NATURAL RESOURCES EVALUATION

SR 9 / I-95 AT SR 80 / SOUTHERN BOULEVARD PROJECT DEVELOPMENT & ENVIRONMENT STUDY

(SR 80 MP 19.1 to 20.4 and I-95 MP 24.3 to 25.3)

ETDM No.: 14183/ FAP No.: TBD
Financial Project ID: 435516-1-22-02
Palm Beach County

Prepared For:
FDOT District Four
3400 W. Commercial Blvd.
Ft. Lauderdale, FL 33309

September 2017

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016 and executed by the Federal Highway Administration (FHWA) and FDOT.

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September 2017

Natural Resources Evaluation
SR 9 / I-95 at SR 80 / Southern Boulevard PD&E Study

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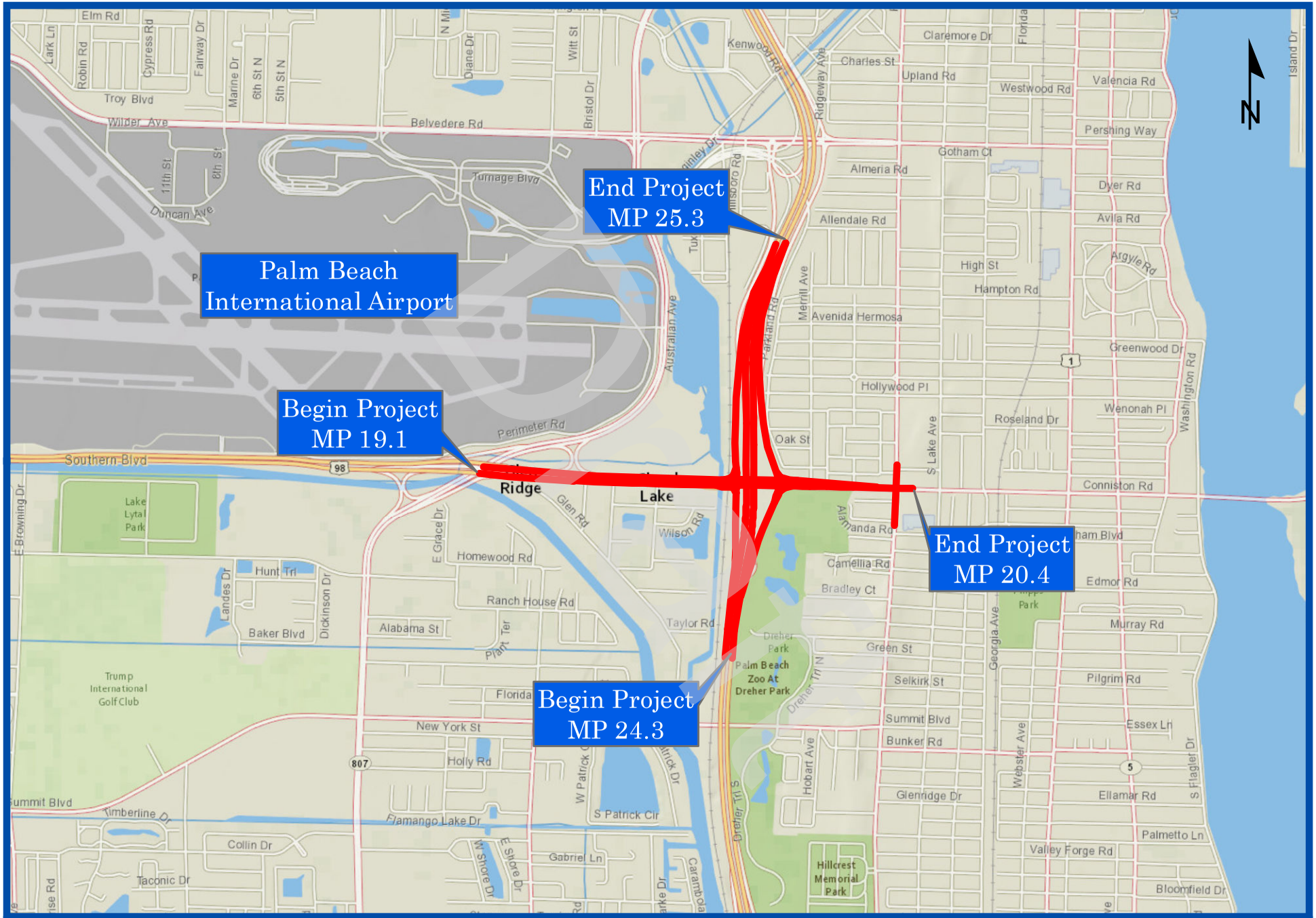
1.0 Introduction

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study to evaluate alternatives for the ultimate improvements of the State Road (SR) 9/I-95 and SR 80/Southern Boulevard Interchange in Palm Beach County, Florida.

This Natural Resources Evaluation (NRE) Report is prepared in accordance with the FDOT PD&E Manual, Part 2, Chapters 18 (Wetlands and Other Surface Waters) and 27 (Protected Species and Habitat), dated August 22, 2016 and August 26, 2016, respectively and other state and federal laws and requirements. The purpose of this report is to document the endangered species and wetland analyses in support of the environmental study consistent with federal, state, and local objectives for the Recommended Alternative. Essential Fish Habitat (EFH), which describes all waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity, is not present within the project corridor. Therefore, this natural resource element is not discussed further in this report.

1.1 Project Description

This interchange was one of seventeen interchanges studied as part of the I-95 Interchange Master Plan that reexamined the 2003 I-95 Interchange Master Plan Study and the State Road 9 (SR 9) / I-95 mainline project. That project added a High Occupancy Vehicle (HOV) lane and auxiliary lanes from south of Linton Boulevard to north of PGA Boulevard in Palm Beach County and also included minor improvements to eight interchanges. Overall, the I-95 Interchange Master Plan recommended new short-term and long-term improvements to interchanges based on changes in traffic volumes and updated design standards. The SR 9 / I-95 at SR 80 / Southern Boulevard interchange is located between the Forest Hill Boulevard interchange (1.45 miles to the south), and the Belvedere Road interchange (1.01 miles to the north), and in proximity to multiple municipalities including the City of West Palm Beach, Town of Cloud Lake, Town of Glen Ridge, and unincorporated Palm Beach County. **Figure 1-1** depicts the project location.



FDOT	SR 9/I-95 at SR 80/Southern Boulevard Interchange Project Development and Environment Study Financial Project ID: 435516-1-22-02, ETDM No: 14183	Figure 1-1 Project Location Map	Page No. 1-2

This interchange project proposes to improve interchange operations to address traffic spillback onto SR 9 / I-95, reduce congestion, and increase safety. This project will also be developed with consideration to the potential extension of the I-95 Express Lanes through this interchange area. Based upon the traffic operations analysis conducted for the interchange and adjacent signalized intersections [as documented in the I-95 (SR-9) Interchange at Southern Boulevard (SR-80) in Palm Beach County Interchange Concept Development Report], the following preliminary short-term and long-term improvements have been identified for this interchange:

2020 Opening Year (Short-Term) Recommended Improvements:

- Add an additional eastbound right-turn lane (dual) on the SR 80 / Southern Boulevard Bridge at the SR 9 / I-95 southbound on-ramp.
- Add an additional right-turn lane (dual) on the SR 9 / I-95 northbound off-ramp.

2040 Design Year (Long-Term) Recommended Improvements:

- Add an eastbound-to-northbound single lane flyover ramp to access the SR 9 / I-95 northbound on-ramp.
- Add a westbound-to-southbound single lane flyover ramp to access the SR 9 / I-95 southbound on-ramp.
- Realign the SR 9 / I-95 northbound off-ramp approach to SR 80 / Southern Boulevard and add an additional left-turn lane (quadruple) and right-turn lane (dual).
- Add two additional right-turn lanes (triple) to the SR 9 / I-95 southbound off-ramp.
- Add an additional eastbound and westbound left-turn lane (dual) on SR 80 / Southern Boulevard at Parker Avenue.
- Add an additional northbound left-turn lane (dual) on Parker Avenue at SR 80 / Southern Boulevard.
- Add an exclusive southbound right-turn lane on Parker Avenue at SR 80 / Southern Boulevard.

This project will evaluate the improvements listed above, as well as, the No-Build and two additional Build alternatives for the interchange.

SR 9 / I-95 is currently a ten-lane, divided interstate freeway from north of the Congress Avenue interchange to north of the PGA Boulevard interchange providing four general

purpose lanes and one High Occupancy Vehicle (HOV) lane in each direction. Auxiliary lanes are also provided in both the northbound and southbound directions on various segments throughout the corridor. The existing right-of-way varies as it approaches the interchange, but the typical right-of-way ranges from approximately 300 to 600 feet. As part of the Strategic Intermodal System (SIS) and one of two major expressways (Florida's Turnpike being the other) that connect the major employment centers and residential areas of Miami-Dade, Broward and Palm Beach Counties, SR 9 / I-95 serves an important role in facilitating the north-south movement of traffic in Southeast Florida.

Under the jurisdiction of the Florida Department of Transportation (FDOT), SR 80 / Southern Boulevard is an eight-lane divided, urban principal arterial designated as an SIS facility west of SR 9 / I-95, and a four-lane divided, urban principle arterial east of SR 9 / I-95. This east-west facility currently bridges over the South Florida Rail Corridor (SFRC) / CSX Railroad and SR 9 / I-95. SR 80 / Southern Boulevard at the SR 9 / I-95 interchange is a typical diamond configuration and has dual left-turn lanes and a single right-turn lane in both the eastbound and westbound directions to access the SR 9 / I-95 on-ramps. The existing right-of-way varies from approximately 135 feet east of SR 9 / I-95 to 180 feet west of SR 9 / I-95. Sidewalks and designated bicycle lanes are provided along both sides of SR 80 / Southern Boulevard within the area of influence. The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016 and executed by the Federal Highway Administration (FHWA) and FDOT.

1.2 Project Purpose

The purpose of the project is to enhance overall traffic operations at the existing interchange of SR 9 / I-95 and SR 80 / Southern Boulevard by providing improvements to achieve acceptable Levels of Service (LOS) at the interchange in the future condition (2040 Design Year). Conditions along SR 80 / Southern Boulevard are anticipated to deteriorate below acceptable LOS standards if no improvements occur by 2040; the interchange will have insufficient capacity to accommodate the projected travel demand.

1.3 Project Need

The need for the project is based on the need to improve operational capacity, improve overall traffic operations in order to accommodate future growth and development, improve safety conditions, and enhance emergency evacuation and response times.

This project is anticipated to improve traffic operations at the SR 9 / I-95 and SR 80 / Southern Boulevard interchange and study area roadways / intersections by implementing operational and capacity improvements to meet the future travel demand projected as a result of Palm Beach County population and employment growth.

Based upon the traffic operations analysis conducted for the SR 9 / I-95 at Southern Boulevard (SR-80) interchange and adjacent signalized intersections [documented in the *I-95 (SR-9) Interchange at Southern Boulevard (SR-80) in Palm Beach County Interchange Concept Development Report*], the existing AM and PM peak hour traffic conditions for the four study intersections along SR 80 / Southern Boulevard range from LOS A to D in the AM peak hour, and from LOS B to D in the PM peak hour. Without interchange improvements, the future year (2040) AM peak LOS will decline and range from B to F. PM peak hour LOS will range from C to F. Although all of the intersections along SR 80 / Southern Boulevard operate at LOS D or better under existing conditions, a noteworthy point is that several of the individual through and turning movements at the intersections (which include the SR 9 / I-95 on / off ramp approaches) operate at LOS F during both the AM and PM peak periods. Without the proposed improvements, the intersections are projected to experience excessive delays and queuing, and operate below acceptable LOS standards by the 2040 Design Year.

Commercial retail / office, hotel and residential land uses are located adjacent to the interchange. Residential, hotel and commercial office uses are located along SR 80 / Southern Boulevard west of SR 9 / I-95. Predominantly residential and industrial uses are located to the west of Gem Lake Drive, while residential and commercial uses are located to the east of SR 9 / I-95. According to the Future Land Use Maps for Palm Beach County, the project area is to remain relatively unchanged.

Population within the vicinity of the interchange is anticipated to increase by approximately 12% from 2005 to 2035 with the majority of the growth occurring southeast of the SR 9 / I-95

at SR 80 / Southern Boulevard interchange. Employment is expected to increase by approximately 784% from 2005 to 2035 with major increases in the areas located northeast and southwest of the interchange. These projections are based on data derived from the enhanced Southeast Regional Planning Model (SERPM) version 6.5, Managed Lanes Model (upgraded to include specific subarea improvements for the I-95 Interchange Master Plan). As such, the proposed improvements will be critical in supporting growth within the vicinity of the interchange and the overall vision of Palm Beach County.

The *I-95 (SR-9) Interchange at Southern Boulevard (SR-80) in Palm Beach County Interchange Concept Development Report* included a safety analysis of the project area. The total number of crashes in the three-year period 2010 through 2012 was 119, with 31% of those being rear-end type crashes, the predominant type of incident. FDOT's high crash location reports, for the period 2010 through 2012, provide locations that have a higher crash rate as compared to crash rates for similar statewide roadways. Based on FDOT's 2011 high crash location report, the SR 9 / I-95 at SR 80 / Southern Boulevard interchange is considered a high crash location.

The proposed improvements are anticipated to provide additional through and turn lanes, as well as interchange ramp improvements, to help reduce conflict points and the potential occurrence of collisions at the interchange.

SR 9 / I-95 and SR 80 / Southern Boulevard serve as part of the emergency evacuation route network designated by the Florida Division of Emergency Management. Also designated by Palm Beach County as evacuation facilities, SR 9 / I-95 and SR 80 / Southern Boulevard are critical in facilitating traffic flows during emergency evacuation periods as they connect other major arterials and highways of the state evacuation route network. This project is anticipated to improve emergency evacuation capabilities by enhancing connectivity and accessibility to SR 9 / I-95 and other major arterials designated on the state evacuation route network from the west and east, and increase the operational capacity of traffic that can be evacuated during an emergency event.

2.0 Existing Conditions

2.1 Typical Sections

SR 80 is an eight-lane divided, urban principal arterial designated as a SIS facility west of I-95 and a four-lane divided, urban principal arterial east of I-95. The east-west facility bridges over the South Florida Rail Corridor (SFRC) / CSX Railroad and I-95. Sidewalks and designated bicycle lanes are provided along both sides of SR 80 within the project corridor. The existing typical sections for SR 80 and I-95 are shown in **Figures 2-1, 2-2, and 2-3**.

SR 80, west of I-95, has the following characteristics:

- Four 12-foot travel lanes in each direction;
- 4-foot bicycle lane in each direction;
- Curb and gutter, inside and outside;
- 7-foot sidewalks adjacent to the outside curb and gutter;
- 40 to 56-foot landscaped median; and
- Right-of-way varies from 170 to 290 feet.

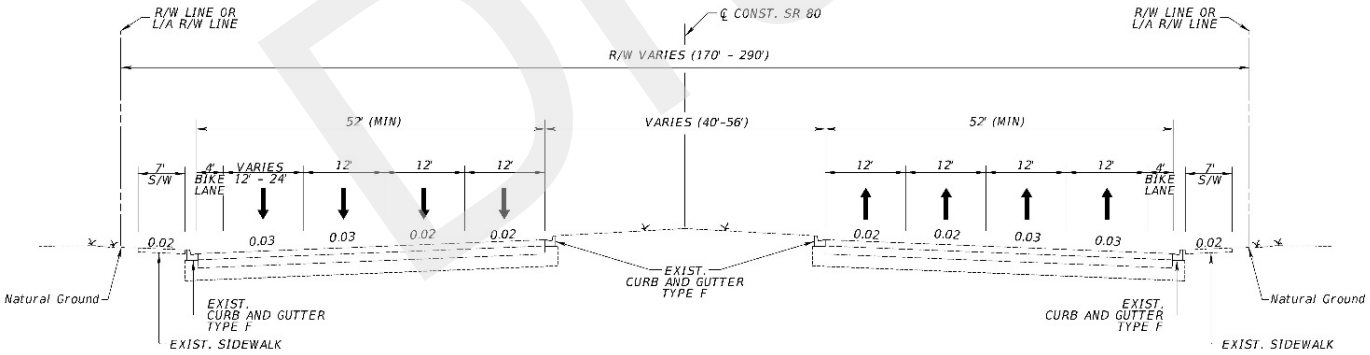


Figure 2-1: Existing Typical Section – SR 80, west of I-95

SR 80, east of I-95, has the following characteristics:

- At the interchange, three 12-foot travel lanes in each direction that merge to two 12-foot travel lanes east of the interchange area prior to the intersection with Parker Avenue;
- 4-foot bicycle lane in each direction;

- Curb and gutter, inside and outside;
- 6-foot sidewalks adjacent to the outside curb and gutter;
- 15 to 56-foot landscaped median; and
- Right-of-way varies from 100 to 285 feet.

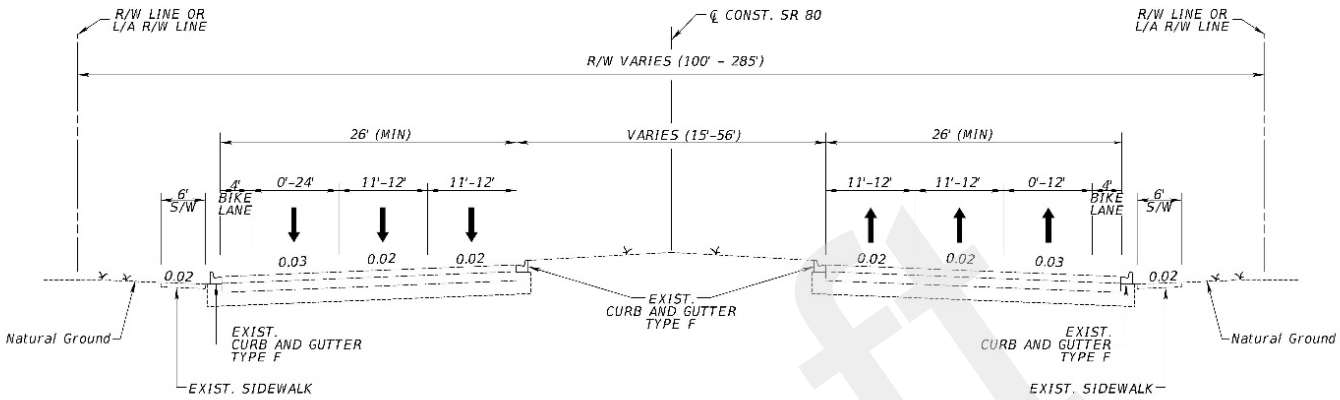


Figure 2-2: Existing Typical Section – SR 80, east of I-95

I-95 is currently a ten-lane, divided interstate freeway providing four general purpose lanes and one High Occupancy Vehicle (HOV) lane in each direction. Auxiliary lanes are also provided in both the northbound and southbound directions on various segments throughout the corridor.

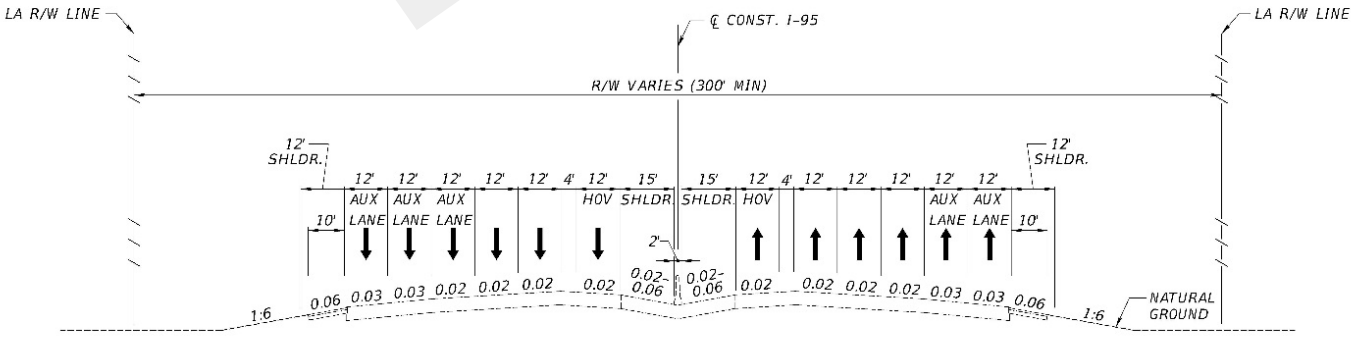


Figure 2-3: Existing Typical Section – I-95

3.0 Project Alternatives

3.1 No Build Alternative

The No Build Alternative assumes no proposed improvements and serves as a baseline for comparison against the other alternatives. This is consistent with requirements of the NEPA and FHWA guidelines. The No Build Alternative includes on-going construction projects and all funded or programmed improvements scheduled to be opened to traffic during the analysis years being considered. The No-Build Alternative, as its name implies, retains the existing roadway and bridge characteristics. Under this scenario, the existing SR 80 corridor would not be improved and conditions would continue to deteriorate. The No-Build Alternative has certain advantages and disadvantages. The advantages of the No-Build Alternative include:

- No expenditure of public funds;
- No disruption or temporary impacts (air, noise, vibration, travel patterns) due to construction activities;
- No right-of-way acquisition; and
- Elimination of public concern regarding future lane configuration, noise, and aesthetic impacts.

The disadvantages of the No-Build Alternative include:

- Does not meet the projects purpose and need;
- Increased vehicular congestion and delay, which leads to increased travel costs and driver frustration;
- Increased safety concerns, particularly at the ramp intersections and Gem Lake Drive;
- Increased emergency response and evacuation time; and
- Decreased air quality and increased noise levels.

If no improvements are made, these conditions will continue to deteriorate. Consequently, the No Build Alternative does not satisfy the purpose and need for this project.

3.2 Build Alternatives

The following paragraphs summarize the various build alternatives evaluated as a part of this study. Originally, four build alternatives were considered: Alternatives 1, 2, 3, and 4. However, Alternative 2, which proposed dual flyovers at the third and fourth levels, was eliminated from further evaluation due to public opinion and Section 4(f) impacts at Dreher Park (see Preliminary Engineering Report (PER) for detailed information). Therefore, this alternative is not evaluated further in this document. The remaining build alternatives, 1, 3 and 4, have many similar elements that are listed below. The remaining paragraphs describe the unique features of the three proposed build alternatives.

Elements that are common and identical in each of the build alternatives include:

- Proposed signalization optimization at the ramp intersections and the downstream intersections east and west of the interchange (Gem Lake Drive and Parker Avenue);
- Gem Lake remains a signalized, full median opening;
- The directional median opening to access Lang Road via westbound Southern Boulevard is proposed to be closed due to proposed flyover ramps in the median of Southern Boulevard;
- The southbound I-95 exit ramp will provide three right turn lanes to westbound Southern Boulevard and two left turn lanes to eastbound Southern Boulevard; both of these movements will be signal controlled;
- The southbound I-95 entrance ramp will accommodate two eastbound right turn lanes and two westbound left turn lanes; both of these movements will be signal controlled;
- The northbound I-95 entrance ramp will retain the existing configuration of a single free-flow, right turn lane from westbound Southern Boulevard;
- The northbound I-95 exit ramp proposes to provide three at-grade, left turn lanes to westbound Southern Boulevard and two right turn lanes to the eastbound direction; these movements will be signal controlled;
- At the intersection with Parker Avenue, a dedicated, right turn lane will be added along eastbound Southern Boulevard, and the existing left turn lane storage will be increased. On the south leg of Parker Avenue, dual left turn lanes are proposed to westbound Southern Boulevard, along with one through lane and one combined through and right turn lane;

- No right-of-way acquisition is proposed in the historic Vedado Hillcrest neighborhood, Dreher Park, or along Parker Avenue;
- In areas where alternatives are proposing reconstruction, seven-foot, buffered bike lanes are planned. Areas of resurfacing propose four-foot bike lanes where possible. The exception is along Parker Avenue, where sharrows are proposed due to right-of-way constraints and consistency with existing conditions. The implementation of green bike lane markings are also proposed where appropriate.
- As requested by the communities, special emphasis pavement markings have been proposed at pedestrian crossings at all cross walks.

3.2.1 Typical Sections

The proposed mainline roadway and bridge typical sections are described below. All alternatives share common typical sections except for flyovers.

SR 80, west of I-95, will have the following characteristics:

- Four 12-foot travel lanes in each direction;
- 4 to 7-foot bicycles lane on both sides of SR 80;
- Curb and gutter, inside and outside;
- 6 to 7-foot sidewalks on both sides of the roadway;
- Single lane flyovers with 6-foot inside and outside shoulders located in the existing median area. Alternatives 1 and 3 have a single flyover and Alternative 4 has two flyovers proposed in the median area; and
- Right-of-way varies from 170 to 290 feet.

SR 80, east of I-95, will have the following characteristics:

- At the interchange, three 12-foot travel lanes in each direction that merge to two 12-foot travel lanes east of the interchange area prior to the intersection with Parker Avenue;
- 4-foot bicycle lane in each direction;
- Curb and gutter, inside and outside;
- 6-foot sidewalks adjacent to the outside curb and gutter;
- 15 to 56-foot landscaped median;

- An 11-foot right-turn lane will be added at the intersection of SR 80 and Parker Avenue; and,

  Right-of-way varies from 100 to 285 feet.

Parker Avenue, south of the intersection of SR 80, will receive minor improvements within the existing right-of-way and have the following characteristics:

- Two 10-foot left-turn lanes, one 11-foot through lane and one 11-foot shared through and right-turn lane in the north bound direction;
- One 11-foot lane in the south bound direction;
- Sharrows, 5-foot sidewalks adjacent to the curb and gutter on both sides; and
- Curb and gutter, inside and outside.

The bridges over I-95 and the railroad will be widened slightly but will share the following characteristics:

- Four 12-foot travel lanes in each direction separated by a concrete median;
- 4 to 7-foot bicycle lane in each direction;
- Curb and gutter, inside and outside;
- 6-foot sidewalks adjacent to the outside curb and gutter; and

Varying number of turn lanes to access the I-95 entrance ramps.

3.2.2 Alternative 1: Northbound to Westbound Flyover

Alternative 1 consists of a single flyover ramp from northbound I-95 to westbound Southern Boulevard. The conceptual plan for Alternative 1 is included in **Appendix A**. The proposed single lane ramp exits I-95 from the east side of the highway, climbs to the third level, crosses over I-95, and turns to the west within the median of Southern Boulevard. The proposed flyover ramp by-passes the intersection of Lang Road, which is proposed to be closed due to the ramp structure, and over Gem Lake Drive, which will remain open. The ramp continues over the existing, at-grade slip ramp that provides access to southbound Australian / Congress Avenue. The proposed ramp profile ties into the existing profile east of Australian Boulevard on the north side of the Southern Boulevard median, merging into the existing westbound Southern Boulevard. Along eastbound Southern Boulevard, three at-grade left turn lanes are proposed to access the northbound I-95 entrance ramp. The southbound I-95 entrance and exit ramps, as well as the eastern portion of SR 80 and Parker Avenue, are

proposed as listed above in the common elements.

Right-of-way acquisition is proposed for Alternative 1 west of I-95 along the north and south sides of the SR 80. On the south side, between Gem Lake Drive and Lang Road, an additional right-of-way width of 0 to 22 feet is required for the proposed improvements. Between Lang Road and I-95, 0 to 30 feet of right-of-way is required. On the north side of Southern Boulevard, approximately 0 to 40 feet of additional right-of-way is required for the proposed improvements. Right-of-way in this area would be acquired from the County-owned parcel (currently accommodating County offices and parking) and largely consists of under-utilized parking areas.

