TYPE 2 CATEGORICAL EXCLUSION DETERMINATION FORM

1. PROJECT DESCRIPTION AND PURPOSE AND NEED

a. Project Information

County: Polk County
Project Name: US 27 FROM HIGHLANDS C/L TO N OF SR 60
Project Limits: West of County Line Road to SR 60
Project Numbers:

3869	419243-1-21-01	N/A
ETDM (if applicable)	Financial Management	Federal-Aid

Project Location Map Documentation:
- Attachment 2

b. Proposed Improvements:

(SEE ATTACHMENT 4 - 1.b. EXISTING CONDITIONS AND PROPOSED IMPROVEMENTS, pgs. 13 -20)

c. Purpose and Need:

(SEE ATTACHMENT 4 - 1.c. PURPOSE AND NEED, pgs. 7-12)

d. Project Planning Consistency:

Highlands County Line to CR 630A (FPID 419243-2)

Currently Adopted CFP-LRTP	COMMENTS
Yes	This project is included within the Cost Feasible Plan (CFP) of the Polk TPO's Momentum 2040 Long Range Transportation Plan (LRTP) as adopted December 10, 2015 and amended June 9, 2016 and the 2040 LRTP TIP adopted June 9, 2016. This segment is included in the 2040 CFP Tier III for years 2031-2040.

PHASE	Currently Approved TIP	Currently Approved STIP	TIP/STIP $	TIP/STIP FY	COMMENTS
PE (Final Design)	Y	Y	$6.703M/$6.734M	<2017/<2017	State funded, design underway. Adopted Work Program (State Funds), <2016 STIP
R/W	Y	Y	$4.014M/$3.897M	>2021/>2020	Adopted Work Program (Federal Funds), 2nd Five Year SIS Plan, >2019 STIP. Anticipated funding in FY 2021.
Construction	N	N	$50.787M	2031-2035	2040 SIS CFP (State and Federal Funds), LRTP CFP Tier III FY 2031-2035

TYPE 2 CATEGORICAL EXCLUSION DETERMINATION FORM

CR 630A to Presidents Drive (FPID 419243-3)

Currently Adopted CFP-LRTP	COMMENTS
Yes	This project is included within the Cost Feasible Plan (CFP) of the Polk TPO's Momentum 2040 Long Range Transportation Plan (LRTP) as adopted December 10, 2015 and amended June 9, 2016 and the 2040 LRTP TIP adopted June 9, 2016. This segment is included in the 2040 CFP Tier II for years 2019-2030.

PHASE	Currently Approved TIP	Currently Approved STIP	TIP/STIP $	TIP/STIP FY	COMMENTS
PE (Final Design)	Y	Y	$4.843M/$4.869M	<2017/<2017	State funded, design underway. Adopted Work Program (State Funds), <2016 STIP
R/W	Y	Y	$2.229M/$2.604M	2021/>2020	Adopted Work Program (Federal Funds), 2nd Five Year SIS Plan, >2019 STIP. Anticipated funding in FY 2021.
Construction	N	N	$34.943M	2026-2030	2040 SIS CFP (State and Federal Funds), LRTP CFP Tier II FY 2026-2030

Presidents Drive to SR 60 (FPID 419243-4)

Currently Adopted CFP-LRTP	COMMENTS
Yes	This project is included within the Cost Feasible Plan (CFP) of the Polk TPO's Momentum 2040 Long Range Transportation Plan (LRTP) as adopted December 10, 2015 and amended June 9, 2016 and the 2040 LRTP TIP adopted June 9, 2016. This segment is included in the 2040 CFP Tier II for years 2019-2030.

PHASE	Currently Approved TIP	Currently Approved STIP	TIP/STIP $	TIP/STIP FY	COMMENTS
PE (Final Design)	Y	Y	$6.664M/$7.179M	<2017/<2017	State funded, design underway. Adopted Work Program (State Funds), <2016 STIP
R/W	Y	Y	$5.221M/$4.638M	2018 & 2019/2018 & 2019	Adopted Work Program (State Funds)
Construction	Y	Y	$49.505M/$48.767M	2020/2020	Adopted Work Program (State Funds)

**** Include pages from current TIP/STIP/LRTP***

Project Plan Consistency Documentation:
- Attachment 3

TYPE 2 CATEGORICAL EXCLUSION DETERMINATION FORM

2. COOPERATING AGENCY

US Army Corps of Engineers

3. ENVIRONMENTAL ANALYSIS

Issues/Resources	Significant Impacts?* Yes	No	Enhance	NoInv	Supporting Information**
A. SOCIAL & ECONOMIC					
1. Social	☐	☒	☐	☐	A.2., A.4. to A.6., pgs. 21-22, 25-30 [Att 4]
2. Economic	☐	☐	☐	☒	
3. Land Use Changes	☐	☒	☐	☐	A.1., p. 21 [Att 4]
4. Mobility	☐	☐	☐	☒	
5. Aesthetic Effects	☐	☒	☐	☐	D.5., p. 52 [Att 4]
6. Relocation Potential	☐	☒	☐	☐	A.3., p. 23 [Att 4]
7. Farmlands	☐	☒	☐	☐	A.8., p. 30 [Att 4]
B. CULTURAL					
1. Section 4(f)	☐	☒	☐	☐	B.1., p. 31 [Att 4]
2. Historic Sites/Districts	☐	☒	☐	☐	B.2., p. 31 [Att 4]
3. Archaeological Sites	☐	☒	☐	☐	B.3., p. 33 [Att 4]
4. Recreation Areas	☐	☒	☐	☐	B.4., p. 34 [Att 4]
C. NATURAL					
1. Wetlands and Other Surface Waters	☐	☒	☐	☐	C.1., p. 36 [Att 4]
2. Aquatic Preserves and Outstanding FL Waters	☐	☒	☐	☐	C.4., p. 39 [Att 4]
3. Water Quality and Quantity	☐	☒	☐	☐	C.3., p. 38 [Att 4]
4. Wild and Scenic Rivers	☐	☐	☐	☒	
5. Floodplains	☐	☒	☐	☐	C.6., p. 39 [Att 4]
6. Coastal Zone Consistency	☐	☐	☐	☒	
7. Coastal Barrier Resources	☐	☐	☐	☒	
8. Protected Species and Habitat	☐	☒	☐	☐	C.9., p. 40 [Att 4]
9. Essential Fish Habitat	☐	☐	☐	☒	
D. PHYSICAL					
1. Highway Traffic Noise	☐	☒	☐	☐	D.1., p. 45 [Att 4]
2. Air Quality	☐	☒	☐	☐	D.2., p. 47 [Att 4]
3. Contamination	☐	☒	☐	☐	D.4., p. 50 [Att 4]
4. Utilities and Railroads	☐	☒	☐	☐	D.7., p. 53 [Att 4]
5. Construction	☐	☒	☐	☐	D.3, p. 49 [Att 4]
6. Bicycles and Pedestrians	☐	☒	☐	☐	D.6., p. 52 [Att 4]
7. Navigation	☐	☒	☐	☐	D.8., p. 54 [Att 4]

a. ☒ A USCG Permit IS NOT required.

b. ☐ A USCG Permit IS required.

*** Impact Determination:** Yes = Significant; No = No Significant Impact; Enhance = Enhancement; NoInv = Issue absent, no involvement. Basis of decision is documented in the referenced attachment(s).

****** Supporting Information is documented in the referenced attachment(s).

E. ENGINEERING ANALYSIS SUPPORT

- Attachment 6

F. ANTICIPATED PERMITS

Individual Environmental Resource Permit (ERP) - SWFWMD; Section 404 Clean Water Act Dredge and Fill Permit - USACE; National Pollutant Discharge Elimination System Permit (NPDES) Permit - FDEP; Sovereign Submerged Lands Easement - TIITF; Gopher Tortoise (GT) Relocation Permit - FWC

4. COMMITMENTS - ADDITIONAL INFORMATION

(SEE ATTACHMENT 4 - 4. COMMITMENTS AND RECOMMENDATIONS, pgs. 2-4 and the PCR for full listing)

5. PUBLIC INVOLVEMENT

1. ☐ A public hearing is not required.
2. ☐ A public hearing will be held N/A. This draft document is publicly available and comments can be submitted to FDOT until N/A.
   District Contact Information: N/A.
3. ☒ A public hearing was held on 09/08/2016 and the transcript is included.
   - Attachment 1
4. ☐ An opportunity for a public hearing was afforded and was documented N/A .

6. DISTRICT DETERMINATION

This project has been developed without regard to race, color, national origin, age, sex, religion, disability, or family status.

William Hartmann	March 28, 2017
FDOT Project Manager	Date
Gwen G. Pipkin	March 28, 2017
FDOT Environmental Manager or Designee	Date

7. OFFICE OF ENVIRONMENTAL MANAGEMENT CONCURRENCE

Signature below constitutes Location and Design Concept Acceptance:

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated 12/14/2016 and executed by the Federal Highway Administration and FDOT.

April 26, 2017

Jason Watts
Director of the Office of Environmental Management or Designee

Date

8. SUPPORTING INFORMATION

1 41924312101-CE2-D1-9_8_16_Transcript_completeREDUCED-2017-0119.pdf
2 41924312101-CE2-D1-US-27_Project_Location_Map-2017-0305.pdf
3 41924312101-CE2-D1-US_27_Type_2_CE_Appendix_A_Plng_Consist_Support-2017-0326.pdf

4 41924312101-CE2-D1-419243-1_Type_2_CE_Support_Document-2017-0327.pdf
5 41924312101-CE2-D1-US_27_Type_2_CE_Appendix_B_Agency_Coordination-2017-0326.pdf
6 41924312101-CE2-D1-2017-03-24_419243-1_US-27__Final_PER-2017-0326.pdf

TYPE 2 CE SUPPORT DOCUMENT

US 27 FROM THE HIGHLANDS COUNTY LINE TO NORTH OF SR 60

FPID: 419243-1-22-01

NOTE: Supporting documentation was in review and process prior to the updated Type 2 Categorical Exclusion Determination Form in the PD&E Manual Part 1, Chapter 5 and in SWEPT, therefore, the topics are numbered differently.

4. COMMITMENTS AND RECOMMENDATIONS

Commitments:

The Department is committed to the following measures to minimize impacts to the human and natural environment:

1) Construction of the US 27 project will not commence until: a) the FDOT provides the U.S. Fish and Wildlife Service (FWS) with a receipt (in the form of a letter or email) from one or more Service-approved conservation banks stating that at least 12.4 ac (5.1 ha) of scrub jay habitat or 12.4 scrub jay credits and 79.34 ac (32.1 ha) of sand skink habitat or 79.34 sand skink credits (2:1 acres to credits ratio) have been acquired by the FDOT; and b) the FDOT receives an email or letter from the Service indicating that they have received the receipt from the approved conservation bank(s).

2) Vegetation removal and land clearing activities may not occur within occupied scrub-jay habitat on the project site during the scrub-jay nesting season (March 1 to June 30).

3) Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest Service Law Enforcement Office: U.S. Fish and Wildlife Service; 9549 Koger Boulevard, Suite 111; St. Petersburg, Florida 33702; 727-570-5398. Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission (FWC): South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1-800-282-8002 and care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured skinks, or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

4) The FDOT will coordinate with the FWS, Florida Department of Agriculture and Consumer Services (FDACS), Bok Tower Gardens (BTG) and other appropriate entities during the future project design phase(s) to avoid and minimize impacts to listed plant species to the extent feasible. The FDOT will coordinate with the Rare Plant Conservation Program staff at BTG who will assist in the conservation efforts of these plants using three main techniques: taking cuttings of plants which are then used to clone additional individuals, collecting ripe seeds, and relocating entire plants. Plants will be relocated to the National Collection growing beds at BTG.

5) The FWS' most current version of the *Standard Protection Measures for the Eastern Indigo Snake* will be adhered to during construction of the project.

6) To avoid potential adverse impacts to migratory bird species with active nests observed during field reviews, the FDOT will commit to resurvey the project area for bald eagle, osprey and Southeastern American kestrel nests during design and permitting. If active nests are observed, the FDOT will coordinate with FWC and FWS (as necessary) to secure proper permits concerning these species.

7) Noise barriers could potentially provide at least the minimum required noise reduction for a cost below the reasonable limit of $42,000 per benefited receptor at five residential areas. The potentially feasible and cost reasonable noise barriers are predicted to benefit 82 impacted residences at locations distributed between Camp Inn RV Resort (four impacted residences potentially benefited), Shady Nook RV Park/Camp'n Aire Camping Resort/Lake Wales Campground (39 impacted residences potentially benefited), Lakeside Garden Mobile Home Park (eight impacted residences potentially benefited), the residential community along Wales Street (24 impacted residences potentially benefited) and the residential community along Lime Avenue (seven impacted residences potentially benefited). The impacted common use areas at the Camp Inn RV Resort (community swimming pool and pavilion) and West Side Baptist Church barbecue area would also potentially benefit from a noise barrier provided for impacted residences. The FDOT is committed to further consideration of noise barriers during the project design phase(s) for these locations contingent upon the following:

- Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement;
- Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion;
- Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office;
- Safety and engineering aspects as related to the roadway user and the adjacent property owner(s) have been reviewed and any conflicts or issues resolved.

8) A land use review will be conducted during the Design phase to identify noise sensitive sites that may have received a building permit subsequent to the noise study but prior to the date of public knowledge (i.e. the date that the environmental document has been approved by OEM). If the review identifies noise sensitive sites that have been permitted prior to the date of public knowledge, then those sensitive sites will be evaluated for traffic noise and abatement considerations.

9) The FDOT will further evaluate High and Medium contamination sites during the project Design phase(s). For contamination sites identified, estimated areas of contamination

will be marked on the project plans and, prior to construction, any necessary cleanup plans will be developed. If remediation activities are required, these will be overseen by the FDOT.

10) It has been determined that Important Farmlands as defined by 7 CFR 658 are located in the project vicinity, however they will not be impacted by the project. If additional ROW is needed during the future project design phase(s), project involvement with Important Farmlands will be reevaluated and coordination will occur with the NRCS as appropriate.

Recommendations:

During a Board Meeting held June 9, 2016, the Polk Transportation Planning Organization (TPO) determined that the proposed action is consistent with Polk County's adopted 2040 Long Range Transportation Plan (LRTP) (**Appendix A**). It is recommended that improvements to US 27 and SR 60 consist of widening from a four-lane divided facility to a six-lane divided facility within the Study Area.

For the purpose of developing and evaluating project alternatives, US 27 was divided into three segments as follows (**Figure 1**):

Segment 1: From County Line Road (MP 0.000) to north of County Road (CR) 630A (MP 8.780);

Segment 2: From north of CR 630A (MP 8.780) to south of President's Drive (MP 13.500);

Segment 3: From south of President's Drive (MP 13.500) to MP 0.220 north of SR 60 (MP 18.816/MP 0.000). This segment includes the interchange of US 27 and SR 60.

The proposed improvements to both US 27 and SR 60 will be implemented as follows:

Within Segments 1 and 2, the Recommended Build Alternative is a six-lane rural roadway providing six 12-foot lanes, a 40-foot median, 8-foot inside shoulders, and 8-foot outside shoulders (5 feet paved). Bicyclists will be accommodated on the 5-foot paved shoulder. The rural typical sections will be modified to include 5-foot sidewalks in both directions within the Frostproof Urban Area and the respective one-mile urban boundary. Additional ROW will be needed for wetland mitigation for Segment 1 and wetland and floodplain mitigation for Segment 2.

Within Segment 3, the Recommended Build Alternative will be the same as Segments 1 and 2 to north of MP 18.057. From north of MP 18.057 to the project terminus, the Recommended Build Alternative will a six-lane suburban roadway providing six 12-foot lanes, a 30-foot

median, 6.5-foot inside shoulders, and 8-foot outside shoulders (5 feet paved). Bicyclists will be accommodated on the 5-foot paved shoulder. The rural typical sections will be modified to include 5-foot sidewalks in both directions within the Lake Wales Urban Area and the respective one-mile urban boundary. Additional ROW will be needed within Segment 3 to accommodate the recommended Refined Single Point Urban Interchange Alternative (SPUI), discussed below.

The Recommended Build Alternative for the interchange of US 27 and SR 60 is a SPUI. This alternative replaces the existing partial cloverleaf interchange with a four-ramp configuration connecting the overpass (SR 60) to the surface road (US 27). This improvement provides additional turn lanes at the ramp terminals intersecting at a single signalized juncture. A two-lane, two-way frontage road was added to the SW quadrant of the interchange so that all access management issues could be properly addressed. The proposed urban typical section for SR 60 will provide six 11-foot lanes, a 22-foot median, 7-foot buffered bicycle lanes, and 5-foot sidewalks. The infield areas at the SR 60 interchange will be utilized for stormwater management. This alternative requires approximately 3.55 acres of additional ROW and will impact 26 parcels, including one business and two residential relocations.

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

NOTE: Supporting documentation was prepared prior to the MOU execution. Determinations made prior to the MOU by FHWA are noted as such throughout and are adopted by FDOT.

1.c. PURPOSE AND NEED

The Florida Department of Transportation (FDOT) District One is conducting a Project Development and Environment (PD&E) study to evaluate options for widening U.S. Highway (US) 27 in Polk County. The study begins at the Polk-Highlands County Line [mile post (MP) 0.00] and ends 0.22 miles north of State Road (SR) 60 (MP 18.816) for a total length of 19.036 miles. SR 60 is at MP 18.816. At SR 60, the roadway ID changes and the MP resets to 0.000. The objective of the PD&E study is to evaluate widening the existing four-lane divided facility to a six-lane divided facility including the development of interchange configurations at US 27 and SR 60 to accommodate the proposed widening. This study documents the need for capacity improvements within the US 27 corridor and determines the optimal and feasible improvements necessary to satisfy the deficiencies.

