through Structure S-333, which is located at the extreme southeast corner of the WCA. Water in the L-29 Canal then passes under the Tamiami Trail into ENP through 19 sets of culverts (55 total culverts, three culverts per set in most locations), as shown in ***Figure 3-3***.

Under existing conditions water does not flow directly from WCA-3B into the L-29 Canal. Although there are two discharge structures (S-355A and S-355B) along the L-29 Levee south of WCA-3B that could move water from WCA-3B into the canal, they are not operating at present because of low water stages in WCA-3B. Water stages in WCA-3B are generally much lower than stages in WCA-3A or the L-29 Canal because there is insufficient conveyance from WCA-3A into WCA-3B. WCA3B loses seepage to the east, and inflows from WCA-3A into the L-29 Canal maintain the canal at a higher level than WCA3B.

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 culverts 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. The canal stage constraint is 7.5 feet National Geodetic Vertical Datum (NGVD). Higher water levels within the canal may erode the sub-base of the road, and create a potential safety hazard. In most cases, flows that would cause the canal water level to rise above 7.5 feet NGVD are diverted or held for release at a different time. ***Figure 3-3*** illustrates the small difference in elevation between the water level in the canal and the base and crown of the road. The completion of flood mitigation features at the 8.5 SMA has removed some of the reasons for maintaining water levels in the L-29 Canal at or below 7.5 feet. The management of stage levels is among the most important factors in determining the amount of water entering the ENP.

FIGURE 3-3: ONE OF 19 SETS OF EXISTING CULVERTS, LOOKING SOUTH FROM L-29 LEVEE

3.4 Water Quality

General. The water quality in the Everglades has been greatly influenced by development-related activities. Extensive drainage networks allowed the development of large land tracts for urban and agricultural development. Nonpoint (e.g., agricultural runoff) and point (e.g., wastewater discharges) sources of contamination now influence surface waters in many areas. Parameters of concern include:

- Metals–mercury, copper, cadmium, lead, zinc, arsenic.
- Pesticides–DDT and derivatives, atrazine, simazine, ametryn, endosulfan compounds, ethion, bromacil, 2,4-D, aldecarb, and fenamiphos.
- Nutrients–phosphorus, nitrite/nitrate, and ammonia/un-ionized ammonia.
- Biological–fecal coliforms and pathogens, and chlorophyll-a.
- Physical parameters–pH, dissolved oxygen, conductivity, turbidity, oil and grease, temperature, and salinity.
- Other constituents–polycyclic aromatic hydrocarbons (PAHs), dioxins and furans, sulfate, chloride, tributyltin (TBT), polychlorinated biphenyls (PCBs), and volatile organic compounds (VOCs).

The primary concerns in the Everglades are nutrients, dissolved oxygen (DO), mercury, biochemical oxygen demand (BOD), and coliforms. Marsh and canal

waters typically have low DO levels relative to the standards in Class I and III Florida State Administrative Code. FDEP is in the process of revising the DO criterion to reflect that these conditions may exist due to natural conditions and do not necessarily require abatement. Nutrient levels at the marsh perimeter are elevated, probably from the breakdown of organic debris as well as agricultural drainage. Key water quality parameters monitored include DO, conductivity, and nutrients.

A water quality study along Tamiami Trail was conducted by the U.S. Geological Survey (USGS) National Water-Quality Assessment Program in 1996-1997 and reported in 1999. The report concluded that the quality of water along the Trail is variable due to natural and human influences. Specific conductance and concentrations of chloride, sulfate, and dissolved organic carbon tended to be relatively low in the undeveloped part of Tamiami Trail from the Turner River (mile 30.4) to about S-12-C (mile 66.6) and relatively high at the more developed west and east ends. Relatively high concentrations occurred to the east of S-12-C due to the inflow of mineralized water from the northern Everglades through a network of canals. Twelve pesticides or pesticide degradation products were detected along the Tamiami Trail, with highest concentrations at Tomato Road in the west and S-12-D in the east where agricultural influences were greatest. Total phosphorus tended to decrease from west to east.

ENP has been designated as an Outstanding Florida Water (OFW) requiring special consideration. In general, an OFW has narrative criteria for not allowing degradation/worsening of water quality conditions relative to the better of (1) a fixed point in time, which for ENP is 1978-79, or (2) the conditions that existed in the year prior to application to FDEP for a Water Quality Certification (WQC). To reduce any potential for degradation of water quality in ENP, the State of Florida requires that the treatment of storm runoff be included as a component of the highway and bridge construction projects.

Highway Runoff. Highway use results in the introduction of metals, fuels, lubricants, combustion products, and toxic chemicals as potential environmental contaminants. ***Table 3-1*** summarizes several of the major constituents in runoff from highway use and their primary sources.

TABLE 3-1: HIGHWAY RUNOFF CONSTITUENTS AND THEIR PRIMARY SOURCES

Constituents	Primary Sources
Lead	Leaded gasoline (exhaust), tire wear, lubrication, bearing wear
Zinc	Tire wear, motor oil
Iron	Rust, vehicle/engine wear
Copper	Metal plating, bearing/bushing wear, engine wear, brake wear
Cadmium	Tire wear, metal plating
Chromium	Metal plating, engine wear, brake wear
Nickel	Exhaust, lubricants, plating, brake wear
Organic compounds	Vehicle exhaust, fuel leaks, lubricants

Source: USEPA (1993).