The proposed typical section for Alternative 1 is shown below in **Figure 3-1.**

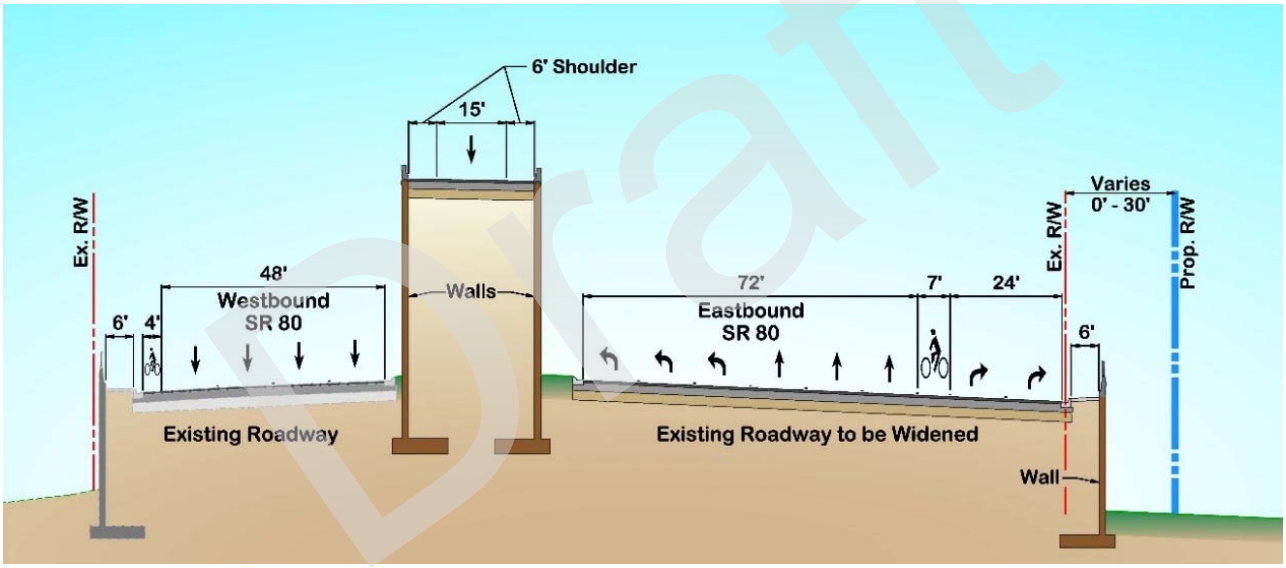


Figure 3-1: Alternative 1 Proposed Typical Section – SR 80 West of I-95

3.2.3 Alternative 3: Eastbound to Northbound Flyover

Alternative 3 consists of a single flyover ramp from eastbound Southern Boulevard to northbound I-95. The conceptual plan for Alternative 3 is included in **Appendix A**. The proposed single lane ramp develops in the median area of Southern Boulevard, east of the Gem Lake Drive intersection. The ramp then ascends to the third level, crosses over I-95 while turning to the north, and connects with the existing entrance ramp, prior to the braided ramps to the north of the interchange. For vehicles east of the Gem Lake Drive area (i.e.; Town of Cloud Lake) or motorists not wishing to utilize the flyover, two at-grade left turn

lanes are proposed to access the northbound I-95 entrance ramp at the existing entrance ramp location. The southbound I-95 entrance and exit ramps, the northbound I-95 exit ramp, and the eastern portion of SR 80, and Parker Avenue are proposed as listed in the common elements.

Right-of-way acquisition associated with Alternative 3 occurs on the west side of I-95 along the south side of Southern Boulevard between Gem Lake Drive and I-95. Proposed improvements will require approximately 12 to 40 feet of additional right-of-way.

The proposed typical section for Alternative 3 is shown below in **Figure 3-2**.

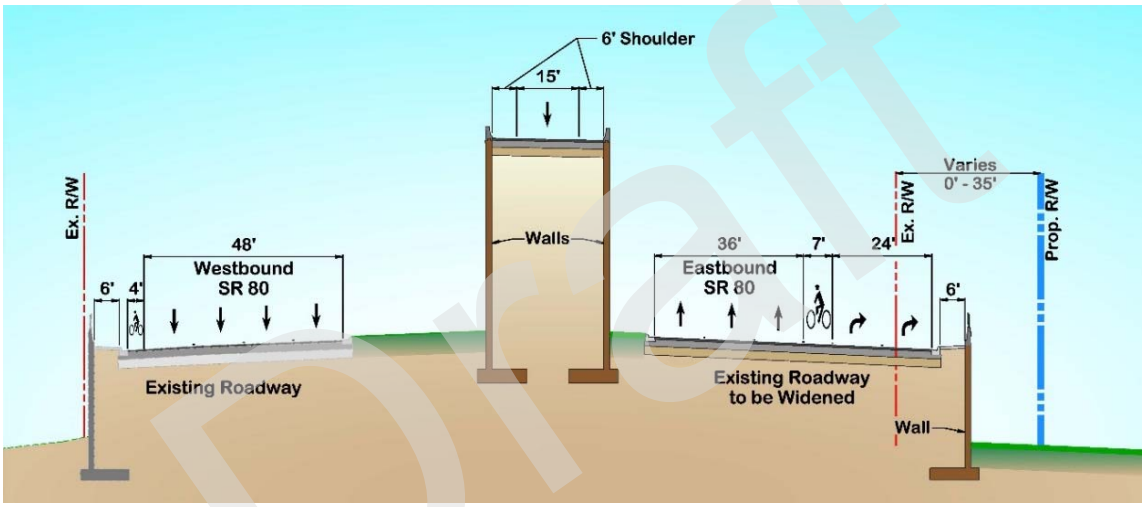


Figure 3-2: Proposed Typical Section – Alternative 3, SR 80 West of I-95

3.2.4 Alternative 4: Northbound to Westbound Flyover (Third Level) & Eastbound to Northbound Flyover (Third Level)

Alternative 4 essentially combines Alternatives 1 and 3 to provide dual third level flyovers: one from northbound I-95 to westbound Southern Boulevard, similar to Alternative 1, and one from eastbound Southern Boulevard to northbound I-95, similar to Alternative 3. The conceptual plan for Alternative 4 is included in **Appendix A**. Both flyover ramps consist of a single lane and are at the third level, thereby minimizing visual impacts, construction cost, and constructability issues. The method in which dual third level flyovers is accomplished is by shifting the Southern Boulevard alignment to the north and braiding the eastbound to northbound entrance under the elevated northbound to westbound ramp to begin its

alignment (at-grade) at Gem Lake Drive. This entrance will essentially align beside the existing westbound slip ramp that provides access to southbound Congress Avenue.

The proposed northbound-to-westbound single lane flyover begins to develop on the east side of I-95 and ascends to the third level. The proposed ramp crosses I-95 and turns to the west along Southern Boulevard, by-passing the intersections of Lang Road and Gem Lake Drive. The ramp continues over the existing, at-grade slip ramp that accesses southbound Australian / Congress Avenue and the eastbound-to-northbound ramp entrance, eventually matching the existing profile east of Australian Boulevard and merging into the inside lane of westbound Southern Boulevard. Vehicles wishing to access the County property and the Towns of Glen Ridge and Cloud Lake will utilize the three at-grade, left turns proposed at the northbound I-95 exit ramp. Access to the Town Cloud Lake, formerly by way of Lang Road, would be via the intersection of Gem Lake Drive. Travelers could turn left into Gem Lake Drive, or a U-turn maneuver could be executed with eastbound access into Lang Road.

The second flyover proposed in Alternative 4 consists of a single lane flyover ramp from eastbound Southern Boulevard to northbound I-95. The proposed ramp braids under the northbound-to-westbound flyover and develops on the north side of the median of Southern Boulevard, east of the Gem Lake Drive intersection and ascends to the third level, crosses over I-95 while turning to the north and connects with the existing northbound I-95 entrance ramp. As described above with Alternative 3, vehicles east of the Gem Lake Drive area (i.e., Town of Cloud Lake) or motorists not wishing to utilize the flyover, two at-grade left turn lanes are proposed to access the northbound I-95 entrance ramp at the existing entrance ramp location. The southbound I-95 entrance and exit ramps, the northbound I-95 exit ramp and the eastern portion of SR 80 and Parker Avenue, are proposed as listed in the common elements.

Alternative 4 requires additional right-of-way along both the north and south sides of Southern Boulevard to the west of I-95. On the north side of SR 80, in the area of the County-owned parcel, approximately 0 to 56 feet of right-of-way would be required to accommodate the improvements. Right-of-way in this area consists of mostly underutilized parking areas for the County offices and existing hotel. On the south side of Southern Boulevard, between Gem Lake Drive and Lang Road, approximately 12 to 28 feet of additional right-of-way is

needed. Parcels affected include one commercial property and three vacant parcels. Between Lang Road approximately 0 to 7 feet of right-of-way is required from two residential properties but would not result in any relocations.

The proposed typical section for Alternative 4 is shown below in **Figure 3-3.**

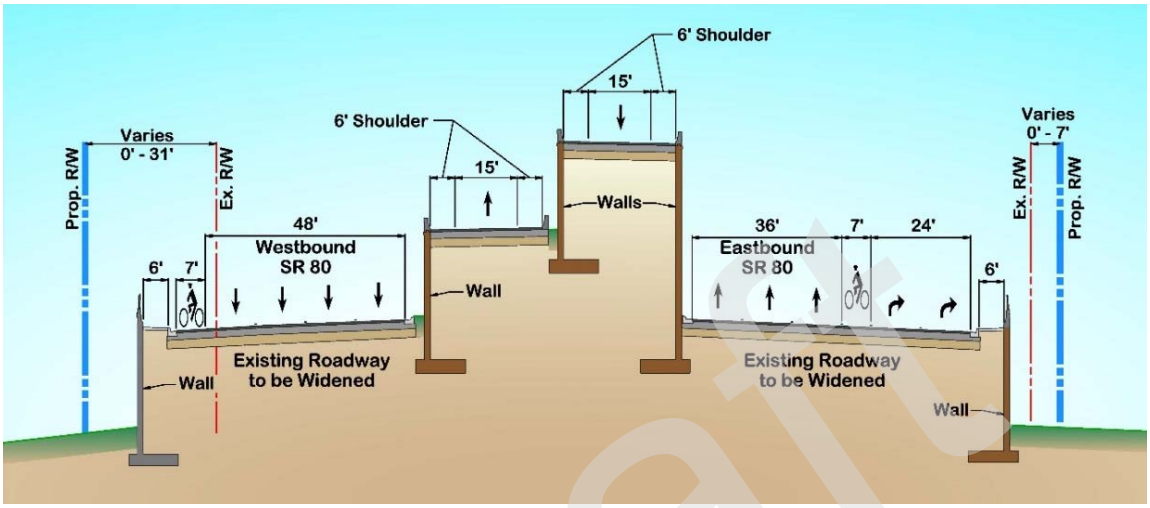


Figure 3-3: Proposed Typical Section – Alternative 4, SR 80 West of I-95

3.3 Recommended Alternative

Alternative 4 has been selected as the Recommended Build Alternative. This alternative provides dual third level flyovers: one from northbound I-95 to westbound Southern Boulevard, and one from eastbound Southern Boulevard to northbound I-95. Both flyover ramps consist of a single lane and are at the third level, thereby minimizing visual impacts, construction cost, and constructability issues. The method in which dual third level flyovers is accomplished is by shifting the Southern Boulevard alignment to the north and braiding the eastbound-to-northbound entrance under the elevated northbound-to-westbound ramp to begin its alignment (at-grade) at Gem Lake Drive. This entrance will essentially align beside the existing westbound slip ramp that provides access to southbound Congress Avenue.

The proposed northbound-to-westbound single lane flyover begins to develop on the east side of I-95 and ascends to the third level. The proposed ramp crosses I-95 and turns to the west along Southern Boulevard, by-passing the intersections of Lang Road and Gem Lake Drive. The ramp continues over the existing, at-grade slip ramp that accesses southbound

Australian / Congress Avenue and the eastbound-to-northbound ramp entrance, eventually matching the existing profile east of Australian Boulevard and merging into the inside lane of westbound Southern Boulevard. Vehicles wishing to access the County property and the Towns of Glen Ridge and Cloud Lake will utilize the three at-grade, left turns proposed at the northbound I-95 exit ramp. The northbound I-95 exit ramp proposes to provide three at-grade, left turn lanes to westbound Southern Boulevard and two right turn lanes to the eastbound direction; these movements will be signal controlled. Access to the Town Cloud Lake, formerly by way of Lang Road, (for which the existing directional median opening is proposed to be closed), would be via the intersection of Gem Lake Drive, also a signal controlled movement. Travelers could turn left into Gem Lake Drive, or a U-turn maneuver could be executed with eastbound access into Lang Road. The northbound I-95 entrance ramp will retain the existing configuration of a single free-flow, right turn lane from westbound Southern Boulevard.

The second flyover proposed in Alternative 4 consists of a single lane flyover ramp from eastbound Southern Boulevard to northbound I-95. The proposed ramp braids under the northbound-to-westbound flyover and develops on the north side of the median of Southern Boulevard, east of the Gem Lake Drive intersection, and ascends to the third level, crosses over I-95 while turning to the north, and connects with the existing northbound I-95 entrance ramp. Eastbound vehicles east of the Gem Lake Drive area (i.e., Town of Cloud Lake) or motorists not wishing to utilize the flyover would utilize two at-grade left turn lanes to access the northbound I-95 entrance ramp at the existing entrance ramp location. The northbound I-95 exit ramp provides three at grade left-turn lanes and two right-turn lanes, both of which will be signalized movements.

The southbound I-95 entrance ramp is proposed as a two lane ramp that merges down-stream into a single lane prior to entering I-95. From the both the eastbound and westbound directions, two right-turn lanes will access the I-95 southbound ramp at a signal controlled location.

The southbound I-95 exit ramp will provide three right-turn lanes to the westbound direction and dual left-turn lanes to the east; these movements will also be signal controlled.

Along SR 80 east of I-95, minor roadway improvements are proposed in the form of milling and resurfacing. At the intersection with Parker Avenue, a dedicated right-turn lane will be added along eastbound Southern Boulevard, and the existing left-turn lane storage will be increased. On the south leg of Parker Avenue, dual left-turn lanes are proposed to westbound Southern Boulevard, along with one through lane and right-turn lane.

Pedestrian facilities project-wide will be reconstructed or upgraded. West of I-95, in areas where the roadway will be reconstructed, new sidewalks will be provided. Sidewalks in the eastern portion of the project, in areas of resurfacing, will receive improved ADA ramp facilities. As requested by the communities, special emphasis pavement markings have been proposed at pedestrian crossings at all cross walks. Bicycle facilities, in areas where the roadway will be widened or reconstructed, are proposed to be seven-foot, buffered bike lanes with green pavement where appropriate. In the eastern portion of the project, in areas of resurfacing, bicycle lanes will remain as existing, four-foot wide, and be marked with green pavement where applicable as well. The exception to this configuration is on Parker Avenue, where sharrows will be utilized due to existing right-of-way constraints and for consistency with existing conditions of the segment of roadway to the north and south of the project limits.

Alternative 4 requires additional right-of-way along both the north and south sides of Southern Boulevard to the west of I-95. On the north side of SR 80, in the area of the County-owned parcel, approximately 0 to 56 feet of right-of-way would be required to accommodate the improvements. Right-of-way in this area consists of mostly underutilized parking areas for the County offices and existing hotel. On the south side of Southern Boulevard, between Gem Lake Drive and Lang Road, approximately 12 to 28 feet of additional right-of-way is needed. Parcels affected include one commercial property and three vacant parcels. Between Lang Road approximately 0 to 7 feet of right-of-way is required from two residential properties but would not result in any relocations. There is no right-of-way acquisition required along the eastern portion of SR 80 or Parker Avenue in order to accommodate the proposed improvements.

4.0 Project Area Description

The I-95 and Southern Boulevard corridor consists of a previously developed urban environment, with minimal to moderate habitat for listed species within and immediately adjacent to the right-of-way. Dry stormwater swales are adjacent to I-95 and four wet swales containing hydrophytic vegetation are located within the right-of-way. Pine Lake, a 34.8 acre freshwater system, is located within 200 feet of the proposed improvements, in the northwest quadrant. The Stub Canal is approximately 100 feet west of I-95; this canal is parallel to the TriRail tracks, and connects to the South Florida Water Management District (SFWMD) C-51 Canal to the south.

4.1 Existing and Future Land Use

Existing and future land use within, and adjacent to, the project corridor was mapped using the Palm Beach County Enterprise Geographic Information Systems (GIS) Data Catalog. Land use within the right-of-way is transportation/utilities with supporting features such as drainage swales. The primary land uses adjacent to the project corridor comprise developed parcels/properties, such as residential, institutional, commercial, and light industrial facilities, as well as recreation/open space. See **Figure 4-1** for the Palm Beach County Existing Land Use Map.

Palm Beach County Future Land Use Map (**Figure 4-2**) identifies the areas east of I-95 and Southern Boulevard to be residential and institutional land uses. The area west of the interchange is identified as utility/transportation, commercial, residential, industrial, and conservation land uses. The proposed improvements on the I-95 and Southern Boulevard Interchange will improve mobility and support the economic development of the local businesses as well as stimulate major construction activities that will contribute to the economic growth within the area.

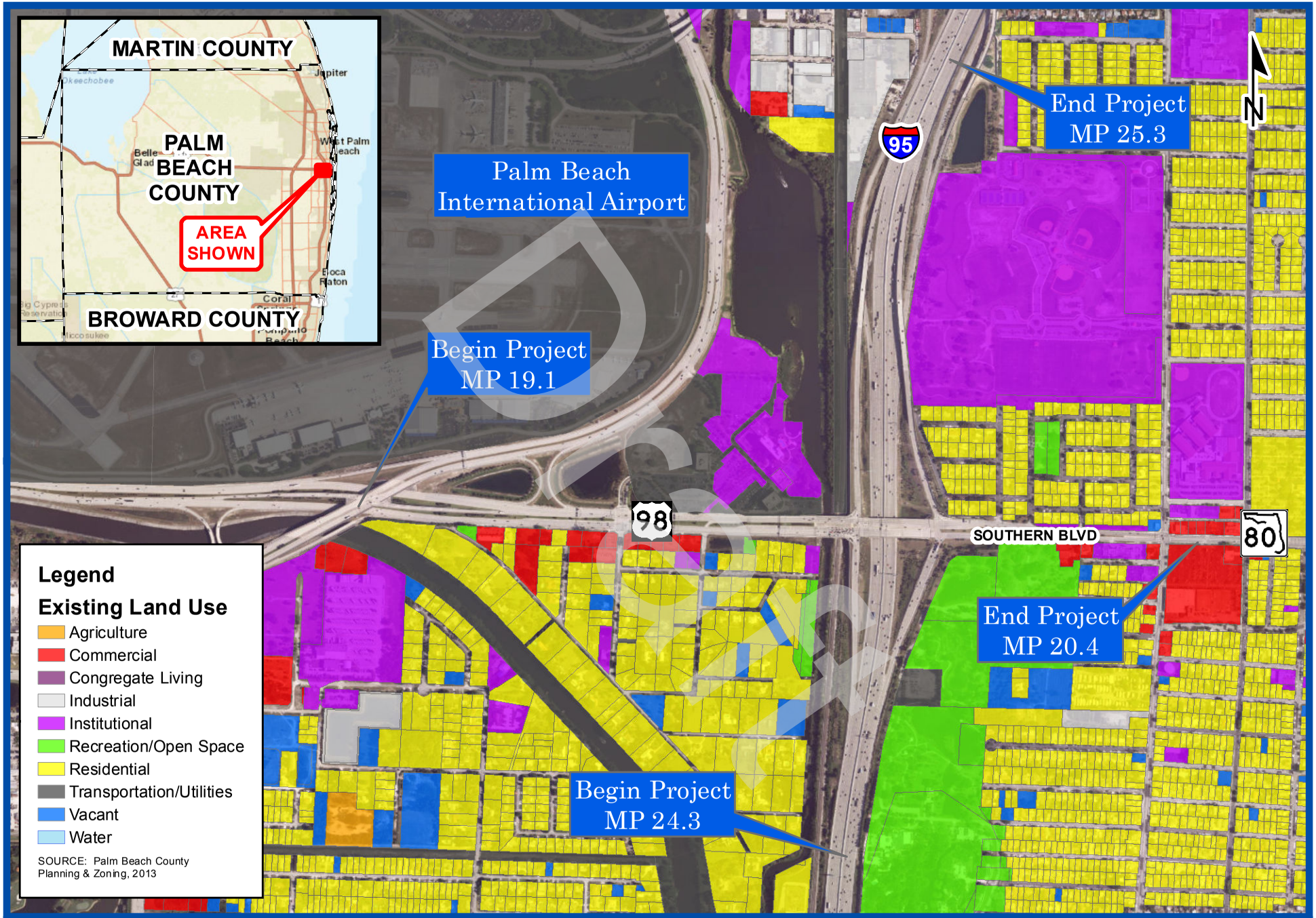


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Figure 4-1
Existing Land Use Map

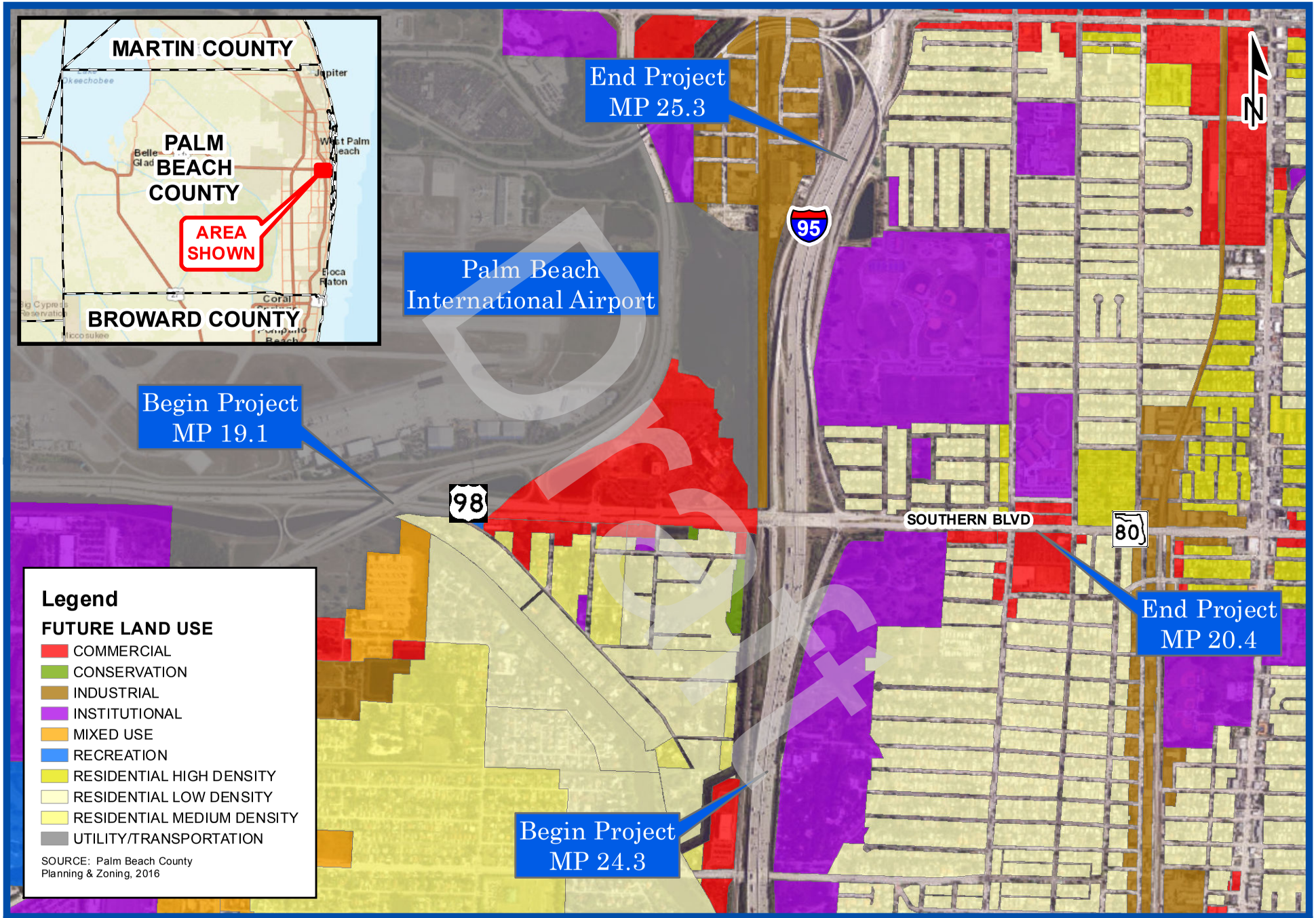

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Figure 4-2
Future Land Use Map

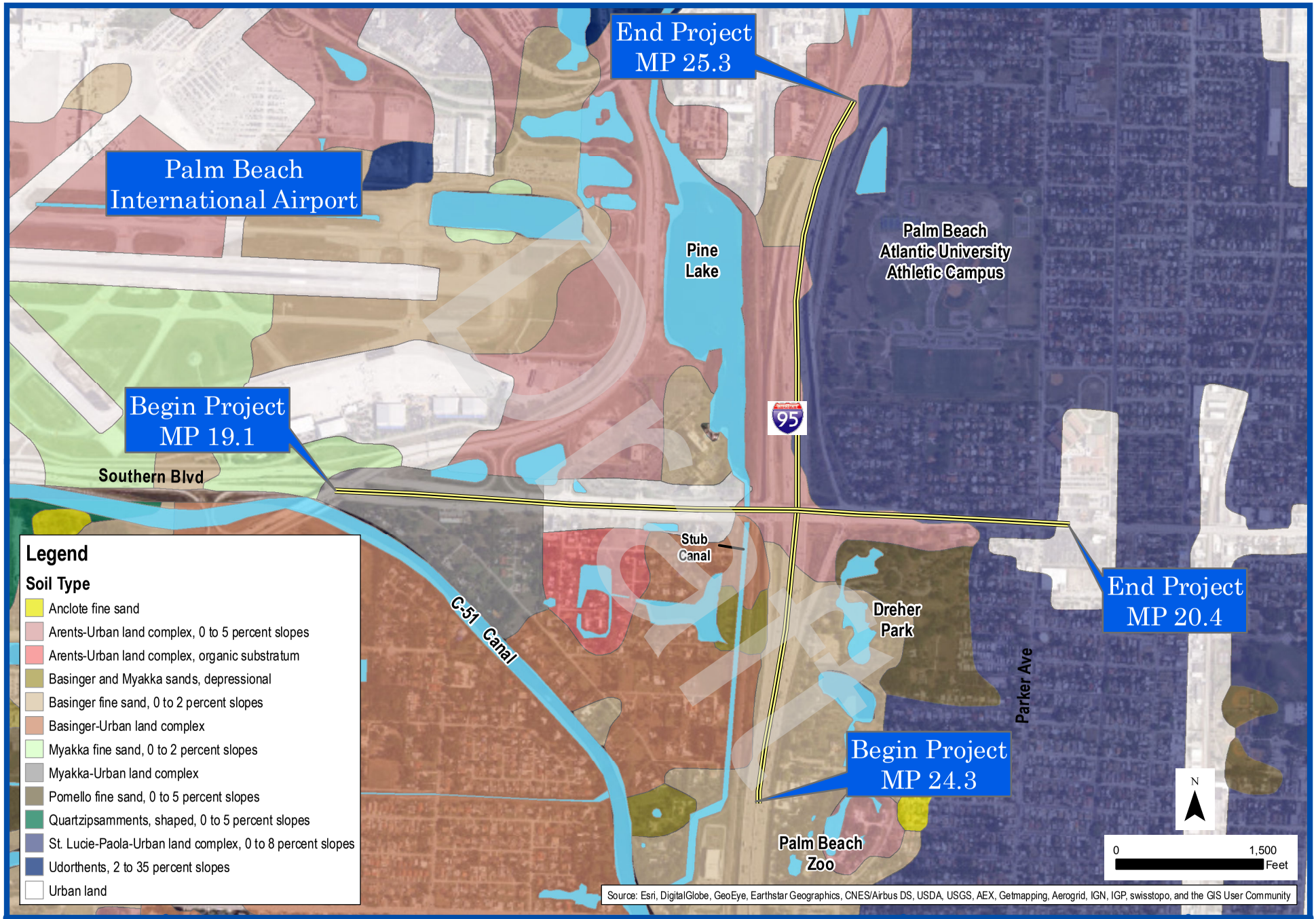
4.2 Soils

Based on the Natural Resources Conservation Service (NRCS) Soil Survey, mapped soil types within 600 feet of proposed improvements are classified in **Table 4-1,** and shown in **Figure 4-3**.