This study meets all requirements of the Federal Highway Administration (FHWA) *National Environmental Policy Act of 1969* (NEPA) regulations.

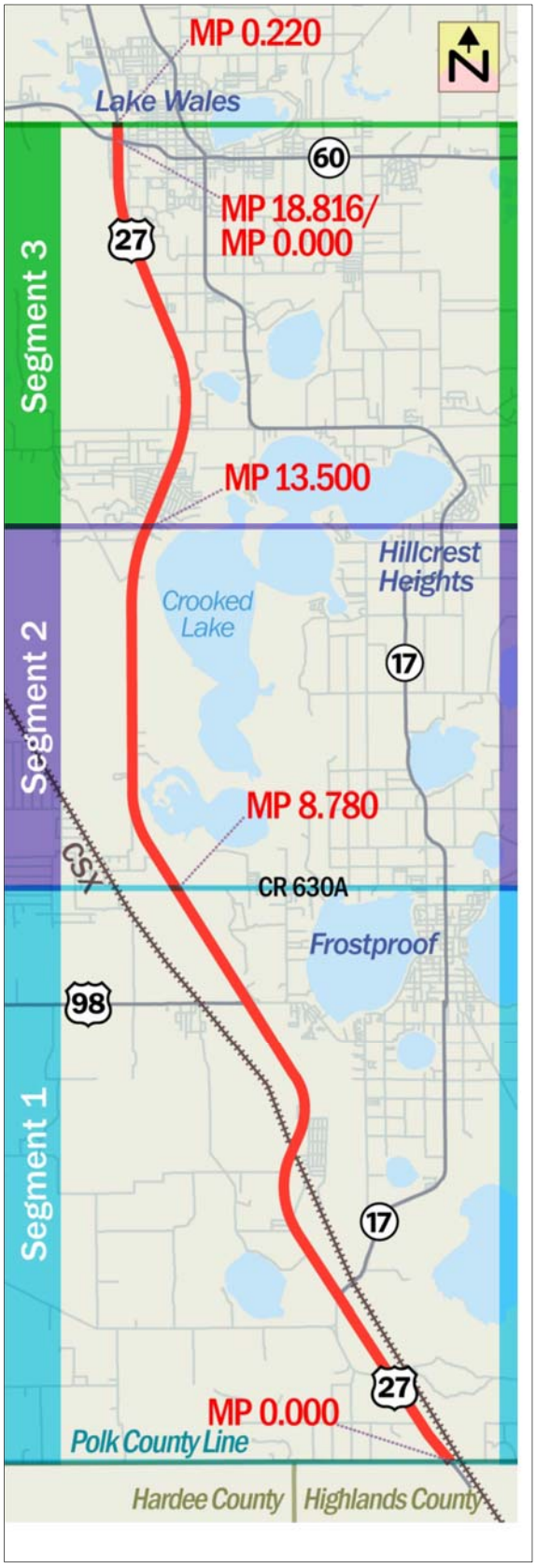
The PD&E Study evaluates the need for capacity improvements and provides documented environmental and engineering analyses to assist FDOT in reaching a decision on the location and conceptual design for improvements to US 27. Additional products of the PD&E study include preliminary engineering conceptual plans, environmental studies, a public outreach program, and other information that can be directly used in the final design of the project. Upon completion, this PD&E study will comply with the requirements of NEPA and other federal and state laws to qualify the proposed project for federal-aid funding.

Based on existing land use patterns, location of intersecting cross streets, likely permitting impacts, and future construction package considerations, the project was divided into three segments as listed below and shown on **Figure 1**:

- Segment 1: From County Line Road (MP 0.000) to north of CR 630A (MP 8.780)
- Segment 2: From north of CR 630A (MP 8.780) to south of Presidents Drive (MP 13.500)
- Segment 3: From south of Presidents Drive (MP 13.500) to MP 0.220 north of SR 60 (MP 18.816). This segment includes the interchange of US 27 with SR 60.

The project was screened through the Efficient Transportation Decision Making (ETDM) process as ETDM Number 3869. The Programming Screen Environmental Technical Advisory Team (ETAT) review was initiated on April 15, 2011, and completed on May 30, 2011. None of the reviewing ETAT members submitted a DOE of "5" for Dispute Resolution. The Programming Screen Summary Report was published on August 26, 2011. It was republished on September 8,

FIGURE 1:
PROJECT LOCATION MAP



2011, with new commentary to reflect Summary DOE coordination with applicable agencies for the Farmlands, Navigation, Wetlands, Historic and Archeological Sites, Land Use and Mobility resource issues. In addition, the Summary DOE for the Land Use issue was changed from Minimal to Moderate due to additional considerations along the project corridor. The ETDM Programming Screen Summary Report is included as Appendix G in the Preliminary Engineering Report (PER), prepared under a separate cover for this project.

An Advance Notification (AN) package was completed for this project and mailed to the Florida State Clearinghouse and local and Federal agencies on June 27, 2012, in accordance with Executive Order 95-359. A response was received from the Southwest Florida Regional Planning Council which stated this project was Regionally Significant and Consistent. The comments received through the AN process were either no comment or were related to respective agency permitting requirements and stressed avoidance and minimization of environmental impacts. There were no adverse comments regarding the proposed roadway improvements and all comments have been addressed in the appropriate sections of this report. The AN Notification Package is included as Appendix H in the PER, prepared under a separate cover for this project.

The primary purpose of this critical centrally located Strategic Intermodal Systems (SIS) project is to: increase capacity due to projected level of service deficiencies; to complete a statewide interconnected multimodal divided roadway transportation system that supports local, regional, and statewide goals related to economic diversification and development; enhance interregional connectivity between Florida's economic regions; provide for safe and efficient operations between transportation modes; and, to ensure Florida's Transportation Systems can meet national defense, emergency response and evacuation needs while providing adequate capacity for the efficient movement of freight, goods and services for all users of the transportation system and one that is consistent with the Florida's Legislative intent for the creation of a multimodal SIS facility that accommodates all modes and users safely; provides support for local land use decisions; enhances transportation alternatives for the region's population; provides transportation choices for education and employment growth in the central Florida area (specifically transportation elements of the Central Florida Regional Planning Council's (CFRPC) 2060 Plan); and, augments the existing emergency hurricane evacuation route for central and south Florida. A Purpose and Need Technical Memorandum (P&N Tech Memo) has been prepared under separate cover which provides more detailed information on each of the needs identified below.

Capacity/Transportation Demand

A Level of Service table for all significant cross street locations (No Build) is included as Appendix ES-1 in the PER, prepared under a separate cover and the SIS Bottleneck Study. As shown in the PER, 6 intersections operate at LOS E/F in 2020, 33 intersections in 2030, and 55 intersections by the year 2040. Also included in the PER are the most recent model runs from the update of the Polk TPO's 2040 LRTP depicting highway capacity deficiencies (V/C ratios) for US 27 in Polk County. As reflected in the graphics, US 27 is projected to be at capacity or exceed capacity by

2040. The attachment also includes the link volumes for the build and no-build scenarios from the US 27 project traffic report (PTR). The V/C ratios project a capacity deficiency within the corridor by 2040, and the corridor is further impacted operationally by the high percentage of heavy trucks and higher crash rates. US 27 is a SIS identified four-lane bottleneck from Polk County line to SR 60. With a six-lane demand at either end of the project, US 27 capacity for these segments will be diminished as time progresses.

Safety

One segment and 5 major intersections are all experiencing crash rates higher than the state wide average for similar facilities. Delay associated with higher crash rates subsequently contribute to reduced capacity at these locations. Improvements were determined based on the crash data review, and the Road Safety Audit (RSA) conducted along the corridor was subsequently documented in the PTR. The RSA was conducted during March 2013, which included representatives from FDOT, Polk County School Board, Polk County Sheriff's Office, Lake Wales Police Department, and AECOM (FDOT's project consultant). The RSA team identified existing safety and access issues and discussed possible solutions. The audit determined that US 27 had higher crash rates in the Study Area compared to similar facilities in the state. To accommodate the high percentage of heavy trucks in the study corridor, roadway geometric improvements strategies such as truck loons and widening of turning radii were proposed.

Regionally Significant Roadway

US 27 and SR 60 are SIS crossroads in central Florida, and Florida's SIS Highways are the backbone of the highway transportation network, which consists of nearly 4,400 miles of roadways. This mileage represents only 3% of the total state roadway mileage, but is responsible for 54% of all traffic and 70% of all truck traffic on the State Highway System. These significant corridors connect all of Florida's economic regions including economic markets beyond Florida. Within the State, they facilitate the movement of passengers and goods between the major airports, seaports, rail facilities, and notable intermodal hubs. The integrated logistics center (ILC) in Winter Haven is one of those hubs and US 27 provides the vital transportation link necessary to ensure the efficient movement of goods and services.

National Defense

US 27 is the only principal arterial that serves the Avon Park Air Force Range (APAFR), which is the primary air-to-ground training facility in Florida and an alternate range for Moody Air Force Base, Georgia. APAFR is also an important range for military air-to-ground operations originating from nearby Patrick AFB and MacDill AFB, which routinely host numerous squadron/unit level deployments from Active and Reserve USAF, USN, USMC and U.S. Army units, to include Army National Guard and Air National Guard, from across the country to practice air-to ground operations. Training requirements include low level flights, night vision training, and the firing/release of many different types of ordnance and weaponry across the full spectrum of Air

Force, Navy, Marine Corps and Army assets, all of which can be readily employed on the APAFR and they require unimpeded access to US 27 to ensure successful training deployments.

Emergency/Evacuation

Due to projected capacity deficiencies along this segment of US 27, the southern segment improvements are needed to address the lack of an FDOT continuous six-lane north/south SIS corridor that serves south central Florida and provides that critical economic link, hurricane emergency/evacuation route, and further provides unrestricted traffic movement for vital military training access to the Avon Park Range facility. Additionally, this is the only segment of US 27 in Polk County that is not currently six lanes. The traffic data and analysis demonstrates the improvements are needed by 2020-2040 in the Polk TPO Plan, and the 2040 SIS Plan. To maintain the integrity of the SIS and comply with stated goals, objectives and policies the projected improvement needs are supported by the Polk TPO, local governments, business leaders, and FDOT. They are included by reference in the Florida Transportation Plan (FTP) and specifically identified in the 2040 SIS Plans.

Intermodal Connectivity

This segment of US 27 represents a critical link in the overall transportation system serving Florida from south to north. The I-75 Vision Study is now beginning to document the need for additional capacity for I-75, a parallel north-south SIS corridor, as it is projected to be over capacity in the same timeframe as we propose to upgrade US 27 (next 25 year period). It is likely that north-south parallel traffic will divert to US 27 if I-75 experiences heavy congestion/delay in the future. Additionally, the Port of Palm Beach Intermodal Logistics Center (ILC, formerly called “inland port”) has received final land use amendments and has begun to move forward once again. The Port of Palm Beach ILC is located south of this project along US 27 on land owned by Florida Crystals and will further enhance the need for US 27 to accommodate a full range of traffic in the future as it moves forward. Additionally, the total estimated economic impact for the integrated logistics center (ILC) in Polk County/Winter Haven is estimated at $10.6 billion with a projected employment base of 6,500 to 11,000 jobs within 10 years. The employment projection is an estimate of the annual number of full-time jobs that will be generated after 10 years of operation. The most affected sectors are Rail and Truck Transportation ($6.7 billion), Manufacturing ($1.8 billion) and Services ($1.4 billion). It is projected that the total development impact within the ILC will be: 3.0 million square feet of warehouse, 1.5 million square feet of industrial sites/plants, and 0.5 million square feet of office space. All figures are expressed in billions of 2005 dollars. These impacts will need adequate transportation facilities to support the projected growth. It is critical that adequate highway infrastructure exist or be provided for to ensure the safe and efficient flow of freight to and from an ILC facility.

Economic Competitiveness

The FTP/SIS supports Florida's Global Economic Competitiveness, is consistent with Florida's Growth Management Laws, and is consistent with local land use policies, as well. The ILC in Winter Haven is a primary hub that will be served by the US 27 improvements and it is a critical investment that supports the growing economic region in terms of freight movement, greater freight accessibility, and will enhance Rural Areas of Critical Economic Concern (RACEC) in south central Florida that utilize the corridor. For example, the mining industry, fruit industry, cattle industry, sugar industry, logging industry, sod industry and goods and services via the trucking industry, to name a few, all utilize this corridor to move their products, and/or goods and services.

1.b. EXISTING CONDITIONS AND PROPOSED IMPROVEMENTS

EXISTING CONDITIONS

US 27 is part of the state's Strategic Intermodal System (SIS). The SIS is a statewide network of high-priority transportation facilities, including the state's largest and most significant commercial airports, spaceport, deep water seaports, freight rail terminals, passenger rail and intercity bus terminals, rail corridors, waterways, and highways. These facilities are the workhorses of Florida's transportation system, carrying more than 68% of all truck traffic and 54% of total traffic on the State Highway System. US 27 also serves as an important evacuation route connecting other major arterials in southern Polk County. Widening US 27 will increase capacity and efficiency, leading to improved evacuation and emergency response times.

The functional classification of US 27 changes several times within the project limits as shown in **Table 1**.

TABLE 1:
FUNCTIONAL CLASSIFICATION OF US 27

Limits	Length	Functional Classification
From Highlands County Line (MP 0.000) to Frostproof Urban Area (MP 4.784)	4.784 mi.	Rural Principal Arterial Other
From Frostproof Urban Area (MP 4.784) to CR 630A (MP 8.623)	3.839 mi.	Urban Principal Arterial Other
From CR 630A (MP 8.623) to Lake Wales Urban Area (MP 16.212)	7.589 mi.	Rural Principal Arterial Other
Lake Wales Urban Area (MP 16.212) to Central Avenue (MP 0.220)*	2.824 mi.	Urban Principal Arterial Other

*SR 60 is at MP 18.816. At SR 60, the roadway ID changes and the MP resets to 0.000.

The existing ROW width within the US 27 PD&E study limits varies from 200 to 230 feet. The existing typical section for US 27 consists of four 12-foot travel lanes (two in each direction) divided by a 40-foot median. The median shoulders range from 8 to 10 feet and the outside shoulders are 10 feet (5 feet paved). Stormwater runoff is collected in roadside swales.

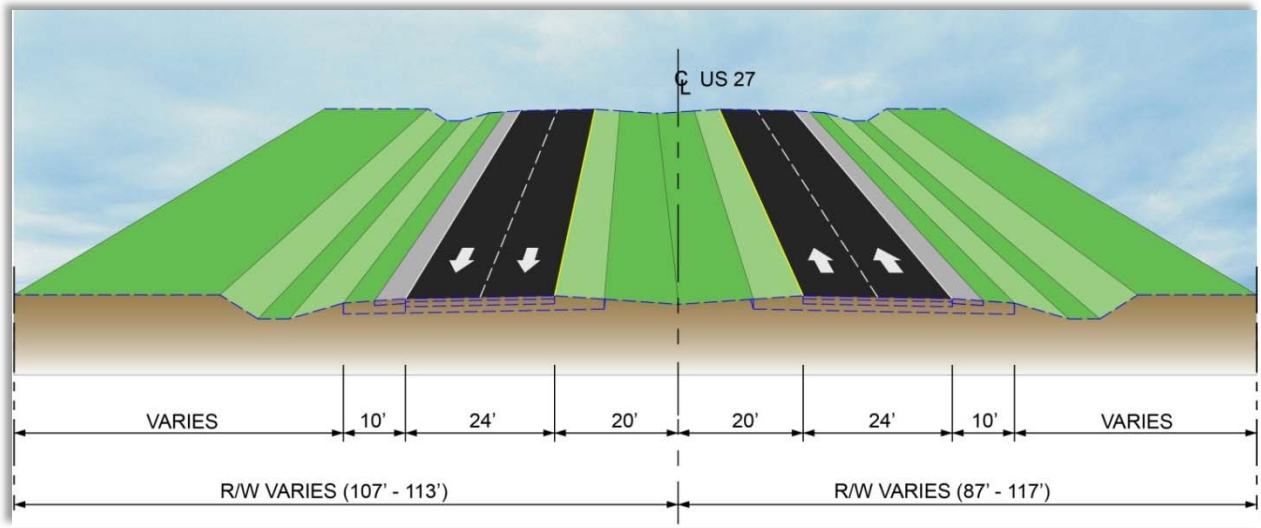
The posted speed along US 27 through the project limits decreases from south to north as shown in **Table 2.**

TABLE 2:
EXISTING POSTED SPEEDS FOR US 27

Limits	Posted Speed
MP 0.000 to MP 16.212	65 miles per hour (mph)
MP 16.212 to MP 18.057	60 mph
MP 18.057 to MP 18.567	55 mph
MP 18.567 to North of Central Avenue (MP 0.220)	50 mph

Within the project limits, US 27 is a four-lane divided roadway with an open drainage system. The existing typical section consists of four 12-foot travel lanes (two in each direction) divided by a 40-foot median. The median shoulders range from 8 to 10 feet and the outside shoulders are 10 feet (5 feet paved), see **Figure 2**. Stormwater runoff is collected in roadside swales. A full discussion of the existing roadway conditions can be found in Section 2.0 of the PER, prepared under separate cover for this project.