The concentration of pollutants in runoff is dependent on a number of factors, including the amount of traffic to which the road is subjected. ***Table 3-2*** illustrates the differences in concentration of pollutants in highway runoff relative to vehicle usage.

Because there are no known studies of the quality or quantity of runoff from the Tamiami Trail in the project area, the quality of the runoff and the effects to the Everglades ecosystem must be inferred. The average daily traffic (ADT) volume along the Tamiami Trail, approximately 5,200 vehicles per day (vpd), is quite low. Applying the findings of Driscoll *et al.* (1990), runoff from the Tamiami Trail would have relatively low concentrations of contaminants. Bingham *et al.*, (2002) suggested that runoff from the Tamiami Trail would have "little effect on the quality of the water and the surrounding aquatic habitat in the Tamiami Canal."

TABLE 3-2: POLLUTANT CONCENTRATIONS IN HIGHWAY RUNOFF

Pollutant	Event Mean Concentration for Highways with Fewer than 30,000 Vehicles/Day* (mg/L)	Event Mean Concentration for Highways with More than 30,000 Vehicles/Day* (mg/L)
Total Suspended Solids	41	142
Volatile Suspended Solids	12	39
Total Organic Carbon	8	25
Chemical Oxygen Demand	49	114
Nitrite and Nitrate	0.46	0.76
Total Kjeldahl Nitrogen	0.87	1.83
Phosphate Phosphorus	0.16	0.40
Copper	0.022	0.054
Lead	0.080	0.400
Zinc	0.080	0.329

* Event mean concentrations are for the 50 percent median site.
Source: Driscoll *et al*. (1990).

There are local sources of metals in addition to highway runoff, such as airboat franchises and residential areas along the Tamiami Trail, and the potential exists for transport of metals from other locations by the network of canals.

It therefore appears that based on existing data and projections, runoff from the Tamiami Trail may have little measurable adverse effect on water quality and biological communities in the L-29 Canal. However, to reduce any potential for degradation in ENP, which is an OFW requiring special consideration, the State of Florida requires that treatment of bridge storm runoff must be included as a component of the proposed project.

3.5 Hazardous, Toxic and Radioactive Waste

A Phase I Hazardous Toxic and Radioactive Waste (HTRW) site assessment of the project area was conducted in late 2006. The assessment area extended the length of the project (between S-333 and S-334/S-356) from the L-29 Canal to 200 feet south of the centerline of the Tamiami Trail (see ***Figure 3-1***). The area assessed included properties owned by Lincoln Financial Media, Everglades Safari Park, the Airboat Association of Florida, Gator Park, Coopertown Airboat

Rides and Restaurant (two adjacent tracts), Radio One Communications, and Florida Power and Light.

The site assessments identified four potential contamination sites, all of which are located on private property outside of the construction footprint required for the proposed project. It is anticipated that the federal government would acquire an interest in real estate from the subject private owners since these lands would be impacted not from the project's construction but rather the operation of the project. In a federal acquisition, the cost of remediation of the subject properties would be assessed against the property owner. Prior to a real estate closing, the landowner would be given a choice of conducting the remedial work at his own cost, or the federal government could withhold a sufficient amount of funds necessary for the remediation from the acquisition funds to ensure compliance.

3.5 Special Environmental Resources

The historic Everglades was 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.

3.6.1 Everglades National Park

ENP 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 that 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 1.3 million acres by 1958.

Recognizing ENP as a nationally and internationally significant resource, Congress passed the "Everglades National Park Protection and Expansion Act" (PL 101-229) in 1989. This law authorized the acquisition of additional land, including the portion of the project area just south of Tamiami Trail, to benefit the natural resources of ENP.

With this addition, ENP is now approximately 1.5 million acres in size, making it the third largest unit of the National Park System in the lower 48 states.

By NPS policy, lands included in the East Everglades Expansion are being assessed in the East Everglades Wilderness Study to determine whether they are suitable for possible wilderness designation. The East Everglades Wilderness Study was added to the scope of the ENP's General Management Plan (GMP)/EIS in 2006.

Because the ENP possesses "outstanding natural 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 ENP as a Wetland of International Importance. ***Figure 3-1*** shows the location of ENP in southern Florida.

3.6.2 Shark River Slough

Historically, Shark River Slough was a 30-mile-wide expanse of relatively shallow water moving downstream through the low-gradient Everglades 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 the Gulf of Mexico.

An extensive ridge and slough landscape was characteristic of Shark River Slough. Within the ridge and slough landscape was a complex mosaic of marsh assemblages with distinct tree islands. The marsh contained large stands of sawgrass interrupted by more open communities with a mixture of smaller aquatic plants and periphyton. These types of habitats are frequently elongated and oriented parallel to the direction of water flow. Tropical hammock and pine forests occur as islands within the prairie landscape and form a third element of the ridge and slough landscape, rising slightly above the elevation of the sawgrass ridges. 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. The orientation of the larger tree islands has the same parallel alignment to the direction of flow.