Table 4-1: Soils within 600 feet of the Proposed Improvements

Soil Name	Hydric Rating
Arents-Urban Land Complex, 0 to 5 Percent Slopes	Yes
Arents-Urban Land Complex, Organic Substratum	No
Basinger Fine Sand, 0 to 2 Percent Slopes	Yes
Basinger-Urban Land Complex	Yes
Basinger and Myakka Sands, Depressional	Yes
Myakka Fine Sand, 0 to 2 Percent Slopes	Yes
Myakka-Urban Land Complex	Yes
Pomello Fine Sand, 0 to 5 Percent Slopes	Yes
St. Lucie-Paola-Urban Land Complex, 0 to 8 Percent Slopes	No
Urban Land	No

Arents-Urban land complex, Basinger fine sand, Basinger-Urban land complex, Basinger and Myakka sands, Myakka fine sand, Myakka-Urban land complex, and Pomello fine sand are classified as hydric, and are mainly characterized as poorly drained sandy soils. However, historic soil conditions within and adjacent to the project corridor have been disturbed by residential and infrastructure development.



Legend

Soil Type

- Anclote fine sand
- Arents-Urban land complex, 0 to 5 percent slopes
- Arents-Urban land complex, organic substratum
- Basinger and Myakka sands, depressional
- Basinger fine sand, 0 to 2 percent slopes
- Basinger-Urban land complex
- Myakka fine sand, 0 to 2 percent slopes
- Myakka-Urban land complex
- Pomello fine sand, 0 to 5 percent slopes
- Quartzipsamments, shaped, 0 to 5 percent slopes
- St. Lucie-Paola-Urban land complex, 0 to 8 percent slopes
- Udorthents, 2 to 35 percent slopes
- Urban land

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Figure 4-3
Soils Map

5.0 Wetland and Surface Water Identification, Delineation, and Classification

In accordance with the FDOT PD&E Manual, Chapter 18, as well as applicable state and federal regulatory requirements, a wetland evaluation was conducted for all Build Alternatives. The objectives of this evaluation were to identify existing wetlands and other surface waters in proximity to the project, evaluate potential impacts to wetlands and surface waters associated with the construction of the project, and to assess the function and value of wetlands potentially affected by the project.

5.1 Data Collection

Data collection was performed prior to performing the field assessments to establish baseline wetland information. The following resources were reviewed for the presence of wetlands and other surface waters:

- ESRI aerial imagery;
- FDOT's Efficient Transportation Decision Making (ETDM) Screening Summary Report Number 14183 (incorporated by reference);
- FDOT's ETDM Environmental Screening Tool;
- FDOT I-95 Interchange at Southern Boulevard (SR 80) Interchange Concept Development Report (February 2014);
- NRCS Soil Survey for Palm Beach County;
- NRCS web soil survey;
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps.

5.2 Wetland and Surface Water Assessment Methodology

The project area was evaluated for the presence of wetlands and other surface waters within the existing I-95 and Southern Boulevard rights-of-way. No new offsite ponds are proposed for this project. Wetlands adjacent to the corridor were delineated based on the criteria specified in the US Army Corps of Engineers (USACE) Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Plain Region (Version 2.0) (USACE, 2010) and the Florida Department of Environmental Protection (FDEP) *Florida Wetlands Delineation Manual* (FDEP, 1995), with the aid of the resources described in

Section 5.1. Each area was classified using the Florida Land Use, Cover and Forms Classification System (FLUCFCS, FDOT, 1999). Representative ground level photographs are included as **Appendix B**.

A preliminary desktop review to identify wetlands and surface waters was performed prior to the field assessments based on aerial signatures, soils and NWI maps. Pedestrian transect surveys were used for the field reviews to confirm those identified areas and any additional potential wetland areas and adjacent properties were viewed from the edge of the existing right-of-way where possible. Field reviews were conducted on September 1, 2015. All reviews occurred during daylight hours between 8:30 am and 5:00 pm. Weather conditions were mostly sunny, 85-95°F.

Wetland and surface water boundaries were estimated through field surveys and review of aerial photography, hydrologic connectivity of systems, historical boundaries of existing wetland systems, and existing drainage plans throughout the project interchange. Approximate boundaries of the wetlands were delineated with a Wide Area Augmentation System (WAAS) corrected, submeter accurate TopCon Global Positioning System (GPS) unit in the field, then mapped using Georgraphic Information System (GIS) software. Surface waters and littoral areas were mapped through aerial interpretation. The wetland and surface water maps in the project area were created through multiple processes. In Arc GIS 10.3.1, the habitat shapefile was created from field review and aerial imagery data.

5.3 Existing Wetlands and Other Surface Waters

No natural wetlands are located within the project area. Small, man-made stormwater swales with hydrophytic vegetation are present within the project area, and are components of the highway's drainage system. The hydrology of these stormwater swales is dependent on rainfall, stormwater runoff, and groundwater. A FLUCFCS code of 511 was used to classify these man-made, vegetated drainage features. In addition, man-made surface waters (i.e., canals and retention ponds) are present. The Stub Canal runs north-south under Southern Boulevard, just west of I-95 and the CSX railroad track. The surface waters were classified with a FLUCFCS code of 510 for Stub Canal, and 534 for retention ponds less than 10 acres, and 534/640 for retention ponds less than 10 acres with a vegetated littoral shelf. Other surface waters adjacent, or in close proximity, to the corridor include Pine Lake, C-51

Canal, and retention ponds associated with commercial or residential developments west of the interchange, and in Dreher Park and Palm Beach Zoo to the southeast. The majority of retention ponds contain littoral shelves with hydrophytic vegetation. **Table 5-1** summarizes the stormwater swales and other surface water sites found in, or directly adjacent to, the project corridor. The size, hydrologic contiguity and vegetative structural diversity are described in the tables. **Figure 5-1** illustrates the location of these sites. Photographs of wet swales and surface waters are provided in **Appendix B**.

Table 5-1: Wet Swales and Other Surface Waters Within or Adjacent to the Proposed Improvements

ID	FLUCFCS Code	Approximate Area (AC)	Description	Dominant Wetland Vegetation	Hydric Soils (Historic)	Hydrologic Connection to Waters of the US
OSW-1	534	1.72	Stormwater retention area between Southern Boulevard and Australian Avenue. Dominated by open water, with small littoral area at western end. Multiple culverts surround and discharge to this drainage feature.	Torpedo grass (*Panicum repens*), cattail (*Typha domingensis*), primrose willow (*Ludwigia peruviana*), and spikerush (*Eleocharis* sp.)	Yes (Ae)	Yes
	534/640	0.07				
OSW-2	534	2.89	Stormwater retention area between Southern Boulevard and Australian Avenue. Dominated by open water, with narrow littoral area surrounding open water. Multiple culverts surround and discharge to this drainage feature.	Torpedo grass, cattail	Yes (Ae)	Yes
	534/640	0.60				
OSW -3	534	0.22	Stormwater retention area located on the north side of Southern Boulevard, east of Gem Lake Drive. Multiple culverts surround and discharge to this drainage feature.	Not present	No (Ur)	Yes
OSW-4	534	0.52	Stormwater retention area located on the south side of Southern Boulevard, east of Lang Road. Multiple culverts surround this drainage feature, which discharges to Stub Canal.	Cattail, primrose willow, and spikerush	No (Ur)	Yes
	534/640	0.26				
OSW-5	510	0.04	Stub Canal connects Pine Lake to the C-51 Canal to the south at Summit Boulevard. Steep cement rip-rap slopes; no littoral vegetation within the project area. Acreage within the project limits is 0.04. Total acreage cannot be determined, as the canal extends beyond the project limits.	Not present within 100 feet to the north and south of Southern Boulevard. Cattail and water lettuce (*Pistia stratiotes*) observed outside project limits.	Yes (Ae, Bc)	Yes

ID	FLUCFCS Code	Approximate Area (AC)	Description	Dominant Wetland Vegetation	Hydric Soils (Historic)	Hydrologic Connection to Waters of the US
Swale-6	511	0.07	Low-lying vegetated swale with 5-10% open water. Located between SB I-95 and SR 80 exit ramp. Dominated by freshwater marsh species within and directly adjacent to inundated area and mixed wetland vegetation in saturated areas. Drainage structure is located on the east perimeter and discharges to the swale.	Torpedo grass, cattail, primrose willow, pennywort (*Hydrocotyle umbellata*), pickerelweed (*Pontederia cordata*), and whitetop sedge (*Rhyncospora colorata*)	Yes (Ae)	Yes
Swale-7	511	0.47	Vegetated swale located between NB I-95 and NB ramp. Dominated by invasive/exotic species. Intermittent newly-planted landscape palms throughout swale. Drainage structures located on the SW corner and midway along east side discharge to the swale.	Torpedo grass, primrose willow, Carolina willow, pickerelweed, duck potato (*Sagittaria latifolia*), and pennywort	Yes (StPb)	Yes
Swale-8	511	0.42	Low-lying vegetated swale with 10-20% open water directly adjacent to SR 80 north retaining wall. Dominated by freshwater marsh species, bordered with recently planted landscape palms. Fenced drainage structure located on the NW corner discharges to the swale.	Torpedo grass, para grass (*Urochloa mutica*), duck potato, pickerelweed, spikerush, primrose willow, Carolina willow, and cattail	Yes (Ae, StPb)	Yes
Swale-9	511	0.05	Vegetated swale located between SB I-95 and RR. Dominated by FACW grasses/sedges. Depression located west of drainage structure adjacent to I-95.	Whitetop sedge, torpedo grass, duck potato, spikerush, primrose willow, cattail, and pennywort	Yes (Ba, Bc)	Yes
FLUCFCS: 510 – Canal; 511 – Wet swale; 534 – Reservoir (Pond) <10 Ac; 640 - Vegetated Littoral Shelf **Soils:** Ae - Arents-Urban land complex, StPb - St. Lucie-Paola-Urban land complex, Ba - Basinger fine sand, Bc - Basinger-Urban land complex; Ur – Urban Land						

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Figure 5-1
Surface Water/Wetland Map

5.3.1 Other Surface Waters

Four man-made retention ponds (OSW-1 through OSW-4), and the Stub Canal (OSW-5) are adjacent to the project's right-of-way. Approximate acreages of each surface water within the project limits are provided in **Table 5-1** above. The surface waters were classified with a FLUCFCS code of 510 for Stub Canal, and 534 for retention ponds less than 10 acres, and 534/640 for retention ponds less than 10 acres with a vegetated littoral shelf. These areas are exempt from state wetland regulations because they are part of a previously permitted stormwater management system. However, the littoral shelves are considered jurisdictional for the USACE because they meet applicable wetland criteria: hydric soils, hydrology and hydrophytic vegetation.

OSW-1 (FLUCFCS 534 and 534/640)

OSW-1 retention pond is located between Southern Boulevard and Australian Avenue. The system comprises approximately 1.79 acres (1.72 acre surface water and 0.07 acre littoral area). Multiple culverts surround and discharge to this drainage feature. Open water is approximately two to three feet in depth, with minimal littoral vegetation at the western end. Littoral vegetation observed was dominated by cattail and spikerush.

OSW-2 (FLUCFCS 534 and 534/640)

OSW-2 retention pond is located between Southern Boulevard and Australian Avenue. The system comprises approximately 3.49 acres (2.89 acre surface water and 0.60 acre littoral area). Multiple culverts surround and discharge to this drainage feature. Open water is approximately two to three feet in depth, with moderate littoral vegetation surrounding the waterbody. Littoral vegetation is dominated by cattail, primrose willow and spikerush.

OSW-3 (FLUCFCS 534)

OSW-3 retention pond is located on the north side of Southern Boulevard, east of Gem Lake Drive. Multiple culverts surround and discharge to this drainage feature. The system comprises approximately 0.22 acre surface water, approximately two to three feet in depth, with no littoral vegetation.

OSW-4 (FLUCFCS 534 and 534/640)

OSW-4 retention pond is located on the south side of Southern Boulevard, east of Lang Road. Multiple culverts surround this drainage feature, which discharges to Stub Canal. The system comprises approximately 0.78 acres (0.52 acre surface water and 0.26 acre littoral area). Open water is approximately one to two feet in depth and littoral vegetation is dominated by cattail, primrose willow, and spikerush.

OSW-5 (FLUCFCS 510)

OSW-5 comprises Stub Canal, a linear waterbody connecting Pine Lake to the West Palm Beach Canal (C-51), both of which are located outside of the project area. Stub Canal has steep cement rip-rap slopes within the area of Southern Boulevard, and no littoral vegetation.

5.3.2 Wetlands

No natural wetlands are present within the project area. Four man-made stormwater swales are within the project's right-of-way. Approximate acreages of each swale are provided in **Table 5-1**. Because these drainage swales were created and not natural landforms, a FLUCFCS code of 511 (Wet Swale) was used to describe them. The swales are considered jurisdictional wetlands for the USACE, because they meet applicable criteria: hydric soils, hydrology and hydrophytic vegetation. However, these areas are part of a previously permitted stormwater management system, and therefore are exempt from state wetland regulations.

Swale-6 (FLUCFCS 511)

Swale-6 is approximately 0.07 acre, located west of I-95 and east of the Southern Boulevard southbound exit ramp, approximately 350 feet north of Southern Boulevard. The swale is bordered by upland slopes leading to the exit ramp retaining wall and I-95 roadway. Dominant vegetation includes cattail in the inundated areas (approximately six to twelve inches in depth) and torpedo grass in the slightly elevated areas (approximately two inches in depth). Drainage structures drain into the southeast corner of the swale and hydrologically connect the swale to Stub Canal. This swale may provide foraging habitat for birds, fish, reptiles, and small mammals. The elevated portions of the swale appear to be mowed during the dry season.

Swale-7 (FLUCFCS 511)

Swale-7 is approximately 0.47 acre and is located immediately north of Swale-8, separated by an elevated upland berm. The swale is bordered on the north by an upland retention area, on the south by an upland berm, on the east by the I-95 northbound on-ramp, and on the west by I-95. Dominant vegetation includes torpedo grass and primrose willow. Standing water was not observed during the time of the assessment, although the ground was saturated. A drainage structure is located in the southwest corner of the area and hydrologically connects Swale-7 to Swales-8 and -6. This swale may provide foraging habitat for birds, reptiles, and small mammals. It appears that a portion of this area is mowed during the dry season.

Swale-8 (FLUCFCS 511)

Swale-8 is approximately 0.42 acre and is located east of I-95, north of Southern Boulevard. This swale is bordered to the north by an upland berm, on the south by the Southern Boulevard ramp retaining wall, on the east by the I-95 northbound on-ramp, and on the west by I-95. The vegetation is dominated by torpedo grass and para grass. Approximately one to two feet of water was observed during the field review. A fenced drainage structure is located in the northwest corner of the swale which hydrologically connects Swales -7, -6 and ultimately the Stub Canal. This swale may provide foraging habitat for a variety of birds, fish, reptiles, and small mammals.

Swale-9 (FLUCFCS 511)

Swale-9 is approximately 0.05 acre and located west of I-95 at the terminal end of the Southern Boulevard southbound entry ramp. This swale is bordered by upland swales to the north and south, by the railroad to the west, and I-95 to the east. Dominant vegetation includes whitetop sedge and torpedo grass. Approximately one to two inches of water was observed in this swale during the field review. A drainage structure drains into the northeast corner of the swale and a culvert is located along the western perimeter which connects the swale to Stub Canal under the railroad. The swale may provide foraging habitat for birds, reptiles, and small mammals. It also appears that a portion of the area is mowed during the dry season.

5.4 Wetland and Surface Water Impacts

Potential impacts associated with project implementation were evaluated. A discussion of direct, indirect and cumulative impacts associated with the project is provided below. The wetland and surface water impacts are situated along a linear strip of existing transportation corridor.

5.4.1 Avoidance and Minimization

No natural wetlands are located within the project area. Man-made stormwater swales and surface water littoral shelves considered jurisdictional wetlands for the USACE are located immediately adjacent to the existing roadway. Therefore, complete avoidance and minimization of wetland impacts is not possible or practicable to still meet the purpose and need of the project, because drainage and water quality and quantity requirements will not be met.

Based on the proposed roadway improvement for the Recommended Alternative (Alternative 4), existing stormwater swales and ponds will be modified to accommodate increased runoff from the roadway and new ramps, as well as any loss of existing storage. Existing control structures and outfalls will remain in place and will continue to function as in the existing condition. The proposed stormwater management facilities will meet FDOT drainage criteria, as well as SFWMD permit (water quality and quantity) criteria.

5.4.2 Direct Impacts

Direct impacts include placement of fill for roadway construction, and excavation of stormwater swales. For purposes of this PD&E impact assessment, impacts to wet swales and other surface waters were calculated based on the preliminary roadway plans. No natural wetland systems will be impacted by the project. Direct impacts to all stormwater swales within the existing I-95 right-of-way are anticipated due to construction activities associated with new interchange and stormwater treatment system construction. Minor impacts to a portion of the littoral shelf associated with an existing retention pond (OSW-4), is also anticipated due to road widening in the area. Functional losses for direct impacts were calculated using Uniform Mitigation Assessment Method (UMAM) (see Section 5.5 -

Wetland Mitigation). **Table 5-2** summarizes the direct impacts to stormwater swale and surface water (acreage) for Alternatives 1, 3 and 4.

Table 5-2: Summary of Potential Direct Wetland and Surface Water Impacts

ID	FLUCCS Code	Size (Ac)	Alternative 1 Direct Impact (Ac)	Alternative 3 Direct Impact (Ac)	Alternative 4 Direct Impact (Ac)
OSW-1	534	1.72	0.00	0.00	0.00
	534/640	0.07	0.00	0.00	0.00
OSW-2	534	2.89	0.00	0.00	0.00
	534/640	0.60	0.00	0.00	0.00
OSW -3	534	0.22	0.00	0.00	0.00
OSW-4	534	0.52	0.09	0.15	0.11
	534/640	0.26	0.13	0.14	0.11
OSW-5	510	0.04	0.00	0.00	0.00
Swale-6	511	0.07	0.07	0.07	0.07
Swale-7	511	0.47	0.47	0.47	0.47
Swale-8	511	0.42	0.42	0.42	0.42
Swale-9	511	0.05	0.05	0.05	0.05
Total Direct Impacts			**1.23**	**1.30**	**1.23**

5.4.3 Indirect and Cumulative Impacts

For linear transportation projects, indirect (secondary) impacts typically include disturbances to areas adjacent to the roadway corridor.

No indirect impacts are anticipated for stormwater swales within the existing I-95 right-of-way, because they will be completely impacted and no adjacent natural areas are present. Minor indirect shading impacts may occur in Stub Canal (OSW-5) due to the proposed roadway/bridge widening; however, based on the field review, this area of the canal has cement rip-rap slopes with no apparent submerged or emergent aquatic vegetation. Therefore, a UMAM assessment was not conducted as compensatory mitigation will not be required for indirect impacts for this area. Minor indirect impacts are anticipated for the littoral area of stormwater pond OSW-4. Indirect impacts are presented below in **Table 5-3.**

Table 5-3: Summary of Potential Indirect Wetland and Surface Water Impacts

ID	FLUCCS Code	Size (Ac)	Alternative 1 Indirect Impact (Ac)	Alternative 3 Indirect Impact (Ac)	Alternative 4 Indirect Impact (Ac)
OSW-1	534	1.72	0.00	0.00	0.00
	534/640	0.07	0.00	0.00	0.00
OSW-2	534	2.89	0.00	0.00	0.00
	534/640	0.60	0.00	0.00	0.00
OSW -3	534	0.22	0.00	0.00	0.00
OSW-4	534	0.52	0.00	0.00	0.00
	534/640	0.26	0.20	0.20	0.20
OSW-5	510	0.04	0.04	0.04	0.04
Swale-6	511	0.07	0.00	0.00	0.00
Swale-7	511	0.47	0.00	0.00	0.00
Swale-8	511	0.42	0.00	0.00	0.00
Swale-9	511	0.05	0.00	0.00	0.00
Total Secondary Impacts			**0.24**	**0.24**	**0.24**

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. I-95 and Southern Boulevard are existing roadways, and the proposed drainage improvements will have an incremental improvement on cumulative water quality over current conditions. These roadways are controlled access facilities that are not likely to promote additional development, although improved access may encourage expansion of already developed properties, and increase impervious area. However, cumulative impacts associated with any future development must comply with environmental regulations and standards of water quality, as well as consider habitat requirements of listed species. Therefore, the I-95 and Southern Boulevard Interchange Project is not expected to contribute to additional impact beyond the direct and secondary impacts described above in sections 5.4.2 and 5.4.3.

5.5 Wetland Mitigation

Wetland evaluations were completed using UMAM for each wet swale and the littoral shelf of OSW-4 proposed to be impacted by the project. If DuPuis Reserve (L-8 Marsh Restoration)

mitigation area or a mitigation bank is chosen to compensate for unavoidable wetland and surface water impacts during final design, another functional methodology may be required during permitting (e.g. Impact Ratio/UMAM Correlation for DuPuis Reserve, and M-WRAP for Loxahatchee Mitigation Bank).

The location of wetland and surface waters are shown in **Figure 5-1.** UMAM worksheets are contained in **Appendix C,** and provide the scoring rationale. These baseline scores have not been approved by state or federal agencies, but will be reviewed and/or verified as part of the permitting process. Compensatory mitigation for SFWMD is not anticipated because the wet swales and stormwater pond littoral shelf are part of a permitted stormwater treatment system. However, compensatory mitigation for the USACE may be required to offset wood stork foraging habitat loss for these areas. The results of the UMAM direct impact evaluations for existing conditions resulted in a score of 0.23, which means that the swales and littoral shelf in the project area are performing 23 percent of the functions of an ideal comparable wetland. UMAM can be used to estimate the functional loss[1] (and ultimately, the mitigation requirements) for direct and indirect impacts.

UMAMs - Direct Impacts

UMAMs were scored for two primary habitats: stormwater swales within the interchange, and littoral habitat associated with OSW-4. Based on field review and functional assessment, a total of 0.28 to 0.30 UMAM functional units of compensatory mitigation for Alternatives 1, 3 and 4 will be required to compensate for the direct impacts to USACE jurisdictional wetlands (**Table 5-4**). The UMAM sheets are included in **Appendix C.**

Table 5-4: UMAM Functional Units Impact Summary - Direct Wetland Impacts (FL[1])

ID	FLUCFCS Code	Alternative 1 FL	Alternative 3 FL	Alternative 4 FL
Swales and OSW-4 Littoral Shelf	511 and 534/640	0.28	0.30	0.28
	Total FL	**0.28**	**0.30**	**0.28**

[1] Functional loss is determined by multiplying the impact delta (change from existing conditions) by the acres of impact. Impact delta is determined by subtracting the score for the wetland with the project (with project) from the score for existing conditions (without project).

UMAM –Indirect Impacts

Minor indirect impacts were assessed where the proposed sidewalk will encroach upon OSW-4. Based on field review and a functional assessment of the littoral area to be impacted, a total of 0.01 UMAM functional units of compensatory mitigation for Alternatives 1, 3 and 4 will be required to compensate for negligible secondary impacts. **Table 5-5** summarizes these UMAM scores. The UMAM forms are included in **Appendix C**.

Table 5-5: UMAM Functional Units Loss Impact Summary- Secondary Wetland Impacts (FL)

ID	FLUCFCS Code	Alternative 1 FL	Alternative 3 FL	Alternative 4 FL
OSW-4 Littoral Shelf	534/640	0.01	0.01	0.01
	Total FL	**0.01**	**0.01**	**0.01**

A total of 0.29 freshwater herbaceous functional units may be required to offset direct and indirect impacts associated with Alternatives 1 and 4. Compensatory mitigation associated with Alternative 3 is slightly higher (0.31 freshwater herbaceous functional units). These values have not been agreed upon by agency staff, and will be reconsidered during design and permitting. Mitigation may be accomplished onsite through the creation of stormwater swales [one foot above Design High Water (DHW), if acceptable to the USACE], or offsite at a permittee responsible mitigation area (e.g. DuPuis Reserve) or authorized mitigation bank (e.g. Loxahatchee Mitigation Bank). Both DuPuis Reserve and Loxahatchee Mitigation Bank have appropriate habitat types to offset impacts to wetlands within the project limits, and are also permitted by the USACE to provide foraging habitat credits for wood storks.

5.6 Permitting

The following environmental permits are anticipated to be required:

- USACE – Section 404 Dredge/Fill Permit (Standard Permit or Nationwide Permit)
- SFWMD – Environmental Resource Permit (New Individual or Modification)
    - A new Individual Permit may be required, or there are two existing permits which may be modified: I-95 HOV Lanes (50-04154-P) or SR 80 West of I-95 to Parker Avenue (50-05327-P).
- SFWMD – Water Use Permit (construction dewatering)

- Project is not included in the Palm Beach County Master Dewatering Permit (#50-09836-W)

- Palm Beach County – Right-of-Way Permit
- FDEP – NPDES Permit

6.0 Endangered Species Biological Assessment Methods

This project was evaluated for impacts to wildlife and habitat resources, including protected species in accordance with 50 CFR Part 402 of the Endangered Species Act (ESA) of 1973, as amended, and Part 2, Chapter 27 of the FDOT PD&E Manual. Both wet and upland habitats exist within the project corridor, providing potential nesting and foraging habitat for federal and state-listed species. Stormwater swales with hydrophytic vegetation associated with the highway's drainage system provide low to moderate habitat for listed wading birds. Surface waters adjacent to the project area, including Stub Canal, Pine Lake, and PBIA retention ponds, contain littoral vegetation suitable for foraging wading birds. Upland drainage swales and other maintained grassed areas are located within the project's right-of-way, adjacent to Dreher Park, and along the perimeter of the TriRail system. These areas provide potential habitat for the Eastern indigo snake, burrowing owl, gopher tortoise, and commensal species.

6.1 Data Collection

A preliminary desktop review was performed prior to performing the field assessments to establish baseline information. Data collection through literature reviews, Environmental Technical Advisory Team (ETAT) review, agency database searches, agency coordination, and GIS analyses were performed to identify state and federally protected species occurring or potentially occurring within the project area that may be impacted by construction of the I-95 and SR 80 (Southern Blvd.) Interchange improvements. Information sources and databases utilized for the wildlife analysis include the following:

- ESRI 2013-2015 world aerial imagery;
- FDOT's ETDM Environmental Screening Tool;
- FDOT's ETDM Screening Summary Report Number 14183;
- FDOT I-95 Interchange at Southern Boulevard (SR 80) Interchange Concept Development Report (February 2014);
- Florida Natural Areas Inventory (FNAI);
- FNAI listed species element occurrence database;
- Florida Fish and Wildlife Conservation Commission (FWC) databases;
- FWC Bald Eagle Nesting database;
- FWC Waterbird Colony Locator;

- FWC's Strategic Habitat Conservation Areas (SHCA);
- USFWS Environmental Conservation Online System (ECOS);
- USFWS Wood Stork Rookeries (18.6 mile radius);
- USFWS Manatee, Atlantic Coastal Plants, and Scrub Jay GIS databases;
- USFWS Manatee Accessibility Map and Structure Access
- USFWS South Florida Multi-Species Recovery Plan (1999).