FIGURE 2:
EXISTING TYPICAL SECTION



Within the study limits, US 27 crosses three locations each with a pair of bridge structures and three bridge culvert locations. **Table 3** describes these structures.

TABLE 3:
EXISTING STRUCTURES

Bridge Number	Crossing	Year Built	No. of Spans	Structure Type		Sufficiency Rating
				Superstructure	Substructure	
160193	SB - Lake Streety Canal	1975	2	Type II AASHTO Girders (7" Deck)	Pile Bents	97.6
160194	NB - Lake Streety Canal					97.6
160195	SB - CSX Railroad	1975	5	Type II AASHTO Girders (7" Deck)	Pile Bents	96.6
160196	NB - CSX Railroad	1974				96.6
160200	Clinch Creek	1939	2	10' x 3' Concrete Box Culvert (CBC)		74.1
160075	McCoy Drainage Ditch	1953	2	10' x 6' CBC		78.6
160067	Crooked Lake Canal	1945	3	10' x 6' CBC		70.3
160018	WB SR 60 Over US 27	1966	4	Type III AASHTO Girders (7" Deck)	Piers	80.0
160134	EB SR 60 Over US 27				Piers	80.0

The surrounding land use is predominately agriculture in pasture and orange groves, with sporadic residential and commercial areas. US 27 south of the Polk/Highlands County Line has just been reconstructed to a six-lane facility; US 27 north of SR 60 (at the north end of the study corridor) is also a six-lane facility.

RECOMMENDED IMPROVEMENTS

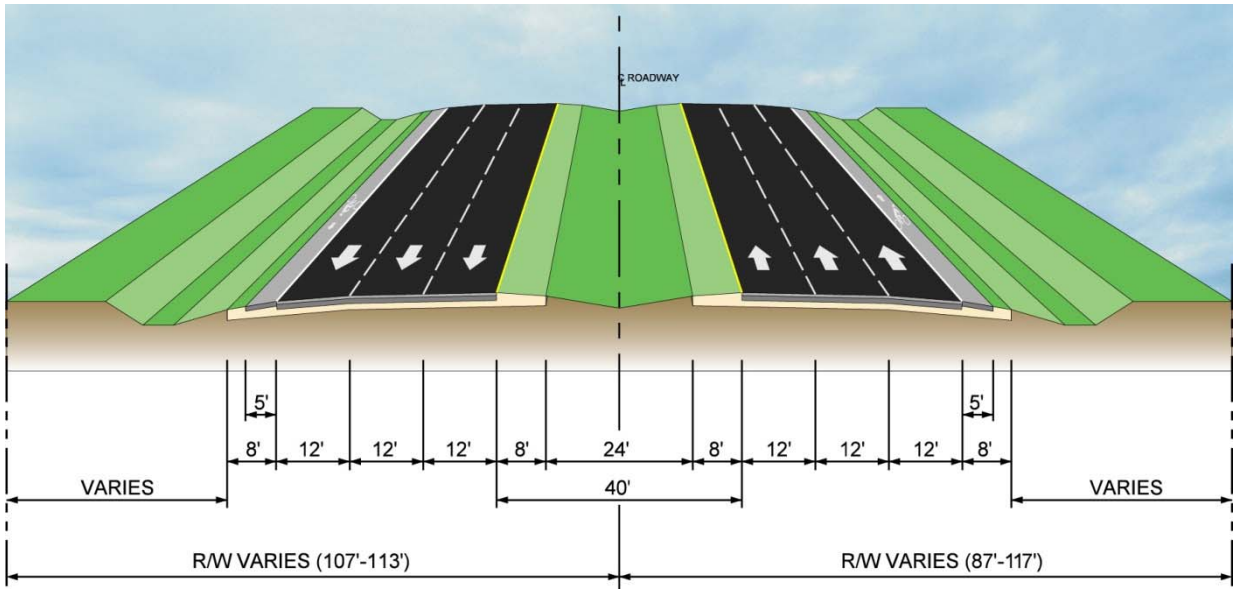
The proposed action is to increase the capacity of the existing four-lane facility to a six-lane facility to accommodate the Purpose and Need stated in the previous section. A full discussion of all Build Alternatives evaluated, including the No-Build Alternative is provided in Section 5.0 of the PER, prepared under separate cover for this project. The following section discusses the Recommended Build Alternative. A full discussion of the design details for the Recommended Build Alternative is provided in Section 6.0 of the PER. The development of a new corridor is not considered a viable alternative. By utilizing the existing corridor, adverse effects to the adjacent land uses will be minimized.

During a Board Meeting held June 9, 2016, the Polk TPO determined that the proposed action is consistent with Polk County's Adopted 2040 Transportation Improvement Plan (TIP). It is recommended that improvements to US 27 and SR 60 consists of widening from a four-lane divided facility to a six-lane divided facility within the Study Area.

Typical Sections

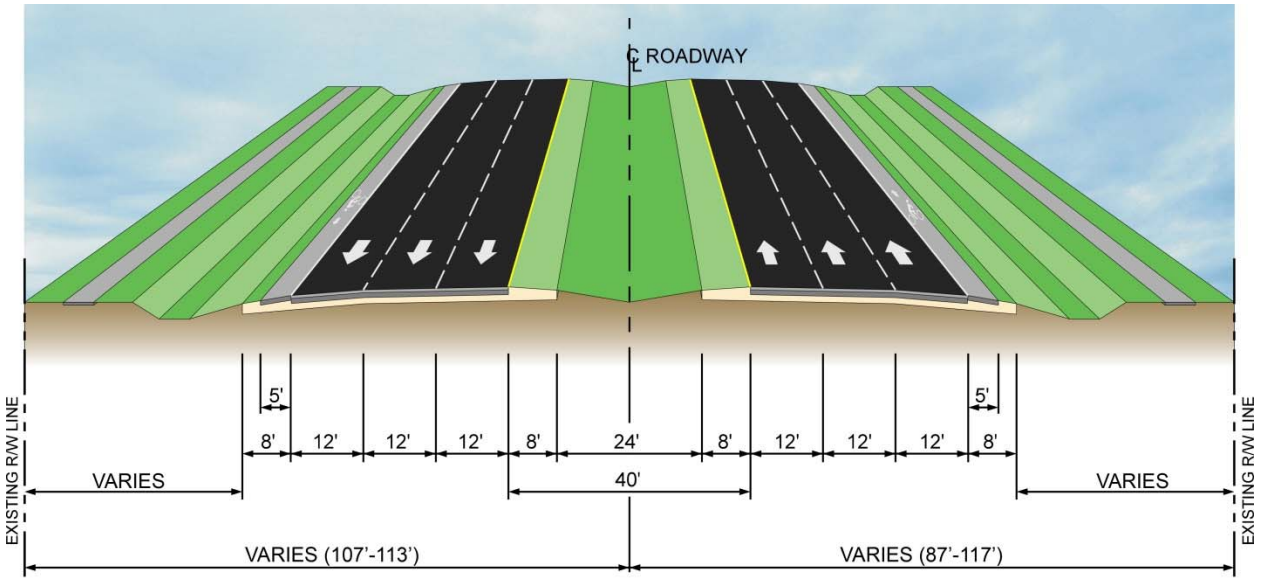
The rural typical sections developed for Segments 1-3 (**Figure 3**) will consist of six 12-foot lanes, a 40-foot median, 8-foot inside shoulders, 8-foot outside shoulders (5 feet paved), and enough border width to accommodate open roadside ditches. Although, the border width will vary, the minimum clear zone width of 36 feet will remain constant throughout the corridor, and bicyclists will be accommodated on the 5-foot paved shoulder. Stormwater management for Segment 1 will be accomplished utilizing a combination of linear dry retention and wet detention systems within the existing ROW. The proposed design speed for this typical section is 70 mph, which is compatible with SIS design speed criteria for rural areas. The roadway improvements would not require any additional ROW. In some locations, the variable ROW width would result in a border width that would fall below the Plans Preparation Manual (PPM) requirements. A Design Variation for Border Width has been approved. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3.

FIGURE 3:
SIX-LANE RURAL TYPICAL SECTION WITHOUT SIDEWALK
FROM MP 0.00 - MP 5.180 AND MP 9.636 - MP 15.166



The rural typical sections will be modified to include 5-foot sidewalks in both directions within the Frostproof Urban Area (Segments 1 and 2), the Lake Wales urban Area (Segment 3), and the respective one-mile urban boundary of these urban areas (**Figure 4**). The sidewalk limits have been adjusted to logical termini based on current development.

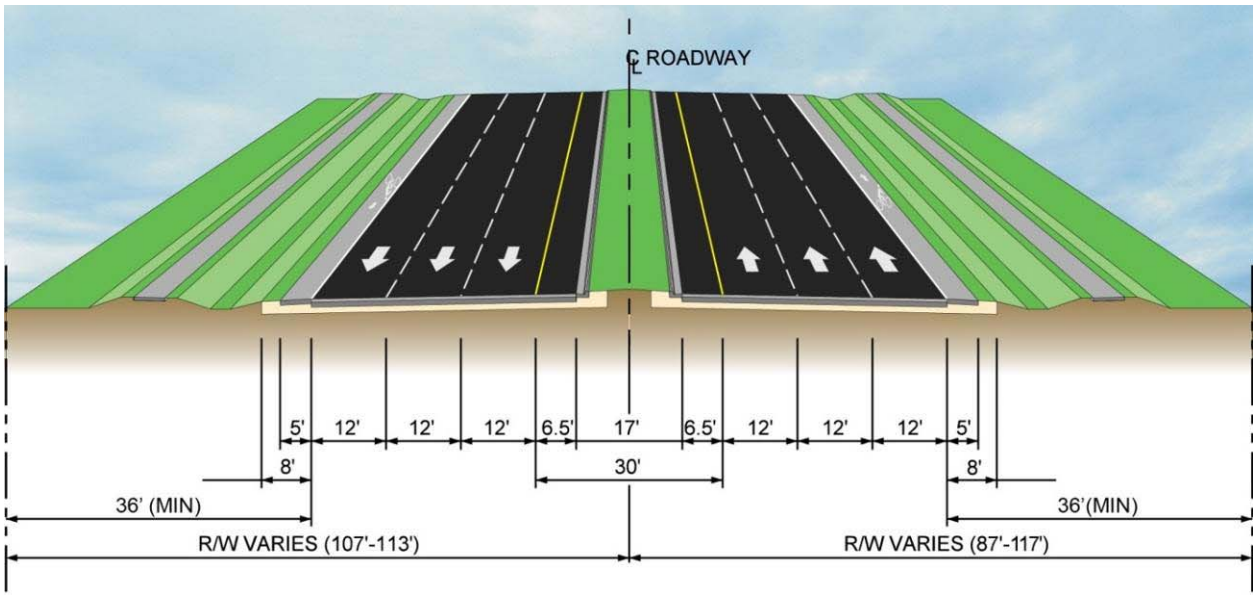
FIGURE 4:
SIX-LANE RURAL TYPICAL SECTION WITH SIDEWALKS
FROM MP 5.180 – MP 9.636 AND MP 15.166 TO MP 18.057



North of MP 18.057, the proposed typical section will be a six-lane suburban section to maximize the border areas for on-site stormwater management. Widening will occur to both the inside and outside of the existing roadway. The suburban typical section (**Figure 5**) will consist of six 12-foot lanes, a 30-foot median, 6.5-foot inside shoulders, 8-foot outside shoulders (5 feet paved), and enough border width to accommodate open roadside ditches. Although, the border width will vary, the minimum clear zone width of 24 feet will remain constant throughout the corridor, and bicyclists will be accommodated on the 5-foot paved shoulder. Stormwater management will be accomplished utilizing a combination of linear dry retention and wet detention systems within the existing ROW. The proposed design speed for this facility is 50 mph. Design variations for vertical alignment (two locations) and side slopes (varying 1:6 to 1:4) have been prepared. The roadway improvements will not require any additional ROW. Mitigation for floodplain encroachment will occur within the existing ROW near the encroachment. Pedestrian facilities, 5-foot sidewalks on both sides of US 27, will be provided based on logical termini for the Lake Wales Urban Area.

Segment 3 includes the interchange of US 27 and SR 60. Three alternatives for this interchange were developed and presented at the Alternatives Public Workshop. Documentation of these alternatives will follow the discussion of the mainline US 27 alternative.

FIGURE 5:
SIX-LANE SUBURBAN TYPICAL SECTION FROM MP 18.057 TO MP 18.816



Bridges

There are a total of two pairs of bridges and three bridge culverts within Segments 1 and 2. The US 27 southbound (SB) and northbound NB bridges (#'s 160193 and 160194) over Lake Streety Canal will be widened to the inside to provide for the six-lane divided rural facility. In order to

accommodate the proposed roadway section, the bridges will be widened to provide three 12-foot travel lanes and 10-foot outside shoulders. The inside shoulder widths will be limited to seven-feet due to the inside widening requiring a design variation for bridge width. The new overall width will be 111.1 feet.

The US 27 SB and NB bridges (#'s 160195 and 160196) over the CSX Railroad will be widened to the outside to provide for the six-lane divided rural facility. The existing span arrangements will be maintained. Subsurface materials at the site are suitable for deep foundations such as driven piles or drilled shafts. Therefore, both bridges can be widened to the outside. In order to accommodate the proposed roadway section the bridges will be widened to provide three 12-foot travel lanes, 10-foot inside shoulders, and 10-foot outside shoulders. The new overall width will be 59.1 feet. The existing sand-cement riprap would be extended to provide abutment slope protection at the widened portions. The CSX railroad line is active underneath the bridge. The bridges currently do not provide adequate horizontal and vertical clearance from the railroad. The widenings will be designed so as to not encroach into the existing clearances. Crash walls would be provided to protect the interior pile bents on either side of the track.

The US 27 SB and NB bridge culvert headwalls at Clinch Creek (#160200), McCoy Drainage Ditch (#160075) and Crooked Lake Canal (#160067) are all currently outside of the clear zones and will need to be lengthened to accommodate the proposed widening. The existing culvert barrels appear to provide sufficient hydraulic capacity as there is no evidence of overtopping.

US 27 and SR 60 Interchange Build Alternative

After the Alternatives Public Workshop and conducting an exhaustive access management analysis, a refined SPUI alternative was developed as shown in **Figure 6**. Also, the SPUI alternative produces $128,816,719 in delay savings per year compared to $128,448,408 in delay savings per year produced by the Tight Diamond alternative. A two lane, two-way frontage road was added to the southwest quadrant of the interchange so that all access management issues could be appropriately addressed. The improved SR 60 would be an urban typical section consisting of six 11-foot lanes, a 22-foot median, 7-foot buffered bicycle lanes (in each direction), and 5-foot sidewalks as shown in **Figure 7**. The costs associated to this interchange alternative can be found as Appendix C of the PER, prepared under a separate cover for this project.

FIGURE 6:
REFINED SINGLE POINT URBAN INTERCHANGE (SIX LANES)