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 muhly grass (*Muhlenbergia capillaris* var. *filipes*) dominate, although more than 100 species of mostly herbaceous plants have been reported.

Although seemingly small, the two-to-three-foot difference in elevation between ridge surface and slough bottom was highly significant in the pre-drainage Everglades. During the typical annual rise and fall of wet- and dry-season water levels, this elevation difference allowed sloughs to remain water-filled throughout the year, while adjacent ridges would be exposed only 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.

3.6.3 Biological Habitats

The habitats along the Tamiami Trail are mostly natural with long and short hydroperiod wetlands with an abundance of interspersed willowheads, bayheads, and hardwood hammocks. Sawgrass (*Cladium jamaicense*) communities dominate the long hydroperiod wetlands, whereas muhly grass (*Muhlenbergia capillaris*) and black sedge (*Schoenus nigricans*) dominate the short hydroperiod wetlands mostly influenced by NESRS and local rainfall. Four herbaceous wetland cover types are found in the Everglades: (1) sloughs with persistently deep water levels; (2) sawgrass marshes with moderate water levels and long hydroperiods; (3) wet peat prairies; and (4) wet marl prairies with shorter hydroperiods.
Plant communities present along the Tamiami Trail in the project area include:

- Swamp forest bayheads (*Magnolia virginiana, Annona glabra, Chrysobalanus icaco, Persea borbonia, Ilex cassine, Metopium toxiferum*, among others);
- Maidencane/spike-rush, a mix of shallow open water, *Eleocharis* spp. *and Panicum hemitomon*, which can include sparse association of low-stature *Cladium jamaicense, Typha* spp., *Sagittaria lancifolia, Pontederia lanceolata, Nymphaea*. spp., etc., typical of SFWMD impounded conservation areas;
- Graminoid (grasses, sedges, and rushes);
- Non-graminoid emergent marsh (*Pontederia lanceolata, Sagittaria* spp., *Nymphaea odorata, Typha* spp., with *Ludwigia repens* and *Utricularia* spp. as possible submergents);
- Saw grass (*Cladium jamaicense*);
- Cattail (*Typha* spp.);
- Scrub hardwood, which includes species such as *M. toxiferum, P. borbonia, Myrica cerifera, I. cassine, M. virginiana, Myrsine floridana, Conocarpus erectus, Chrysobalanus icaco*, often with a moderate-to-heavy component of mixed grasses; and
- Willow shrublands *(Salix caroliniana*).

Sloughs provide critical habitat for submerged and floating vegetation in the Everglades ecosystem as they are the deepest marsh communities that provide the main pathway of water flow through the Everglades (Lodge, 2005). Slough vegetation communities are often associated with tree islands and long patches of sawgrass stands. This vegetation landscape is termed "ridge and slough", since the sawgrass is elevated above the adjacent slough.

The deep water slough vegetation community is typically dominated by submerged and floating aquatic plants such as bladderworts, white waterlily, floating heart, and spatterdock (Lodge, 2005). In the U.S. Environmental Protection Agency's 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 the 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).

White waterlily has adaptations including an extensive root system and floating leaves that allow it to out-compete other species of emergent and submerged vegetation during optimum hydrologic conditions. Richards' (2007) mesocosm studies illustrated that white waterlily exhibits significantly more root biomass at depths of 60 cm (2 ft.) and 90 cm (3 ft.) as compared to a depth of 30 cm (1 ft.). Field studies also verify that deep water slough vegetation is dominated by white waterlily in wet season water depths exceeding 90 cm (Powers, 2005; Volin, 2007; and Givinish, 2007). McVoy et al.'s (in review) historical ecological study of the Everglades estimated that pre-drainage water depths in sloughs had a long term average depth of 60 cm (2 ft.). Based on the scientific literature review, the optimal hydrological conditions for white waterlily-dominated deep water sloughs are wet season depths exceeding two to three feet and a maximized average wet season depth.

Other classifications along the Tamiami Trail include Brazilian pepper/shrubland mix, open water, spoil areas, areas influenced by human activities, major roads, and canals.

Partitioning of the Everglades by levees, canals, and roads, including the Tamiami Trail and the L-29 Canal, has created barriers to the free movement of

organisms, particularly aquatic species and those with limited mobility. Aquatic connectivity between the WCAs and ENP is currently limited to the series of small culverts under the Tamiami Trail. The L-29 Canal and Levee are obstructions to fish and wildlife movement and migration from WCA-3A to ENP. Traffic mortality on the Tamiami Trail reduces the free movement of terrestrial and semiaquatic animals.

3.6.4 Protected Species

Federally listed species known or potentially encountered in the project area, and which were given consideration by FWS coordination in accordance with Section 7 of the Endangered Species Act, include the Cape Sable seaside sparrow (CSSS), eastern indigo snake, Florida panther, snail kite, West Indian manatee, and wood stork.

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*). 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. 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 FR 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 CSSS inhabits six distinct subpopulations called A, B, C, D, E and F. Critical habitat for this species was designated on August 11, 1977 (42 FR 42840). Currently, the critical habitat includes areas of land, water, and airspace in the Taylor Slough vicinity of Collier, Miami-Dade, and Monroe Counties. Much of this area is within the boundaries of ENP. Because this was one of the first critical habitat designations under the Act, there were no primary constituent elements defined. The designated area encompasses about 197,260 acres (79,828 ha), and includes portions of subpopulations B through F. Subpopulation A is the only area occupied by sparrows that does not have associated designated critical habitat.