6.2 Field Survey Methodology

The proposed project is primarily contained within existing I-95 and Southern Boulevard rights-of-way. No new offsite ponds are proposed for this project. Pedestrian transects and windshield surveys were used for the field review, and adjacent properties were viewed from the edge of the existing rights-of-way. Windshield surveys were also used to review properties within 0.25 mile of the project corridor, which included Pine Lake and Stub Canal. The field review was conducted on September 1, 2015 during daylight hours between 8:30 am and 5:00 pm. Weather conditions were sunny and warm (85-95ºF). Representative ground-level photographs are included in **Appendix B**.

6.3 Listed Species Occurrences

The FDOT ETDM Screening Summary Report, FDOT EST, USFWS' listed species database for Palm Beach County, and FNAI were reviewed to develop a project-specific, protected species list.

6.3.1 Federally Listed Species

Based on the results of the combined desktop and on-site pedestrian reviews, the federally-listed species potentially existing within the project area are presented in **Table 6-1** with their corresponding listing status. Likelihood of occurrence is also presented, and is based on the above-mentioned data sources, as well as presence of suitable nesting or foraging habitat for each species.

Table 6-1: Federally Listed Species with the Potential to Occur within the Project Area

Scientific Name	Common Name	Listing Status	Likelihood of Occurrence
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	Moderate
Birds			
Mycteria americana	Wood Stork	FT	Moderate
Aphelocoma coerulescens	Florida Scrub-Jay	FT	No
Mammals			
Trichechus manatus	West Indian Manatee	FT	Low*
Plants			
Trichomanes punctatum ssp. floridanum	Florida Filmy Fern	FE	No
Jacquemontia reclinata	Beach Jacquemontia	FE	No
Asimina tetramera	Four-Petal Pawpaw	FE	No
Polygala smallii	Tiny Polygala	FE	No

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered

*Due to C-51 control structures S155 and S155A

Sources: FWC. January 2017. Florida's Endangered and Threatened Species; FNAI. 2016. Biodiversity Matrix; USFWS. 2016. ECOS; USFWS. September 2006. Central and Southern Florida Project Manatee Accessibility. SFWMD West Palm Beach Field Station.

Each species and their habitat requirements are discussed in the following sections.

6.3.1.1 Eastern Indigo Snake

The ETDM Summary Report #14183 referenced the potential for this snake to be present within the project corridor. In addition to being federally threatened, this snake is also a state-listed threatened species. Habitat requirements for this species are broad, ranging from scrub and sandhills to wet prairies and disturbed uplands. These snakes often inhabit gopher tortoise burrows, and one active burrow was observed during the September 1, 2015 field review within a dry stormwater swale in FDOT limited access right-of-way, adjacent to Dreher Park. However, a review of the burrow on January 19, 2017 revealed the burrow was abandoned. Marginal habitat is also present in other areas of open, undeveloped land along the corridor (e.g. along the Tri-Rail system). Ground level photographs of these areas are shown in **Appendix B**. Individuals of this species were not observed during the review.

6.3.1.2 Wood Stork

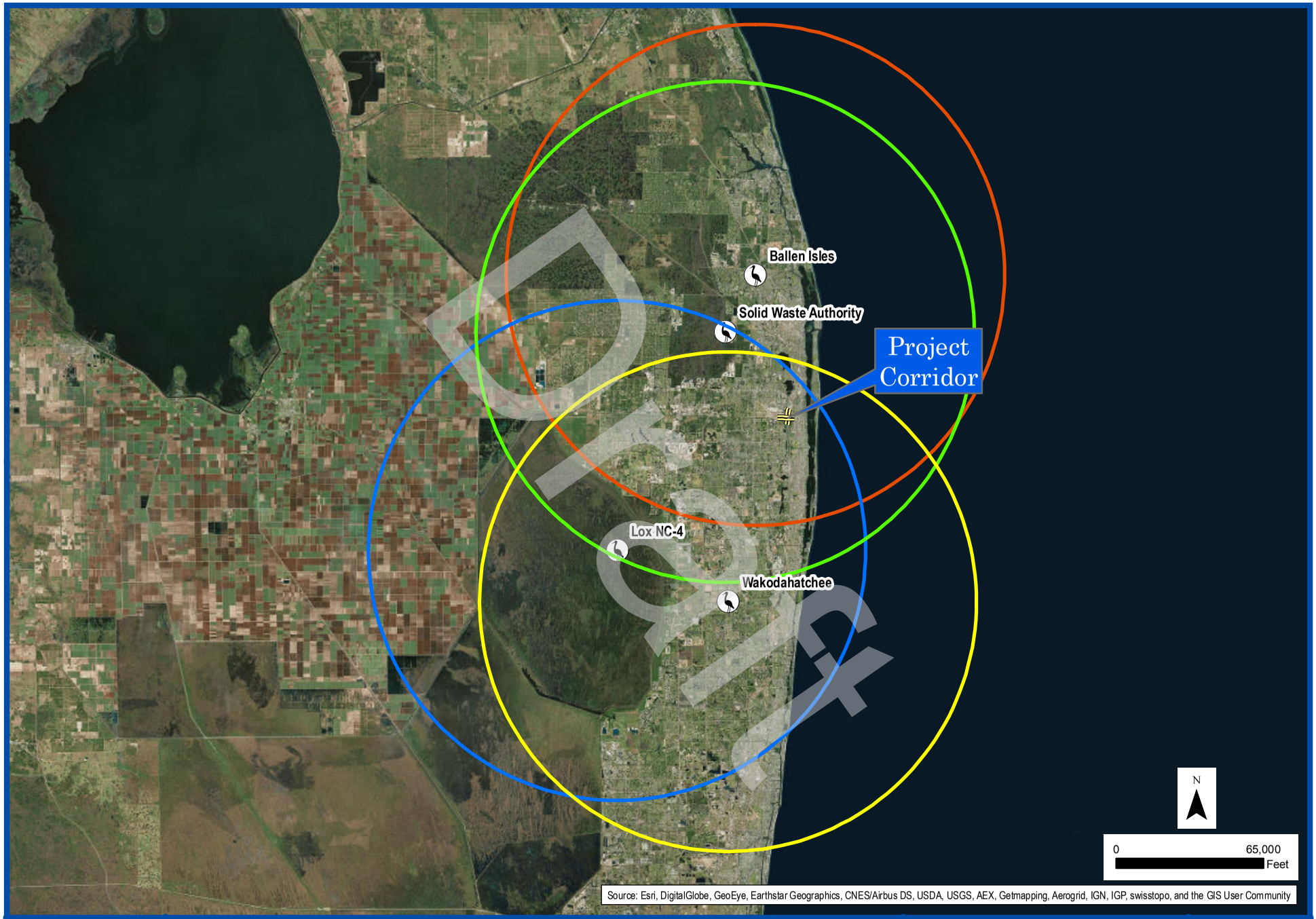
The project corridor falls within the Core Foraging Area (CFA) (within 18.6 miles) of four nesting wood stork colonies (**Figure 6-1**). The wood stork is a large wading bird that nests in inundated wetland forests, and forages in water depths ranging from 2 to 15 inches. Portions of Stub Canal, outside the project area, and Pine Lake are adjacent to the project corridor, and contain suitable foraging habitat (SFH) for this species. Drainage swales and retention ponds within, or adjacent to, the right-of-way also contain SFH. Individuals of this species were not observed during the field reviews. In addition to being listed as federally threatened, the wood stork is also a state-listed threatened species.

6.3.1.3 Florida Scrub Jay

The project corridor is located within the USFWS Consultation Area for the Florida scrub-jay (**Figure 6-2**). However, this species has very specific habitat, primarily well-drained, sandy ridges with short oaks, open patches of sand, and few trees. This type of scrub habitat is not present within, or immediately adjacent, to the project right-of-way, and no individuals were observed during the field review. The Florida scrub-jay is listed as both state and federally threatened.

6.3.1.4 West Indian Manatee

In addition to being listed as federally threatened, the West Indian manatee is also a state-listed threatened species. The West Indian manatee inhabits coastal bays, rivers, and occasionally lakes. Individuals of this species were not observed during field reviews. According to USFWS, critical habitat for this species is located within portions of Pine Lake, the C-51 canal, and a retention pond within the Town of Cloud Lake. However, the USFWS GIS critical habitat layers are not consistent with the manatee critical habitat definition in the Code of Federal Regulations (50 CFR, Chapter 1, Part 17). Additionally, after review of the Central and Southern Florida Project Manatee Accessibility Map and Structure Access data, it appears manatee critical habitat near the project site is inaccessible due to SFWMD C-51 weir structures S155 to the southeast and S155A to the west. Coordination with USFWS Manatee Recovery Coordinator, Jim Valade, in August and November of 2016 confirmed the above-mentioned waterbodies are not considered manatee critical habitat due



FDOT

SR 9/I-95 at SR 80/Southern Boulevard Interchange
Project Development and Environment Study
Financial Project ID: 435516-1-22-02, ETDM No:14183

Figure 6-1
Wood Stork Colonies and Foraging Areas

FDOT

SR 9/I-95 at SR 80/Southern Boulevard Interchange
Project Development and Environment Study
Financial Project ID: 435516-1-22-02, ETDM No:14183

Figure 6-2
Threatened and Endangered Species Consultation Area Map

to inaccessibility, and also confirmed no sightings or strandings of this species within the project area (**Appendix D**).

6.3.1.5 Atlantic Coastal Plants

The ETDM Summary Report #14183 makes a general reference to "Federally listed plants in Palm Beach County" that may occur within the project area. Based on the link provided in that report, the four plants listed below were reviewed. Please note Johnson's seagrass (*Halophila johnsonii*) is a federally-listed species residing in Palm Beach County that is limited to tidal areas; not associated with this corridor. Therefore, this plant species is not discussed. The project corridor is located within the USFWS Consultation Area for Atlantic Coastal Plants (**Figure 6-2**). The flowering plants identified are listed in **Table 6-1** and briefly described below.

6.3.1.6 Florida Filmy Fern

The Florida filmy fern is a small fern with delicate, overlapping leaves and long, thread-like stems. These ferns are endemic to Florida and may be mistaken for moss, algae, or liverworts. Habitat comprises tree trunks in hammocks, edges of limesinks, and limestone boulders. This habitat type was not identified within, or adjacent to, the project corridor during the field review.

6.3.1.7 Beach Jacquemontia

This vine has a woody base and non-woody, creeping or twinning stems up to six feet long. Its habitat consists of the lee side of stable, vegetated dunes, disturbed openings in maritime hammock, coastal strand and coastal scrub. This habitat type was not identified within, or adjacent to, the project corridor during the field review.

6.3.1.8 Four-Petal Pawpaw

This shrub ranges from 3 to15 feet tall with one to several arching stems. Its habitat consists of sand pine scrub on the south-central Atlantic Coastal Ridge. This habitat type was not identified within, or adjacent to, the project corridor during the field review.

6.3.1.9 Tiny Polygala

This perennial, short-lived herb forms a rosette, and grows no more than eight centimeters tall. It has one to four typically unbranched stems with a scented taproot. The tiny polygala requires high light levels, open sand, and little to no organic litter within pine rockland, scrub, sandhill, and open coastal spoil pile habitats. These habitat types were not identified within, or adjacent to, the project corridor during the field review.

6.3.2 State Listed and Other Species

The ETDM Summary Report #14183 indicated minimal involvement with state-listed species. Based on our field reviews, some state–listed species could be associated with the project corridor. These species are listed in **Table 6-2**.

Table 6-2: State Listed Species with the Potential to Occur within the Project Area

Scientific Name	Common Name	Listing Status	Likelihood of Occurrence
Reptiles			
Gopherus polyphemus	Gopher Tortoise	ST	Moderate
Birds			
Athene cunicularia floridana	Florida Burrowing Owl	ST	Moderate
Egretta caerulea	Little Blue Heron	ST	Moderate
Egretta tricolor	Tricolored Heron	ST	Moderate
Egretta rufescens	Reddish Egret	ST	Low

Note: ST = State-designated Threatened
Sources: FWC. January 2017. Florida's Endangered and Threatened Species; FNAI. 2016. Biodiversity Matrix

Each species and their habitat requirements are briefly discussed in the following sections.

6.3.2.1 Gopher Tortoise

The gopher tortoise is a state-listed threatened species. Gopher tortoises live in well-drained sandy soils, typically with a sparse tree canopy and abundant herbaceous vegetation, such as pine flatwoods, scrub, dry prairies, coastal dunes, and disturbed uplands. Potential marginal to moderate quality habitat is present in adjacent open land along the corridor and CSX railroad tracks. One active burrow was observed during the September 1, 2015 field review at the edge of a dry stormwater swale within FDOT limited access right-of-way, adjacent to Dreher Park. However, a review of the burrow on January 19, 2017 revealed the

burrow was abandoned (**Figure 6-3** and **Appendix B**). The gopher tortoise is also a federal candidate species for listing as threatened.

6.3.2.2 Florida Burrowing Owl

The Florida burrowing owl is a state-listed threatened species. The owl prefers sparsely vegetated, high, sandy ground to create nesting burrows. Habitats may include ruderal areas such as pastures, airports, golf courses, parks, school grounds, road right-of-way, and vacant parcels in residential areas. Potential habitat is present within and outside the project right-of-way, as well as the adjacent Dreher Park and Palm Beach Zoo. Individuals, or burrows, of this species were not observed during the field review.

6.3.2.3 Little Blue Heron

The little blue heron is a state-listed threatened species. This heron is a medium-sized wading bird that nests in woody vegetation and forages in shallow freshwater, saltwater or brackish habitats and likely inhabits Pine Lake. Minimal nesting and moderate foraging habitat is also present within the project corridors' stormwater swales and littoral shelves of retention ponds. Individuals, or nests, of this species were not observed during the field review.

6.3.2.4 Tricolored Heron

The tricolored heron is a state-listed threatened species. This heron is a medium-sized wading bird that typically nests on mangrove islands or dense freshwater thickets over standing water and foraging areas consist of flooded wetlands, tidal creeks, ditches, mangrove swamps and edges of lakes and ponds and likely inhabits Pine Lake. Minimal nesting and moderate foraging habitat is present within the project corridor's stormwater swales and littoral shelves of retention ponds. Individuals, or nests, of this species were not observed during the field review.

6.3.2.5 Reddish Egret

The reddish egret is a state-listed threatened species. This egret is a medium-sized wading bird that almost exclusively nests in coastal areas, and forages in very shallow waterbodies of variable salinity, which may include Pine Lake. Minimal foraging habitat is present within

FDOT	SR 9/I-95 at SR 80/Southern Boulevard Interchange Project Development and Environment Study Financial Project ID: 435516-1-22-02, ETDM No:14183	Figure 6-3 Gopher Tortoise Map	Page No. 6-10

the project corridor's stormwater swales and littoral shelves of retention ponds. Individuals, or nests, of this species were not observed during the field review.

6.4 Listed Species Impacts

The project corridor falls within the CFA of four wood stork colonies and the consultation areas of the Florida scrub jay and Atlantic coastal plants. However, no listed species were observed within or directly adjacent to the project corridor. One active gopher tortoise burrow was observed during the September 1, 2015 field review, although a January 19, 2017 review of the burrow revealed it was abandoned. No individuals of this species were observed during the 2015 or 2017 field reviews. Potential habitat within the corridor is moderate for the gopher tortoise and commensal species (e.g. Eastern indigo snake), Florida burrowing owl, little blue heron, and tricolored heron. Impacts to listed species are not anticipated with any alternative; however, if a gopher tortoise or burrowing owl is encountered within or adjacent to the right-of-way, a state relocation permit may be required, and coordination with FWC will be initiated. Additional information specific to each species is within Section 6.4.2 below.

6.4.1 Avoidance and Minimization of Impacts

Avoidance, minimization, and conservation measures are intended to minimize or avoid environmental impacts to listed species or critical habitat. The project is located within urban Palm Beach County. Minimal to moderately appropriate uplands are available for protected species within the right-of-way, and any existing uplands and wetlands located outside the right-of-way will not be impacted. Stormwater swales and surface waters within the right-of-way provide marginal habitat for wading birds, including the wood stork, and impacts to these areas will be minimized throughout the project's design. Protected species were not observed in uplands, stormwater swales, or surface waters during this study's field reviews. The proposed project has been designed to avoid and minimize impacts threatened and endangered species to the maximum extent practical while still accomplishing the objectives of the project. Avoidance and minimization measures applicable to specific listed wildlife are discussed below in Section 6.4.3.

6.4.2 Direct Effects

Direct effects are caused by an action/project and occur at the same time and place as that action/project. Fill placement in wading bird nesting or foraging habitat is one example of a direct impact. The potential effect of all build alternatives on each federally-listed and state-listed species is summarized in **Table 6-3** and **Table 6-4**, respectively, in the following discussion.

6.4.2.1 Federally Listed Species

Table 6-3: Federally Listed Species Determination of Effect

Scientific Name	Common Name	Listing Status	Determination of Effect – All Build Alternatives**
Reptiles			
Drymarchon corais couperi	Eastern Indigo Snake	FT	NLAA
Birds			
Mycteria americana	Wood Stork	FT	NLAA
Aphelocoma coerulescens	Florida Scrub-Jay	FT	NE
Mammals			
Trichechus manatus	West Indian Manatee	FT	NE
Plants			
Trichomanes punctatum ssp. floridanum	Florida Filmy Fern	FE	NE
Jacquemontia reclinata	Beach Jacquemontia	FE	NE
Asimina tetramera	Four-Petal Pawpaw	FE	NE
Polygala smallii	Tiny Polygala	FE	NE

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered

** NE = No Effect; NLAA = Not Likely to Adversely Affect

6.4.2.1.1 Eastern Indigo Snake

Xeric habitat (i.e., dry, open land) was observed during the field review. One active gopher tortoise burrow was observed during the September 1, 2015 field review at edge of a dry stormwater swale within FDOT limited access right-of-way, adjacent to Dreher Park. However, a January 19, 2017 review of the burrow revealed it had been abandoned. The remaining dry upland retention areas are located within the right-of-way of I-95 and Southern Boulevard, and are components of the road's drainage system. To minimize adverse effects to the eastern indigo snake during construction, the FDOT will adhere to the *Standard*

Protection Measures for the Eastern Indigo Snake (USFWS 2013, see **Appendix E**). These measures will be incorporated into the final project construction documents and FDOT will require the contractor abide by the guidelines during construction. Additionally, the USFWS August 2013 Programmatic Indigo Snake Key was also reviewed (**Appendix F**). Based on this key, site conditions, and incorporation of standard protection measures, the FDOT determined the project is ***"not likely to adversely affect"*** the Eastern indigo snake.

6.4.2.1.2 Wood Stork

The project corridor falls within the CFA of four wood stork colonies, and there are stormwater swales with hydrophytic vegetation to provide potential SFH for the wood stork. The May 18, 2010 Wood Stork Effect Determination Key (**Appendix F**), and 1990 *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (HMG) were reviewed for this project. Based on these guidelines, the project is not contrary to the HMG, and will provide SFH compensation within similar hydroperiod wetlands at DuPuis Reserve or the Loxahatchee Mitigation Bank in the event new drainage features do not offset wood stork SFH. Analysis of wood stork foraging prey base is not required because the total anticipated wetland impacts for the three alternatives [1.12 acres – 1.15 acres: stormwater swale impacts (1.01 acres); littoral shelf impacts (0.11 – 0.14 acre] are less than five acres. Based on the above-mentioned factors, the FDOT determined the project is ***"not likely to adversely affect"*** the wood stork.

6.4.2.1.3 Florida Scrub-Jay

Even though the project corridor is located within the USFWS Consultation Area for the Florida scrub-jay, habitat requirements (well-drained, sandy ridges with short oaks, open patches of sand, and few trees) are not present, and no individuals were observed during the field review. Based on the project location, lack of suitable habitat, and the field review results, the FDOT determined the project will have ***"no effect"*** on the Florida scrub jay.

6.4.2.1.4 West Indian Manatee

According to USFWS, critical habitat for this species is located within portions of Pine Lake, the C-51 canal, and a retention pond within the Town of Cloud Lake (**Figure 5-2**). However, a review of the manatee accessibility map indicates these areas are not accessible to

manatees, and per USFWS coordination, those waterbodies not accessible to manatees are not considered manatee critical habitat (see **Appendix D**). Therefore, the FDOT determined the project will have ***"no effect"*** on the manatee.

6.4.2.1.5 Atlantic Coastal Plants

The habitat requirements for the Florida filmy fern, beach jaquemontia, four-petal pawpaw, and tiny polygala were not observed within or adjacent to the right-of-way during the field reviews. Based on the project location, lack of suitable habitat, and field review results, the FDOT determined the project will have ***"no effect"*** on these Atlantic coastal plants.

6.4.2.2 State Listed Species

Table 6-4: State Listed Species Determination of Effect

Scientific Name	Common Name	Listing Status	Determination of Effect – All Build Alternatives**
Reptiles			
Gopherus polyphemus	Gopher Tortoise	ST	NLAA
Birds			
Athene cunicularia floridana	Florida Burrowing Owl	ST	NLAA
Egretta caerulea	Little Blue Heron	ST	NLAA
Egretta tricolor	Tricolored Heron	ST	NLAA
Egretta rufescens	Reddish Egret	ST	NE

Note: ST = State Threatened
** NE = No Effect; NLAA = Not Likely to Adversely Affect

The ***"no effect"*** determination for the reddish egret is based on the lack of available suitable nesting and minimal foraging habitat within the right-of-way.

The ***"not likely to adversely affect"*** determination for the remaining species is based on potential burrowing habitat (Florida burrowing owl, gopher tortoise and commensals), and potential foraging habitat (little blue heron and tricolored heron) within or adjacent to the right-of-way. Little blue heron and tricolored heron foraging, if present, is anticipated to be transient and nesting by this species within the right-of-way is not anticipated. To minimize adverse effects to burrowing owls, gopher tortoises and commensal species, a pre-construction survey should be conducted within the existing and proposed right-of-way. Dry swales and uplands adjacent to the CSX railroad tracks should also be surveyed for

burrowing owls and gopher tortoises. Burrows encountered outside the limit of construction (LOC) should be protected and any tortoise or burrowing owl in conflict with construction relocated.

6.4.3 Indirect Effects

For transportation projects, indirect impacts typically include disturbance to areas adjacent to the project area. These impacts include short-term impacts associated with road construction activities, as well as, long-term impacts. Degradation of water quality entering adjacent wetlands or surface waters is one example of a project's indirect effect. Due to the urban landscape surrounding the project and the proposed mitigative measures previously mentioned, indirect effects to listed species are not anticipated.

Indirect effects to offsite habitats are also not anticipated, as the proposed surface water management system does not include offsite ponds, and the system will be designed to comply with current water quality and quantity criteria. The FDOT will ensure a Stormwater Pollution Prevention Plan (SWPPP) is implemented during construction to prevent stormwater runoff from entering wetlands or surface waters proposed to remain post-project. The FDOT will also ensure the project is compliant with current National Pollutant Discharge Elimination System (NPDES) criteria as well as implement Best Management Practices (BMPs) during construction. Discharge of untreated stormwater into wetlands or surface waters outside the I-95 and Southern Boulevard surface water management system is not proposed both during and post-construction. Implementation of the project is not anticipated to affect offsite groundwater levels. While there may be short-term disruptions during construction (e.g. noise, dust), they will disappear once construction is complete.

6.4.4 Cumulative Effects

A "cumulative impact", according to the definition in the Council of Environmental Quality Regulations (40 CFR 1508.7), is "the impact on the environment which results from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

The project is not anticipated to contribute adversely to protected species or offsite habitats. The entire corridor is surrounded by development, and located within urban Palm Beach County. The intent of the project is to improve traffic flow, and re-development of the existing corridor is the only option to achieve this goal, as adjacent land is already developed. Direct and indirect impacts have been avoided and minimized to the maximum extent practical. The proposed drainage system will be compliant with SFWMD water quality and quantity criteria, and FDOT will comply with the requirements of NPDES, and implement BMPs during construction. Based on the proposed scope of work, urban setting, surrounding development and proposed mitigative measures, no cumulative impacts to protected species or offsite habitats are anticipated for this project.

7.0 Regulatory Agency Coordination

The project was reviewed through the FDOT's ETDM process where members of the ETDM ETAT provide input and comments. The ETDM Screening Summary Report (No. 14183) is incorporated by reference. The following is a summary of the ETAT reviews and description of the potential effects of Alternative 1 on wetlands within the corridor, and listed species that could potentially inhabit the project area. There will be no impacts associated with the No Build Alternative. The Recommended Build Alternative (Alternative 4) provides dual third level flyovers, which is slightly different from Alternative 1, but the effect to wetlands and wildlife is similar.

The USFWS commented the project will have "Minimal" effect on wildlife and habitat, and a "Moderate" effect on wetlands. They provided the following comments, and the corresponding response/action taken by FDOT is included below each comment:

a) The project corridor is located in the CFA of two active nesting colonies of the endangered wood stork. They recommended that any lost foraging habitat resulting from the project be replaced within the CFA of the affected nesting colony.

   Response: The corridor is located in the CFA of four active nesting wood stork colonies. Mitigation for lost foraging habitat will be accomplished during final design by implementing drainage features to offset wood stork SFH, or by purchasing wetland credits at DuPuis Reserve or the Loxahatchee Mitigation Bank through the environmental permitting process.

b) The USFWS requires a functional assessment be conducted for projects that impact five or more acres of wood stork foraging habitat.

   Response: The total wetland impact for the Recommended Alternative is less than five acres; therefore, a wood stork foraging analysis is not required for this project.

c) The USFWS commented that the Eastern indigo snake and the wood stork have the potential to occur in or near the project site.

   Response: FDOT will adhere to the *Standard Protection Measures for the Eastern Indigo Snake* (USFWS 2013, see **Appendix E**) during construction to prevent

adverse impacts to this species. Loss of wood stork foraging habitat (i.e., swales) will be mitigated during final design through the environmental permitting process.

d) The USFWS recommended that wetland impacts be avoided to the greatest extent practicable, and if impacts are unavoidable, the FDOT should provide compensatory mitigation.

   Response: Mitigation for wetland impacts will be accomplished during final design by implementing drainage features to offset wood stork SFH, or by purchasing wetland credits at DuPuis Reserve or the Loxahatchee Mitigation Bank through the environmental permitting process.

The FWC commented the project will have "Minimal" effect on wildlife and habitat. They provided the following comment, and the corresponding response/action taken by FDOT is included below the comment:

a) There are no significant fish, wildlife or habitat resources identified in the project area.

   Response: No response required.

Other ETAT comments regarding wetlands, wildlife, and water quality/quantity are provided below, followed by the corresponding response/action taken by FDOT:

a) The FDEP and SFWMD commented the project will have "Minimal" effect on wetlands, and an ERP and potentially a Water Use Permit will be required. They recommended care must be taken during dewatering and construction activities to prevent contaminated soil/water from migrating into non-contaminated areas.

   Response: FDOT will obtain an ERP and potentially a SFWMD Water Use Permit during final design. BMPs will be implemented to ensure any contaminated areas will not migrate into non-contaminated areas.

b) USACE and US Environmental Protection Agency (EPA) commented the project will have "Moderate" effect on wetlands and surface waters. Wetland and surface water impacts should be avoided and minimized, and if unavoidable, fully mitigated.

Response: FDOT will avoid wetland and surface water impacts to the greatest extent practicable. Mitigation for unavoidable wetland impacts will be accomplished during final design by implementing drainage features with hydrophytic vegetation, or by purchasing wetland credits at DuPuis Reserve or Loxahatchee Mitigation Bank through the environmental permitting process.

c) FDEP, EPA, and SFWMD commented the project will have "Minimal" effect on water quality and quantity. Effort should be made to maximize treatment of stormwater runoff from the proposed interchange improvements to prevent ground and surface water contamination. Net impact on water quality and water flow should be minimized.

   Response: FDOT will design the stormwater treatment system to meet current SFWMD criteria, ensuring no adverse impacts to water quality and quantity will occur as a result of this project.