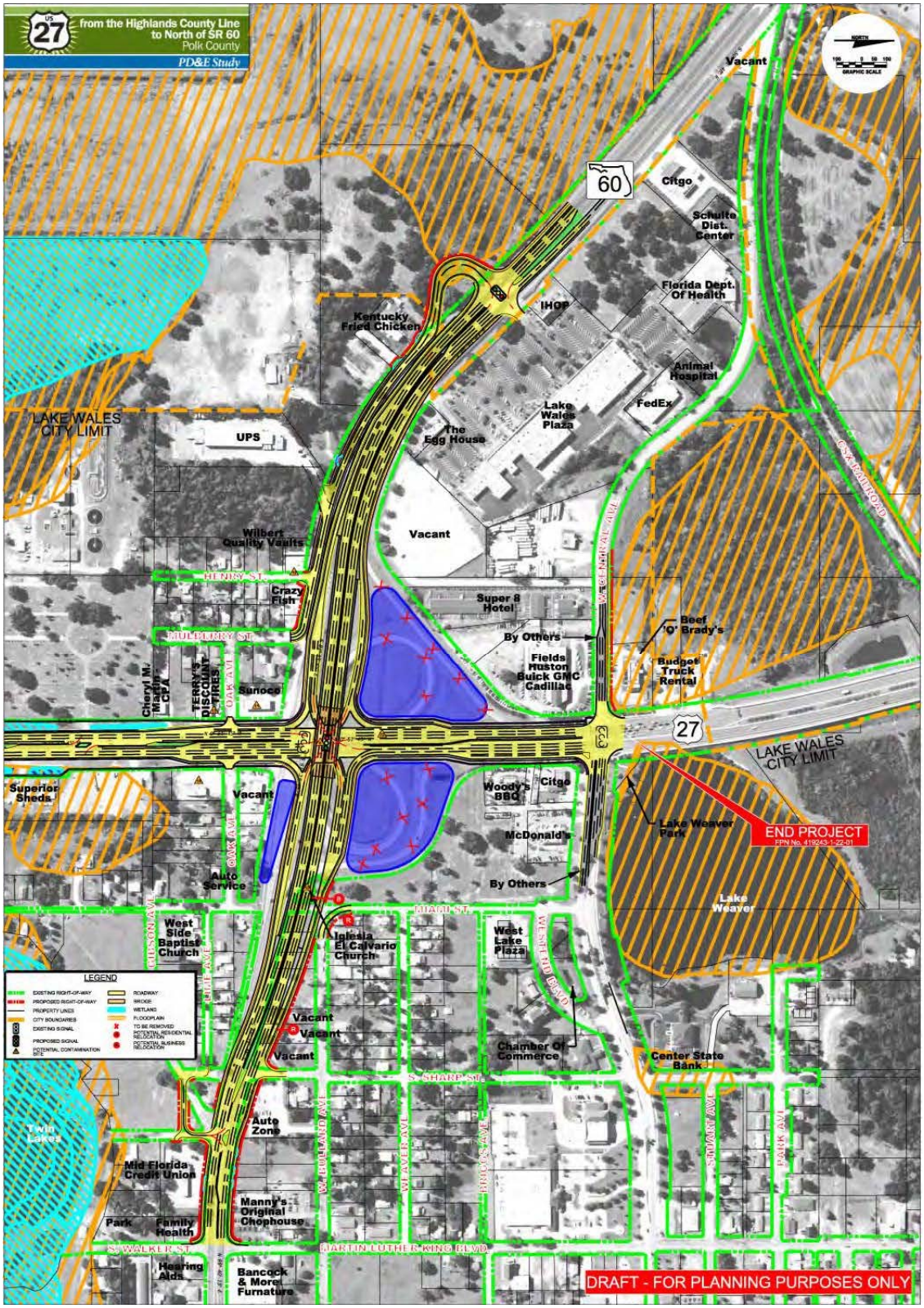
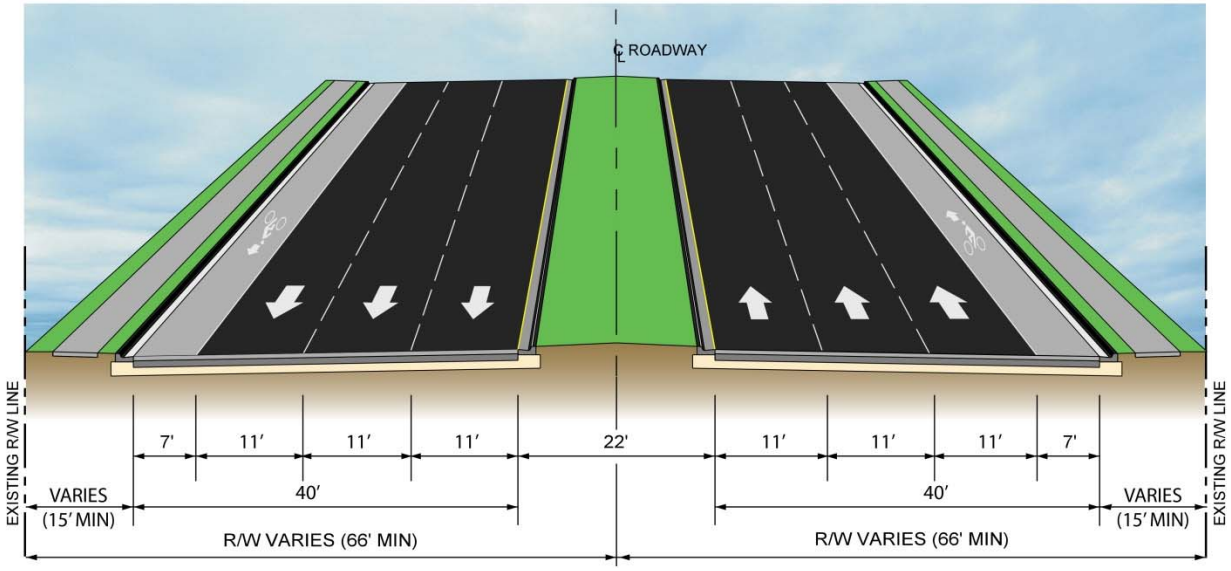


FIGURE 7:
URBAN TYPICAL SECTION FOR SR 60



ATTACHMENT A – SOCIAL & ECONOMIC

A.1. Land Use Changes

The surrounding existing land use is predominately agriculture in pasture and orange groves, with sporadic residential and commercial areas. A review of the ETDM Environmental Screening Tool (EST) shows two significant planned development areas adjacent to the west side of US 27 within the study limits. The Five R Ranch, a planned 4,126-acre office/retail Development of Regional Impact (DRI) in the northwest quadrant of the CR 640/US 27 intersection was denied (but may be renewed in the future). The Lake Streety Planned Use Development (PUD) plans for approximately 159 acres of residential development on the northeast shore of Lake Streety, approximately 3.6 miles north of the Polk/Highlands County Line. The Polk County 2030 Comprehensive Plan Generalized Future Land Use Map (dated December 10, 2015) shows that most of the land along the US 27 corridor will remain designated as Agricultural/Residential Rural, with the exception of developed areas within and adjacent to the City of Frostproof, Warner University and along US 27 within the Lake Wales municipal boundaries, which extend south to Warner University. Future land uses within these developed areas include Neighborhood Activity Center, Residential Low, Residential Medium, Industrial, Institutional, Rural Cluster Center, Commercial Enclave, and Linear Commercial Corridor. There are two Leisure Recreation areas shown just north of the City of Frostproof. Although not shown in the 2030 Generalized Future Land Use Map as Recreation/Open Space, Conservation or Preservation, the various Lake Wales Ridge Wildlife and Environmental Area and Crooked Lake West (Britt and Stuart Tracts) parcels are treated as such.

The Recommended Build Alternative generally consists of widening the existing US 27 roadway within its existing ROW. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3. This project will not result in changes in adjacent land uses beyond that which is already allowable or subject to revision under Polk County's planning/zoning/land development requirements and guidelines. The project is ultimately intended to accommodate the projected population and employment growth in the area by increasing operational capacity and enhancing overall traffic operations. There will be no overall effects on the area's character resulting from the improvements as the project supports the land use vision depicted within the Polk County 2030 Comprehensive Plan Generalized Future Land Use Map. The project is also consistent with the Polk TPO's Momentum 2040 (LRTP) plan, as a subset of the Comprehensive Plan. Therefore, the level of effects is expected to be none.

A.2. Community Cohesion

Construction of a new highway or improvements to an existing facility can impact community cohesion in several ways and can be either beneficial or adverse. An evaluation of environmental, public health, and interrelated social and economic effects of the proposed projects on minority and/or low-income populations has been completed. A detailed discussion of the population,

housing and income information for the State of Florida, Polk County and the project study area is provided in Section 5 of the Conceptual Stage Relocation Plan (CSRP), prepared under separate cover. Area population characteristics were identified through analysis of 2013 American Community Survey Data (ACS Data).

Census data indicates the presence of minority and low-income populations in the area of the project. The information in the following table is summarized from Tables 5-2 and 5-3 in the CSRP, which identify the total population distribution along the project corridor.

	Hispanic	**Non-White**	**Low-Income (% below poverty level)**
Project Census Tract Ranges	2.3%-30.8%	1.7%-85.3%	4.65-41.9%
Polk County-Wide Average	18.2%	21.1%	18.2%

The Recommended Build Alternative will occur mainly within the existing US 27 and SR 60 ROW. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3. The Recommended Build Alternative (including the 6-lane Refined SPUI) was selected based on its attainment of SIS requirements and reduced community impacts. Other interchange concepts either failed to meet SIS requirements or resulted in additional community impacts (i.e. relocations or direct parcel impacts). The Refined SPUI Alternative reduces the total number of both relocations and parcel impacts that would occur in the area of the interchange. The Recommended Build Alternative also better enhances safety and access to SR 60 and US 27 from adjacent neighborhoods.

The 3.55 acres of new ROW needed for the recommended Refined SPUI Alternative in Segment 3 will predominantly impact vacant commercial parcels and several active commercial parcels. However, the relocation of two residential parcels and one vacant building (former church) are necessary for the Recommended Build Alternative. Although these impacts will occur within areas which contain higher percentages of low-income and Hispanic populations, the Recommended Build Alternative will have a minimal impact on the periphery of these populations.

The Recommended Build Alternative is not anticipated to adversely impact elderly persons; handicapped individuals; non-drivers; transit-dependent individuals; or minorities. This project is expected to enhance the quality of life by improving mobility, accessibility and connectivity along the US 27 corridor. The project will not bisect any communities or isolate any portions thereof. It is anticipated that the project improvements will have no significant impact on community cohesion. This project has been developed to comply with Executive Order 12898, Environmental Justice, issued February 11, 1994 and has been developed without regard to race, color, national origin, age, sex, religion, disability, or family status. Therefore, the level of effects is expected to be not significant.

A.3. Relocation Potential

In accordance with Part 2, Chapter 9 of the FDOT's *PD&E Manual*, a Conceptual Stage Relocation Plan (CSRP) was completed to identify community characteristics, analyze the impact of the project on the community and to identify residences and businesses that would be impacted by the project and any special relocation needs.

As previously stated, the proposed roadway improvement concepts within Segments 1, 2 and 3 can be completed within the existing ROW. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3. The FDOT is evaluating impacting one vacant ± 60-acre off-site mitigation/floodplain compensation parcel (i.e., Flood Parcel) located adjacent to the west side of US 27, just north of the Camp Inn RV Resort (within Segment 2). The parcel is located adjacent to the Crooked Lake floodplain, would provide for wetland mitigation and floodplain compensation for Segments 1 and 2 and will not require any relocations. The 3.55 acres of additional ROW for the Refined SPUI Alternative will impact 26 parcels and require the relocations of one vacant building (former church) and two residences. Although these impacts will occur within areas which contain higher percentages of low-income and Hispanic populations, the Recommended Build Alternative will have a minimal impact on the periphery of these populations. The project will not bisect any communities or isolate any portions thereof. There are no social service or environmental justice issues known associated with these relocations.

Comparable replacement housing for sale and rent is available in Lake Wales. However, there may be some last resort rent supplements and last resort replacement housing payments necessary. Last resort housing payments would be used in order to place the relocatees in decent, safe, and sanitary housing, if necessary. Should last resort housing be constructed, the housing would be available before the displacees were required to vacate their dwellings. There are numerous residential lots available for new construction within the Lake Wales area. Lot sizes range from 13,325 square feet to 117,612 square feet and are priced from $7,000 to $92,000.

In order to minimize the unavoidable effects of ROW acquisition and displacement of people, the FDOT will carry out a Right of Way and Relocation Program in accordance with Florida Statute 339.09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646 as amended by Public Law 100-17).

The FDOT provides advance notification of impending ROW acquisition. Before acquiring ROW, all properties are appraised on the basis of comparable sales and land use values in the area. Owners of property to be acquired will be offered and paid fair market value for their property rights.

No person lawfully occupying real property will be required to move without at least 90 days written notice of the intended date to vacate, and no occupant of a residential property will be

required to move until decent, safe and sanitary replacement housing is made available. "Made available" means that the affected person has either by him/herself obtained and has the right of possession of replacement housing, or that the FDOT has offered the relocatee decent, safe and sanitary housing which is within his financial means and available for immediate occupancy.

At least one relocation specialist is assigned to each highway project to carry out the Relocation Assistance and Payments program. A relocation specialist will contact each person to be relocated to determine individual needs and desires, and to provide information, answer questions, and give help in finding replacement property. Relocation services and payments are provided without regard to race, color, religion, sex, or national origin.

All tenants and owner-occupant displacees will receive an explanation regarding all options available to them, such as (1) varying methods of claiming reimbursement for moving expenses; (2) rental replacement housing, either private or publicly subsidized; (3) purchase of replacement housing; and (4) moving owner-occupied housing to another location.

Financial assistance is available to the eligible relocatee to:

- Reimburse the relocatee for the actual reasonable costs of moving from homes, businesses, and farm operations acquired for a highway project.

- Make up the difference, if any, between the amount paid for the acquired dwelling and the cost of a comparable decent, safe and sanitary dwelling available on the private market, as determined by the department.

- Provide reimbursement of expenses, incidental to the purchase of a replacement dwelling.

- Make payment for eligible increased interest cost resulting from having to get another mortgage at a higher interest rate. Replacement housing payments, increased interest payments, and closing costs are limited to $31,000 combined total.

A displaced tenant may be eligible to receive a payment, not to exceed $7,200, to rent a replacement dwelling or room, or to use as down payment, including closing costs, on the purchase of a replacement dwelling.

The brochures that describe in detail the FDOT's Relocation Assistance Program and Right of Way Acquisition Program are *"Residential Relocation Under the Florida Relocation Assistance Program", "Relocation Assistance Business, Farms and Non-profit Organizations", "Sign Relocation Under the Florida Relocation Assistance Program", "Mobile Home Relocation Assistance", and "Relocation Assistance Program Personal Property Moves".* These brochures (including Spanish versions) were available at the Alternatives Public Workshop workshop, two public hearings (discussed in more detail in Attachment A.6.) and were made available upon request to any interested persons. Representatives of the FDOT District One Right of Way Office attended

the Alternatives Public Workshop and both public hearings to speak to interested persons and answer questions regarding ROW issues.

Therefore, based on the implementation of this program, the level of effects is expected to be not significant.

A.4. Community Services

There are businesses, churches, schools, medical facilities, government buildings, and other community services located along the project corridor. These properties are summarized as follows: Lake Wales Public Health Department, Polk County Tax Collector; Florida State Corrections - Lake Wales Parole Office; Warner University and Pontious Learning Resources Center Library; Bok Academy; two fire stations, Sun Ray Sheriff's Annex; Lake Wales Cemetery; Lake Wales Ridge Wildlife and Environmental Area (various parcels); Crooked Lake West (Britt and Stuart tracts) natural areas; Crooked Lake Wildlife and Environmental Area; three group care facilities; nine mobile home/RV communities; eight churches; two migrant residential communities (Frontier Harvesting and Anthony's Trailers 136); and one community center (Lake Wales Elks Lodge). Polk County Citrus Connection Bus Route 35 occurs within the project corridor along SR 60 including the US 27 interchange. There are no bus stops located immediately adjacent to SR 60 or US 27. There are two stops located in the parking lot between the Lake Wales Public Health Department and the Polk County Tax Collector (approximately 0.41-mile NW of the US 27/SR 60 interchange). Two additional stops, one westbound and one eastbound, are located on West Central Avenue approximately 0.10-mile east of US 27. Access to these facilities will be maintained with minimal disruption, and the project construction contractors will be required by the FDOT's *Standard Specifications for Road and Bridge Construction* to maintain access for emergency services and all adjacent properties throughout construction. Construction will be coordinated with all municipalities within the project limits to minimize disruption to local communities. The affected entities and local residents will be notified regarding public involvement efforts during future project design and construction phases. The level of effect is anticipated to be not significant to any community services.

A.5. Nondiscrimination Considerations

In February 1994, the President of the United States issued Executive Order 12898 (Environmental Justice) requiring federal agencies to analyze and address, as appropriate, disproportionately high adverse human health and environmental effects of federal actions on ethnic and cultural minority populations and low-income populations, when such analysis is required by NEPA.

An evaluation of environmental, public health, and interrelated social and economic effects of the proposed projects on minority and/or low-income populations has been completed. A detailed discussion of the population, housing and income information for the State of Florida, Polk County and the project study area is provided in Section 5 of the CSRP. Area population characteristics were identified through analysis of 2013 ACS Data.

Census data indicates the presence of minority and low-income populations in the area of the project. The information in the following table is summarized from Tables 5-2 and 5-3 in the CSRP, which identify the total population distribution along the project corridor.

	Hispanic	**Non-White**	**Low-Income (% below poverty level)**
Project Census Tract Ranges	2.3%-30.8%	1.7%-85.3%	4.65-41.9%
Polk County-Wide Average	18.2%	21.1%	18.2%

The Recommended Build Alternative will occur mainly within the existing US 27 and SR 60 ROW. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3. The Recommended Build Alternative (including the 6-lane Refined SPUI) was selected based on its attainment of SIS requirements and reduced community impacts. Other interchange concepts either failed to meet SIS requirements or resulted in additional community impacts (i.e. relocations or direct parcel impacts). The Refined SPUI Alternative reduces the total number of both relocations and parcel impacts that would occur in the area of the interchange. The Recommended Build Alternative also better enhances safety and access to SR 60 and US 27 from adjacent neighborhoods.

The 3.55 acres of new ROW for the Refined SPUI will predominantly impact vacant commercial parcels and several active commercial parcels. However, the relocation of two residential parcels and one vacant building (former church) are necessary for the Recommended Build Alternative. Although these impacts will occur within areas which contain higher percentages of low-income and Hispanic/non-white populations, the Recommended Build Alternative will have a minimal impact on the periphery of these populations.

Low-income and minority populations present in the study area were engaged through the methods outlined in the Public Involvement Program (PIP) for the project. These methods are discussed further in Section A.6. A project website was also developed to provide the public with access to up-to-date information and an online comment option. Furthermore, an Alternatives Public Workshop was held on September 19, 2013, to give interested persons an opportunity to express their views concerning the alternatives being analyzed. There were no comments received which cited concerns regarding potential impacts to low-income or minority populations in the project area. Public hearings were held on March 22, 2016 and September 8, 2016 to inform the public of the results of the PD&E Study and to give the public the opportunity to express their views regarding specific location, design, socio-economic effects, and environmental impacts associated with the Recommended Build Alternative.

This project has been developed in accordance with the Civil Rights Act of 1964, as amended by the Civil Rights Act of 1968, and in accordance with Executive Order 12898 and FHWA Order

6640.23a. The Recommended Build Alternative will not result in any disproportionate adverse effects to any distinct minority, ethnic, elderly or handicapped groups, and/or low-income populations. Title VI information was made available at the public hearings. This project has been developed without regard to race, color, national origin, age, sex, religion, disability, or family status. No further Environmental Justice analysis is required.

The level of effects is expected to be not significant.