Subpopulation A is one of the large subpopulations and thought to be critical to the existence of the CSSS. It is located in western Shark River Slough immediately in the path of water discharges from WCA-3A through the S-12 structures. Unusually intense and unseasonable rainy periods coupled with C&SF operations during the winters of 1992/93 and 1993/94 caused prolonged flooding in subpopulation A, with the result that little or no breeding there was possible during the 1993 and 1994 sparrow breeding seasons. The

flooding of the habitat by direct rainfall was exacerbated by discharges of water through the S-12s needed to meet the water regulation schedule for WCA-3A. This is reflected in the dramatic reduction of CSSS detected in subsequent surveys in subpopulation A. As a consequence, FWS issued a BO in 1999 providing recommendations to the USACE on how water levels must be controlled in nesting habitat so that the existence of CSSS would not be jeopardized. 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 the breeding season and to keep the habitat for the subpopulations B, C, D, E, and F from excessive drying to prevent un-natural fire frequencies.

Eastern Indigo Snake (*Drymarchon corais couperi*). The indigo snake was listed as threatened in 1979 because of a loss of habitat associated with farming, construction, forestry, and other land use conversions, as well as over-collecting for the pet trade. In south Florida, the snake can be found in a variety of habitats, including wet prairies and mangrove swamps. Farther north, it can be found in pine-hardwood forest, mixed hardwood forest, creek bottoms, agricultural fields, and sandy habitats of the Florida scrub communities, typically in association with gopher tortoises.

Florida Panther (*Puma* [*Felis*] *concolor coryi*). The Florida panther was listed as endangered in 1967. Activities beginning as early as the 1800s influenced the status of the panther, with the first bounty passed in Florida in 1832. Following bounty hunting, agricultural land clearing and lumbering reduced its habitat drastically into the 1950s. Significant habitat reduction continues today. Other factors affecting the population's decline include contaminants, prey availability, human-related disturbance and mortality, disease, and genetic erosion.

The current occupied range of the panther is estimated to be 2.2 million acres (890,000 hectares) in south Florida. Panthers prefer native, upland forests, especially hardwood hammocks and pine flatwoods, to wetlands and disturbed habitats. Native landscapes within the Big Cypress Swamp region of south Florida, within occupied panther range, are dominated by slash pine (*Pinus elliottii*), cypress, and freshwater marshes, interspersed with mixed-swamp forests, hammock forests, and prairies. Private lands represent about 50 percent of occupied panther range in south Florida. The largest contiguous tract of panther habitat is the Big Cypress National Preserve/Everglades ecosystem in Collier, Monroe, and Miami-Dade counties. Suitable habitat extends into Lee, Hendry, Charlotte, Glades, Broward, Palm Beach, and southern Highlands counties.

Breeding activity peaks in fall and winter. Parturition is distributed throughout the year with 81 percent of births occurring between March and July. Litter sizes range from one to four kittens, with a mean of 2.2 kittens per successful litter. Intervals between litters range from 16 to 37 months.

The number of radio-collared panthers being monitored has increased from 8 in 1984 to 46 in 2001. Throughout the occupied range of the panther, the ENP population represents at least 11 percent of the panther population known to the Fish and Wildlife Service. Two panthers in ENP have been documented crossing the Shark River Slough into Big Cypress National Preserve. The only known reproducing panther population is located in the Big Cypress Swamp/Everglades physiographic region.

Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*). Snail kites, listed as endangered in 1967, require long hydroperiod wetlands that remain inundated throughout the year. This preference is associated with the apple snail (*Pomacea paludosa*), its primary food source, which requires nearly continuous flooding of wetlands for greater than one year. Suitable habitats for the kite include freshwater marsh and shallow vegetated lake margins where apple snails can be found. 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. 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. 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. ***Figure 3-4*** depicts recent snail kite nesting locations and protection zones.

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 kites) to aquatic sloughs in selected sites in that area, along with losses of interspersed herbaceous and woody species essential for nesting habitat.

West Indian Manatee (*Trichechus manatus*). The West Indian manatee was first listed as endangered in 1967. This species lives in freshwater, brackish, and marine habitats and eats submerged, emergent, and floating vegetation. During the hot summer months, the mammal's habitat can range as far north as Rhode Island and as far west as Texas. During winter months, the population concentrates in peninsular Florida, depending on warm water flows from natural springs and power plant outfalls. The most significant threat facing manatees in Florida is death or injury from boat strikes. It is highly unlikely that the West Indian manatee occurs in the project area.

Wood Stork (*Mycteria americana*). The wood stork was listed as endangered in 1984 due to loss of foraging habitat and colony nesting failures. No critical habitat has been designated for the wood stork.