On May 31, 2017, FDOT coordinated with USFWS to obtain concurrence on the effects to federally listed species, and with National Marine Fisheries Service (NMFS) to obtain concurrence that there is no EFH or marine listed species within the project area. NMFS responded on June 15, 2017 that the project will not impact trust listed species or resources, and also stated that concurrence is not required if the determination for listed species is "no effect". USFWS concurred with the effect determination on June 29, 2017 (**Appendix D**).

8.0 Conclusions

Unavoidable direct impacts to man-made, wet stormwater swales, ponds, and littoral areas will result as part of this project. Also, unavoidable indirect impacts to stormwater pond littoral areas will also occur. The FDOT will avoid clearing impacts beyond the work area needed, and will also evaluate additional measures to avoid and minimize impacts during design and permitting to the greatest extent practical. The FDOT will adhere to the permitting agencies' general and specific conditions regarding turbidity control during construction to ensure that waters remain in compliance with water quality parameters and the sedimentation of wetlands.

The Recommended Build Alternative (Alternative 4) will incur 1.01 acres of impacts to stormwater swales supporting hydrophytic vegetation, and OSW/littoral impacts of 0.22 acre. A total of 0.28 freshwater herbaceous functional units may be required to offset direct and secondary impacts associated with the Recommended Alternative. This value has not been agreed upon by agency staff, and will be reconsidered during design and permitting. To mitigate for the unavoidable impacts to wetlands, the FDOT will provide appropriate mitigation for loss of wetland habitat. Compensation for unavoidable wetland impacts will occur in coordination with USACE, SFWMD, and the City of West Palm Beach. Mitigation may be accomplished onsite through the creation of vegetated drainage swales, or offsite at a permittee responsible mitigation area (e.g. DuPuis Reserve) or authorized mitigation bank (e.g. Loxahatchee Mitigation Bank).

It was determined the project will "Not Likely Adversely Impact" the federally listed Eastern indigo snake and wood stork, and have "No Effect" on the Florida scrub-jay, West Indian manatee, Florida filmy fern, beach jacquemontia, four-petal pawpaw, and tiny polygala. USFWS concurred with these determinations on June 29, 2017, and NMFS responded on June 15, 2017 that the project will not impact trust listed species or resources (**Appendix D**). The project corridor currently falls within the CFA of four wood stork colonies. The FDOT will continue to coordinate with the USFWS regarding wood storks, and any required suitable foraging habitat compensation will be accomplished through new drainage features or through the purchase of credits at a permittee responsible mitigation

area or a USFWS-approved mitigation bank. Both DuPuis Reserve and Loxhatchee Mitigation Bank provide wood stork mitigation.

It was determined the project will "Not Likely Adversely Impact" the state-listed gopher tortoise, Florida burrowing owl, little blue heron and tricolored heron, and have "No Effect" on the reddish egret. However, if a gopher tortoise or burrowing owl is encountered within or adjacent to the right-of-way, a state relocation permit may be required, and coordination with FWC will be initiated.

The FDOT will continue to coordinate with the regulatory and commenting agencies, and local governments including USACE, USFWS, NMFS, EPA, SFWMD, FDEP, FWC, and Palm Beach County during final design, construction and permitting to seek avoidance, minimization and mitigation measures for wetlands, protected species and managed species.

8.1 Commitments

In order to ensure that adverse and/or excessive impacts to wetlands and listed species within the vicinity of the project corridor will not occur, the FDOT will abide by the following commitments:

- FDOT agrees to follow the U.S. Fish and Wildlife Service (USFWS) *Standard Protection Measures for the Eastern Indigo Snake* (the current version at the time of construction) during implementation of the project, and Technical Special Provisions will be incorporated into the contractor's bid documents (see **Appendix E**).

- FDOT will determine if there are any active wood stork breeding colonies within a determined distance of the proposed improvements at the time the Environmental Resource Permit (ERP) application is submitted to the US Army Corps of Engineers (USACE). If the proposed improvements are determined to be within the core foraging area of any active wood stork breeding colony, any wetlands impacted will be replaced within the core foraging area of the active wood stork breeding colony. If the replacement of wetlands within the core foraging area is not practicable, the FDOT will coordinate with the USFWS to identify acceptable wetland compensation outside the core foraging area, such as purchasing wetland credits from a "FWS Approved" mitigation bank or permittee-responsible mitigation area.

- Upon locating a dead wood stork specimen, initial immediate notification will be made to the nearest Service Law Enforcement Office (Address: 10426 NW 31st Terrace, Miami, FL 33172, 305-526-2695). Secondary notification will be made to the FWC; South Region (Address: 8535 Northlake Boulevard, West Palm Beach, FL 33412, 561-625-5122). Care will be taken in handling any dead specimens of proposed or listed species found in the project area to preserve the specimen or its remains in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the Act. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure the terms and conditions are appropriate and effective.

- A preconstruction survey for gopher tortoises and burrowing owls will be performed prior to construction. If tortoises, burrowing owls and/or their burrows are found within proposed impact areas, coordination with the FWC will be initiated.

9.0 References

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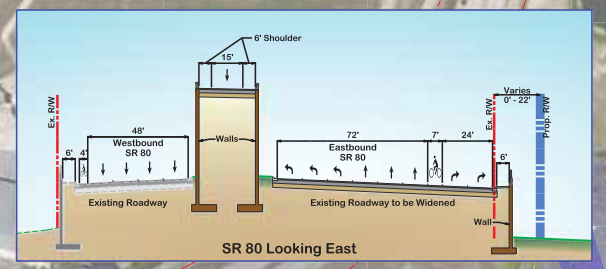
APPENDIX A

Conceptual Plans for Alternatives 1, 3 and 4

Alternative 1: NB-WB Flyover

FDOT



SR 80 Looking East

Palm Beach International Airport

Australian Ave

Hilton Palm Beach Airport Hotel

Airport Center Complex

County Offices

CITY OF WEST PALM BEACH

South Florida Rail Corridor/CSX Railroad

MARSHALL AND VERA LEA RINKER ATHLETIC CAMPUS

Parkland Rd

Merrill Ave

Paseo Andalusia

VEDADO HISTORIC DISTRICT

Paseo Alcala

Vandeventer St

Parker Ave

Lake Ave

Conniston Middle School

Coin Laundry

La Familia Grocery

Capri Bakery

Coastal Gas

Food Mart

Subway

Southern Blvd

Leased Spaces Immigration Attorney Taxing Matters

Residence

Law Offices

Peterson Bernard Attorneys at Law

Gem Lake Dr

Specialty Glass

Shannondale Rd

TOWN OF GLEN RIDGE

Lang Rd

TOWN OF CLOUD LAKE

Stub Canal

Vacant

Ram Group Gubagoo.com

Holy Cross Preschool and Center

Oil Well and Brakes

Wells Fargo

Dreher Trail N

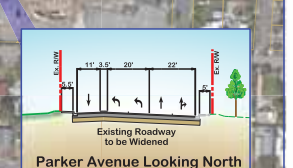
Pet Supermarket

Publix

CVS

DREHER PARK

SR 80 Looking East



Parker Avenue Looking North

Inset for I-95 Ramps

See Inset for I-95 Ramps

LEGEND

- Existing Right-of-Way
- Existing Limited Access Right-of-Way
- Proposed Right-of-Way
- Proposed Limited Access Right-of-Way
- City / Town Limits
- Property Line
- Pavement
- 2nd Level Bridge
- 3rd Level Bridge
- Special Bicycle Lane Treatment
- Sidewalk
- Retaining Wall
- Lane Configuration
- Traffic Signal

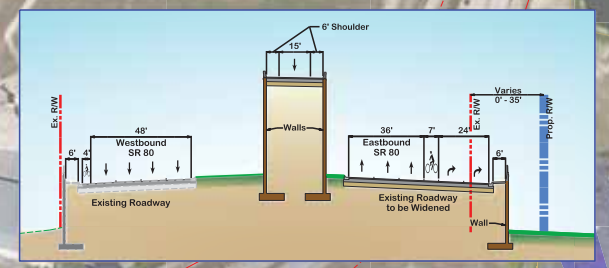
N

0 100' 200'

Scale: 1" = 100'

I-95 at SR 80 (Southern Boulevard)
Alternative 1
NB-WB Flyover

Alternative 3: EB-NB Flyover



Palm Beach International Airport

Australian Ave

Southern Blvd

Leased Spaces
Immigration Attorney
Taxing Matters

Residence

Law Offices

Peterson Bernard
Attorneys at Law

Gem Lake Dr

Specialty Glass

Shannondale Rd

Lang Rd

TOWN OF GLEN RIDGE

TOWN OF CLOUD LAKE

Stub Canal

Airport Center Complex

Hilton Palm Beach
Airport Hotel

County Offices

South Florida Rail
Corridor/CSX Railroad

CITY OF WEST PALM BEACH

I-95

MARSHALL AND VERA LEA
RINKER
ATHLETIC CAMPUS

Parkland Rd

Merrill Ave

Vandeventer St

VEDADO HISTORIC DISTRICT

Paseo Andalusia

Paseo Alcala

Parker Ave

Lake Ave

Conniston
Middle
School

Subway

La Familia
Grocery

Coin Laundry

Capri
Bakery

Coastal Gas

Food Mart

Wells
Fargo

Vacant

Ram Group
Gubagoo.com

Holy Cross
Preschool and Center

Oil Well
and Brakes

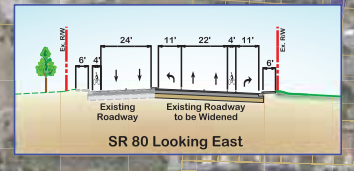
Dreher Trail N

Pet Supermarket

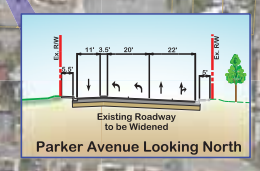
Publix

CVS

DREHER PARK



SR 80 Looking East



Parker Avenue Looking North

I-95 SB Entrance Ramp

See Inset for
I-95 SB Entrance Ramp

LEGEND

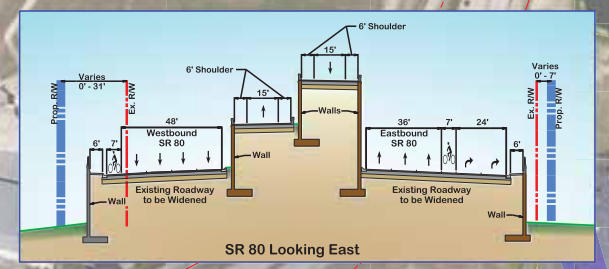
- Existing Right-of-Way
- Existing Limited Access Right-of-Way
- Proposed Right-of-Way
- Proposed Limited Access Right-of-Way
- City / Town Limits
- Property Line
- Pavement
- 2nd Level Bridge
- 3rd Level Bridge
- Special Bicycle Lane Treatment
- Sidewalk
- Retaining Wall
- Lane Configuration
- Traffic Signal

N

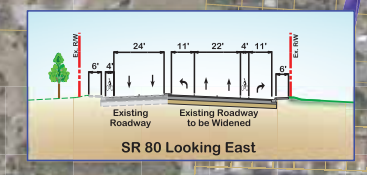
0 100' 200'
Scale: 1" = 100'

I-95 at SR 80 (Southern Boulevard)
Alternative 3
EB-NB Flyover

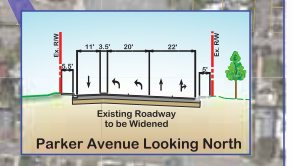
Alternative 4: EB-NB & NB-WB Dual 3rd-Level Flyovers



SR 80 Looking East



SR 80 Looking East



Parker Avenue Looking North

Palm Beach International Airport
Australian Ave
Southern Blvd
Hilton Palm Beach Airport Hotel
Airport Center Complex
County Offices
CITY OF WEST PALM BEACH
South Florida Rail Corridor/CSX Railroad
MARSHALL AND VERA LEA RINKER ATHLETIC CAMPUS
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Capri Bakery
Coastal Gas
Food Mart
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Leased Spaces Immigration Attorney Taxing Matters
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TOWN OF GLEN RIDGE
TOWN OF CLOUD LAKE
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Dreher Trail N
Vacant
Ram Group Gubagoo.com
Holy Cross Preschool and Center
Oil Well and Brakes
Wells Fargo
Pet Supermarket
Publix
CVS
DREHER PARK
See Inset for I-95 Ramps

LEGEND
- Existing Right-of-Way
- Existing Limited Access Right-of-Way
- Proposed Right-of-Way
- Proposed Limited Access Right-of-Way
- City / Town Limits
- Property Line
- Pavement
- 2nd Level Bridge
- 3rd Level Bridge
- Special Bicycle Lane Treatment
- Sidewalk
- Retaining Wall
- Lane Configuration
- Traffic Signal

N

0 100' 200'
Scale: 1" = 100'

I-95 at SR 80 (Southern Boulevard)
Alternative 4
EB-NB & NB-WB Dual 3rd-Level Flyovers

APPENDIX B

Ground-Level Photographs

Photo 1: OSW-1 between Southern Blvd. and Australian Ave.

Photo 2: OSW-2 between Southern Blvd. and Australian Avenue.

Photo 3: OSW-4 on the south side of Southern Blvd., east of Lang Road.

Photo 4: OSW-5 - Stub Canal – facing northeast toward I-95.

Photo 5: Swale-6

Photo 6: Swale-7

Photo 7: Swale-8

Photo 8: Swale-9

Photo 9: Pine Lake – facing south toward Stub Canal and Southern Blvd.

Photo 10: Gopher tortoise burrow noted September 1, 2015 at edge of dry retention area in Dreher Park; southeast corner of Southern Blvd. and I-95 northbound off-ramp.

Photo 11: Abandoned and collapsed gopher tortoise burrow noted January 19, 2017 at edge of dry retention area in Dreher Park; southeast corner of Southern Blvd. and I-95 northbound off-ramp.

APPENDIX C

UMAM Worksheets

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01	N/A	Wet Swales and Vegetated Littoral Shelf (Alternatives 1 and 4)

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
511 and 534/640	Wet Swales and Vegetated Littoral Shelf	Impact	1.23 acre

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
C-51 East Basin		None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

These Assessment Areas (AA's) comprise a man-made stormwater pond with littoral shelf (OSW-4), and man-made wet swales (Swales 6-9) among roads, highways and adjacent upland communities. The AA's are hydrologically connected to Stub Canal and the West Palm Beach Canal (C-51) through a variety of drainage structures and culverts.

Assessment area description

The AA's are located within or adjacent to the Florida Department of Transportation (FDOT) State Road (SR)-9/I-95 and SR-80/Southern Boulevard right-of-way (ROW). Vegetation occurring in the AA's includes: torpedo grass (*Panicum repens*), primrose willow (*Ludwigia peruviana*), pickerelweed (*Pontederia cordata*), duck potato (*Sagittaria latifolia*), spikerush (*Eleocharis* sp.), and cattail (*Typha* sp.). These areas also contain whitetop sedge (*Rhynchospora colorata*), para grass (*Urochloa mutica*), Carolina willow (*Ludwigia bonariensis*), and pennywort (*Hydrocotyle umbellata*). Drainage structures drain into the AA's and hydrologically connect them to other surface waters. Wildlife must cross SR-9/I-95 or adjacent entry/exit ramps to access the identified areas.

Significant nearby features

SR-9/I-95 and SR-80/Southern Boulevard are located directly adjacent to the AA's. The AA's are also within close proximity to Palm Beach International Airport, Pine Lake, Stub Canal, C-51 Canal, Cloud Lake, and Dreher Park.

Uniqueness (considering the relative rarity in relation to the regional landscape.)

The AA's are not unique in relation to the regional landscape.

Functions

The AA's provide water storage, filtration and attenuation. This type of habitat also provides foraging for a number of wildlife species, especially wading birds (wood storks, sandhill cranes, herons, egrets, ibis, etc.). The reference wetland provides similar functions.

Mitigation for previous permit/other historic use

None

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

Anticipated wildlife includes wading & migratory birds, fish, reptiles and amphibians.

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Utilization by listed species could vary depending on site conditions, season and food availability. Species may include: wood stork (T/T), manatee (E/E), alligator (T/SA), and little blue heron (N/T), among others.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Avian and reptile species were observed both directly and indirectly within the AA's during the field review. The species observed included great blue heron, cattle egret, moorhen, and pigeon. An active gopher tortoise burrow was located outside the AA's, approximately 250 feet southeast of Swale-8 (20-feet south of SR-80/Southern Boulevard, approximately 50-feet east of the I-95 Northbound exit ramp). A subsequent field visit in January 2017 determined this burrow was abandoned.

Additional relevant factors:

The AA's provide foraging sites for wildlife but only transient use is anticipated.

Assessment conducted by:	Assessment date(s):
CECOS	1-Sep-15

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01		Wet Swales and Vegetated Littoral Shelf (Alternatives 1 and 4)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	CECOS	1-Sep-15

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 2	with: 0	The AA's comprise four man-made, low quality wet swales and one reservoir with a littoral shelf in previously disturbed areas within or adjacent to the FDOT ROW. Invasive vegetation present. The AA's provide foraging sites for wildlife but only transient use is anticipated. Wildlife acccess is diminished due to presence of SR-9/I-95, SR-80/Southern Boulevard, and the CSX Railroad. Some adverse impacts to wildlife due to noise from the highway and railroad.
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 3	with: 0	The AA's are not hydrologically connected to any natural wetlands. Stormwater runoff from the roadway enters the AA's untreated. Water levels were appropriate for each AA. Some inappropriate exotic, invasive vegetation observed.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 2	with: 0	Native vegetation within the AA's comprise pickerelweed (*Pontederia cordata*), duck potato (*Sagittaria latifolia*), spikerush (*Eleocharis* sp.), whitetop sedge (*Rhynchospora colorata*), para grass (*Urochloa mutica*), Carolina willow (*Ludwigia bonariensis*), and pennywort (*Hydrocotyle umbellata*). Invasive torpedo grass (Panicum repens), primrose willow (Ludwigia peruviana), and cattail (Typha sp.) were also observed, mainly in the deeper inundated areas.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.23	with: 0

Delta = [with-current]
0.23

If preservation as mitigation,	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor) =	
Risk factor =	

For impact assessment areas	
FL = delta x acres =	0.28

For mitigation assessment areas	
RFG = delta/(t-factor x risk) =	

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01	N/A	Wet Swales and Vegetated Littoral Shelf (Alternative 3)

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
511 and 534/640	Wet Swales and Vegetated Littoral Shelf	Impact	1.30

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
C-51 East Basin		None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

These Assessment Areas (AA's) comprise a man-made stormwater pond with littoral shelf (OSW-4), and man-made wet swales (Swales 6-9) among roads, highways and adjacent upland communities. The AA's are hydrologically connected to Stub Canal and the West Palm Beach Canal (C-51) through a variety of drainage structures and culverts.

Assessment area description

The AA's are located within or adjacent to the Florida Department of Transportation (FDOT) State Road (SR)-9/I-95 and SR-80/Southern Boulevard right-of-way (ROW). Vegetation occurring in the AA's includes: torpedo grass (Panicum repens), primrose willow (Ludwigia peruviana), pickerelweed (Pontederia cordata), duck potato (Sagittaria latifolia), spikerush (Eleocharis sp.), and cattail (Typha sp.). These areas also contain whitetop sedge (Rhynchospora colorata), para grass (Urochloa mutica), Carolina willow (Ludwigia bonariensis), and pennywort (Hydrocotyle umbellata). Drainage structures drain into the AA's and hydrologically connect them to other surface waters. Wildlife must cross SR-9/I-95 or adjacent entry/exit ramps to access the identified areas.

Significant nearby features

SR-9/I-95 and SR-80/Southern Boulevard are located directly adjacent to the AA's. The AA's are also within close proximity to Palm Beach International Airport, Pine Lake, Stub Canal, C-51 Canal, Cloud Lake, and Dreher Park.

Uniqueness (considering the relative rarity in relation to the regional landscape.)

The AA's are not unique in relation to the regional landscape.

Functions

The AA's provide water storage, filtration and attenuation. This type of habitat also provides foraging for a number of wildlife species, especially wading birds (wood storks, sandhill cranes, herons, egrets, ibis, etc.). The reference wetland provides similar functions.

Mitigation for previous permit/other historic use

None

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

Anticipated wildlife includes wading & migratory birds, fish, reptiles and amphibians.

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Utilization by listed species could vary depending on site conditions, season and food availability. Species may include: wood stork (T/T), manatee (E/E), alligator (T/SA), and little blue heron (N/T), among others.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Avian and reptile species were observed both directly and indirectly within the AA's during the field review. The species observed included great blue heron, cattle egret, moorhen, and pigeon. An active gopher tortoise burrow was located outside the AA's, approximately 250 feet southeast of Swale-8 (20-feet south of SR-80/Southern Boulevard, approximately 50-feet east of the I-95 Northbound exit ramp). A subsequent field visit in January 2017 determined this burrow was abandoned.

Additional relevant factors:

The AA's provide foraging sites for wildlife but only transient use is anticipated.

Assessment conducted by:	Assessment date(s):
CECOS	1-Sep-15

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01		Wet Swales and Pond <10 Ac with Littoral Shelf (Alternative 3)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	CECOS	1-Sep-15

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 2 — with: 0	The AA's comprise four man-made, low quality wet swales and one reservoir with a littoral shelf in previously disturbed areas within or adjacent to the FDOT ROW. Invasive vegetation present. The AA's provide foraging sites for wildlife but only transient use is anticipated. Wildlife acccess is diminished due to presence of SR-9/I-95, SR-80/Southern Boulevard, and the CSX Railroad. Some adverse impacts to wildlife due to noise from the highway and railroad.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 3 — with: 0	The AA's are not hydrologically connected to any natural wetlands. Stormwater runoff from the roadway enters the AA's untreated. Water levels were appropriate for each AA. Some inappropriate exotic, invasive vegetation observed.	
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 2 — with: 0	Native vegetation within the AA's comprise pickerelweed (Pontederia cordata), duck potato (Sagittaria latifolia), spikerush (Eleocharis sp.), whitetop sedge (Rhynchospora colorata), para grass (Urochloa mutica), Carolina willow (Ludwigia bonariensis), and pennywort (Hydrocotyle umbellata). Invasive torpedo grass (Panicum repens), primrose willow (Ludwigia peruviana), and cattail (Typha sp.) were also observed, mainly in the deeper inundated areas.	

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	0.23
with	0

Delta = [with-current]
0.23

If preservation as mitigation,	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor) =	
Risk factor =	

For impact assessment areas	
FL = delta x acres =	0.30

For mitigation assessment areas	
RFG = delta/(t-factor x risk) =	

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01	N/A	OSW 4 Littoral Shelf (Alts 1, 3, 4)

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
534/640	Vegetated Littoral Shelf in a Reservoir (Pond) <10 Acres	Impact	0.20

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
C-51 East Basin		None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This Assessment Area (AA) is a man-made, stormwater pond with a vegetated littoral shelf located on the south side of Southern Boulevard, east of Lang Road, that hydrologically connects to Stub Canal.

Assessment area description

Littoral vegetation is dominated by cattail, primrose willow, and spikerush.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
SR-80/Southern Boulevard is located directly adjacent to the AA, and Cloud Lake is within close proximity to the AA.	The AA is not unique in relation to the regional landscape.

Functions	Mitigation for previous permit/other historic use
The AA provides water storage, filtration and attenuation. This type of habitat also provides foraging for a number of wildlife species, especially wading birds (wood storks, sandhill cranes, herons, egrets, ibis, etc.).	None

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Anticipated wildlife includes wading & migratory birds, fish, reptiles and amphibians.	Utilization by listed species could vary depending on site conditions, season and food availability. Species may include: wood stork (T/T), manatee (E/E), alligator (T/SA), and little blue heron (N/T), among others.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No species were observed within this AA during the assessment.

Additional relevant factors:

The AA provides foraging sites for wildlife but only transient use is anticipated.

Assessment conducted by:	Assessment date(s):
CECOS	1-Sep-15

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SR-9/I-95 at SR-80/Southern Boulevard Interchange FPID: 435516-1-22-01		OSW 4 Littoral Shelf (Alts 1, 3, 4)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	CECOS	1-Sep-15

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 2	with: 2
The stormwater pond hydrologically connects to Stub Canal to the east. Minimal native littoral vegetation within the AA. Wildlife acccess is diminished due to presence of SR-80/Southern Boulevard to the north, and residential development to the east, west and south. The AA provides minimal foraging for wildlife. Some adverse impacts to wildlife due to noise from the highway and railroad.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 3	with: 3
Inundated during assessment. Water levels are appropriate. Total depth could not be determined; estimated 2-3 feet within AA.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 2	with: 1
Littoral vegetation is dominated by native spikerush, and invasive cattail and primrose willow. Increased invasive recruitment anticipated after development.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.23	0.20

Delta = [with-current]
0.03

If preservation as mitigation,	
Preservation adjustment factor =	
Adjusted mitigation delta =	

If mitigation	
Time lag (t-factor) =	
Risk factor =	

For impact assessment areas	
FL = delta x acres =	0.01

For mitigation assessment areas	
RFG = delta/(t-factor x risk) =	

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:

(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable)/((t-factor)(risk))

If the acreage of mitigation proposed is known:

(FG) Functional Gain = Relative Functional Gain X Mitigation acres

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Areas	RFG	X	Acres	=	Credits
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assessed in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment

Area	FL	=	Credits needed - Alts 1 & 4	Area	FL	=	Credits needed - Alt 3
Direct	0.28		0.28	Direct	0.30		0.30
Secondary	0.01		0.01	Secondary	0.01		0.01
TOTAL			0.29	**TOTAL**			0.31

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG).

FL	/	RFG	=	Acres of Mitigation

If there are multiple impact assessment areas and/or multiple mitigation assessment areas to offset those impacts, or if the proposed mitigation acreage is a given, then the summation of the appropriate functional gain (FG) must be equal to or greater than the summation of respective functional losses (FL)

	FL	<	FG	
Direct Impacts				
Temporary Impacts				
Mitigation				RFG x ac = FG
summation	0		0	

APPENDIX D

Agency Coordination

Jenna santangelo

From: Wrublik, John <john_wrublik@fws.gov>
Sent: Wednesday, November 30, 2016 3:29 PM
To: Jenna santangelo
Cc: Piche, Cassie; Kelley, Lynn; Wendy Cyriacks
Subject: Re: FPID: 435516-1-22-02; SR 9/I-95 at SR 80/Southern Blvd. PD&E - manatee critical habitat

Follow Up Flag: Follow up
Flag Status: Completed

Jim is correct in that the critical habitat maps for the manatee are not exact. I would say that any areas that are not accessible to manatees (e.g., canals with structures that don't allow access, uplands etc.) would not be considered to be critical habitat by the Service.

John

John M. Wrublik
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
Office: (772) 469-4282
Fax: (772) 562-4288
email: John_Wrublik@fws.gov

On Wed, Nov 30, 2016 at 2:41 PM, Jenna santangelo <js@cecosenvironmental.com> wrote:

> Good afternoon John,
>
> I would like your help with an issue regarding manatee critical habitat associated with the SR 9 / I-95 at SR 80 / Southern Boulevard Interchange PD&E project. The project is located between the Forest Hill Boulevard interchange, and the Belvedere Road interchange, and in proximity to multiple municipalities including the City of West Palm Beach, Town of Cloud Lake, Town of Glen Ridge, and unincorporated Palm Beach County. The project's purpose is to improve interchange operations to address traffic spillback onto SR 9 / I-95, reduce congestion, and increase safety.
>
> During our data collection and preparation of the draft Natural Resource Report for the project we noticed the USFWS GIS critical habitat layers included waterbodies such as Pine Lake, Cloud Lake, and the C-51 Canal, as well upland areas (see attached GIS map from ECOS). These areas do not appear accurate based on 50 CFR (see attached). Additionally, manatees appear to have no access to Pine Lake, Cloud Lake or the C-51 Canal in this area, due to control structures S-155 and S-155A along the C-51 (see attached Manatee Accessibility Map).
>
> I previously contacted Jim Valade in your Jacksonville office, and he stated the GIS layers are not exact; he followed up with an email stating there are no manatee sightings or strandings in the project area. I sent a

follow-up email to see if he would confirm whether the GIS areas indicated on the project area map are, in fact, considered critical habitat for USFWS, despite no sightings or strandings in the area. I have followed up a few times since then and have not received a written response to date.