A.6. Controversy Potential

The project was screened through the ETDM process as ETDM Number 3869. The Programming Screen Environmental Technical Advisory Team (ETAT) review was initiated on April 15, 2011, and completed on May 30, 2011. None of the reviewing ETAT members submitted a DOE of "5" for Dispute Resolution. The Programming Screen Summary Report (PER Appendix G) was published on August 26, 2011. It was republished on September 8, 2011, with new commentary to reflect Summary DOE coordination with applicable agencies for the Farmlands, Navigation, Wetlands, Historic and Archeological Sites, Land Use and Mobility resource issues. In addition, the Summary DOE for the Land Use issue was changed from Minimal to Moderate due to additional considerations along the project corridor.

An Advanced Notification (AN) package was completed for this project and mailed to the Florida State Clearinghouse and local and Federal agencies on June 27, 2012, in accordance with Executive Order 95-359. A response was received from the Southwest Florida Regional Planning Council which stated this project was Regionally Significant and Consistent. The comments received through the AN process (PER Appendix H) were either no comment or were related to respective agency permitting requirements and stressed avoidance and minimization of environmental impacts. There were no adverse comments regarding the proposed roadway improvements and all comments have been addressed in the appropriate sections of this report.

A PIP was developed and approved for this project. The PIP was implemented in compliance with the FDOT *PD&E Manual*; Florida Statute 339.155; Executive Orders 11990 and 11988; Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA 23 CFR 771. The PIP outlines community outreach efforts, and presents the approach used throughout this project to involve the general public, public officials, the media, and government agencies throughout the project process. A property owner list was developed for the purpose of sending out newsletters and public meeting invitations. A mailing list of public officials was also developed for the purpose of informing representatives of the project area with newsletters, and workshop and hearing invitations. A project website was also developed to provide the public with access to up-to-date information and an online comment option.

The public, including low-income and minority populations present in the study area, were engaged through the methods outlined in the PIP for the project. Newsletters were prepared in

English and Spanish translation (to meet greater than 5% Limited English Proficiency criteria) to inform the public of upcoming opportunities for comment and review of project materials. Additionally, at least one Spanish-speaking project team representative was available to assist as needed with translation at all public meetings. An original property owners list was developed from information in the property appraiser's websites for Polk and Highlands Counties. This list was updated as requests were received by citizens to be added to the list, either through the project website, or through meeting with citizens and business owners within the project area throughout the course of the study. The first newsletter issue was published and distributed in August 2012. It informed the public of the start of the project and included a discussion of the study process and schedule. The newsletter also stressed the need for public input and provided information on points of contact within the department regarding citizen comments and concerns. The second issue was mailed in September 2013. It presented an overview of the study progress to date and served as notification of the upcoming September 19, 2013 Alternatives Public Workshop. The third issue, was published and distributed on February 24, 2016, to inform the public of the Recommended Build Alternative and serve as notification of the March 22, 2016 public hearing.

An Alternatives Public Workshop was held on September 19, 2013 from 5:00 p.m. to 7:00 p.m. at Warner University, Ratzlaff Administration Building, 211 Presidents Drive, Lake Wales, Florida. The purpose of the public meeting was to provide interested persons with information on the alternative alignments developed to date and to allow the public the opportunity to comment. No formal presentation was made, but a looping project video was shown. The video included an overview of the PD&E study process, a description of the alternatives being considered, the estimated project costs and discussion regarding the overall project schedule. The materials on display and handed out at the meeting were uploaded to the project website for public viewing. The workshop was attended by 45 citizens. All attendees were given the opportunity to provide written comments at the workshop or within an 11-day comment period following the meeting. FDOT received 13 completed comment sheets and emails at the public meeting and during the 11-day period. The comments included requests for access management and traffic operations improvements relating to specific properties or situations, to be added to the study mailing lists and to receive study concept maps. The study team reviewed the comments to determine if suggestions can be included in the conceptual design.

A formal public hearing was held on Tuesday, March 22, 2016, at 7:00 p.m. at South Lake Wales Church of God, 210 Presidents Drive, Lake Wales, Florida. The public hearing was held to inform the public of the results of the PD&E study and to give the public the opportunity to express their views regarding specific location, design, socio-economic effects, and environmental impacts associated with the Recommended Build Alternative and the No-Build Alternative.

Tony Sherrard, FDOT Project Manager, presided at the hearing. FDOT and its consultant team were present for one hour prior to the formal proceedings to informally discuss the project with the general public. Aerial photographs with the Recommended Build Alternative and poster

boards were displayed. A project handout was offered to attendees. It included a description of the ROW acquisition procedures with particular reference to state and federal relocation assistance programs. Comment sheets were offered for the public to complete.

A total of 64 persons registered at the public hearing. Following introductory remarks by Mr. Sherrard, FDOT presented a video about the study. The video included a summary of the need for the facility and advantages and disadvantages of the Recommended Build Alternative and the No-Build Alternative. Socio-economic and environmental impacts were presented.

Specific questions and comments raised at the public hearing were answered during informal discussions with concerned individuals or by letter following the hearing. Five persons spoke for the public record at the hearing with 12 comment sheets received at the hearing. There were 10 comments sheets, comments submitted on the study web site, e-mails, and letters received in the ten-day period following the hearing. Substantive comments made at and subsequent to the public hearing focused primarily on water quality and wetland/floodplain mitigation associated with Crooked Lake, access management/traffic signal issues, and requests for wildlife underpasses. FDOT responded that the comments were reviewed and will be further evaluated during the design phases of the three projects that are included within the study limits.

Due to circumstances involving property owners along SR 60 within the study limits who were not notified of the first public hearing on March 22, 2016, and to ensure compliance with federal and state requirements, FDOT hosted a second public hearing on September 8, 2016, at 7:00 p.m. at South Lake Wales Church of God, 210 Presidents Drive, Lake Wales, Florida. The information presented was identical to the information displayed at the first public hearing.

Tony Sherrard, FDOT Project Manager, presided at the hearing. FDOT and its consultant team were present at the meeting site for one hour prior to the formal proceedings to informally discuss the project with the general public. Aerial photographs with the viable alternatives and poster boards were displayed. A project handout was offered to attendees. It included a description of the ROW acquisition procedures with particular reference to state and federal relocation assistance programs. Comment sheets were offered for the public to complete.

Forty persons registered at the public hearing. Following introductory remarks, FDOT presented a project video. The video included a summary of the need for the facility and advantages and disadvantages of the Recommended Build Alternative and the No-Build Alternative. Socio-economic and environmental impacts were presented.

Specific questions and comments raised at the public hearing were answered during informal discussions with concerned individuals. One person spoke for the public record at the hearing and FDOT received two comments by e-mail during the ten-day comment period that followed.

Substantive comments made at and subsequent to the second public hearing focused on access management and traffic signal issues. FDOT responded that the comments will be reviewed and further evaluated during the design phases of the three projects that are included within the study limits.

A final project newsletter will be sent to the property owners and interested citizens to announce the final approval (i.e., Location and Design Concept Acceptance) of the environmental document. Therefore, the level of effects is expected to be none.

A.8. Farmlands

In accordance with Part 2, Chapter 28 of the FDOT's *PD&E Manual*, project involvement with Farmlands of Prime or Unique Importance was evaluated. The proposed roadway improvement concepts within Segments 1, 2 and 3 can generally be completed within the existing US 27 ROW. However, additional ROW will be needed for wetland mitigation for Segment 1, wetland and floodplain mitigation for Segment 2, and the recommended Refined SPUI Alternative in Segment 3. The FDOT is evaluating impacting one vacant ± 60-acre off-site mitigation/floodplain compensation parcel to be considered for mitigation. This parcel is located adjacent to the west side of US 27, just north of the Camp Inn RV Resort (within Segment 2). A review of the ETDM EST does not show any potential prime or unique farmlands within this off-site property.

Through coordination with the Natural Resources Conservation Service, it has been determined that Important Farmlands as defined by 7 CFR 658 are located in the project vicinity, however they will not be impacted by the project. The NRCS' June 11, 2014 concurrence is included in **Appendix B**. If additional ROW is needed during the future project design phase(s), project involvement with Important Farmlands will be reevaluated and coordination will occur with the NRCS as appropriate. Therefore, the level of effects is expected to be none.

ATTACHMENT B – CULTURAL

B.1. Section 4(f) Lands

In accordance with Section 4(f) of the Department of Transportation Act of 1966 (Title 49, U.S.C., Section 1653(f), amended and recodified in Title 49, U.S.C., Section 303, in 1983), the proposed project was examined for possible involvement with Section 4(f) resources. Section 4(f) requires that prior to the use of any land from a publicly owned park, recreation area, wildlife or waterfowl refuge, or land from a historic property on or eligible for inclusion in the National Register of Historic Places (NRHP) for transportation purposes, it must be documented that there are no prudent or feasible alternatives which avoid such "use" and that the project includes all possible planning to minimize harm to the Section 4(f) resources.

There are several publicly-owned parks/recreation areas and wildlife/natural areas adjacent to the project limits, including the Lake Wales Ridge Wildlife and Environmental Area (LWRWEA) (Sunray/Hickory Lake South Site), Crooked Lake West (Stuart and Britt Tracts) and Lake Weaver Park. These properties were discussed in more detail within the Section 4(f) Determination of Applicability (DOA) completed for this project.

Although these properties meet the criteria for Section 4(f) resources, the proposed roadway improvement concepts within Segments 1, 2 and 3 can be completed within the existing roadway ROW and will not result in a "use" of any of these resources. Consistent with Part 2, Chapter 13 of the FDOT's *PD&E Manual*, the FDOT obtained Statement of Significance (SOS) letters from the entities with jurisdiction of these resources and has prepared a Determination of Applicability (DOA) for these resources, stating that that the proposed project will not result in impacts to these Section 4(f) recreational resources. A letter was sent to the FHWA requesting their concurrence with the FDOT's DOA. The FHWA provided a response via electronic communication dated March 10, 2016 (**Appendix B**). Based on the Recommended Build Alternative as currently proposed, the FHWA agreed that no Section 4(f) impacts will occur since there is no use of the publicly-owned parks/recreation areas and/or wildlife/natural areas by the project for transportation purposes. The project, including the project stormwater ponds and floodplain compensation acquisitions, will be designed to avoid all use of these potential Section 4(f) properties. If the project changes to the extent that acquisition of any of these properties cannot be avoided, the FDOT will provide detailed information including input from the official with jurisdiction to assess significance, as well as information related to potential wildlife/waterfowl refuge function. Therefore, the level of effects is expected to be none.

B.2. Historic Sites/Districts

In accordance with the procedures contained in Chapter 36 Code of Federal Regulations (CFR) Part 800 (revised May 1999), a Cultural Resource Assessment, including literature review and a field survey, was performed for the proposed project. This survey was completed in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (Public Law 89-

655), as implemented by 36 CFR 800 (Protection of Historic Properties, effective January 2001); Chapter 267, Florida Statutes (F.S.); Section 4(f) of the Department of Transportation Act of 1966, as amended (49 USC 303). It also complies with the minimum field methods, data analysis, and reporting standards embodied in the Florida Division of Historical Resources' (FDHR), *Cultural Resource Management Standards and Operational Manual* (February 2003), and Chapter 1A-46 (Archaeological and Historical Report Standards and Guidelines), Florida Administrative Code (F.A.C.). In addition, this report conforms with Part 2, Chapter 12 (Archaeological and Historic Resources) of the FDOT *PD&E Manual*. All work conforms to professional guidelines set forth in the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716, as amended and annotated). The purpose of this CRAS was to locate and evaluate archaeological and historic resources within the area of potential effect (APE) and to assess eligibility for inclusion in the National Register of Historic Places (National Register) according to the criteria set forth in 36 CFR Section 60.4.

The historic resources survey within the APE resulted in 40 extant historic resources and 38 historic resources (50 years of age or older) that were newly-identified and recorded. These resources include five resource groups (8PO07639-7641 and 8PO07726-7727), 31 buildings (8PO07608-7634, 8PO07728-7731) constructed between 1935 and 1962, one linear resource (8PO07654), and one cemetery (8PO07635). After application of the National Register Criteria of Significance, all but one of these sites, the Lake Wales Cemetery (8PO07635) were found to be not eligible for listing in the National Register of Historic Places either individually or as part of a district. The Lake Wales Cemetery (8PO07635) was determined eligible for listing on the National Register of Historic Places. Through the application of the Criteria of Adverse Effect, it was determined that the proposed widening of US 27 within FDOT's existing ROW did not constitute an adverse effect on this property.

The CRAS was submitted to the FHWA for review and concurrence with these findings. The FHWA approved the recommendations and findings on June 27, 2014. The State Historic Preservation Officer (SHPO) concurred with the findings on August 12, 2014. The SHPO clarified that Criteria D does not apply to the Lake Wales Cemetery.

Since the submittal of the CRAS, design changes have occurred and additional historic reconnaissance was required. The original Operational Improvement interchange configuration was replaced with the Refined SPUI Alternative described previously in Attachment 2 Proposed Improvements.

A CRAS Technical Memorandum Addendum was completed in December 2015. As a result of this effort, 33 individual resources were identified within the project APE. Of these, 17 previously recorded buildings are within the project APE. Florida Master Site File (FMSF) forms for these were updated and 16 buildings were newly recorded. None of these buildings are considered eligible for listing in the NRHP. In addition, it was determined that 10 previously recorded

buildings within the project APE are no longer extant. A letter was prepared for the SHPO regarding the status of these demolished buildings.

As a result of this research, the Recommended Build Alternative will have no effect on any cultural resources or historic resources which are listed, determined eligible, or potentially eligible for listing in the NRHP, either individually or as part of a historic district. The CRAS Technical Memorandum Addendum was submitted to FHWA and SHPO for review and concurrence with these findings. The FHWA approved the recommendations and findings on February 29, 2016. The SHPO concurred with the findings on March 10, 2016. The FHWA and SHPO coordination letters are included in **Appendix B**. Therefore, the level of effects is expected to be none.

B.3. Archaeological Sites

In accordance with the procedures contained in Chapter 36 Code of Federal Regulations (CFR) Part 800 (revised May 1999), a Cultural Resource Assessment, including literature review and a field survey, has been performed for the proposed project. This survey has been completed in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (Public Law 89-655), as implemented by 36 CFR 800 (Protection of Historic Properties, effective January 2001); Chapter 267, Florida Statutes (F.S.); Section 4(f) of the Department of Transportation Act of 1966, as amended (49 USC 303). It also complies with the minimum field methods, data analysis, and reporting standards embodied in the Florida Division of Historical Resources' (FDHR), *Cultural Resource Management Standards and Operational Manual* (February 2003), and Chapter 1A-46 (Archaeological and Historical Report Standards and Guidelines), Florida Administrative Code (F.A.C.). In addition, this report conforms with Part 2, Chapter 12 (Archaeological and Historic Resources) of the FDOT *PD&E Manual*. All work conforms to professional guidelines set forth in the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716, as amended and annotated). The purpose of this CRAS was to locate and evaluate archaeological and historic resources within the area of potential effect (APE) and to assess eligibility for inclusion in the National Register of Historic Places (National Register) according to the criteria set forth in 36 CFR Section 60.4.

As a result of the assessment, 14 archaeological sites have been recorded within one mile of the project corridor, but none is contained within the APE. The site location predictive model for the region indicated a variable potential for archaeological sites within the study corridor. However, as a result of this survey, no archaeological sites were discovered. The archaeological APE was determined to have a low archaeological site potential, which the pedestrian and subsurface survey confirmed. It was determined that the proposed widening of US 27 within FDOT's existing ROW would have no effect on any sites.

The CRAS was submitted to the FHWA for review and concurrence with these findings. The FHWA approved the recommendations and findings on June 27, 2014. The SHPO concurred with the findings on August 12, 2014.

Since the submittal of the CRAS, design changes have occurred and additional archaeological testing was required to address additional ROW required. The original Operational Improvement interchange configuration was replaced with the Refined SPUI Alternative described previously in Attachment 2 Proposed Improvements.

A CRAS Technical Memorandum Addendum was completed in December 2015 and documented that no archaeological sites were discovered. As a result of this research, the Recommended Build Alternative will have no effect on any cultural resources, including archaeological sites which are listed, determined eligible, or potentially eligible for listing in the NRHP, either individually or as part of a historic district. The CRAS Technical Memorandum Addendum was submitted to FHWA and SHPO for review and concurrence with these findings. The FHWA approved the recommendations and findings on February 29, 2016. The SHPO concurred with the findings on March 10, 2016. The FHWA and SHPO coordination letters are included in **Appendix B**. Therefore, the level of effects is expected to be none.