Preferring freshwater wetlands for nesting, roosting, and foraging, wood storks can be found throughout central and southern Florida. Nests are typically constructed in tree stands within swamps or stands surrounded by large areas of open water. Because of their tactile feeding methods, storks feed most effectively in shallow water settings where prey items are concentrated. During winter and spring dry seasons when water levels recede, prey items are often further concentrated, providing foraging areas with abundant food supplies. Drainage in south Florida may be responsible for delaying stork nesting from November to as late as February or March. Nesting delays are believed to contribute to nest failures and colony abandonment because of the dispersal of prey items associated with the onset of the wet season (May-June). Wood stork rookeries occur at two pond apple stands along the south side of the highway: the Tamiami Trail West Rookery and the Tamiami Trail East Rookery (***Figure 3-4***).

In 2001, overall wood stork nesting effort in the WCAs was greater than had previously been seen since the mid-1970s and ten percent greater than 2000, another banner year. As in 2000, the storks nested in February and were able to fledge large numbers of young prior to the onset of rains. In 2005, nests were largely unsuccessful as a result of stable or rising water levels during March due to unseasonable rainfall. Tamiami West had a maximum of 25-35 successful nests.

The FWS, using the Habitat Management Guidelines for the Wood Stork in the Southeast Region (Guidelines) (Ogden 1990) based on recent photography during nesting season, identified primary and secondary restriction zones.

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 FWS 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 FWS has designated the primary zone for the East Colony as a 1,300-foot radius from the colony center. The pond apple forest creates a visual barrier between the rookery and Tamiami Trail. The storks appear to have become somewhat acclimated to highway traffic noise.

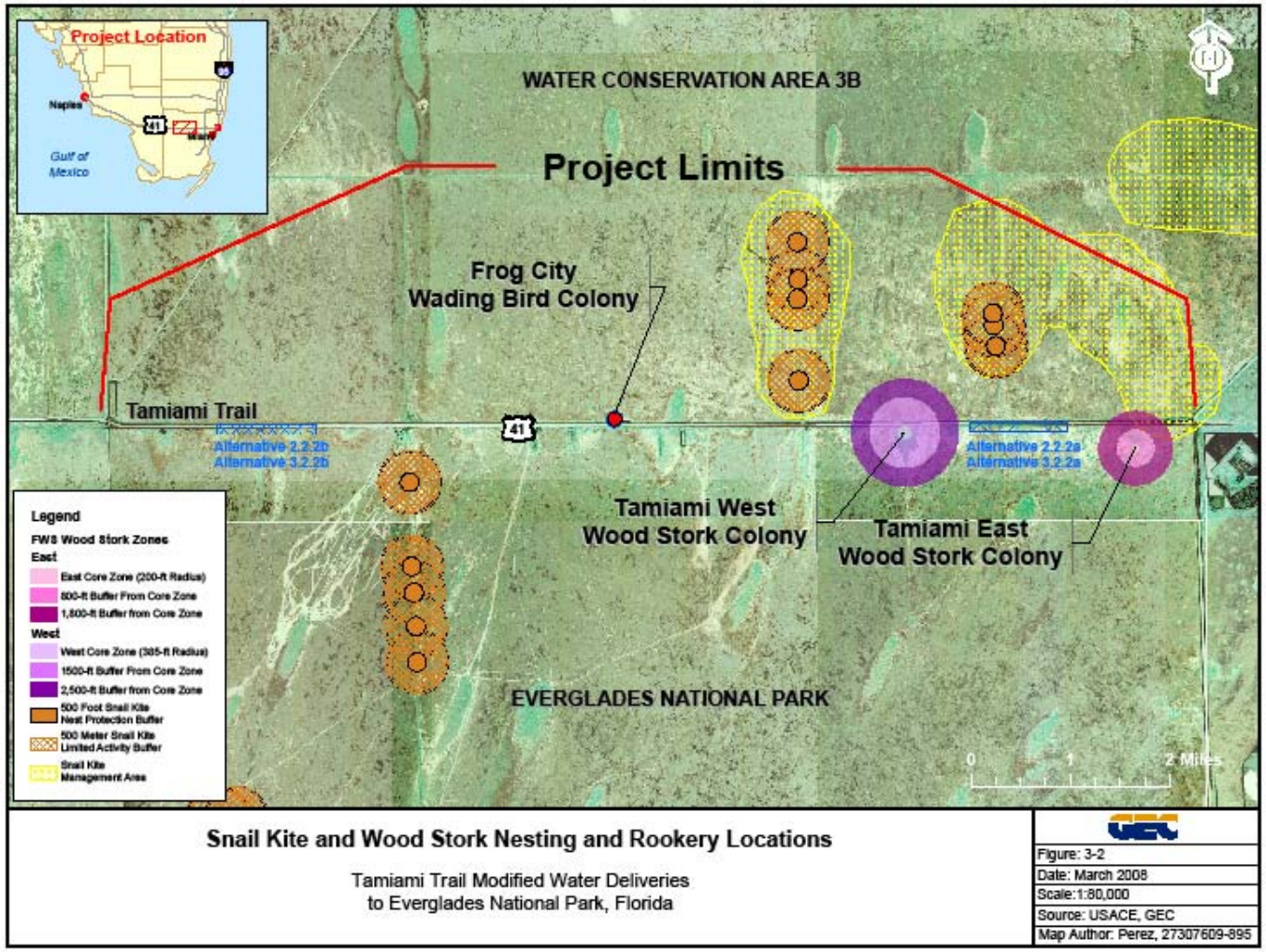
The secondary zone may be used by wood storks for collecting nesting material and for roosting, loafing, and feeding (especially important for newly fledged young). The secondary zone of the West Colony extends an additional 1,000 feet beyond the primary zone for a total radius of 2,885 feet from the 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.