If you are able to clarify whether these waterbodies are considered manatee critical habitat, it would be greatly appreciated.

Thanks,

Jenna

JENNA SANTANGELO | Senior Environmental Scientist

Cyriacks Environmental Consulting Services, Inc.
3001 Southwest 15th Street **|** Suite B **|** Deerfield Beach, Florida 33442
T: 954.571.0290 **| M:** 561.427.9308

7850 Northwest 146th Street **|** Suite 510 **|** Miami Lakes, Florida 33016
T: 305.509.6550

Jenna santangelo

From: Jim Valade <jim_valade@fws.gov>
Sent: Monday, August 22, 2016 2:17 PM
To: Jenna Santangelo
Subject: RE: southern blvd

Jenna,

We checked, there are no manatee sightings or strandings in the area of your project site.

Jim

Jim Valade
Florida Manatee Recovery Coordinator

US Fish and Wildlife Service
North Florida Ecological Services Office
7915 Baymeadows Way Suite 200
Jacksonville, Florida 32256

E-mail: Jim_Valade@fws.gov

PHONE: 904 731-3116
OFFICE: 904 731-3336
FAX: 904 731-3045

www.fws.gov/northflorida

From: Jenna Santangelo [mailto:js@cecosenvironmental.com]
Sent: Monday, August 22, 2016 10:40 AM
To: jim_valade@fws.gov
Subject: southern blvd

JENNA SANTANGELO | Senior Environmental Scientist

Cyriacks Environmental Consulting Services, Inc.
3001 Southwest 15th Street | Suite B | Deerfield Beach, Florida 33442
T: 954.571.0290 | **M:** 561.427.9308

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FDOT
Florida Department of Transportation
RICK SCOTT
GOVERNOR
3400 West Commercial Blvd.
Fort Lauderdale, FL 33309
RACHEL D. CONE
INTERIM SECRETARY

May 31, 2017

Roxanna Hinzman, Field Supervisor
South Florida Ecological Services Office
US Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960

Attn: John Wrublik

Subject: **ESA Section 7 Consultation/Concurrence Request Letter**
Project Name: SR 9 / I-95 at SR 80 / Southern Boulevard
(I-95 MP 24.3 to 25.3 and SR 80 MP 19.1 to 20.4)
Financial Management No.: 435516-1-22-02
ETDM No. 14183
County: Palm Beach County

Dear Mr. Wrublik:

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment Study (PD&E) for the referenced project. The interchange project extends along SR 9 / I-95 (milepost 24.3 to 25.3) and SR 80/Southern Boulevard (milepost 19.1 to 20.4). The PD&E Study evaluated alternatives for the ultimate interchange improvements to address traffic spillback onto SR 9 / I-95, reduce congestion, and increase safety. The project was screened through the Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST) and the programming screen was published May 27, 2015 (ETDM #14183).

A Natural Resource Evaluation (NRE) has been prepared for the project and is attached. Three build alternatives were analyzed in the study for the interchange improvements. Essential Fish Habitat (EFH) is not present within the project corridor. The effects to surface waters (OSW), wetlands (stormwater swales), and listed species were similar for all alternatives.

The Recommended Alternative (Alternative 4) provides dual third level flyovers: one from northbound I-95 to westbound Southern Boulevard, and one from eastbound Southern Boulevard to northbound I-95. The following is a summary of impacts for all alternatives.

OSW / Wetland Direct Impacts:

Alternative 1: 1.23 acres (0.22 acres OSW; 1.01 acres wetland)
Alternative 3: 1.30 acres (0.29 acres OSW; 1.01 acres wetland)
Alternative 4: 1.23 acres (0.22 acres OSW; 1.01 acres wetland)

OSW / Wetland Indirect Impacts:

Alternative 1: 0.24 acres (OSW)
Alternative 3: 0.24 acres (OSW)
Alternative 4: 0.24 acres (OSW)

Mitigation

Mitigation may be accomplished onsite through the creation of stormwater swales [one foot above Design High Water (DHW), if acceptable to the USACE], or offsite at a permittee responsible mitigation area (e.g., DuPuis Reserve) or authorized mitigation bank (e.g., Loxahatchee Mitigation Bank). Both DuPuis Reserve and Loxahatchee Mitigation Bank have appropriate credits and habitat types to offset impacts to wetlands within the project limits, and are also permitted by the USACE to provide foraging habitat credits for wood storks.

The project corridor is located within the Core Foraging Areas of four active wood stork nesting colonies (Ballen Isles, Solid Waste Authority, Lox NC-4, and Wakodahatchee) and the USFWS-designated Consultation Areas for the Florida scrub-jay (*Aphelocoma coerulescens*), and Atlantic coast plants. According to USFWS GIS data, critical habitat for the West Indian manatee is located within portions of Pine Lake, the C-51 canal, and a retention pond within the Town of Cloud Lake. However, a review of the manatee accessibility map indicated these areas are not accessible to manatees, and per USFWS coordination in November of 2016 (included in Appendix D of the attached report), those waterbodies not accessible to manatees are not considered manatee critical habitat.

Nine federally listed species were evaluated to determine if the proposed project will adversely affect these species. Based on review of available data, in conjunction with field reconnaissance and surveys, the following effects determinations have been made:

Scientific Name	Common Name	Listing Status	Determination of Effect – All Build Alternatives**
Drymarchon corais couperi	Eastern Indigo Snake	FT	NLAA
Mycteria americana	Wood Stork	FT	NLAA
Aphelocoma coerulescens	Florida Scrub-Jay	FT	NE
Trichechus manatus	West Indian Manatee	FT	NE
Trichomanes punctatum ssp. floridanum	Florida Filmy Fern	FE	NE
Jacquemontia reclinata	Beach Jacquemontia	FE	NE
Asimina tetramera	Four-Petal Pawpaw	FE	NE
Polygala smallii	Tiny Polygala	FE	NE

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered; FT (S/A) = Federally Threatened due to similarity of appearance

** NE = No Effect; NLAA = Not Likely to Adversely Affect

FDOT commits to the following measures to minimize and mitigate potential impacts to listed species:

1) Incorporate the most current versions of the Standard Protection Measures for the Eastern Indigo Snake during construction.

2) Replace impacted wetlands within the core foraging area of the respective active wood stork breeding colony. If this is not feasible, FDOT will coordinate with the USFWS to identify acceptable wetland compensation outside the core foraging area, such as purchasing wetland credits from a "USFWS Approved" mitigation bank or permittee-responsible mitigation area.

3) Pre-construction surveys for gopher tortoises and Florida burrowing owls will be conducted prior to construction.

The purpose of this letter is to request written concurrence on the effects to listed species. Enclosed is the NRE for your review. Coordination will also occur with National Marine Fisheries Service to confirm there are no impacts to EFH and marine listed species. Please call me at 954-777-4325 if you have any questions.

Sincerely,

Ann Broadwell
Environmental Administrator
FDOT – District 4

cc: Anson Sonnett, P.E., FDOT District 4, Project Manager
Lynn Kelley, FDOT District 4, Environmental Specialist
Cassie Piche, P.E., RS&H
Paul Heeg, P.E., RS&H

Palm Beach 2014-CPA-0287 I-95 at SR 80 interchange

FDO

Florida Department

RICK SCOTT
GOVERNOR

3400 West Comm
Fort Lauderdale

May 31, 2

Roxanna Hinzman, Field Supervisor
South Florida Ecological Services Office
US Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960

Attn: John Wrublik

U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
772-562-3909 Fax 772-562-4288
04EF2000
FWS Log No. 2014-CPA-0287

The U.S. Fish and Wildlife Service has reviewed the information provided and finds that the proposed action is not likely to adversely affect any federally listed species or designated critical habitat protected by the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et. seq.). A record of this consultation is on file at the South Florida Ecological Service Office.

This fulfills the requirements of section 7 of the Act and further action is not required. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

Roxanna Hinzman, Field Supervisor — Date 6/29/17

FOR

Subject: **ESA Section 7 Consultation/Concurrence Request Letter**
Project Name: SR 9 / I-95 at SR 80 / Southern Boulevard
(I-95 MP 24.3 to 25.3 and SR 80 MP 19.1 to 20.4)
Financial Management No.: 435516-1-22-02
ETDM No. 14183
County: Palm Beach County

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A Natural Resource Evaluation (NRE) has been prepared for the project and is attached. Three build alternatives were analyzed in the study for the interchange improvements. Essential Fish Habitat (EFH) is not present within the project corridor. The effects to surface waters (OSW), wetlands (stormwater swales), and listed species were similar for all alternatives.

The Recommended Alternative (Alternative 4) provides dual third level flyovers: one from northbound I-95 to westbound Southern Boulevard, and one from eastbound Southern Boulevard to northbound I-95. The following is a summary of impacts for all alternatives.

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Mitigation

Mitigation may be accomplished onsite through the creation of stormwater swales [one foot above Design High Water (DHW), if acceptable to the USACE], or offsite at a permittee responsible mitigation area (e.g., DuPuis Reserve) or authorized mitigation bank (e.g., Loxahatchee Mitigation Bank). Both DuPuis Reserve and Loxahatchee Mitigation Bank have appropriate credits and habitat types to offset impacts to wetlands within the project limits, and are also permitted by the USACE to provide foraging habitat credits for wood storks.

The project corridor is located within the Core Foraging Areas of four active wood stork nesting colonies (Ballen Isles, Solid Waste Authority, Lox NC-4, and Wakodahatchee) and the USFWS-designated Consultation Areas for the Florida scrub-jay (*Aphelocoma coerulescens*), and Atlantic coast plants. According to USFWS GIS data, critical habitat for the West Indian manatee is located within portions of Pine Lake, the C-51 canal, and a retention pond within the Town of Cloud Lake. However, a review of the manatee accessibility map indicated these areas are not accessible to manatees, and per USFWS coordination in November of 2016 (included in Appendix D of the attached report), those waterbodies not accessible to manatees are not considered manatee critical habitat.

Nine federally listed species were evaluated to determine if the proposed project will adversely affect these species. Based on review of available data, in conjunction with field reconnaissance and surveys, the following effects determinations have been made:

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Asimina tetramera	Four-Petal Pawpaw	FE	NE
Polygala smallii	Tiny Polygala	FE	NE

Note: FT = Federally-designated Threatened; FE = Federally-designated Endangered; FT (S/A) Federally Threatened due to similarity of appearance

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FDOT
Florida Department of Transportation
RICK SCOTT
GOVERNOR
3400 West Commercial Blvd.
Fort Lauderdale, FL 33309
RACHEL D. CONE
INTERIM SECRETARY

May 31, 2017

NOAA Fisheries Southeast Regional Office
Habitat Conservation Division
400 North Congress Avenue, Suite 110
West Palm Beach, FL 33401

Attn: Jennifer Schull

Subject: ESA Section 7 Consultation/Concurrence Request Letter and Essential Fish Habitat Assessment (EFH)/Habitat Areas of Particular Concern (HAPC) Coordination
Project Name: SR 9 / I-95 at SR 80 / Southern Boulevard
(I-95 MP 24.3 to 25.3 and SR 80 MP 19.1 to 20.4)
Financial Management No.: 435516-1-22-02
ETDM No. 14183
County: Palm Beach County

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OSW / Wetland Indirect Impacts:

Alternative 1: 0.24 acres (OSW)
Alternative 3: 0.24 acres (OSW)
Alternative 4: 0.24 acres (OSW)

Mitigation

Mitigation, if required, may be accomplished onsite through the creation of stormwater swales [one foot above Design High Water (DHW), if acceptable to the USACE], or offsite at a permittee responsible mitigation area (e.g., DuPuis Reserve) or authorized mitigation bank (e.g., Loxahatchee Mitigation Bank). Both DuPuis Reserve and Loxahatchee Mitigation Bank have appropriate credits and habitat types to offset impacts to wetlands within the project limits, and are also permitted by the USACE to provide foraging habitat credits for wood storks.

According to USFWS GIS data, critical habitat for the West Indian manatee is located within portions of Pine Lake, the C-51 canal, and a retention pond within the Town of Cloud Lake. However, a review of the manatee accessibility map indicates these areas are not accessible to manatees, and per USFWS coordination in November of 2016 (included in Appendix D of the attached report), those waterbodies not accessible to manatees are not considered manatee critical habitat.

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FDOT commits to the following measures to minimize and mitigate potential impacts to listed species:

1) Incorporate the most current versions of the Standard Protection Measures for the Eastern Indigo Snake during construction.

2) Replace impacted wetlands within the core foraging area of the respective active wood stork breeding colony. If this is not feasible, FDOT will coordinate with the USFWS to identify acceptable wetland compensation outside the core foraging area, such as purchasing wetland credits from a "USFWS Approved" mitigation bank or permittee-responsible mitigation area.

3) Pre-construction surveys for gopher tortoises and Florida burrowing owls will be conducted prior to construction.

The purpose of this letter is to request written concurrence that there is no EFH within the project area, and no marine listed species under the purview of NMFS. Coordination will also occur with US Fish and Wildlife Service regarding the impacts to other listed species not under NMFS review. Please call me at 954-777-4325 if you have any questions.

Sincerely,

Ann Broadwell

Ann Broadwell
Environmental Administrator
FDOT – District 4

cc: Anson Sonnett, P.E., FDOT District 4, Project Manager
Lynn Kelley, FDOT District 4, Environmental Specialist
Cassie Piche, P.E., RS&H
Paul Heeg, P.E., RS&H

From:	Piche, Cassie
To:	jenna santangelo; wendy cyriaks (wc@cecosenvironmental.com)
Subject:	FW: Question on I-95 and Southern Boulevard project
Date:	Tuesday, June 20, 2017 9:44:50 AM

From: Jennifer Schull - NOAA Federal [mailto:jennifer.schull@noaa.gov]
Sent: Thursday, June 15, 2017 3:07 PM
To: Kelley, Lynn; Broadwell, Ann L
Subject: Question on I-95 and Southern Boulevard project

Hi Ann.

Thanks for the letter regarding I-95 and Southern Boulevard. As noted in the letter, we provided comments through the EST (ETDM 14183) in August 2014. The NMFS maintains its position that the project will not impact our trust resources. Effects determinations for listed species are the responsibility of the lead federal action agency or their non-federal designee (FDOT). If that determination is "no effect", FDOT simply documents the finding in their records. We do not need to concur with "no effect" determinations.

Please rely on our determination in the EST for this project unless substantial modifications are made that would lead FDOT to believe EFH may be impacted or NMFS trust listed species may be affected. Let me know if this email is sufficient for your records or if you'd like a letter.

Thanks,

Jen

--
Jennifer Schull
NOAA Fisheries Southeast Regional Office
Habitat Conservation Division
400 N. Congress Avenue STE 110
West Palm Beach, FL 33401
561 249-1652

APPENDIX E

Eastern Indigo Snake Standard Protection Measures (August 2013)

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service
August 12, 2013

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida for use by applicants and their construction personnel. At least **30 days prior** to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov; South Florida Field Office: verobeach@fws.gov; Panama City Field Office: panamacity@fws.gov). As long as the signatory of the e-mail certifies compliance with the below Plan (including use of the attached poster and brochure), no further written confirmation or "approval" from the USFWS is needed and the applicant may move forward with the project.

If the applicant decides to use an eastern indigo snake protection/education plan other than the approved Plan below, written confirmation or "approval" from the USFWS that the plan is adequate must be obtained. At least 30 days prior to any clearing/land alteration activities, the applicant shall submit their unique plan for review and approval. The USFWS will respond via e-mail, typically within 30 days of receiving the plan, either concurring that the plan is adequate or requesting additional information. A concurrence e-mail from the appropriate USFWS Field Office will fulfill approval requirements.

The Plan materials should consist of: 1) a combination of posters and pamphlets (see **Poster Information** section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated (see **Pre-Construction Activities** and **During Construction Activities** sections below).

POSTER INFORMATION

Posters with the following information shall be placed at strategic locations on the construction site and along any proposed access roads (a final poster for Plan compliance, to be printed on 11" x 17" or larger paper and laminated, is attached):

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat. These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida. Although they have a preference for uplands, they also utilize some wetlands

and agricultural areas. Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION UNDER FEDERAL AND STATE LAW: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. "Taking" of eastern indigo snakes is prohibited by the Endangered Species Act without a permit. "Take" is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

IF YOU SEE A <u>LIVE</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the live eastern indigo snake sufficient time to move away from the site without interference;
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A <u>DEAD</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicant's designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

Telephone numbers of USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office – (904) 731-3336
Panama City Field Office – (850) 769-0552
South Florida Field Office – (772) 562-3909

PRE-CONSTRUCTION ACTIVITIES

1. The applicant or designated agent will post educational posters in the construction office and throughout the construction site, including any access roads. The posters must be clearly visible to all construction staff. A sample poster is attached.

2. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss identification of the snake, its protected status, what to do if a snake is observed within the project area, and applicable penalties that may be imposed if state and/or federal regulations are violated. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office (a final brochure for Plan compliance, to be printed double-sided on 8.5" x 11" paper and then properly folded, is attached). Photos of eastern indigo snakes may be accessed on USFWS and/or FWC websites.

3. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan, which includes notification of the appropriate USFWS Field Office. The contact information for the USFWS is provided on the referenced posters and brochures.

DURING CONSTRUCTION ACTIVITIES

1. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting (example: discovery of snake sheds, tracks, lots of refugia and cavities present in the area of clearing activities, and presence of gopher tortoises and burrows).

2. If an eastern indigo snake is discovered during gopher tortoise relocation activities (i.e. burrow excavation), the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.

3. Periodically during construction activities, the applicant's designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed. Construction personnel should be reminded of the instructions (above) as to what is expected if any eastern indigo snakes are seen.

POST CONSTRUCTION ACTIVITIES

Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion. The report can be sent electronically to the appropriate USFWS e-mail address listed on page one of this Plan.

APPENDIX F

USFWS Wood Stork Effect and Eastern Indigo Snake Programmatic Effect Determination Keys

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
August 13, 2013

Colonel Alan M. Dodd, District Engineer
Department of the Army
Jacksonville District Corps of Engineers
P.O Box 4970
Jacksonville, Florida 32232-0019
(Attn: Mr. David S. Hobbie)

RE: Update Addendum to USFWS Concurrence Letter to U.S. Army Corps of Engineers Regarding Use of the Attached Eastern Indigo Snake Programmatic Effect Determination Key

Dear Colonel Dodd:

This letter is to amend the January 25, 2010, letter to the U.S. Army Corps of Engineers regarding the use of the attached eastern indigo snake programmatic effect determination key (key). It supersedes the update addendum issued January 5, 2012.

We have evaluated the original programmatic concurrence and find it suitable and appropriate to extend its use to the remainder of Florida covered by the Panama City Ecological Services Office.

On Page 2

The following replaces the last paragraph above the signatures:

"Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. Any questions or comments should be directed to Annie Dziergowski (North Florida ESO) at 904-731-3089, Harold Mitchell (Panama City ESO) at 850-769-0552, or Victoria Foster (South Florida ESO) at 772-469-4269."

On Page 3

The following replaces both paragraphs under "Scope of the key":

"This key should be used only in the review of permit applications for effects determinations for the eastern indigo snake within the State of Florida, and not for other listed species or for aquatic resources such as Essential Fish Habitat (EFH)."

On Page 4

The following replaces the first paragraph under Conservation Measures:

"The Service routinely concurs with the Corps' "not likely to adversely affect" (NLAA) determination for individual project effects to the eastern indigo snake when assurances are given that

our *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013) located at: http://www.fws.gov/northflorida/IndigoSnakes/indigo-snakes.htm will be used during project site preparation and project construction. There is no designated critical habitat for the eastern indigo snake."

On Page 4 and Page 5 (Couplet D)

The following replaces D. under Conservation Measures:

D. The project will impact less than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) or less than 25 active and inactive gopher tortoise burrows.....*go to* E

The project will impact more than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) or more than 25 active and inactive gopher tortoise burrows and consultation with the Service is requested[2].....*"may affect"*

On Page 5

The following replaces footnote #3:

"[3]If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a FWC Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at http://myfwc.com/gophertortoise ."

Thank you for making these amendments concerning the Eastern Indigo Snake Key. If you have any questions, please contact Jodie Smithem of my staff at the address on the letterhead, by email at jodie_smithem@fws.gov, or by calling (904)731-3134.

Sincerely,

Dawn Jennings
Acting Field Supervisor

cc:
Panama City Ecological Services Field Office, Panama City, FL
South Florida Ecological Services Field Office, Vero Beach, FL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

January 25, 2010

David S. Hobbie
Chief, Regulatory Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2009-FA-0642
Service Consultation Code: 41420-2009-I-0467
41910-2010-I-0045
Subject: North and South Florida Ecological Services Field Offices Programmatic Concurrence for Use of Original Eastern Indigo Snake Key(s) Until Further Notice

Dear Mr. Hobbie:

The U.S. Fish and Wildlife Service's (Service) South and North Florida Ecological Services Field Offices (FO), through consultation with the U.S. Army Corps of Engineers Jacksonville District (Corps), propose revision to both Programmatic concurrence letters/keys for the federally threatened Eastern Indigo Snake (*Drymarchon corais couperi*), (indigo snake), and now provide one key for both FO's. The original programmatic key was issued by the South Florida FO on November 9, 2007. The North Florida FO issued a revised version of the original key on September 18, 2008. Both keys were similar in content, but reflected differences in geographic work areas between the two Field Offices. The enclosed key satisfies each office's responsibilities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*).

Footnote number 3 in the original keys indicated "A member of the excavation team should be authorized for Incidental Take during excavation through either a section 10(a)(1)(A) permit issued by the Service or an incidental take permit issued by the Florida Fish and Wildlife Conservation Commission (FWC)." We have removed this reference to a Service issued Section 10(a)(1)(A) permit, as one is not necessary for this activity. We also referenced the FWC's revised April 2009 Gopher Tortoise Permitting Guidelines with a link to their website for updated excavation guidance, and have provided a website link to our Standard Protection Measures. All other conditions and criteria apply.

We believe the implementation of the attached key achieves our mutual goal for all users to make consistent effect determinations regarding this species. The use of this key for review of projects

located in all referenced counties in our respective geographic work areas leads the Service to concur with the Corps' determination of "may affect, not likely to adversely affect" (MANLAA) for the Eastern indigo snake. The biological rationale for the determinations is contained within the referenced documents and is submitted in accordance with section 7 of the Act.

Should circumstances change or new information become available regarding the eastern indigo snake or implementation of the key, the determinations may be reconsidered as deemed necessary.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. Any questions or comments should be directed to either Allen Webb (Vero Beach) at 772-562-3909, extension 246, or Jay Herrington (Jacksonville) at 904-731-3326.

Sincerely,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

David L. Hankla
Field Supervisor
North Florida Ecological Services Office

Enclosure

cc: electronic only
FWC, Tallahassee, Florida (Dr. Elsa Haubold)
Service, Jacksonville, Florida (Jay Herrington)
Service, Vero Beach, Florida (Sandra Sneckenberger)

Eastern Indigo Snake Programmatic Effect Determination Key

Scope of the key

This key should be used only in the review of permit applications for effects determinations within the North and South Florida Ecological Services Field Offices Geographic Areas of Responsibility (GAR), and not for other listed species or for aquatic resources such as Essential Fish Habitat (EFH). Counties within the **North** Florida GAR include Alachua, Baker, Bradford, Brevard, Citrus, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Hernando, Hillsborough, Lafayette, Lake, Levy, Madison, Manatee, Marion, Nassau, Orange, Pasco, Pinellas, Putnam, St. Johns, Seminole, Sumter, Suwannee, Taylor, Union, and Volusia.

Counties in the **South** Florida GAR include Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, St. Lucie.

Habitat

Over most of its range, the eastern indigo snake frequents several habitat types, including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats (Service 1999). Eastern indigo snakes appear to need a mosaic of habitats to complete their life cycle. Wherever the eastern indigo snake occurs in xeric habitats, it is closely associated with the gopher tortoise *(Gopherus polyphemus),* the burrows of which provide shelter from winter cold and summer desiccation (Speake et al. 1978; Layne and Steiner 1996). Interspersion of tortoise-inhabited uplands and wetlands improves habitat quality for this species (Landers and Speake 1980; Auffenberg and Franz 1982).

In south Florida, agricultural sites, such as sugar cane fields, created in former wetland areas are occupied by eastern indigo snakes (Enge pers. comm. 2007). Formerly, indigo snakes would have only occupied higher elevation sites within the wetlands. The introduction of agriculture and its associated canal systems has resulted in an increase in rodents and other species of snakes that are prey for eastern indigo snakes. The result is that indigos occur at higher densities in these areas than they did historically.

Even though thermal stress may not be a limiting factor throughout the year in south Florida, indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigos use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Service 2006). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges. In extreme south Florida (the Everglades and Florida Keys), indigo snakes are found in tropical

hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats (Steiner et al. 1983). It is suspected that they prefer hammocks and pine forests, because most observations occur in these habitats disproportionately to their presence in the landscape (Steiner et al. 1983). Hammocks may be important breeding areas as juveniles are typically found there. The eastern indigo snake is a snake-eater so the presence of other snake species may be a good indicator of habitat quality.

Conservation Measures

The Service routinely concurs with the Corps' "not likely to adversely affect" (NLAA) determination for individual project effects to the eastern indigo snake when assurances are given that our *Standard Protection Measures for the Eastern Indigo Snake* (Service 2004) located at: http://www.fws.gov/northflorida/IndigoSnakes/indigo-snakes will be used during project site preparation and project construction. There is no designated critical habitat for the eastern indigo snake.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing an Eastern Indigo Snake Effect Determination Key, similar in utility to the West Indian Manatee Effect Determination Key and the Wood Stork Effect Determination Keys presently being utilized by the Corps. If the use of this key results in a Corps' determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination and no additional correspondence will be necessary[1]. This key is subject to revisitation as the Corps and Service deem necessary.

A. Project is not located in open water or salt marsh.....*go to* B

   Project is located solely in open water or salt marsh.....*"no effect"*

B. Permit will be conditioned for use of the Service's *Standard Protection Measures For The Eastern Indigo Snake* during site preparation and project construction.....*go to* C

   Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested[2] .....*"may affect"*

C. There are gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities .....*go to* D

   There are no gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities .....*"NLAA"*

D. The project will impact less than 25 acres of xeric habitat supporting less than 25 active and inactive gopher tortoise burrows.....*go to* E

The project will impact more than 25 acres of xeric habitat or more than 25 active and inactive gopher tortoise burrows and consultation with the Service is requested[2]..... *"may affect"*

E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be evacuated prior to site manipulation in the vicinity of the burrow[3]. If an indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an indigo snake, no work will commence until the snake has vacated the vicinity of proposed work..... *"NLAA"*

Permit will not be conditioned as outlined above and consultation with the Service is requested[2] ..... *"may affect"*

---

[1]With an outcome of "no effect" or "NLAA" as outlined in this key, the requirements of section 7 of the Act are fulfilled for the eastern indigo snake and no further action is required.

[2]Consultation may be concluded informally or formally depending on project impacts.

[3] If burrow excavation is utilized, it should be performed by experienced personnel. The method used should minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the Florida Fish and Wildlife Conservation Commission's revised April 2009 Gopher Tortoise Permitting Guidelines located at **http://myfwc.com/License/Permits_ProtectedWildlife.htm#gophertortoise**. A member of the excavation team should be authorized for Incidental Take during excavation through an incidental take permit issued by the Florida Fish and Wildlife Conservation Commission.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

May 18, 2010

Donnie Kinard
Chief, Regulatory Division
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2007-FA-1494
Service Consultation Code: 41420-2007-I-0964
Subject: South Florida Programmatic Concurrence
Species: Wood Stork

Dear Mr. Kinard:

This letter addresses minor errors identified in our January 25, 2010, wood stork key and as such, supplants the previous key. The key criteria and wood stork biomass foraging assessment methodology have not been affected by these minor revisions.