B.4. Recreation Areas

In accordance with Section 4(f) of the Department of Transportation Act of 1966 (Title 49, United States Code (U.S.C.), Section 1653(f), amended and recodified in Title 49, U.S.C., Section 303, in 1983), the project was examined for possible Section 4(f) properties. There are several publicly-owned parks/recreation areas and wildlife/natural areas adjacent to the project limits. Several of these properties have been conserved and managed to highlight the unique scrub flora and fauna of the Lake Wales Ridge. The LWRWEA is generally adjacent to the east side of US 27 between the US 27/SR 17 intersection and the US 27 bridge over the CSX rail line. There is also a small spur of this property adjacent to the west side of the US 27 at the US 27/SR 17 intersection. These natural area parcels are owned by the State of Florida's TIITF and are leased/managed for regulated public recreational activities by the FWC. Polk County owns and manages the 57-acre Hickory Lake Scrub County Park, which occurs along the north side of SR 17 just east of the LWRWEA parcels and offers recreational (hiking and nature viewing) opportunities. The Crooked Lake West natural area parcels occur along both sides of US 27 in the vicinity of Crooked Lake. These are comprised of the 3,508.2-acre Stuart Tract (east and west sides of US 27), the 77.3-acre Britt Tract (west side only) and numerous unnamed parcels further to the west. The Stuart and Britt parcels are owned jointly by Polk County and the SWFWMD and managed through agreement by both agencies. Although planned for future recreational access, recreational access is currently not allowed/available on the Stuart and Britt Tracts and is pending due to conflicts with the properties' conservation easement and restoration plan. Polk County owns and manages the smaller, more sporadic/individual Crooked Lake West site parcels. The Crooked Lake Wildlife and Environmental Area is a 1,146.9-acre natural area north of US 98/SR 700 and west of US 27. It is owned by the State of Florida's TIITF and is leased/managed for regulated public recreational activities by the FWC as a wildlife and environmental area.

Although these properties meet the criteria for Section 4(f) resources, the proposed roadway improvement concepts within Segments 1, 2 and 3 can be completed within the existing roadway

ROW and will not result in a "use" of any of these resources. Consistent with Part 2, Chapter 13 of the FDOT's *PD&E Manual*, the FDOT obtained SOS letters, and prepared a DOA for these resources, stating that that the proposed project will not result in impacts to these Section 4(f) recreational resources (discuss in section B.1 above). A letter was sent to the FHWA requesting their concurrence with the FDOT's DOA. The FHWA provided a response via electronic communication dated March 10, 2016 (**Appendix B**). Based on the Recommended Build Alternative as currently proposed, the FHWA agreed that no Section 4(f) impacts will occur since there is no use of the publicly-owned parks/recreation areas and/or wildlife/natural areas by the project for transportation purposes. The project, including the project stormwater ponds and floodplain compensation acquisitions, will be designed to avoid all use of these potential Section 4(f) properties. If the project changes to the extent that acquisition of any of these properties cannot be avoided, the FDOT will provide detailed information including input from the official with jurisdiction to assess significance, as well as information related to potential wildlife/ waterfowl refuge function. Therefore, the level of effects is expected to be none.

ATTACHMENT C – NATURAL

C.1. Wetlands

In accordance with Executive Order 11990, Protection of Wetlands, dated May 23, 1977, and US Department of Transportation order 56601.A, Preservation of the Nation's Wetlands, dated August 24, 1978, a Wetland Evaluation Report (WER) was completed under separate cover as part of this PD&E study. The purpose of this WER is to document and describe existing wetland and surface water habitats located within and adjacent to the project area and to assess the potential wetland and other surface water impacts associated with the Recommended Build Alternative. These wetlands were classified, and characterized utilizing Florida Land Use Cover and Forms Classification System (FLUCFCS) codes, and the US. Fish and Wildlife Service's National Wetland Inventory (NWI) codes.

As a result of this study, it has been determined that there are no practicable alternatives to completely avoid wetland impacts. Unavoidable wetland impacts would result from construction of the project and are necessary to accommodate transportation safety standards for side slopes, turn radius, additional lanes, and widths necessitate these impacts. Impacts to wetlands are unavoidable for the proposed alignment due to their location within the existing ROW. However, potential wetland impacts have been minimized to the extent possible by incorporating the following measures:

- Using gravity walls in the Crooked Lake floodplain
- At the present time, all stormwater is proposed to be treated (for water quality and quantity requirements) inside the existing ROW.

Anticipated direct impacts to wetlands and surface waters from the proposed project activities are as follows: 1) Segment 1 – 4.03 acres, 2) Segment 2 – 5.83 acres, and 3) Segment 3 – 3.62 acres. Based on this evaluation, the project will result in direct permanent impacts to approximately 13.48 acres of wetlands and other surface waters, which includes drainage ditches, canals, and lakes. Impacted wetland and surface water types include: Stream and Lake Swamps, Slash Pine Swamp Forest, Wetland Shrub, Freshwater Marshes, Wet Prairies, Lakes and Hydric Ditches/Canals. SWFWMD guidance requires that all remaining wetland areas within 25 feet of direct impacts are considered to have secondary impacts. An additional 12.56 acres of wetlands and other surface waters are considered to have permanent secondary impacts based on SWFWMD criteria. Thus, the proposed project would result in 26.04 acres of permanent wetland impacts (13.48 acres + 12.56 acres = 26.04 acres). No temporary impacts are associated with this project. No wetlands or surface waters exist within the US 27/SR 60 interchange; therefore, no wetland or surface water impacts would occur at this location. This evaluation of wetland impacts does not include/consider potential wetland impacts resulting from construction of any off-site stormwater ponds, as none are currently proposed.

These wetlands were also subjected to a functional assessment using the Uniform Mitigation Assessment Method (UMAM). The UMAM, per Chapter 62-345, FAC, is a state and federally-approved method used to assess wetlands in the State of Florida. UMAM was developed by the FDEP and the water management districts to determine the amount of mitigation required to offset adverse impacts to wetlands. The methodology was designed to assess functions provided by wetlands, the amount those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset the proposed functional losses. This method is also used to determine the degree of improvement in ecological value that will be created by proposed mitigation activities. The estimated total numeric value of functions to fish and wildlife lost as a result of construction of the proposed project is estimated at 9.43 Functional Units (i.e., 8.59 UMAM functional loss units for direct impacts and 0.84 UMAM functional loss units for secondary impacts).

At present, there are no permitted wetland mitigation banks or in-lieu fee programs available to service the majority of the project area therefore, mitigation through the purchase of mitigation credits from a wetland mitigation bank or participation in an in-lieu fee program is generally not available. The status of available mitigation banks and mitigation credits will be reassessed as this project moves forward into design and permitting. Additional ROW will be needed for wetland mitigation for Segment 1 and wetland and floodplain mitigation for Segment 2. To fulfill these mitigative requirements, the FDOT is evaluating one vacant $\pm$ 60-acre off-site mitigation/ floodplain compensation parcel. This parcel is located adjacent to the Crooked Lake floodplain on the west side of US 27, just north of the Camp Inn RV Resort (within Segment 2).

Based on the results of a June 2013 field review, the parcel appears to provide sufficient opportunities for wetland creation, restoration and enhancement to offset impacts in Segments 1 and 2 of the project area. Through the creation, restoration and enhancement of wetlands within the off-site parcel, the estimated functional gains of 6.85 units (2.02 units functional gain from wetland restoration, 4.83 functional gain from wetland creation) is expected to be equal to the expected Functional Loss for Segments 1 and 2. Presently, only the northern portion (Segment 3) of the project study area (from north of Presidents Drive to north of SR 60) is located within a mitigation bank service area (i.e., the Peace River and Boran Ranch mitigation banks). Boran Ranch currently has herbaceous wetland mitigation credits available for purchase, while Peace River has forested credits available. The mitigation necessary to offset the remaining 1.78 Functional Loss units for Segment 3 is expected to be provided through the purchase of credits from one or both banks (or others if available) during the project's final design and permitting phase(s). Therefore, the level of effects is expected to be not significant.

It is important to note that these impacts will be further reviewed during the future design and permitting phases to determine the feasibility of further avoidance and minimization measures. All UMAM scores, UMAM calculations, preliminary wetland lines and determinations discussed are subject to revision and approval by regulatory agencies during the permitting process. The

exact type(s) of mitigation used to offset wetland impacts from the proposed US 27 roadway improvements will be coordinated with the USACE and SWFWMD during the project's final design and permitting phase(s).

The proposed project was evaluated for potential wetland impacts in accordance with Executive Order 11990, Protection of Wetlands. Based upon the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and the proposed action includes all practicable measures to minimize impacts to wetlands which may result from such use.

The FDOT will document measures used to avoid and minimize jurisdictional wetland and surface water impacts. Wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, F.S., to satisfy all mitigation requirements of Part IV of Chapter 373, F.S., and 33 U.S.C. §1344. As mitigation will be completed to offset project wetland impacts, these impacts are expected to be not significant.

C.3. Water Quality

Stormwater management for the proposed project will generally be accomplished utilizing a combination of linear dry retention and wet detention systems within the existing ROW. Some gravity walls will be necessary within Segment 2 to provide some of the swales that are within this segment. Within Segment 3, the infield areas at the SR 60 interchange will also be utilized for stormwater management.

The project's stormwater management facilities will include, at a minimum, the water quality and quantity requirements of the SWFWMD under Chapter 62-330, Florida Statutes and Rules 40D-4 and 40D-40, Florida Administrative Code (F.A.C.), with further coordination to occur between the FDOT and SWFWMD during future design, permitting and construction phase(s).

A Pond Siting Report (PSR), with Addendum 1 and Addendum 2, has been prepared under separate cover to address the stormwater management facilities needed for the proposed conceptual design. In accordance with Part 2, Chapter 20 of the FDOT's *PD&E Manual*, a *Water Quality Impact Evaluation (WQIE)* has also been prepared under separate cover for this project.

During project construction, potential short term increases in water turbidity which could temporarily affect water quality will be controlled by strict adherence to applicable federal and state environmental permit conditions and the procedures and techniques set forth in the latest edition of the FDOT's *Standard Specifications for Road and Bridge Construction*, Section 104, "Pollution, Control, and Abatement of Erosion and Water Pollution." Therefore, the level of effects is expected to be not significant.

C.4. Outstanding Florida Waters

Crooked Lake, along a portion of the east side of US 27 within the project corridor, is designated under 62-302.700 (9)(i), Florida Administrative Code as a Special Outstanding Florida Water (OFW). A pre-application meeting was held on September 27, 2012 between the FDOT and SWFWMD. The minutes of this meeting included discussion of the OFW status for Crooked Lake. As recorded in the meeting minutes, the SWFWMD stated that the project will discharge into the connecting canals and therefore have no "direct discharge" to the lake and that the more stringent OFW criteria would not apply. However, the FDOT will review/verify this issue with the SWFWMD during the future project design and environmental permitting phase(s). Therefore, the level of effects is expected to be none.

C.6. Floodplains

In accordance with Part 2, Chapter 24 of the FDOT's *PD&E Manual*, a Location Hydraulics Report (LHR) and a PSR have been prepared under separate cover. These documents provide detailed information about existing drainage patterns, potential floodplain encroachment, drainage calculations, and proposed drainage structures.

Based on the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the project will result in unavoidable floodplain encroachments. There are no regulated floodways within the project corridor. There are three major FEMA floodplain encroachments within the project limits: Lake Streety Canal (Segment 1), Crooked Lake (Segment 2), and the semi-closed basins within the Peace Creek Drainage Canal basin (Segment 3). These encroachments are expected to be as follows: 1) Segment 1 – 0.9 acre-feet (ac-ft), 2) Segment 2 – 23.1 ac-ft, and 3) Segment 3 – 2.7 ac-ft., a total of 26.7 ac-ft.

Floodplain encroachments will be avoided and/or offset within the impact basin to the maximum extent practicable. Within Segment 1, it is expected that typical section modifications, the elimination of stormwater management ponds/use of the roadway median and the installation of guardrails may eliminate the potential floodplain impact entirely. Within Segment 2, floodplain impacts are anticipated to be compensated through volumetric cup-for-cup excavation within the vacant $\pm$ 60-acre off-site mitigation/floodplain compensation parcel, which is hydraulically connected to the Crooked Lake floodplain through an existing wetland that is contiguous with the larger Crooked Lake floodplain. Within Segment 3, floodplain impacts were minimized by reducing the volume of additional stormwater runoff by storage of excess runoff in percolation ponds located within the infield areas of the US 27/SR 60 interchange. The future project design phase(s) will further evaluate opportunities to avoid and minimize floodplain impacts.

The construction of the drainage structure(s) proposed for this project will cause minimal changes in flood stage and flood limits. These changes will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant changes in flood risk or damage. These changes have been reviewed by the appropriate regulatory authorities who have concurred

with the determination that there will be no significant impacts. There will not be significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

C.9. Wildlife and Habitat

The project area was evaluated for potential occurrences of federal- and state-listed/protected plant and animal species in accordance with the *Endangered Species Act of 1973*, as amended, *Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act*, and Chapters 5B-40 and 68A-27 of the F.A.C. The evaluation included coordination with the FWS, the FWC, the FHWA, and the Florida Natural Areas Inventory (FNAI). The evaluation also included literature review, database searches, and field assessments of the project area to identify the potential occurrence of protected species and/or presence of federally-designated critical habitat.

Based on evaluation of collected data and field reviews, the potential was noted for applicable federal- and state-listed/protected plant and animal species to occur within or adjacent to the project area. An effect determination was then established for each federal and state-listed/protected species based on an analysis of the potential impacts of the proposed project to each species and their habitat. In accordance with Part 2, Chapter 27 of the FDOT's *PD&E Manual*, an Endangered Species Biological Assessment (ESBA) and ESBA Addendum have been prepared under separate cover to document the FDOT's species observations, findings and effects determinations.

Based on coordination with the FWS, limited-methodology surveys were conducted for the Florida scrub jay and Audubon's crested caracara. The following protected species (or evidence thereof) were observed during field reviews: sand skink (tracks observed, also used as an indicator species for the blue-tailed mole skink as they may coexist within/adjacent to the project limits), wood stork, bald eagle (nests), osprey (nests), gopher tortoise (occupied burrows), white ibis, Southeastern American kestrel, Florida sandhill crane, pygmy fringe tree; short-leaved rosemary, scrub buckwheat, paper-like nailwort (papery whitlow-wort) sandlace/Small's jointweed, scrub plum, cutthroat grass, and Curtiss' milkweed.

The FDOT has evaluated the potential for project activities to impact various listed/protected species occurring or potentially occurring in the vicinity of the project limits. Through their evaluation, the FDOT made the following effect determinations for federally-listed species (see **Table 4**).

TABLE 4:
FDOT EFFECT DETERMINATIONS FOR FEDERALLY-LISTED SPECIES WITHIN OR ADJACENT TO THE US 27 PD&E LIMITS

SPECIES	Status	Impact Determination
Animals		
Eastern Indigo Snake (*Drymarchon couperi*) Blue-tailed Mole Skink (*Plestiodon egregious lividus*) Sand Skink (*Plestiodon reynoldsi*) Florida Scrub Jay *(Aphelocoma coerulescens*) Crested Caracara (*Caracara cheriway audubonii*) Wood Stork (*Mycteria americana*)	FWS - Threatened	May Affect, But is Not Likely to Adversely Affect
Florida Grasshopper Sparrow *(Ammodramus savannarum floridanus)* Everglade Snail Kite (*Rostrhamus sociabilis*) Florida Bonneted Bat *(Eumops floridanus)* Florida Panther *(Puma concolor coryi)*	FWS - Endangered	May Affect, But is Not Likely to Adversely Affect
Plants		
Pygmy fringe tree *(Chionanthus pygmaeus)* Short-leaved rosemary (*Conradina brevifolia)* Small's jointweed *(Polygonella myriophylla)* Scrub plum (*Prunus geniculata)*	FWS- Endangered FDACS- Endangered	May Affect, Likely to Adversely Affect
Scrub buckwheat (*Eriogonum longifolium var. gnaphalifolium)* Paper-like nailwort (Papery Whitlow-wort) (*Paronychia chartacea ssp. chartacea)*	FWS- Threatened FDACS- Endangered	May affect, Likely to Adversely Affect
Florida bonamia (*Bonamia grandiflora)* Scrub pigeon-wing *(Clitoria fragrans)*	FWS- Threatened FDACS- Endangered	No Effect
Avon Park rabbit-bells (*Crotalaria avonensis)* Scrub mint *(Dicerandra frutescens)* Florida blazing star (*Liatris ohlingerae)* Highlands scrub hypericum (*Hypericum cumulicola)* Britton's beargrass (*Nolina brittoniana)* Lewton's polygala (*Polygala lewtonii)* Clasping warea (*Warea amplexifolia)* Carter's warea (*Warea carteri)* Scrub ziziphus (*Ziziphus celata)* Florida Jointweed (*Polygonella basiramia*)	FWS- Endangered FDACS- Endangered	No Effect
Critical Habitat	FWS	No Effect

The FDOT, on behalf of the FHWA, initiated informal Section 7 Endangered Species Act (ESA) consultation with the FWS. Via a letter dated February 25, 2014 (**Appendix B**), the FWS provided concurrence with the FDOT's "*may affect, but not likely to adversely affect*" determinations for the following species: eastern indigo snake, Florida grasshopper sparrow, Everglade snail kite, Florida bonneted bat, and Florida panther. The FWS also concurred with the FDOT's "*may affect, and is likely to adversely affect*" determinations; however, the FWS did not have enough information at the time to initiate formal consultation pursuant to Section 7 of the ESA for the

pygmy fringe tree, short-leaved rosemary, scrub-buckwheat, papery willow-wort, sandlace and scrub plum.

Following the completion of species-specific field surveys during 2014, the FDOT and FHWA further coordinated anticipated project impacts for federally-listed species and their habitat. In a letter to the Service dated December 5, 2014, the FHWA determined the US 27 project may affect and is likely to adversely affect the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum. The FHWA requested the FWS initiate formal consultation for the US 27 project's adverse effects to these species pursuant to Section 7 of the ESA.