In addition to the wood stork, FWC has identified six birds as species of special concern that may nest or otherwise be found in the vicinity of Tamiami Trail between S-334 and the L-67 Canal: tricolored heron, snowy egret, little blue heron, limpkin, roseate spoonbill, and white ibis. These migratory birds are protected under the provisions of the Migratory Bird Treaty Act. They are protected species under the jurisdiction of FWS. Nesting activities in these rookeries usually last until the rains have dispersed prey, leading to the cessation of nesting. FWS and FWC identified the Frog City wading bird colony, which hosts tricolored herons and great egrets, as potentially requiring protective measures during construction. The Frog City rookery is located in WCA-3B close to the L-29 Levee approximately one-quarter mile west of the Tigertail Camp.

The American alligator (*Alligator mississippiensis*), a species of special concern, and the Everglades mink (*Mustela vison evergladensis*), listed as threatened by the State of Florida, are also found along the Tamiami Trail corridor.

FIGURE 3-4: SNAIL KITE AND WOOD STORK NESTING AND ROOKERY LOCATIONS



3.6 Air Quality

In accordance with the 1990 Clean Air Act Amendments (CAA), the EPA designated the Southeast Florida Airshed, consisting of Miami-Dade, Broward, and Palm Beach counties, as a nonattainment area for ozone and its precursors. On April 27, 1995, the airshed was redesignated as an ozone attainment/maintenance area. Miami-Dade County is an attainment area for carbon monoxide. Nitrogen dioxide, sulfur dioxide, and total suspended particulates are present in concentrations that are better than national standards. EPA has not determined a designation for airborne lead in southeastern Florida. ENP is a Class I Airshed.

3.7 Tamiami Trail Transportation

The original Tamiami Trail was most likely constructed in the late 1920s and early 1930s primarily by digging the canal by steam shovel and placing the spoil ahead to create the roadbed. In the mid-1940s, about 38 bridges were added at various locations on the Tamiami Trail, 19 of which were within the project area. In the early 1950s, the bridges were removed and replaced with the culverts that are currently in place. In 1968, the shoulders were widened and the pavement was overlaid. In 1970, a guardrail was added on the north side. At some time in the 1980s or 1990s, another guardrail was added on the south side of the road. Finally, in 1993, the shoulders were widened, and the mainline pavement was resurfaced.

FDOT requires that culverts be designed for a projected maintenance-free time or a Design Service Life (DSL) appropriate for the culvert function and highway type. Recently, the FDOT Culvert Service Life Estimator Program was used with soil parameters to determine DSLs for four locations. The results indicated that the existing reinforced concrete pipe culverts under US 41, which have been in operation for approximately 50 years, should continue to provide service for an additional 50 years.

The road is currently in need of maintenance. The asphalt surface of the road has surface environmental stress cracks and subsurface fatigue cracks. On the Pavement Condition Rating, by which road surfaces are rated on a scale of 1 to 10, the Tamiami Trail would receive an FDOT rating of 6. Whenever a road is rated at 6 or below, repair actions are typically required. Because of pavement deterioration in terms of cracking, rutting, and ride, FDOT determined that the portion of the Tamiami Trail within the project area is in need of rehabilitation. The average daily traffic (ADT) volume along the Tamiami Trail, approximately 5,200 vehicles per day (vpd), is quite low.

3.8 Recreation

ENP receives in excess of a million visitors each year. Recreational opportunities include biking, boating, fishing, hiking, camping, and wildlife viewing. Approximately six miles west of the project area, the Shark Valley Information Center offers a 15-mile round-trip tram road (not open to private motorized vehicles) that extends into the marsh, offering one of the best opportunities for viewing wildlife. A two-hour narrated tram ride provides an overview of the freshwater Everglades, and bicycles are available to rent. An observation tower is located at the half-way point.

The Airboat Association of Florida is a recreational association with facilities on the south side of the Tamiami Trail about three miles east of the western end of the project area.

Four commercial airboat operators are currently operating south of the Tamiami Trail. Three operators, Coopertown Airboat Rides and Restaurant, Everglades Safari Park and Gator Park operate from facilities located on the south side of Tamiami Trail and receive between two and three hundred thousand visitors each year. The other operator, Airboat USA launches from a public airboat ramp immediately east of Coopertown Airboat Rides. These ecotourism businesses offer guided tours into ENP.

The verge between the L-29 Canal and the L-29 Levee is used for passage along the canal, picnicking, or launching boats into the L-29 Canal. A road atop the L-29 Levee allows panoramic views to the north into WCA-3B.