The Fish and Wildlife Service's (Service) South Florida Ecological Services Office (SFESO) and the U.S. Army Corps of Engineers Jacksonville District (Corps) have been working together to streamline the consultation process for federally listed species associated with the Corps' wetland permitting program. The Service provided letters to the Corps dated March 23, 2007, and October 18, 2007, in response to a request for a multi-county programmatic concurrence with a criteria-based determination of "may affect, not likely to adversely affect" (NLAA) for the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered wood stork (*Mycteria americana*) for projects involving freshwater wetland impacts within specified Florida counties. In our letters, we provided effect determination keys for these two federally listed species, with specific criteria for the Service to concur with a determination of NLAA.

The Service has revisited these keys recently and believes new information provides cause to revise these keys. Specifically, the new information relates to foraging efficiencies and prey base assessments for the wood stork and permitting requirements for the eastern indigo snake. This letter addresses the wood stork key and is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The eastern indigo snake key will be provided in a separate letter.

Wood stork

Habitat

The wood stork is primarily associated with freshwater and estuarine habitats that are used for nesting, roosting, and foraging. Wood storks typically construct their nests in medium to tall

trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Ogden 1991, 1996; Rodgers et al. 1996). Successful colonies are those that have limited human disturbance and low exposure to land-based predators. Nesting colonies protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle. These colonies have water depths between 0.9 and 1.5 meters (3 and 5 feet) during the breeding season.

Successful nesting generally involves combinations of average or above-average rainfall during the summer rainy season and an absence of unusually rainy or cold weather during the winter-spring breeding season (Kahl 1964; Rodgers et al. 1987). This pattern produces widespread and prolonged flooding of summer marshes, which maximize production of freshwater fishes, followed by steady drying that concentrate fish during the season when storks nest (Kahl 1964). Successful nesting colonies are those that have a large number of foraging sites. To maintain a wide range of foraging sites, a variety of wetland types should be present, with both short and long hydroperiods. The Service (1999) describes a short hydroperiod as a 1 to 5-month wet/dry cycle, and a long hydroperiod as greater than 5 months. During the wet season, wood storks generally feed in the shallow water of the short-hydroperiod wetlands and in coastal habitats during low tide. During the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry-down (though usually retaining some surface water throughout the dry season).

Wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the wood stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside and agricultural ditches, narrow tidal creeks and shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs. Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly concentrated prey. Through tactolocation, or grope feeding, wood storks in south Florida feed almost exclusively on fish between 2 and 25 centimeters [cm] (1 and 10 inches) in length (Ogden et al. 1976). Good foraging conditions are characterized by water that is relatively calm, uncluttered by dense thickets of aquatic vegetation, and having a water depth between 5 and 38 cm (5 and 15 inches) deep, although wood storks may forage in other wetlands. Ideally, preferred foraging wetlands would include a mosaic of emergent and shallow open-water areas. The emergent component provides nursery habitat for small fish, frogs, and other aquatic prey and the shallow, open-water areas provide sites for concentration of the prey during seasonal dry-down of the wetland.

Conservation Measures

The Service routinely concurs with the Corps' "may affect, not likely to adversely affect" determination for individual project effects to the wood stork when project effects are insignificant due to scope or location, or if assurances are given that wetland impacts have been avoided, minimized, and adequately compensated such that there is no net loss in foraging potential. We utilize our *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service 1990) (Enclosure 1) (HMG) in project evaluation. The HMG is currently under review and once final will replace the enclosed HMG. There is no designated critical habitat for the wood stork.

The SFESO recognizes a 29.9 kilometer [km] (18.6-mile) core foraging area (CFA) around all known wood stork colonies in south Florida. Enclosure 2 (to be updated as necessary) provides locations of colonies and their CFAs in south Florida that have been documented as active within the last 10 years. The Service believes loss of suitable wetlands within these CFAs may reduce foraging opportunities for the wood stork. To minimize adverse effects to the wood stork, we recommend compensation be provided for impacts to foraging habitat. The compensation should consider wetland type, location, function, and value (hydrology, vegetation, prey utilization) to ensure that wetland functions lost due to the project are adequately offset. Wetlands offered as compensation should be of the same hydroperiod and located within the CFAs of the affected wood stork colonies. The Service may accept, under special circumstances, wetland compensation located outside the CFAs of the affected wood stork nesting colonies. On occasion, wetland credits purchased from a "Service Approved" mitigation bank located outside the CFAs could be acceptable to the Service, depending on location of impacted wetlands relative to the permitted service area of the bank, and whether or not the bank has wetlands having the same hydroperiod as the impacted wetland.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing the Wood Stork Effect Determination Key below. If the use of this key results in a Corps determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination[1]. This Key is subject to revisitation as the Corps and Service deem necessary.

The Key is as follows:

A. Project within 0.76 km (0.47 mile)[2] of an active colony site[3] ..... "*may affect*[4]"

Project impacts Suitable Foraging Habitat (SFH)[5] at a location greater than 0.76 km (0.47 mile) from a colony site..... ....."*go to* B"

---

[1] With an outcome of "no effect" or "NLAA" as outlined in this key, and the project has less than 20.2 hectares (50 acres) of wetland impacts, the requirements of section 7 of the Act are fulfilled for the wood stork and no further action is required. For projects with greater than 20.2 hectares (50 acres) of wetland impacts, written concurrence of NLAA from the Service is necessary.

[2] Within the secondary zone (the average distance from the border of a colony to the limits of the secondary zone is 0.76 km (2,500 feet, or 0.47 mi).

[3] An active colony is defined as a colony that is currently being used for nesting by wood storks or has historically over the last 10 years been used for nesting by wood storks.

[4] Consultation may be concluded informally or formally depending on project impacts.

[5] Suitable foraging habitat (SFH) includes wetlands that typically have shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between 5 to 38 cm (2 to 15 inches) deep. Other shallow non-wetland water bodies are also SFH. SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to freshwater marshes, small ponds, shallow, seasonally flooded roadside or agricultural ditches, seasonally flooded pastures, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs.

Project does not affect SFH……..…..*"no effect[1]".*

B. Project impact to SFH is less than 0.20 hectare (one-half acre)[6]……..……*NLAA[1]"*

Project impact to SFH is greater in scope than 0.20 hectare (one-half acre)....……*go to* C

C. Project impacts to SFH not within the CFA (29.9 km, 18.6 miles) of a colony site ……..…….…….…..……*go to* D

Project impacts to SFH within the CFA of a colony site …….…..…...…….*go to* E

D. Project impacts to SFH have been avoided and minimized to the extent practicable; compensation (Service approved mitigation bank or as provided in accordance with Mitigation Rule 33 CFR Part 332) for unavoidable impacts is proposed in accordance with the CWA section 404(b)(1) guidelines; and habitat compensation replaces the foraging value matching the hydroperiod[7] of the wetlands affected and provides foraging value similar to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]…….. *NLAA[1]"*

Project not as above.……... *"may affect[4]"*

E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod[7] of the wetlands affected, and provides foraging value similar

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[6] On an individual basis, SFH impacts to wetlands less than 0.20 hectare (one-half acre) generally will not have a measurable effect on wood storks, although we request that the Corps require mitigation for these losses when appropriate. Wood storks are a wide ranging species, and individually, habitat change from impacts to SFH less than one-half acre are not likely to adversely affect wood storks. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

[7] Several researchers (Flemming et al. 1994; Ceilley and Bortone 2000) believe that the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater early nestling survivor value for wood storks than the foraging base (grams of fish per square meter) than long hydroperiod wetlands provide. Although the short hydroperiod wetlands may provide less fish, these prey bases historically were more extensive and met the foraging needs of the pre-nesting storks and the early-age nestlings. Nest productivity may suffer as a result of the loss of short hydroperiod wetlands. We believe that most wetland fill and excavation impacts permitted in south Florida are in short hydroperiod wetlands. Therefore, we believe that it is especially important that impacts to these short hydroperiod wetlands within CFAs are avoided, minimized, and compensated for by enhancement/restoration of short hydroperiod wetlands.

[8] For this Key, the Service requires an analysis of foraging prey base losses and enhancements from the proposed action as shown in the examples in Enclosure 3 for projects with greater than 2.02 hectares (5 acres) of wetland impacts. For projects with less than 2.02 hectares (5 acres) of wetland impacts, an individual foraging prey base analysis is not necessary although type for type wetland compensation is still a requirement of the Key.

to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]..... *"NLAA[1]"*

Project does not satisfy these elements ..... *"may affect[4]"*

This Key does not apply to Comprehensive Everglades Restoration Plan projects, as they will require project-specific consultations with the Service.

Monitoring and Reporting Effects

For the Service to monitor cumulative effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued where the effect determination was: "may affect, not likely to adversely affect." We request that the Corps send us an annual summary consisting of: project dates, Corps identification numbers, project acreages, project wetland acreages, and project locations in latitude and longitude in decimal degrees.

Thank you for your cooperation and effort in protecting federally listed species. If you have any questions, please contact Allen Webb at extension 246.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosures

cc: w/enclosures (electronic only)
Corps, Jacksonville, Florida (Stu Santos)
EPA, West Palm Beach, Florida (Richard Harvey)
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Service, Jacksonville, Florida (Billy Brooks)

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

A number of Federal and state laws and/or regulations prohibit, cumulatively, such acts as harrassing, disturbing, harming, molesting, pursuing, etc., wood storks, or destroying their nests (see Section VII). Although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to mainain and/or improve the environmental conditions that are required for the survival and well-being of wood storks in the southeastern United States, and are designed essentially for application in wood stork/human activity conflicts (principally land development and human intrusion into stork use sites). The emphasis is to avoid or minimize detrimental human-related impacts on wood storks. These guidelines were prepared in consultations with state wildlife agencies and wood stork experts in the four southeastern states where the wood stork is listed as Endangered (Alabama, Florida, Georgia, South Carolina).

General

The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. Storks that nest in the southeastern United States appear to represent a distinct population, separate from the nearest breeding population in Mexico. Storks in the southeastern U.S. population have recently (since 1980) nested in colonies scattered throughout Florida, and at several central-southern Georgia and coastal South Carolina sites. Banded and color-marked storks from central and southern Florida colonies have dispersed during non-breeding seasons as far north as southern Georgia, and the coastal counties in South Carolina and southeastern North Carolina, and as far west as central Alabama and northeastern Mississippi. Storks from a colony in south-central Georgia have wintered between southern Georgia and southern Florida. This U.S. nesting population of wood storks was listed as endangered by the U.S. Fish and Wildlife Service on February 28, 1984 (*Federal Register* 49(4):7332-7335).

Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of regional populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites; thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources.

All available evidence suggests that regional declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat. An understanding of the qualities of good stork habitat should help to focus protection efforts on those sites

that are seasonally important to regional populations of wood storks. Characteristics of feeding, nesting, and roosting habitat, and management guidelines for each, are presented here by habitat type.

I. Feeding habitat.

A major reason for the wood stork decline has been the loss and degredation of feeding habitat. Storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.

Storks feed primarily (often almost exclusively) on small fish between 1 and 8 inches in length. Successful foraging sites are those where the water is between 2 and 15 inches deep. Good feeding conditions usually occur where water is relatively calm and uncluttered by dense thickets of aquatic vegetation. Often a dropping water level is necessary to concentrate fish at suitable densities. Conversely, a rise in water, especially when it occurs abruptly, disperses fish and reduces the value of a site as feeding habitat.

The types of wetland sites that provide good feeding conditions for storks include: drying marshes or stock ponds, shallow roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads or swamp sloughs. In fact, almost any shallow wetland depression where fish tend to become concentrated, either through local reproduction or the consequences of area drying, may be used by storks.

Nesting wood storks do most of their feeding in wetlands between 5 and 40 miles from the colony, and occasionally at distances as great as 75 miles. Within this colony foraging range and for the 110-150 day life of the colony, and depending on the size of the colony and the nature of the surrounding wetlands, anywhere from 50 to 200 different feeding sites may be used during the breeding season.

Non-breeding storks are free to travel much greater distances and remain in a region only for as long as sufficient food is available. Whether used by breeders or non-breeders, any single feeding site may at one time have small or large numbers of storks (1 to 100+), and be used for one to many days, depending on the quality and quantity of available food. Obviously, feeding sites used by relatively large numbers of storks, and/or frequently used areas, potentially are the more important sites necessary for the maintenance of a regional population of birds.

Differences between years in the seasonal distribution and amount of rainfall usually mean that storks will differ between years in where and when they feed. Successful nesting colonies are those that have a large number of feeding site options, including sites that may be suitable only in years of rainfall extremes. To maintain the wide range of feeding site options requires that many different wetlands, with both relatively short and long annual hydroperiods, be preserved. For example, protecting only the larger wetlands, or those with longer annual hydroperiods, will result in the eventual loss of smaller, seemingly less important wetlands. However, these small scale wetlands are crucial as the only available feeding sites during the wetter periods when the larger habitats are too deeply flooded to be used by storks.

II. Nesting habitat.

Wood storks nest in colonies, and will return to the same colony site for many years so long as that site and surrounding feeding habitat continue to supply the needs of the birds. Storks require between 110 and 150 days for the annual nesting cycle, from the period of courtship until the nestlings become independent. Nesting activity may begin as early as December or as late as March in southern Florida colonies, and between late February and April in colonies located between central Florida and South Carolina. Thus, full term colonies may be active until June-July in south Florida, and as late as July-August at more northern sites. Colony sites may also be used for roosting by storks during other times of the year.

Almost all recent nesting colonies in the southeastern U.S. have been located either in woody vegetation over standing water, or on islands surrounded by broad expanses of open water. The most dominant vegetation in swamp colonies has been cypress, although storks also nest in swamp hardwoods and willows. Nests in island colonies may be in more diverse vegetation, including mangroves (coastal), exotic species such as Australian pine (*Casuarina*) and Brazilian Pepper (*Schinus*), or in low thickets of cactus (*Opuntia*). Nests are usually located 15-75 feet above ground, but may be much lower, especially on island sites when vegetation is low.

Since at least the early 1970's, many colonies in the southeastern U.S. have been located in swamps where water has been impounded due to the construction of levees or roadways. Storks have also nested in dead and dying trees in flooded phosphate surface mines, or in low, woody vegetation on mounded, dredge islands. The use of these altered wetlands or completely "artificial" sites suggests that in some regions or years storks are unable to locate natural nesting habitat that is adequately flooded during the normal breeding season. The readiness with which storks will utilize water impoundments for nesting also suggests that colony sites could be intentionally created and maintained through long-term site management plans. Almost all impoundment sites used by storks become suitable for nesting only fortuitously, and therefore, these sites often do not remain available to storks for many years.

In addition to the irreversible impacts of drainage and destruction of nesting habitat, the greatest threats to colony sites are from human disturbance and predation. Nesting storks show some variation in the levels of human activity they will tolerate near a colony. In general, nesting storks are more tolerant of low levels of human activity near a colony when nests are high in trees than when they are low, and when nests contain partially or completely feathered young than during the period between nest construction and the early nestling period (adults still brooding). When adult storks are forced to leave their nests, eggs or downy young may die quickly (<20 minutes) when exposed to direct sun or rain.

Colonies located in flooded environments must remain flooded if they are to be successful. Often water is between 3 and 5 feet deep in successful colonies during the nesting season. Storks rarely form colonies, even in traditional nesting sites, when they are dry, and may abandon nests if sites become dry during the nesting period. Flooding in colonies may be most important as a defense against mammalian predators. Studies of stork colonies in Georgia and

Florida have shown high rates of raccoon predation when sites dried during the nesting period. A reasonably high water level in an active colony is also a deterrent against both human and domestic animal intrusions.

Although nesting wood storks usually do most feeding away from the colony site (>5 miles), considerable stork activity does occur close to the colony during two periods in the nesting cycle. Adult storks collect almost all nesting material in and near the colony, usually within 2500 feet. Newly fledged storks, near the end of the nesting cycle, spend from 1-4 weeks during the fledging process flying locally in the colony area, and perched in nearby trees or marshy spots on the ground. These birds return daily to their nests to be fed. It is essential that these fledging birds have little or no disturbance as far our as one-half mile within at least one or two quadrants from the colony. Both the adults, while collecting nesting material, and the inexperienced fledglings, do much low, flapping flight within this radius of the colony. At these times, storks potentially are much more likely to strike nearby towers or utility lines.

Colony sites are not necessarily used annually. Regional populations of storks shift nesting locations between years, in response to year-to-year differences in food resources. Thus, regional populations require a range of options for nesting sites, in order to successfully respond to food availability. Protection of colony sites should continue, therefore, for sites that are not used in a given year.

III. Roosting habitat.

Although wood storks tend to roost at sites that are similar to those used for nesting, they also use a wider range of site types for roosting than for nesting. Non-breeding storks, for example, may frequently change roosting sites in response to changing feeding locations, and in the process, are inclined to accept a broad range of relatively temporary roosting sites. Included in the list of frequently used roosting locations are cypress "heads" or swamps (not necessarily flooded if trees are tall), mangrove islands, expansive willow thickets or small, isolated willow "islands" in broad marshes, and on the ground either on levees or in open marshes.

Daily activity patterns at a roost vary depending on the status of the storks using the site. Non-breeding adults or immature birds may remain in roosts during major portions of some days. When storks are feeding close to a roost, they may remain on the feeding grounds until almost dark before making the short flight. Nesting storks traveling long distances (>40 miles) to feeding sites may roost at or near the latter, and return to the colony the next morning. Storks leaving roosts, especially when going long distances, tend to wait for mid-morning thermals to develop before departing.

IV. Management zones and guidelines for feeding sites.

To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

A. There should be no human intrusion into feeding sites when storks are present. Depending upon the amount of screening vegetation, human activity should be no closer than between 300 feet (where solid vegetation screens exist) and 750 feet (no vegetation screen).

B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.

C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.

D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. Management zones and guidelines for nesting colonies.

A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.

1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.

2. Recommended Restrictions:

a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:

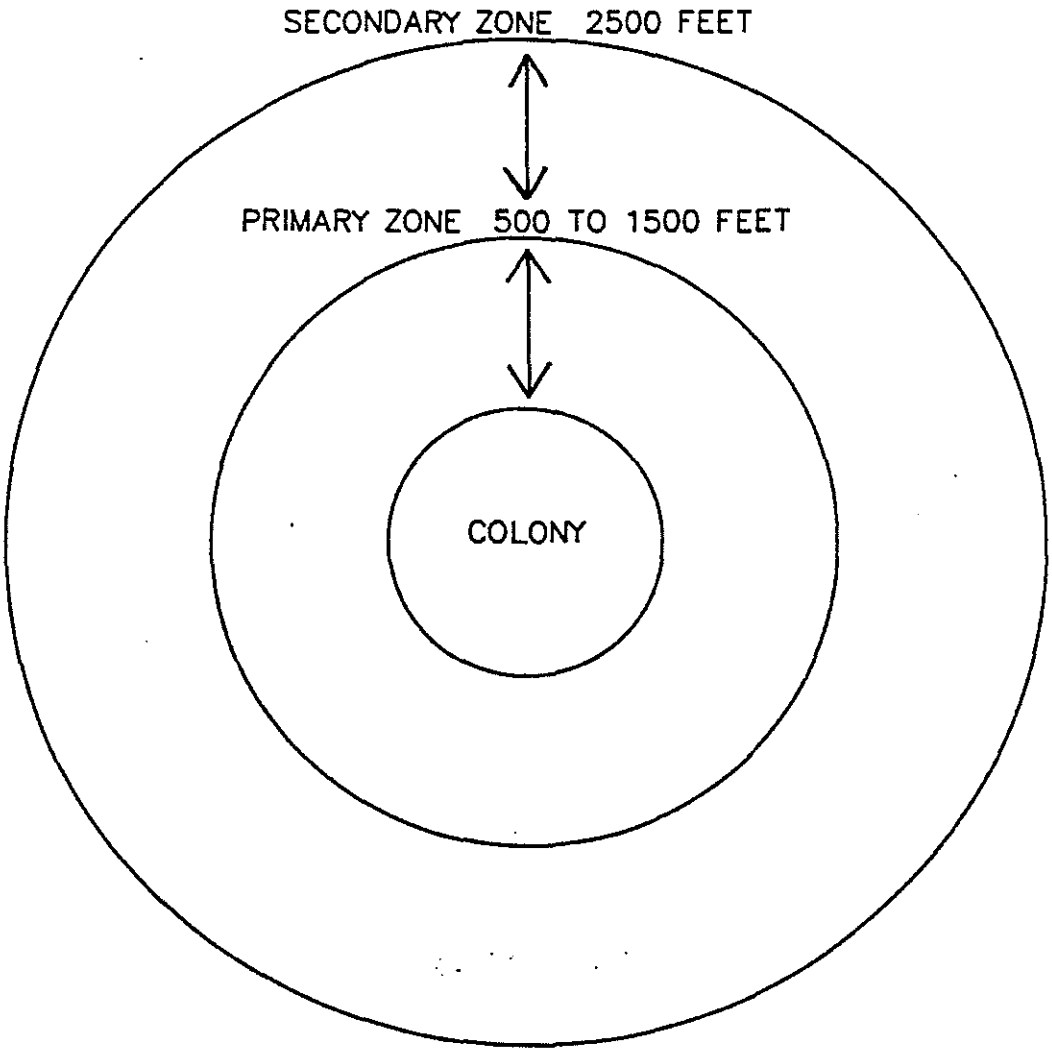
(1) Any lumbering or other removal of vegetation, and

(2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and

(3) The construction of any building, roadway, tower, power line, canal, etc.

b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:

(1) Any unauthorized human entry closer than 300 feet of the colony, and


SECONDARY ZONE 2500 FEET
PRIMARY ZONE 500 TO 1500 FEET
COLONY

(2) Any increase or irregular pattern in human activity anywhere in the primary zone, and

(3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and

(4) Any aircraft operation closer than 500 feet of the colony.

B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.

1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.

2. Recommended Restrictions:

a. Activities in the secondary zone which may be detrimental to nesting wood storks include:

(1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and

(2) Any alteration in the area's hydrology that might cause changes in the primary zone, and

(3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.

b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall trans-mission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

The general characteristics and temporary use-patterns of many stork roosting sites limit the number of specific management recommendations that are possible:

A. Avoid human activities within 500-1000 feet of roost sites during seasons of the year and times of the day when storks may be present. Nocturnal activities in active roosts may be especially disruptive.

B. Protect the vegetative and hydrological characteristics of the more important roosting sites--those used annually and/or used by flocks of 25 or more storks. Potentially, roosting sites may, some day, become nesting sites.

VII. Legal Considerations.

A. Federal Statutes

The U.S. breeding population of the wood stork is protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act). The population was listed as endangered on February 28, 1984 (49 Federal *Register* 7332); wood storks breeding in Alabama, Florida, Georgia, and South Carolina are protected by the Act.

Section 9 of the Endangered Species Act of 1973, as amended, states that it is unlawful for any person subject to the jurisdiction of the United States to take (defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.") any listed species anywhere within the United States.

The wood stork is also federally protected by its listing (50 CFR 10.13) under the Migratory Bird Treaty Act (167 U.S.C. 703-711), which prohibits the taking, killing or possession of migratory birds except as permitted.

B. State Statutes

1. State of Alabama

Section 9-11-232 of Alabama's Fish, Game, and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin, or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor...

Section 1 of the Alabama Nongame Species Regulation (Regulation 87-GF-7) includes the wood stork in the list of nongame species covered by paragraph (4). " It shall be unlawful to take, capture, kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value, the following nongame wildlife species (or any parts or reproductive products of such species) without a scientific collection permit and written permission from the Commissioner, Department of Conservation and Natural Resources,..."

2. State of Florida

Rule 39-4.001 of the Florida Wildlife Code prohibits "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing (collectively defined as "taking"), transporting, storing, serving, buying, selling,

possessing, or wantonly or willingly wasting any wildlife or freshwater fish or their nests, eggs, young, homes, or dens except as specifically provided for in other rules of Chapter 39, Florida Administrative Code.

Rule 39-27.011 of the Florida Wildlife Code prohibits "killing, attempting to kill, or wounding any endangered species." The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" dated 1 July 1988, includes the wood stork, listed as "endangered" by the Florida Game and Fresh Water Fish Commission.

3. State of Georgia

Section 27-1-28 of the Conservation and Natural Resources Code states that "Except as otherwise provided by law, rule, or regulation, it shall be unlawful to hunt, trap, fish, take, possess, or transport any nongame species of wildlife..."

Section 27-1-30 states that, "Except as otherwise provided by law or regulation, it shall be unlawful to disturb, mutilate, or destroy the dens, holes, or homes of any wildlife; "

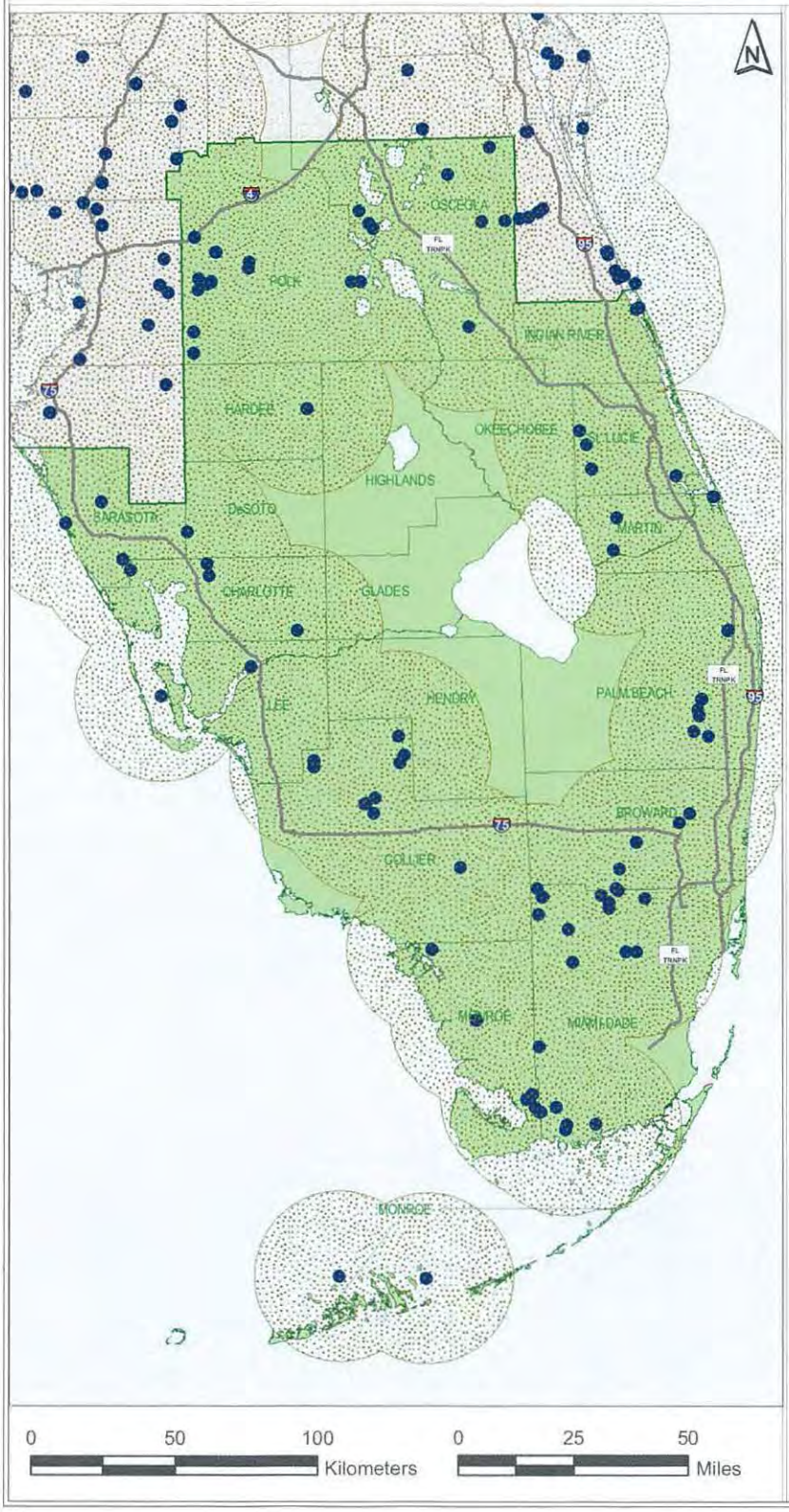
Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof...".