The FWS completed their review and issued their Biological Opinion (BO) dated May 21, 2015 to the FHWA (**Appendix B**). In this BO, the FWS acknowledges that the proposed project is anticipated to result in the following impacts:

- The loss of 12.4 acres (5.02 hectares) of Florida scrub jay habitat
- The loss of 39.67 acres (16.1 hectares) of occupied sand skink and blue-tailed mole skink habitat; and
- The incidental "take" of individual Florida scrub jays, sand skinks, and blue-tail mole skinks could not adequately be determined by the FWS.

The FWS has determined that these impacts/anticipated level of take are not likely to result in jeopardy to the Florida scrub jay, sand skink, or blue-tailed mole skink. Critical habitat has not been designated for any of these species, so none will be affected. Within their BO, the FWS presented the following "Reasonable and Prudent Measures":

- Minimize the adverse effects of harm and harassment to the scrub-jay, sand skink, and blue-tailed mole skink by implementing an appropriate skink and scrub jay habitat compensation and management plan.
- Minimize the adverse effects of the action to the scrub jay through appropriate timing of vegetation removal.
- Notify the FWS of any unauthorized take of scrub jays, sand skinks and blue-tailed mole skinks.

Per the FWS BO, Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to federally-listed plant species, and no there are no further requirements for listed plant species provided in the BO.

Within their BO, the FWS presented the following non-discretionary "Terms and Conditions" that must be followed and are included as commitments:

- Construction of the US 27 project will not commence until: a) the FDOT provides the US Fish and Wildlife Service with a receipt (in the form of a letter or email) from one or more Service approved conservation banks stating that at least 12.4 ac (5.1 ha) of scrub jay habitat or 12.4 scrub jay credits and 79.34 ac (32.1 ha) of sand skink habitat or 79.34 sand skink credits (2:1 acres to credits ratio) have been acquired by the FDOT; and b) the FDOT receives an email or letter from the Service indicating that we have received the receipt from the approved conservation bank(s).

- Vegetation removal and land clearing activities may not occur within occupied scrub-jay habitat on the project site during the scrub-jay nesting season (March 1 to June 30).

- Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest Service Law Enforcement Office: U.S. Fish and Wildlife Service; 9549 Koger Boulevard, Suite 111; St. Petersburg, Florida 33702; 727-570-5398. Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission: South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1-800-282-8002; and

- Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured skinks, or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

The ESBA was also sent to the FWC to address impacts to state-listed and protected species. In addition to the federally-listed wildlife species above (similarly listed at the State level), the species listed in **Table 5** were also included. Other protected (non-listed) species evaluated included the Florida black bear, the bald eagle, and osprey. Via a response letter dated March 20, 2014 (**Appendix B**), the FWC stated their concurrence with the FDOT's effects determinations for state-listed species and reiterated the project's wildlife-related commitments.

TABLE 5:
FDOT EFFECT DETERMINATIONS FOR STATE-LISTED SPECIES WITHIN OR ADJACENT TO THE US 27 PD&E LIMITS

SPECIES	Status	Impact Determination
Animals		
Southeastern American Kestrel (*Falco sparverius paulus*) Florida Sandhill Crane (*Grus canadensis pratensis*) Least Tern (*Sterna antillarum*) Gopher Tortoise (*Gopher polyphemus*) Short-tailed Snake (*Lampropeltis extenuate*)	State - Threatened	May Affect, But is Not Likely to Adversely Affect
Florida Pine Snake (*Pituophis melanoleucus mugitis*) Gopher Frog (*Rana capito*) Florida Burrowing Owl (*Athene cunicularia floridana*) Limpkin (*Aramus guarana*) Snowy Egret (*Egretta thula*) Little Blue Heron (*Egretta caerulea*) Tricolored Heron *(Egretta tricolor*) White Ibis (*Eudicimus albus*) Roseate Spoonbill (*Platalea ajaja*) Sherman's Fox Squirrel (*Sciurus niger shermani*) Homosassa Shrew (*Sorex longirostris*) Florida Mouse (*Podomys floridanus*)	State - Species of Special Concern	May Affect, But is Not Likely to Adversely Affect

The FDOT's commitments addressing listed and protected species are discussed previously in the Commitments and Recommendations section (Section 6) at the beginning of this document and are not repeated here. Therefore, based on the adherence to these commitments, the level of effects is expected to be not significant.

ATTACHMENT D – PHYSICAL

D.1. Noise

The FDOT conducted a traffic noise analysis for this project, as documented in the project's Noise Study Report. The PD&E study includes a traffic noise analysis for noise sensitive sites along the Recommended Build Alternative. The traffic noise analysis was completed in accordance with Title 23, Code of Federal Regulations, Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise* following methodology and policy established by the FDOT in the *PD&E Manual*, Part 2, Chapter 17. The purpose of the traffic noise analysis is to identify noise-sensitive sites that would be impacted with the Recommended Build Alternative and evaluate abatement measures at impacted noise-sensitive sites.

For the Recommended Build Alternative, which includes the Single Point Urban Interchange (SPUI) configuration at the US 27/SR 60 interchange, noise levels are predicted at 450 receptor points representing 506 residences (includes designated camping and RV sites), four residential common use areas (community pools and a pavilion), three motels (swimming pools at Sun Ray Motel, Lake Wales Inn and Royale Inn), one office (exterior use), the Lake Wales Cemetery, three churches (Sun Ray United Methodist interior, West Side Baptist interior/exterior including a barbecue area and playground and Connections Community Church interior), two community recreational areas (soccer field at Sun Ray Community Center and Walker Family Park), Bok Academy (school interior), the Elks Lodge (exterior use) and a medical facility (Lake Wales Family Health Center interior).

Exterior noise levels are predicted to approach or exceed the Noise Abatement Criteria (NAC) for 2040 Recommended Build Alternative conditions at 140 residences (includes designated camping and RV sites), the community pool and pavilion at Camp Inn RV Resort, a community pool at Camp'n Aire Camping Resort, gravesite areas in the Lake Wales Cemetery, Elks Lodge outdoor seating, the motel pool at Lake Wales Inn and the West Side Baptist Church barbecue area. Compared to existing conditions, traffic noise levels for 2040 Recommended Build Alternative conditions are predicted to increase 9.2 dB(A), or less. Therefore, traffic noise levels are not predicted to substantially increase (increase by 15 dB(A) or greater) at any noise sensitive site as a direct result of the transportation improvement project.

Abatement was evaluated for all noise sensitive sites identified as impacted by the Recommended Build Alternative. Traffic management and alignment modifications are determined to not be viable abatement measures. Consideration of buffer zones during planning of future development is identified as a viable abatement measure that can be implemented by local officials responsible for land use planning.

Noise barriers could potentially provide at least the minimum required noise reduction for a cost below the reasonable limit of $42,000 per benefited receptor at five residential areas. From south

to north, the first residential area includes Camp Inn RV Resort, the second residential area includes Shady Nook RV Park, Camp'n Aire Camping Resort and Lake Wales Campground, the third residential area includes Lakeside Garden Mobile Home Park, the fourth area includes the residences along Wales Street and the fifth area includes residences along Lime Avenue. The potentially feasible and cost reasonable noise barriers are predicted to benefit 82 impacted residences at locations distributed between Camp Inn RV Resort (four impacted residences potentially benefited), Shady Nook RV Park/Camp'n Aire Camping Resort/Lake Wales Campground (39 impacted residences potentially benefited), Lakeside Garden Mobile Home Park (eight impacted residences potentially benefited), the residential community along Wales Street (24 impacted residences potentially benefited) and the residential community along Lime Avenue (seven impacted residences potentially benefited). The impacted common use areas at the Camp Inn RV Resort (community swimming pool and pavilion) and West Side Baptist Church barbecue area would also potentially benefit from a noise barrier provided for residences. In addition to impacted residences, up to 55 residences with predicted noise levels that do not approach the NAC may potentially be provided an incidental benefit. FDOT is committed to construction of noise barriers at these locations contingent on: 1) abatement being found feasible and cost reasonable in the design phase, 2) community support, and 3) resolution of any safety and engineering issues.

Noise barriers are not feasible and cost reasonable at 58 impacted residences primarily because the impact is at an isolated residence, the impacted residences are in an area where the density of residential development is low or gaps in a noise barrier to accommodate driveways/roads accessing US 27 limit the amount of noise reduction to less than 5 dB(A). Noise barriers are not cost reasonable at impacted non-residential sites (community pool at Camp'n Aire Camping Resort, Lake Wales Cemetery, outdoor seating at the Elks Lodge, motel pool at Lake Wales Inn) because the noise reduction design goal could not be achieved or the noise sensitive site would not generate the person-hours of use on an average day required to meet the cost reasonable limit.

The surrounding land use is predominately agriculture in pasture and orange groves, with sporadic residential and commercial areas. Significant portions adjacent to US 27 study corridor are currently undeveloped. A land use review will be conducted during the future project Design phase to identify all noise sensitive sites that may have received a building permit subsequent to the noise study but prior to the project's Date of Public Knowledge. The date that the Type 2 Categorical Exclusion is approved will be the Date of Public Knowledge. If the review identifies noise sensitive sites that have been permitted prior to the date of public knowledge, then those sensitive sites will be evaluated for traffic noise and abatement considerations. There was no ongoing construction observed during various field reviews performed to establish existing land use; however, this is subject to change at any time.

During the construction phase of the proposed project, short-term noise may be generated by construction equipment and activities. The construction noise will be temporary at any location

and will be controlled by adherence to provisions documented in the most recent edition of the FDOT *Standard Specifications for Road and Bridge Construction*.

Using FDOT's listing of vibration sensitive sites, residences were identified as land uses potentially sensitive to vibration during construction. No other construction noise and vibration sites were identified along the project. If noise-sensitive land uses develop adjacent to the roadway prior to construction, additional impacts could result. It is anticipated that the application of the FDOT *Standard Specifications for Road and Bridge Construction* will minimize or eliminate most of the potential construction noise and vibration impacts. However, should unanticipated noise or vibration issues arise during the construction process, the Project Manager, in concert with the District Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

Based on the traffic noise analysis, the consideration of noise barriers to mitigate traffic noise impacts, and consideration of construction noise and vibration impacts, the level of effect is not significant.

D.2. Air Quality

An air quality analysis, specifically an analysis of carbon monoxide (CO) concentrations, was performed using methodology established in the FDOT's *PD&E Manual*, Part 2, Chapter 16. The findings of this analysis were documented in the project's Air Quality Technical Memorandum. CO levels were predicted using FDOT's screening model *CO Florida 2012*. Motor vehicle emissions are typically highest at intersections where operating speeds are slower and vehicles are delayed at traffic signals. A review of traffic data documented in the *Project Traffic Report* showed the US 27/SR 60 interchange and associated ramp intersections as having the highest vehicle approach volumes. Therefore, the US 27/SR 60 interchange was evaluated as a worst-case scenario for air quality.

The highest predicted CO concentrations are 6.5 parts per million (ppm) for a 1-hour averaging time and 3.9 ppm for an 8-hour averaging time. All predicted CO concentrations for the No-Build and Recommended Build Alternative conditions in the opening year and design year are below the National Ambient Air Quality Standards (NAAQS) of 35 ppm for a 1-hour averaging time and the NAAQS of 9 ppm for an 8-hour averaging time. The predicted 1-hour and 8-hour concentrations include a background CO level of 3.3 ppm and 2.0 ppm, respectively.

The project is in an area that has been designated as attainment for all of the NAAQS established by the Clean Air Act and subsequent amendments. Therefore, demonstration of conformity with a State Implementation Plan (SIP) is not required for this project.

Green House Gases (GHG) cause a global phenomenon in which heat is trapped in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can

cause changes in precipitation and sea levels. The burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries.

To date, no national standards have been established regarding GHGs, nor has the United States Environmental Protection Agency (EPA) established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO_2 under the Clean Air Act. GHGs are different from other air pollutants evaluated in the Federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The affected environment for CO_2 and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad scale actions such as actions involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Furthermore, presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

Under NEPA, detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making (Title 40 CFR 1500.1(b), 1500.2(b), 1500.4(g), and 1501.7). The FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the proposed action, that the GHG emissions from the proposed action will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emission from the project build alternative will be insignificant, and will not play a meaningful role in a determination of the environmentally preferable alternative or the selection of the Recommended Build Alternative. More detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)).

This document does not incorporate an analysis of the GHG emissions or climate change effects of each of the alternatives because the potential change in GHG emissions is very small in the context of the affected environment. Because of the insignificance of the GHG impacts, those local impacts will not be meaningful to a decision on the environmentally preferable alternative or to a choice among alternatives. For these reasons, no alternatives-level GHG analysis has been performed for this project.

Temporary air quality impacts (smoke, fugitive dust, etc.) may result during the course of construction activities, however, these will be avoided and minimized to the maximum practicable extent through adherence to applicable state and local regulations, the implementation of standard Best Management Practices (BMPs) and adherence to the FDOT's *Standard Specifications for*

Road and Bridge Construction any other applicable requirements in the construction contract documents.

Therefore, the level of effects is expected to be none.

D.3. Construction

Construction activities for the project may have short-term air, noise, vibration, water quality, traffic flow, and visual effects for those residents and travelers within the immediate vicinity of the project.

The air quality effect will be temporary and will primarily be in the form of emissions from diesel-powered construction equipment and dust from embankment and haul road areas. Air pollution associated with the creation of airborne particles will be effectively controlled through the use of watering or the application of other controlled materials in accordance with FDOT's *Standard Specifications for Road and Bridge Construction*.

Noise and vibration effects will be from the heavy equipment movement and construction activities, such as pile driving and vibratory compaction of embankments. Noise control measures will include those contained in FDOT's *Standard Specifications for Road and Bridge Construction*. Specific noise level problems that may arise during construction of the project will be addressed by the Construction Engineer in cooperation with the appropriate Environmental Specialist.

Water quality impacts resulting from erosion and sedimentation during construction will be controlled in accordance with agency-issued permits, FDOT's *Standard Specifications for Road and Bridge Construction* and through the use of BMPs.

Short-term construction related wetland impacts will be minimized by adherence to FDOT's *Standard Specifications for Road and Bridge Construction*. These specifications include BMP measures such as the use of siltation barriers, dewatering structures, and containment devices that will be implemented for controlling turbid water discharges outside of construction limits.

Maintenance of traffic and sequence of construction will be planned and scheduled to minimize traffic delays throughout the project. Signs will be used to provide notice of road closures and other pertinent information to the traveling public. The local news media will be notified in advance of road closings and other construction-related activities so that motorists, residents, and business persons can make other accommodations. All provisions of FDOT's *Standard Specifications for Road and Bridge Construction* will be followed. A sign providing the name, address, and telephone of a FDOT contact person will be displayed on-site to assist the public in obtaining immediate answers to questions and logging complaints about project activity.

Access to local properties, businesses and residences will be maintained to the extent practical through controlled construction scheduling and the implementation of the project's specific Traffic Control Plan(s) and implementation of the FDOT's *Standard Specifications for Road and Bridge Construction*.

For the residents living along US 27 and SR 60 in the project area, materials stored for the project may be displeasing visually; however, this is a temporary condition and should pose no substantial problem in the short term.

Construction of the roadway and bridges may require excavation of unsuitable material (muck), placement of embankments, and use of materials, such as limerock, asphaltic concrete, and portland cement concrete. Demucking will be controlled by Section 120 of FDOT's *Standard Specifications for Road and Bridge Construction*. The removal of structures and debris will be in accordance with local and state regulation agencies permitting this operation. The contractor is responsible for his methods of controlling pollution on haul roads, in borrow pits and other materials pits, and in areas used for disposal of waste materials from the project. Temporary erosion control features, as specified in FDOT's *Standard Specifications for Road and Bridge Construction*, will consist of temporary grassing, sodding, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

Construction impacts from the project activities discussed herein have been determined as none.

D.4. Contamination

A Level I Contamination Screening of the project corridor was conducted to determine the potential for contamination of the ROW from adjacent properties and business operations. A Contamination Screening Evaluation Report (CSER) was prepared under separate cover for this project pursuant to the FHWA's Technical Advisory T6640.8A, dated October 30, 1987, and in accordance with the FDOT's *PD&E Manual*, Part 2 Chapter 22.

Seventy-eight (78) mainline locations were investigated for sites that may present the potential for finding petroleum contamination or hazardous materials, and, therefore, may impact the proposed improvements for this project. Of the 78 mainline sites investigated, the following risk rankings have been applied: five (5) "High" ranking sites, twenty-three (23) "Medium" ranking sites, forty-two (42) "Low" ranking sites, and eight (8) sites ranked "No" for potential contamination concerns.

For the sites ranked "No" for potential contamination, no further action is recommended. This site has been evaluated and determined not to have any potential environmental risk to the study area at this time.

For sites ranked "Low" for potential contamination, no further action is required at this time. These sites/facilities have potential to impact the study area, but based on select variables they have been determined to have low risk to the corridor at this time. Variables that may change the risk ranking

include a facility's non-compliance to environmental regulations, new discharges to the soil or groundwater, and modifications to current permits. Should any of these variables change, additional assessment of the facilities shall be conducted.

Based on the results of the contamination screening analysis, the Recommended Build Alternative for roadway Segments 1-3 is anticipated to have involvement with potential contamination sites as follows: Segment 1: 1 High- and 8 Medium-risk sites; Segment 2: 0 High- and 1 Medium-risk sites and Segment 3: 4 High- and 14 Medium-risk sites. The recommended Refined SPUI Alternative for the US 27/SR 60 interchange may have potential involvement with 3 High- and 4 Medium-risk sites. A detailed evaluation of each of the sites can be found in the CSER.