Primary access to boat ramps on the north side of the L-29 Canal is at S-333 and S-334. Roads across these structures lead to several boat ramps and to bank fishing on the north bank of the L-29 Canal. S-334 provides access to a boat ramp (Boat Ramp 153) three miles to the east that allows boat launching into the L-29 Canal. A picnic area is associated with the boat ramp. Control structure S-333 provides access across the L-29 Canal to one airboat ramp and two boat ramps. There is a boat ramp on Canal 67-A and another on Canal 67-C. Both ramps are heavily used by boat fishermen. The airboat ramps provide access for deer and waterfowl hunters, as well as for recreational airboaters. Approximately 10.5 miles of the north bank of the L-29 Canal are available for bank fishing. Noncommercial airboats also launch south of the Tamiami Trail at two locations for sightseeing. The two locations are the ramp immediately east of Coopertown Airboat Rides and an undeveloped area at the L-67 Extension. The "Everglades National Park and Expansion Act" allows those noncommercial airboat operators using the expansion area on January 1, 1989 to continue to operate airboats inside the expansion area.

Bank fishing is also popular from the shoulders of the Tamiami Trail and L-67 Extension Levee. Fishermen frequent the 10.7 miles of the south bank of the L-29 Canal (north shoulder of the highway). The only places for bank fishing on the south side of the highway are where the culverts discharge water to the south. FWC personnel conducted angler counts along the Tamiami Trail from December 1998 to May 1999. The mean number of anglers per mile for weekdays and weekend days, respectively, was 0.95 and 2.28. Ninety-four percent were bank anglers (personal communication, FWC, September 28, 2000). These numbers translate into an estimated 10 fishermen per weekday and 23 per weekend day, totaling approximately 5,000 man-days of fishing per year within the 10.7-mile study area. Personal observation revealed 25 bank fishermen and two boats with two fishermen in the project study segment at approximately 10:00 A.M. on a Saturday in September 2000. Almost all the bank fishermen were fishing on either side of the highway right-of-way, with only a few on the north bank of the L-29 Canal.

It should be noted that at least some of the fishing is subsistence, not recreational. There is reportedly recreational fishing for oscars (*Astronotus ocellatus)*, an aquarium fish native to South America that has become established in south Florida and which reportedly "puts up a good fight." Recreational anglers have been observed fishing for bass by boat in the canal during the short period of time when dry conditions drive the bass out of the marshes.

3.9 Cultural Resources

Studies for historic and archaeological resources were conducted to identify and assess National Register of Historic Places (NRHP) eligibility of historic properties within the project area, to survey potential archaeological sites, to conduct archival research, and to assess the potential of each historic resource as a Traditional Cultural Property as defined by National Register Bulletin No. 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties. This work was conducted to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the Archaeological and Historic Preservation Act of 1974.

Cultural resource surveys have been performed by Janus Research (2001) and New South Associates (2006). Background research was conducted at the Florida Master Site File in the Florida Collection of the Florida State Library. Additional literature was examined at the University of Florida libraries, the Miami-Dade Public Library, and the Historical Museum of Southern Florida.

Ethnographic interviews determined that several cultural groups use the L-29 Canal for recreation and food. Formal and informal interviews were conducted with anglers, business owners, and members of the Airboat Association of

Florida. Because these activities are not limited to the canal or form the basis for identity of any group, the L-29 Canal was not recommended as a Traditional Cultural Property (New South Associates, 2006).

Archaeological surveys consisted of visual examinations, limited shovel testing along the right-of-way of the Tamiami Trail, and six areas having the greatest potential for containing archaeological deposit: the Osceola Camp, Everglades Safari Park, the Airboat Association of Florida, Gator Park, and Coopertown Restaurant and Airboat Rides. None of the locations contained cultural material (New South Associates, 2006).

Architectural historians assessed properties within the project area for NRHP eligibility. Five historic properties within the project corridor were recommended and evaluated for potential eligibility for the NRHP. Private properties include: Coopertown Airboat Rides and Restaurant, Gator Park and the Airboat Association of Florida. However, the Tamiami Trail and the Tamiami Canal were also recommended for NRHP listing. The SHPO has concurred with these recommendations for listing.

The Tamiami (Tampa to Miami) Trail is important as one of the state's major engineering projects during the early 20th century. It has an overall length of 245 miles with approximately 24 miles within Miami-Dade County. Although the roadway has experienced changes over the years, such as the paving of the original limerock road with asphalt, slight widening of the road and the addition of low metal marries on both sides of the road, the Tamiami Trail continues to retain its historic character. Additionally, the road's historic feeling, association, design, and setting are still evident. Its engineering and construction were performed under conditions that at the time were unprecedented in highway construction. It provided the first route across the southern peninsula and offered an opportunity for the general public to observe the Everglades from automobiles. Based on its associations with the developmental, commercial, and transportation history of Florida and the Miami-Dade County, the Miami-Dade County segment, including the portion adjacent to ENP, is considered to be a significant historic resource.

Two additional investigations of cultural resources commissioned by ENP revealed no additional resources within the footprint of the project (Schwadron, 2006a,b).

3.10 Aesthetics

The views along the project segment of the Tamiami Trail are interesting, but somewhat limited and constrained. On the north side of the highway are the L-29 Canal and the L-29 Levee, which extend along the entire 10.7 miles of the project segment. The view of the north side of the canal and levee is broken up

by several water control structures and the Tigertail Camp. A panoramic view of the sawgrass and occasional hammocks or tree islands is largely blocked by the height of the levee. On the south side, the view is often blocked by tall vegetation along the roadside. Occasional breaks allow some distance views. The Osceola Camp and the grove of trees at the Airboat Association site provide some points of interest.