The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the death of animal species protected under the Endangered Wildlife Act. The destruction of habitat of protected species on public lands is also prohibited.

4. State of South Carolina

Section 50-15-40 of the South Carolina Nongame and Endangered Species Conservation Act states, "Except as otherwise provided in this chapter, it shall be unlawful for any person to take, possess, transport, export, process, sell, or offer of sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) the list of wildlife indigenous to the State, determined to be endangered within the State...(2) the United States' List of Endangered Native Fish and Wildlife... (3) the United States' List of Endangered Foreign Fish and Wildlife ..."

Wood Stork



Nesting Colonies
Core Foraging Areas

1999 to 2005

- Colony Location
- Core Foraging Area
- South Florida Service Area

U.S. FISH & WILDLIFE SERVICE

Produced by:
South Florida Ecological Services Office
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Enclosure 3

Wood Stork Foraging Analysis: Excerpts of concepts and procedure as presented by the Service in this appendix may be viewed in detail in any one of our recent Biological Opinions for project related impacts to the wood stork. These documents can be found at the internet website address http://www.fws.gov/filedownloads/ftp%5verobeach.

Foraging Habitat

Researchers have shown that wood storks forage most efficiently and effectively in habitats where prey densities are high and the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978, Browder 1984, Coulter 1987). Prey availability to wood storks is dependent on a composite variable consisting of density (number or biomass/m^2) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too deep (greater than 30 cm) for storks or the tree canopy at the site is too dense for storks to land. Calm water, about 5-40 cm (2-16 in) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993).

Coulter and Bryan's (1993) study suggested that wood storks preferred ponds and marshes, and visited areas with little or no canopy more frequently. Even in foraging sites in swamps, the canopy tended to be sparse. They suggested that open canopies may have contributed to detection of the sites and more importantly may have allowed the storks to negotiate landing more easily than at closed-canopy sites. In their study, the median amount of canopy cover where wood stork foraging was observed was 32 percent. Other researchers (P.C. Frederick, University of Florida, personal communication 2006; J.A. Rodgers, FWC, personal communication 2006) also confirm that wood storks will forage in woodlands, though the woodlands have to be fairly open and vegetation not very dense. Furthermore, the canopies must be open enough for wood storks to take flight quickly to avoid predators.

Melaleuca-infested Wetlands: As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. Melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and dense understory growth pattern that generally limits a site's accessibility to foraging by wading birds. However, O'Hare and Dalrymple (1997) suggest moderate infestations of melaleuca may have little effect on some species' productivity (*i.e.*, amphibians and reptiles) as long as critical abiotic factors such as hydrology remain. They also note as the levels of infestation increase, usage by wetland dependent species decreases. Their studies also showed that the number of fish species present in a wetland system remain stable at certain levels of melaleuca. However, the availability of the prey base for wood storks and other foraging wading birds is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wading birds can forage in these systems in open area pockets (*e.g.*, wind blow-downs), provided multiple conditions are optimal (*e.g.*, water depth, prey density). In O'Hare and Dalrmyple's study (1997), they identify five cover types (Table 1) and

provide information on the number of wetland dependent bird species and the number of individuals observed within each of these vegetation classes (Table 2).

Table 1: Vegetation classes

DMM	75-100 percent mature dense melaleuca coverage
DMS or (SDM)	75-100 percent sapling dense melaleuca coverage
P75	50-75 percent melaleuca coverage
P50	0-50 percent melaleuca coverage
MAR (Marsh)	0-10 percent melaleuca coverage

The number of wetland-dependent species and individuals observed per cover type is shown below in columns 1, 2, and 3 (Table 2). To develop an estimate of the importance a particular wetland type may have (based on density and aerial coverage by exotic species) to wetland dependent species, we developed a foraging suitability value using observational data from O'Hare and Dalrymple (1997). The Foraging Suitability Value as shown in column 5 (Table 2) is calculated by multiplying the number of species by the number of individuals and dividing this value by the maximum number of species and individuals combined (12*132=1584). The results are shown below for each of the cover types in O'Hare and Dalrymple (1997) study (Table 1). As an example, for the P50 cover type, the foraging suitability is calculated by multiplying 11 species times 92 individuals for a total of 1,012. Divide this value by 1,584, which is the maximum number of species times the maximum number of individuals (12*132 = 1,584). The resultant is 0.6389 or 64 percent 11*92=1012/1584*100=63.89).

Table 2: Habitat Foraging Suitability

Cover Type	# of Species (S)	# of Individuals (I)	S*I	Foraging Suitability
DMM	1	2	2	0.001
DMS	4	10	40	0.025
P75	10	59	590	0.372
P50	11	92	1,012	0.639
MAR	12	132	1,584	1.000

This approach was developed to provide us with a method of assessing wetland acreages and their relationship to prey densities and prey availability. We consider wetland dependent bird use to be a general index of food availability. Based on this assessment we developed an exotic foraging suitability index (Table 3):

Table 3. Foraging Suitability Percentages

Exotic Percentage	Foraging Suitability (percent)
Between 0 and 25 percent exotics	100
Between 25 and 50 percent exotics	64
Between 50 and 75 percent exotics	37
Between 75 and 90 percent exotics	3
Between 90 and 100 percent exotics	0

In our assessment however, we consider DMM to represent all exotic species densities between 90 and 100 percent and DMS to represent all exotic species densities between 75 and 90 percent. In our evaluation of a habitat's suitability, the field distinction between an exotic coverage of

90 percent and 100 percent in many situations is not definable, therefore unless otherwise noted in the field reports and in our analysis; we consider a suitability value of 3 percent to represent both densities.

Hydroperiod: The hydroperiod of a wetland can affect the prey densities in a wetland. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod. Marshes inundated for less than120 days of the year average ± 4 fish/m^2; whereas, those flooded for more than 340 days of the year average ± 25 fish/m^2 (Loftus and Eklund 1994, Trexler et al. 2002).

The Service (1999) described a short hydroperiod wetland as wetlands with between 0 and 180-day inundation, and long hydroperiod wetlands as those with greater than 180-day inundation. However, Trexler et al. (2002) defined short hydroperiod wetlands as systems with less than 300 days per year inundation. In our discussion of hydroperiods, we are considering short hydroperiod wetlands to be those that have an inundation of 180 days or fewer.

The most current information on hydroperiods in south Florida was developed by the SFWMD for evaluation of various restoration projects throughout the Everglades Protection Area. In their modeling efforts, they identified the following seven hydroperiods:

Table 4. SFWMD Hydroperiod Classes – Everglades Protection Area

Hydroperiod Class	Days Inundated
Class 1	0-60
Class 2	60-120
Class 3	120-180
Class 4	180-240
Class 5	240-300
Class 6	300-330
Class 7	330-365

Fish Density per Hydroperiod: In the Service's assessment of project related impacts to wood storks, the importance of fish data specific to individual hydroperiods is the principle basis of our assessment. In order to determine the fish density per individual hydroperiod, the Service relied on the number of fish per hydroperiod developed from throw-trap data in Trexler et al.'s (2002) study and did not use the electrofishing data also presented in Trexler et al.'s study that defined fish densities in catch per unit effort, which is not hydroperiod specific. Although the throw-trap sampling generally only samples fish 8 cm or less, the Service believes the data can be used as a surrogate representation of all fish, including those larger than 8 cm, which are typically sampled by either electrofishing or block net sampling.

We base this evaluation on the following assessment. Trexler et al.'s (2002) study included electrofishing data targeting fish greater than 8 cm, the data is recorded in catch per unit effort and in general is not hydroperiod specific. However, Trexler et al. (2002) notes in their assessment of the electrofishing data that in general there is a correlation with the number of fish per unit effort per changes in water depth. In literature reviews of electrofishing data by Chick et

al. (1999 and 2004), they note that electrofishing data provides a useful index of the abundance of larger fish in shallow, vegetated habitat, but length, frequency, and species compositional data should be interpreted with caution. Chick et al. (2004) also noted that electrofishing data for large fish (> 8cm) provided a positive correlation of the number of fish per unit effort (abundance) per changes in hydropeiod. The data in general show that as the hydroperiod decreases, the abundance of larger fishes also decreases.

Studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979) also noted this abundance trend for fish species sampled. We also noted in our assessment of prey consumption by wood storks in the Ogden et al. (1976) study (Figure 4) (discussed below), that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, although we also acknowledged that wood storks consume fish larger than the limits discussed in the Ogden et al. (1976) study. A similar assessment is reference by Trexler and Goss (2009) noting a diversity of size ranges of prey available for wading birds to consume, with fish ranging from 6 to 8 cm being the preferred prey for larger species of wading birds, particularly wood storks (Kushlan et al. 1975).

Therefore, since data were not available to quantify densities (biomass) of fish larger than 8 cm to a specific hydroperiod, and Ogden et al.'s (1976) study notes that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, and that empirical data on fish densities per unit effort correlated positively with changes in water depth, we believe that the Trexler et al. (2002) throw-trap data represents a surrogate assessment tool to predict the changes in total fish density and the corresponding biomass per hydroperiod for our wood stork assessment.

In consideration of this assessment, the Service used the data presented in Trexler et al.'s (2002) study on the number of fish per square-meter per hydroperiod for fish 8 cm or less to be applicable for estimating the total biomass per square-meter per hydroperiod for all fish. In determining the biomass of fish per square-meter per hydroperiod, the Service relied on the summary data provided by Turner et al. (1999), which provides an estimated fish biomass of 6.5 g/m^2 for a Class 7 hydroperiod for all fish and used the number of fish per square-meter per hydroperiod from Trexler et al.'s data to extrapolate biomass values per individual hydroperiods.

Trexler et al.'s (2002) studies in the Everglades provided densities, calculated as the square-root of the number of fish per square meter, for only six hydroperiods; although these cover the same range of hydroperiods developed by the SFWMD. Based on the throw-trap data and Trexler et al.'s (2002) hydroperiods, the square-root fish densities are:

Table 5. Fish Densities per Hydroperiod from Trexler et al. (2002)

Hydroperiod Class	Days Inundated	Fish Density
Class 1	0-120	2.0
Class 2	120-180	3.0
Class 3	180-240	4.0
Class 4	240-300	4.5
Class 5	300-330	4.8
Class 6	330-365	5.0

Trexler et al.'s (2002) fish densities are provided as the square root of the number of fish per square meter. For our assessment, we squared these numbers to provide fish per square meter, a simpler calculation when other prey density factors are included in our evaluation of adverse effects to listed species from the proposed action. We also extrapolated the densities over seven hydroperiods, which is the same number of hydroperiods characterized by the SFWMD. For example, Trexler et al.'s (2002) square-root density of a Class 2 wetland with three fish would equate to a SFWMD Model Class 3 wetland with nine fish. Based on the above discussion, the following mean annual fish densities were extrapolated to the seven SFWMD Model hydroperiods:

Table 6. Extrapolated Fish Densities for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Density
Class 1	0-60	2 fish/m^2
Class 2	60-120	4 fish/m^2
Class 3	120-180	9 fish/m^2
Class 4	180-240	16 fish/m^2
Class 5	240-300	20 fish/m^2
Class 6	300-330	23 fish/m^2
Class 7	330-365	25 fish/m^2

Fish Biomass per Hydroperiod: A more important parameter than fish per square-meter in defining fish densities is the biomass these fish provide. In the ENP and WCA-3, based on studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979), the standing stock (biomass) of large and small fishes combined in unenriched Class 5 and 6 hydroperiod wetlands averaged between 5.5 to 6.5 grams-wet-mass/m^2. In these studies, the data was provided in g/m^2 dry-weight and was converted to g/m^2 wet-weight following the procedures referenced in Kushlan et al. (1986) and also referenced in Turner et al. (1999). The fish density data provided in Turner et al. (1999) included both data from samples representing fish 8 cm or smaller and fish larger than 8 cm and included summaries of Turner and Trexler (1997) data, Carlson and Duever (1979) data, and Loftus and Eklund (1994) data. These data sets also reflected a 0.6 g/m^2 dry-weight correction estimate for fish greater than 8 cm based on Turner et al.'s (1999) block-net rotenone samples.

Relating this information to the hydroperiod classes developed by the SFWMD, we estimated the mean annual biomass densities per hydroperiod. For our assessment, we considered Class 7 hydroperiod wetlands based on Turner et al. (1999) and Trexler et al. (2002) studies to have a mean annual biomass of 6.5 grams-wet-mass/m^2 and to be composed of 25 fish/m^2. The remaining biomass weights per hydroperiod were determined as a direct proportion of the number of fish per total weight of fish for a Class 7 hydroperiod (6.5 grams divided by 25 fish equals 0.26 grams per fish).

For example, given that a Class 3 hydroperiod has a mean annual fish density of 9 fish/m^2, with an average weight of 0.26 grams per fish, the biomass of a Class 3 hydroperiod would be 2.3 grams/m^2 (9*0.26 = 2.3). Based on the above discussion, the biomass per hydroperiod class is:

Table 7. Extrapolated Mean Annual Fish Biomass for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Biomass
Class 1	0-60	0.5 gram/m^2
Class 2	60-120	1.0 gram/m^2
Class 3	120-180	2.3 grams/m^2
Class 4	180-240	4.2 grams/m^2
Class 5	240-300	5.2 grams/m^2
Class 6	300-330	6.0 grams/m^2
Class 7	330-365	6.5 grams/m^2

Wood stork suitable prey size: Wood storks are highly selective in their feeding habits and in studies on fish consumed by wood storks, five species of fish comprised over 85 percent of the number and 84 percent of the biomass of over 3,000 prey items collected from adult and nestling wood storks (Ogden et al. 1976). Table 8 lists the fish species consumed by wood storks in Ogden et al. (1976).

Table 8. Primary Fish Species consumed by Wood Storks from Ogden et al. (1976)

Common name	Scientific name	Percent Individuals	Percent Biomass
Sunfishes	*Centrarchidae*	14	44
Yellow bullhead	*Italurus natalis*	2	12
Marsh killifish	*Fundulus confluentus*	18	11
Flagfish	*Jordenella floridae*	32	7
Sailfin molly	*Poecilia latipinna*	20	11

These species were also observed to be consumed in much greater proportions than they occur at feeding sites, and abundant smaller species [*e.g.*, mosquitofish (*Gambusia affinis*), least killifish (*Heterandria formosa*), bluefin killifish (*Lucania goodei*)] are under-represented, which the researchers believed was probably because their small size did not elicit a bill-snapping reflex in these tactile feeders (Coulter et al. 1999). Their studies also showed that, in addition to selecting larger species of fish, wood storks consumed individuals that are significantly larger (>3.5 cm) than the mean size available (2.5 cm), and many were greater than 1-year old (Ogden et al. 1976, Coulter et al. 1999). However, Ogden et al. (1976) also found that wood storks most likely consumed fish that were between 1.5 and 9.0 cm in length (Figure 4 in Ogden et al. 1976).

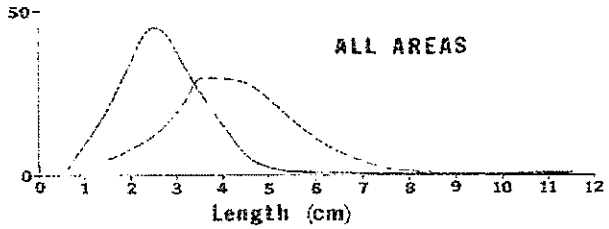

FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

In Ogden et al.'s (1976) Figure 4, the dotted line is the distribution of fish consumed and the solid line is the available fish. Straight interpretation of the area under the dotted line curve

represents the size classes of fish most likely consumed by wood storks and is the basis of our determination of the amount of biomass that is within the size range of fish most likely consumed by wood storks, which in this example is a range size of 1.5 to 9.0 cm in length.

Wood stork suitable prey base (biomass per hydroperiod): To estimate that fraction of the available fish biomass that might be consumed by wood storks, the following analysis was conducted. Trexler et al.'s (2002) 2-year throw trap data of absolute and relative fish abundance per hydroperiod distributed across 20 study sites in the ENP and the WCAs was considered to be representative of the Everglades fish assemblage available to wood storks (n = 37,718 specimens of 33 species). Although Trexler et al.'s (2002) data was based on throw-trap data and representative of fish 8 cm or smaller, the Service believes the data set can be used to predict the biomass/m^2 for total fish (those both smaller and larger than 8 cm). This approach is also supported, based on our assessment of prey consumption by wood storks in Ogden et al.'s (1976) study (Figure 4), that the wood storks general preference is for fish measuring 1.5 cm to 9 cm and is generally inclusive of Trexler et al.'s (2002) throw-trap data of fish 8 cm or smaller.

To estimate the fraction of the fish biomass that might be consumed by wood storks, the Service, using Trexler et al.'s (2002) throw-trap data set, determined the mean biomass of each fish species that fell within the wood stork prey size limits of 1.5 to 9.0 cm. The mean biomass of each fish species was estimated from the length and wet mass relationships for Everglades' icthyofauna developed by Kushlan et al. (1986). The proportion of each species that was outside of this prey length and biomass range was estimated using the species mean and variance provided in Table 1 in Kushlan et al. (1986). These biomass estimates assumed the length and mass distributions of each species was normally distributed and the fish biomass could be estimated by eliminating that portion of each species outside of this size range. These biomass estimates of available fish prey were then standardized to a sum of 6.5 g/m^2 for Class 7 hydroperiod wetlands (Service 2009).

For example, Kushlan et al. (1986) lists the warmouth (*Lepomis gulosus*) with a mean average biomass of 36.76 g. In fish samples collected by Trexler et al. (2002), this species accounted for 0.048 percent (18/37,715=0.000477) of the Everglades freshwater ichthyofauna. Based on an average biomass of 36.76 g (Kushlan et al. 1986), the 0.048 percent representation from Trexler et al. (2002) is equivalent to an average biomass of 1.75 g (36.76*0.048) or 6.57 percent (1.75/26.715) of the estimated average biomass (26.715 g) of Trexler et al.'s (2002) samples (Service 2009).

Standardizing these data to a sample size of 6.5 g/m^2, the warmouth biomass for long hydroperiod wetlands would be about 0.427 g (Service 2009). However, the size frequency distribution (assumed normal) for warmouth (Kushlan et al. 1986) indicate 48 percent are too large for wood storks and 0.6 percent are too small (outside the 1.5 cm to 9 cm size range most likely consumed), so the warmouth biomass within the wood stork's most likely consumed size range is only 0.208 g (0.427*(0.48+0.006)=0.2075) in a 6.5 g/m^2 sample. Using this approach summed over all species in long hydroperiod wetlands, only 3.685 g/m^2 of the 6.5 g/m^2 sample consists of fish within the size range likely consumed by wood storks or about 57 percent (3.685/6.5*100=56.7) of the total biomass available.

An alternative approach to estimate the available biomass is based on Ogden et al. (1976). In their study (Table 8), the sunfishes and four other species that accounted for 84 percent of the biomass eaten by wood storks totaled 2.522 g of the 6.5 g/m^2 sample (Service 2009). Adding the remaining 16 percent from other species in the sample, the total biomass would suggest that 2.97 g of a 6.5 g/m^2 sample are most likely to be consumed by wood storks or about 45.7 percent (2.97/6.5=0.4569)

The mean of these two estimates is 3.33g/m^2 for long hydroperiod wetlands (3.685 + 2.97 = 6.655/ 2 = 3.33). This proportion of available fish prey of a suitable size (3.33 g/m^2 / 6.5 g/m^2 = 0.51 or 51 percent) was then multiplied by the total fish biomass in each hydroperiod class to provide an estimate of the total biomass of a hydroperiod that is the appropriate size and species composition most likely consumed by wood storks.

As an example, a Class 3 SFWMD model hydroperiod wetland with a biomass of 2.3 grams/m^2, adjusted by 51 percent for appropriate size and species composition, provides an available biomass of 1.196 grams/m^2. Following this approach, the biomass per hydroperiod potentially available to predation by wood storks based on size and species composition is:

Table 9. Wood Stork Suitable Prey Base (fish biomass per hydroperiod)

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.26 gram/m^2
Class 2	60-120	0.52 gram/m^2
Class 3	120-180	1.196 grams/m^2
Class 4	180-240	2.184 grams/m^2
Class 5	240-300	2.704 grams/m^2
Class 6	300-330	3.12 grams/m^2
Class 7	330-365	3.38 grams/m^2

Wood Stork-Wading Bird Prey Consumption Competition: In 2006, (Service 2006), the Service developed an assessment approach that provided a foraging efficiency estimate that 55 percent of the available biomass was actually consumed by wood storks. Since the implementation of this assessment approach, the Service has received comments from various sources concerning the Service's understanding of Fleming et al.'s (1994) assessment of prey base consumed by wood storks versus prey base assumed available to wood stork and the factors included in the 90 percent prey reduction value.

In our original assessment, we noted that, "*Fleming et al. (1994) provided an estimate of 10 percent of the total biomass in their studies of wood stork foraging as the amount that is actually consumed by the storks. However, the Fleming et al. (1994) estimate also includes a second factor, the suitability of the foraging site for wood storks, a factor that we have calculated separately. In their assessment, these two factors accounted for a 90 percent reduction in the biomass actually consumed by the storks. We consider these two factors as equally important and are treated as equal components in the 90 percent reduction; therefore, we consider each factor to represent 45 percent of the reduction. In consideration of this approach, Fleming et al.'s (1994) estimate that 10 percent of the biomass would actually be consumed by the storks would be added to the 45 percent value for an estimate that 55 percent (10 percent plus the remaining 45 percent) of the available biomass would actually be consumed by the storks and is the factor we believe represents the amount of the prey base that is actually consumed by the stork.*"

In a follow-up review of Fleming et al.'s (1994) report, we noted that the 10 percent reference is to prey available to wood storks, not prey consumed by wood storks. We also noted the 90 percent reduction also includes an assessment of prey size, an assessment of prey available by water level (hydroperiod), an assessment of suitability of habitat for foraging (openness), and an assessment for competition with other species, not just the two factors considered originally by the Service (suitability and competition). Therefore, in re-evaluating of our approach, we identified four factors in the 90 percent biomass reduction and not two as we previously considered. We believe these four factors are represented as equal proportions of the 90 percent reduction, which corresponds to an equal split of 22.5 percent for each factor. Since we have accounted previously for three of these factors in our approach (prey size, habitat suitability, and hydroperiod) and they are treated separately in our assessment, we consider a more appropriate foraging efficiency to represent the original 10 percent and the remaining 22.5 percent from the 90 percent reduction discussed above. Following this revised assessment, our competition factor would be 32.5 percent, not the initial estimate of 55 percent.

Other comments reference the methodology's lack of sensitivity to limiting factors, i.e., is there sufficient habitat available across all hydroperiods during critical life stages of wood stork nesting and does this approach over emphasize the foraging biomass of long hydroperiod wetlands with a corresponding under valuation of short hydroperid wetlands. The Service is aware of these questions and is examining alternative ways to assess these concerns. However, until futher research is generated to refine our approach, we continue to support the assessment tool as outlined.

Following this approach, Table 10 has been adjusted to reflect the competition factor and represents the amount of biomass consumed by wood storks and is the basis of our effects assessments (Class 1 hydroperiod with a biomass 0.26 g, multiplied by 0.325, results in a value of 0.08 g [0.25*.325=0.08]) (Table 10).

Table 10 Actual Biomass Consumed by Wood Storks

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.08 gram/m^2
Class 2	60-120	0.17 gram/m^2
Class 3	120-180	0.39 grams/m^2
Class 4	180-240	0.71 grams/m^2
Class 5	240-300	0.88 grams/m^2
Class 6	300-330	1.01 grams/m^2
Class 7	330-365	1.10 grams/m^2

Sample Project of Biomass Calculations and Corresponding Concurrence Determination

Example 1:

An applicant is proposing to construct a residential development with unavoidable impacts to 5 acres of wetlands and is proposing to restore and preserve 3 acres of wetlands onsite. Data on the onsite wetlands classified these systems as exotic impacted wetlands with greater than 50

percent but less than 75 percent exotics (Table 3) with an average hydroperiod of 120-180 days of inundation.

The equation to calculate the biomass lost is: The number of acres, converted to square-meters, times the amount of actual biomass consumed by the wood stork (Table 10), times the exotic foraging suitability index (Table 3), equals the amount of grams lost, which is converted to kg.

Biomass lost (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

In the example provided, the 5 acres of wetlands, converted to square-meters (1 acre= 4,047 m^2) would provide 2.9 kg of biomass (5*4,047*0.39 (Table 10)*0.37 (Table 3)= 2,919.9 grams or 2.9 kg), which would be lost from development.

The equation to calculate the biomass from the preserve is the same, except two calculations are needed, one for the existing biomass available and one for the biomass available after restoration.

Biomass Pre: (3*4,047*0.39(Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg)

Biomass Post: (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg)

Net increase: 4.74 kg-1.75 kg = 2.98 kg Compensation Site

Project Site Balance 2.98 kg- 2.92 kg = 0.07kg

The compensation proposed is 3 acres, which is within the same hydroperiod and has the same level of exotics. Following the calculations for the 5 acres, the 3 acres in its current habitat state, provides 1.75 kg (3*4,047*0.39 (Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg) and following restoration provides 4.74 kg (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg), a net increase in biomass of 2.98 kg (4.74-1.75=2.98).

Example 1: 5 acre wetland loss, 3 acre wetland enhanced – same hydroperiod - NLAA

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92	3	1.75	3	4.74	(5)	0.07
Class 4 - 180 to 240 Days								
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**1.75**	**3**	**4.74**	**(5)**	**0.07**

*Since the net increase in biomass from the restoration provides 2.98 kg and the loss is 2.92 kg, there is a positive outcome (4.74-1.75-2.92=0.07) in the same hydroperiod and Service concurrence with a NLAA is appropriate.

Example 2:

In the above example, if the onsite preserve wetlands were a class 4 hydroperiod, which has a value of 0.71. grams/m^2 instead of a class 3 hydroperiod with a 0.39 grams/m^2 [Table 10]), there would be a loss of 2.92 kg of short hydroperiod wetlands (as above) and a net gain of 8.62 kg of long-hydroperiod wetlands.

Biomass lost: (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

The current habitat state of the preserve provides 3.19 kg (3*4,047*0.71 (Table 10)*0.37 (Table 3)=3,189.44 grams or 3.19 kg) and following restoration the preserve provides 8.62 kg (3*4,047*0.71 (Table 10)*1(Table 3)= 8,620.11 grams or 8.62 kg, thus providing a net increase in class 4 hydroperiod biomass of 5.43 kg (8.62-3.19=5.43).

Biomass Pre: (3*4,047*0.71(Table 10)*0.37 (Table 3) = 3,189.44 grams or 3.19 kg)

Biomass Post: (3*4,047*0.71 (Table 10)*1(Table 3)=8,620.11 grams or 8.62 kg)

Net increase: 8.62 kg-3.19 kg = 5.43 kg

Project Site Balance 5.43 kg- 2.92 kg = 2.51 kg

Example 2: 5 acre wetland loss, 3 acre wetland enhanced – different hydroperiod – May Affect

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92					(5)	-2.92
Class 4 - 180 to 240 Days			3	3.19	3	8.62	0	5.43
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**3.19**	**3**	**8.62**	**(5)**	**2.51**

In this second example, even though there is an overall increase in biomass, the biomass loss is a different hydroperiod than the biomass gain from restoration, therefore, the Service could not concur with a NLAA and further coordination with the Service is appropriate.

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