3.11 Noise Environment

The 2003 GRR/SEIS evaluated existing conditions, future without project conditions, and the alternatives under consideration at that time. ***Table 3-3*** presents project area traffic data from the report.

Traffic noise impacts were evaluated using maximum peak hour traffic at level of service (LOS) "D" because they provide higher noise levels than maximum peak hour traffic at LOS "C." Because the geometry of all current alternatives is identical with respect to Highway Capacity Manual (HCM) operational analysis, projected flow, LOS, and average speeds are identical for a given year and month for all alternatives.

TABLE 3-3 PROJECT AREA TRAFFIC DATA

Year	ADT (vpd)	Design Hour (vph)	Flow (vph)	Level of Service (LOS)	Average Speed (mph)
2000	5,375	800	860	D	50
2020	8,852	1,316	1,400	D	50

Source: USACE (2003)

Sensitive receivers selected and evaluated for the 2003 report included the Flight 592 Memorial, Osceola Camp, Safari Park, Gator Park, Tigertail Camp, Coopertown Airboats and the Airboat Association of Florida. Three sound levels were determined for each activity: (1) noise abatement criteria (NAC); (2) existing noise levels; and (3) predicted noise levels.

Ambient noise levels were recorded for 16.5 hours at the Osceola Camp and at the Tigertail Camp to determine background and peak hour noise levels. Measurements indicated average background A-weighted hourly equivalents (LAeq1h) of 65.8 decibels (dBA) at the Osceola Camp and 58.4 dBA at the Tigertail Camp. Peak hour levels were 68.0 dBA at the Osceola Camp and 61.0 dBA at the Tigertail Camp.

Peak hour existing conditions from the 2003 report are presented in ***Table 3-4***. Significantly, the evaluation indicated that the northwest portion of the Osceola

Camp exceeded FDOT approach criterion of 66 dBA at peak hour existing conditions.

TABLE 3-4 EXISTING PEAK HOUR NOISE LEVELS

Site	Receiver[1]				
	1	2	3	4	5
Flight 592 Memorial	59.9	--	--	--	--
Osceola Camp	68.3	62.0	57.5	62.2	62.6
Safari Park	69.6	69.9	--	--	--
Gator Park	69.6	62.7	--	--	--
Tigertail Camp	60.5	60.8	--	--	--
Coopertown Airboats	69.6	69.9	62.7	--	--

Note: [1]Receivers are hypothetical points for sites for existing peak-hour modeling.

Source: USACE (2003).

3.12 Tribal Lands

The Miccosukee Tribe of Indians has lived in what is now ENP for generations and has traditional, aboriginal, and statutory rights to live in the Everglades.

Two Miccosukee Tribe family group settlements are located within the project area: the Tigertail Camp and the Osceola Camp. The Tigertail Camp, located north of Tamiami Trail between the L-29 Canal and the L-29 Levee, is home to approximately 15-20 people, as indicated by the 2003 report. Vehicle access is by means of unimproved roads adjacent to and on top of the L-29 Levee that intersect the Tamiami Trail at canal crossings at each end of the project area. A pedestrian bridge crossing the canal connects a small parking area along the northern side of the highway to the Tigertail Camp. The living facilities of the Tigertail Camp were recently elevated above the flow levels anticipated for MWD.

According to the RGRR/SEIS, the Osceola Camp is home to 10-15 people. It is located on the south side of the Tamiami Trail approximately one-half mile east of the western end of the project area. Access is by vehicle directly from the highway.

3.13 Economics/Socioeconomics

The project study area is west of the "limits to urbanization" boundary established by the Miami-Dade Planning Department. Coupled with the protected natural areas north and south of the corridor, this effectively means that no additional development would be allowed along the corridor within the project limits. However, new ENP operations/visitor areas are possible in light

of the ongoing ENP GMP process consistent with the Everglades National Park Protection and Expansion Act of 1989.

The Miami-Dade County region is a major metropolitan area with a population in excess of two million. The region supports a diverse economy with an emphasis on tourism, wholesale and retail trade, manufacturing, and shipping/transport. One-third of the Miami-Dade County area is within the boundary of ENP.

According to the 2000 census, the population of the county is approximately 70 percent white and slightly more than 20 percent black. Approximately 57 percent of Miami-Dade residents identify themselves as Hispanic. In 2000 it was estimated that 18 percent of the county's residents were in poverty, with almost 25 percent of that number being children under the age of 18. Over one million people were employed.

Three tourist-oriented businesses located on the south side of Tamiami Trail in the study area offer airboat trips, souvenirs and restaurant facilities: Coopertown Airboat Rides and Restaurant, Everglades Safari Park and Gator Park, Inc. The particular attraction of the businesses is ecotourism.

3.14 Flight 592 Memorial

The Valu Jet Flight 592 Memorial is located at the western end of the project area on the northern side of the L-29 Levee, about 250 feet from Tamiami Trail. Access to the memorial is via the S-333 canal crossing. The site consists of a parking area and a sculpture/memorial consisting of 110 concrete pillars that symbolize each of the lives lost in the DC-9 crash on May 11, 1996. The pillars are arranged in a triangular pattern that points to the actual crash site eight miles away in the Everglades.

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