The US 27 bridges over the CSX Railroad and Lake Streety Canal were inspected and tested for Asbestos-Containing Materials (ACM) and heavy metals as defined in FDOT procedures. No ACM was identified; however, steel surfaces with metal-based paints and/or coatings were identified at both bridge pairs from the samples collected. Based on the presence of metals in the coatings, any renovation activities which could result in exposure to workers, such as sand blasting should be performed in accordance with Occupational Safety and Health Administration (OSHA) regulations to protect workers. Based on the total concentrations of the metals, it does appear that the paint waste itself potentially could be deemed a hazardous waste. Ultimately, the method used to remove the paint has an impact on the outcome of the waste determination (i.e. sandblasting verses solvent based paint removers). Wastes generated from coating removal during construction will be tested to determine if it is classified as hazardous waste. All wastes generated during construction activities will be properly disposed of.

The majority of the proposed improvements will occur within the existing ROW, most of which occurs in a rural/undeveloped area of Polk County. Improvements within the existing ROW are expected to avoid most of the potential contamination involvement from adjacent/off-site properties. However, the potential five (5) High- and 23 Medium-risk sites identified and any newly-identified sites will be evaluated further during the project design phase(s), including Level II testing as necessary. Future project design plans will contain marked contamination polygons and general notes as applicable. The FDOT will oversee any remediation activities necessary.

Based on 1) the avoidance of potential contamination sites where possible, 2) the future completion of Level II field screening for the "Medium" and "High" risk-ranked sites identified, 3) the completion of contamination remediation activities as determined necessary (following future testing activities), and 4) the inclusion of the appropriate contamination demarcation in the construction plans, the level of effects is expected to be not significant.

D.5. Aesthetic Effects

The northern end of the project in the vicinity of the US 27/SR 60 interchange is within the three-mile viewshed buffer of Bok Tower Gardens. However, the Recommended Build Alternative will

not result in significant vertical alignment changes and there is existing roadway lighting and sign structures within the existing interchange. Additionally, though several outdoor advertising (ODA) signs exist along the study area, the Recommended Build Alternative is not expected to block the view zone of any ODA signs. The project is not expected to result in new impacts to any defined social or natural viewsheds beyond those impacts currently present.

Visual impacts associated with clearing and grubbing, storage of construction materials and establishment of temporary construction facilities may occur, but are expected to be minimal and temporary in nature. With the exceptions noted previously, project work will occur within ROW under State ownership/control which has generally been subjected to prior construction, use and maintenance activities. Project work on the new/additional ROW will generally occur on minor portions of previously developed/cleared private properties immediately adjacent to US 27 and SR 60. Limited staging of construction materials and equipment on-site may be necessary; however, this will be temporary. All temporarily disturbed areas will be restored to existing or better condition after the completion of construction activities. Therefore, the level of effects has been determined to be none.

D.6. Bicycles and Pedestrians

The FHWA's Bicycle Policy states: "under 23 USC Section 109(n), the U.S. Secretary of Transportation shall not approve any project under this title that will result in the severance or destruction of an existing major route for non-motorized transportation traffic and light motorcycles, unless such project provides a reasonable alternate route or such a route exists."

Additionally, subsection (1)(a) of Florida Statute 335.065 states: "Bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such ways into state, regional and local transportation plans and programs. Bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction, or other change of any state transportation facility, and special emphasis shall be given to projects in or within one mile (1.6 kilometers) of an urban area; (b) Notwithstanding the provisions of paragraph (a), bicycle and pedestrian ways are not required to be established:

1) Where their establishment would be contrary to public safety;
2) When the cost would be excessively disproportionate to the need or probable use;
3) Where other available means or factors indicate an absence of need."

Portions of the existing paved roadway shoulders are marked as bicycle lanes. In those areas where it is not continuous, bicyclists must use the existing traffic lanes, unpaved roadway shoulders or sidewalks to continue their journey. Existing dedicated pedestrian facilities (sidewalks) have minimal coverage and are not continuous.

The Recommended Build Alternative includes improvements for pedestrians and bicycles. Bicycles will be accommodated on the 5-foot paved portion of the outside roadway shoulders. Bicycle keyways between outside through lanes and proposed right-turn lanes will be provided. Pedestrian facilities, 5-foot sidewalks on both sides of US 27, will be provided within the urban area and the respective one-mile urban boundary of the Frostproof Urban Area, which begins at MP 3.405 in Segment 1 and extends north to MP 9.636 in Segment 2. Five-foot sidewalks will also be provided within the urban area and the respective one-mile urban boundary of the Lake Wales Urban Area, which begins at MP 15.166 in Segment 3 and extends north to the end of the project. Specific logical termini for sidewalks within the study corridor will be determined during the future project design phase(s) based on existing development and adjacent land uses.

The sidewalk facilities in the project will be designed and constructed to comply with the Americans with Disabilities Act (ADA) of 1990, as amended. The sidewalks will meet ADA requirements for access, width, and grade. Therefore, the level of effects is expected to be none.

D.7. Utilities and Railroads

In order to evaluate potential aerial, surface, and subsurface utility conflicts associated with the project, FDOT requested information from utility companies pertaining to the type, location, and ownership of the existing utilities within the project area. In accordance with Part 2, Chapter 10 of the FDOT *PD&E Manual*, a letter explaining the study and aerial plans were sent to each utility provider with a request to provide information on existing and planned utilities. All information received from the various utility companies is located in the project file. The existing utilities include overhead and buried electric distribution, overhead electric transmission, overhead and buried communications cables (coaxial, copper and fiber optic cables), potable water, reclaimed water, sanitary sewer, and natural gas mains. More detailed information for utility locations and potential impacts is provided in Sections 2.17 and 6.10 of the PER and the Utilities Assessment Report, published under separate cover.

The following utility providers have existing facilities within the project area:

- Central Florida Gas
- CenturyLink
- City of Lake Wales Utility Department
- Comcast Cablevision
- Duke Energy Distribution
- Duke Energy Transmission c/o UC Synergetic
- Florida Gas Transmission
- Gulfstream Natural Gas System
- Level 3 Communications, Inc.
- MCI/Verizon Business
- Park Water Company

- Polk County Utilities Department
- Tampa Electric (TECO) Peoples Gas
- Frontier (formerly Verizon)

The FDOT's coordination with potentially affected utility owners will continue as necessary throughout the future project design and construction phases. Project design will seek to avoid and minimize impacts to existing utilities to the extent feasible within FDOT's ROW. Any unavoidable relocation of utilities will be done in accordance with the respective ROW/easement agreements for all applicable parties. Significant impacts to utilities are not expected.

A CSX rail corridor parallels the US 27 project corridor on the east side beginning at the Polk/Highlands County line heading north to approximately Otto Polk Road. At that point, US 27 makes a turn to the northeast, crosses over the CSX railroad, and then turns northerly again. The railroad then runs parallel to US 27 on the west side with the separation distance between the corridors increasing as they move to the north end of the project. The US 27 bridges 160195 (southbound bridge) and 160196 (northbound bridge) will be widened, and will be designed to have sufficient horizontal and vertical clearance over the CSX rail line. The FDOT will continue to coordinate with CSX regarding these bridge crossings during the project design phase. Therefore, the level of effects is expected to be not significant.

D.8. Navigation

A Bridge Project Questionnaire (U.S. Coast Guard Form D-7-1103 Rev. 4-10) was prepared for Lake Streety Canal Bridges 160193 and 160194. The Lake Streety Canal Bridges are not being replaced, only widened to the inside. No change in vertical clearance over Lake Streety Canal related to the bridge widening is anticipated, and the USCG form reflects no change to the existing conditions. Increase in floodplain impacts or obstruction of water flow are also not anticipated. The USCG forms and photographs of the bridge locations and associated Lake Streety Canal have been included in Appendix G of the PER.

According to the ETDM Programming Summary Report, the USCG previously provided a determination of "no navigable waterways in the vicinity of the project." This is reiterated by the FHWA in the same document. Therefore, the level of effects is expected to be none

APPENDIX A

LRTP, TIP & STIP PLANNING/FUNDING CONSISTENCY DOCUMENTS

Figure 4-8 below lists the project by phase that corresponds to the above maps. This figure is a summary of projects in the transportation plan. A complete listing of projected is contained in Appendix A and Appendix B. For committed projects please refer to the transportation improvement program (TIP) located in Technical Appendix 4.

Tier I: Existing + Committed Roadway Improvements

- Bartow Northern Connector (US 98 to US 17)
- Bartow Northern Connector (US 17 to SR 60)
- Bella Citta Blvd (US 27 to Osceola County L)
- Buckingham Drive (Buckingham Drive to Dunson Rd)
- County Line Road (SR 60 to West Pipkin Road)
- CR 35A (Galloway Road to Duff Road)
- CR 37B (CR 540A to SR 570)
- CR 559A (CR 655 to SR 559)
- CR 655 (Berkley Rd) (CR 546 to Pace Road)
- CR 655 (Berkley Rd) (Pace Rd to CR 559A)
- Dunson Rd Ext (Dead End to CR 54)
- Dunson Rd Ext (Dead End to Buckingham Drive)
- Edgewood Extension (Edgewood Drive to SR 573 (Harden))
- Ernie Caldwell Boulevard (FDC Grove Road to Pine Tree Trail)
- Ernie Caldwell Boulevard (Pine Tree Trail to US 17/92)
- Harden Boulevard (W Pipkin Road to SR 570)
- Home Run Blvd Connector (US 27 to Ernie Caldwell)
- Home Run Blvd Connector (Ernie Caldwell to Home Run Blvd)
- Lakeland E-W Connector Rd (SR 33 to SR 570)
- Logistics Parkway (CSX to SR 60)
- North Ridge Trail (NW Access Rd to Dunson Rd)
- NW Access Rd (North Ridge Tr to NW Access Rd)
- Pace Road Extension (SR 570 to CR 655 Berkley Rd)
- Pine Tree Trail (Ernie Caldwell to CR 54)
- Poinciana Parkway (Marigold Avenue to US 17/92)
- Rhododendron Extension (CR 580 to Marigold Ave)
- Sand Mine Road (Sand Mine Rd to Sand Mine Rd)
- SR 33 (End of 2 lane to E Old Combee Rd)
- SR 542 (SR 549/1st St to Buckeye Loop Rd)
- SR 559 Extension (SR 655 to CR 544A)
- SR 570/Polk Parkway (S/O CR 546 to N/O Eastern Toll Plaza)
- SR 570/Polk Parkway (S/O Pace Road to I-4)
- SR 60 (W of US 98 to US 98/17)
- US 27 (CR 546 to SR 544)
- US 27 (SR 540 to SR 542)
- US 27 (Dunson Road to US 192)
- US 27 (SR 542 to CR 546)
- US 98 (SR 540 to Brooks Ave)
- US 98 (N of CR 540A to S of Manor Drive)
- US 98 (SR 60 to S of Manor Drive)
- US 98 (CR 540A to SR 540)
- US 98 (Brooks Ave to Edgewood Drive)
- USF Loop Road (Lakeland E-W to Lakeland E-W)
- Waring Road Extension (W Pipkin Rd to Medulla Rd)

Tier II: Cost Feasible Plan (2019 to 2030)

ID #	Name
26	SR 542/Dundee Rd (Buckeye Loop Rd to US 27)
42	I-4 (Hillsborough Co/L to Osceola Co/L)
64	US 92/New Tampa Hwy (Hillsborough Co/L to Wabash Ave)
96	US 17/92/Hinson Ave (10th St to 17th St)
112	Wabash Ave Extension (Polk Parkway to Ariana St)
134	Marigold Avenue (Coyote Road to CR 580/Cypress Parkway)
234	Pipkin Road West (Medulla Road to Pipkin Road South)
305	Crews Lake Road/E.F. Griffin Road Connector (Crews Lake Road to E.F. Griffin Road)
310	Crevasse - Lakeland Park Drive Connector (Union Drive to Lakeland Park Drive)
362	New E_W Road (E.F. Griffin Road to US 98)
363	New Silver Development Road (New E-W Road to US 98)
300E	CPP East Corridor (US 17/92 to Interstate 4)
312A	North Ridge Trail (Deen Still Road to Four Corners Blvd)
312B	North Ridge Trail (Four Corners Blvd to Sand Mine Road)
88A	Spirit Lake Rd (US 17 to Thornhill Road)
89B	SR 33 (Old Combee Road to North of Tomkow Road)
98B	US 27 (CR 630A to Presidents Drive)
98C	US 27 (Presidents Dr to SR 60)
153	Interstate 4 @ CR 557
384	Lake Wilson Rd @ CR 532
388	SR 655 (Recker Highway), Chambers Rd to US 92 @ Thornhill Rd, 1/2 mi S of SR 655 to SR 655

Tier III: Cost Feasible Plan (2031 to 2040)

ID #	Name
43	I-4 (Hillsborough Co/L to West of US 27)
56	SR 544/Lucerne Park Rd (Avenue T to US 27)
57A	SR 544/Lucerne Park Rd (US 27 to SR 17)
98A	US 27 (Highlands Co/L to CR 630A)
114	Wabash Ave (US 92/Memorial Blvd to 10th St)
115	Wabash Ave Extension (10th St to Interstate Drive)

Tier III: Cost Feasible Plan (2031 to 2040) Cont.

ID #	Name
129	Marigold Avenue (Poinciana Parkway to Coyote Rd)
235	Pipkin Road West (Pipkin Road South to Harden Boulevard/Old 37)
381	US 98 @ Griffin Road
L11	SR 572 (Drane Field Rd) @ Waring Road
382	SR 37 (S Fl Ave) @ Edgewood Drive
L12	West Pipkin Road @ Yates Road
L15	Commerce Point Drive @ US 98
L13	SR 659 (Combee Rd) @ US 98
385	30th Street @ Hinson Avenue
348	Central Polk Parkway @ US 17/92
349	Central Polk Parkway @ Interstate 4

Tier IV: Illustrative Projects

ID #	Name
4	US 98/Bartow Rd (Lake Parker Ave to Edgewood Dr)
88B	Spirit Lake Rd (Thronhill Road to SR 540/Winterlake Rd)
237	US 98 (Daughtery Road W to N of West Socrum Loop Road)
360	US 98 (N of West Socrum Loop Road to SR 471)
299A-D, 300 A-D	Central Polk Parkway (SR 570/Polk Parkway to US 17/92)
102	US 27 @ Dundee Road (SR 542)
100	US 27 @ Cypress Gardens Boulevard (SR 540)
99	US 27 @ SR 60
342	I-4 @ SR 33
343	US 27 @ SR 544 (Lucerne Park Road)
344	US 27 @ CR 17
345	US 27 @ CR 547 (Bay Street)
346	US 27 @ Ronald Reagan Parkway
380	Old Combee Road @ Tenoroc Mine Rd/SR 659
387	US 17 @ SR 544 (Avenue T NE)
389	SR 540 @ US 17 - 1st Street

Figure 4-8: Projects by Phase

Roadway Projects and Costs (Present Day Cost)

	Project Details						PD&E			Project Engineering			ROW			Construction			Total
Project Tier	ID/ FPN	Facility	From	To	No. of Existing Lanes	Project Type	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)
I (Committed)	329	SR 570 (Polk Parkway)*	S/O CR 546	N/O Eastern Toll Plaza	2	Interstate	-	-	-	4.00	Turnpike	Committed	-	-	-	32.00	Turnpike	Committed	36.00
	Tier I Totals						0.00			4.00			0.00			32.00			36.00
II (Cost Feasible in 2019-2030)	26	SR 542 (Dundee Rd)	Buckeye Loop Rd	US 27	2	Roadway - Widening	2.07	OA	Completed	6.20	OA	Completed	17.39	OA	Completed	41.32	OA	2019-2020	66.97
	42	SR 400 (I-4) "I-4 BEYOND THE ULTIMATE"	W. of US 27	E. of CR 532	6	Interstate	-	SIS	-	3.10	SIS	Committed	24.00	SIS	2019-2020	146.00	SIS	2019-2020	173.10
	64	US 92 (New Tampa Hwy)	Hillsborough Co/L	Wabash Ave	2	Roadway - Widening	1.95	OA	Underway	4.45	OA	2019-2020	1.43	OA	2021-2025	38.90	OA	2026-2030	46.73
	89B	SR 33**	Old Combee Road	University Blvd (excludes interchange)	2	Roadway - Widening	0.95	OA	Underway	2.84	OA	Completed	0.00	OA	2019-2020	18.95	OA	2021-2025	22.74
	96	US 17/92 (Hinson Ave)	10th St	17th St	2	Roadway - Widening	0.16	OA	Committed	0.48	OA	Committed	1.30	OA	2021-2025	3.21	OA	2021-2025	5.15
	98C	US 27	Presidents Dr	SR 60	4	Roadway - Widening	-	SIS	-	0.78	SIS	Committed	5.57	SIS	Committed	47.00	SIS	2019-2020	53.35
	112	Wabash Ave Extension	Harden Blvd	Ariana St	-	Roadway - New Construction	1.41	Local	Completed	1.05	Local	Underway	4.98	Local	2021-2025	12.50 11.50 1.00	Multiple Sources Local TALU	2021-2025	19.94
	114	Wabash Ave	US 92 (Memorial Blvd)	10th St	2	Roadway - New Construction	0.28	Local	2021-2025	0.85	Local	2021-2025	0.00	Local	2026-2030	5.64	Local	2026-2030	6.76
	115	Wabash Ave Extension	10th St	Interstate Drive	-	Roadway - New Construction	0.41	Local	Completed	1.24	Local	Underway	1.70	Local	Underway	3.57	Local	2021-2025	6.92
	153	I-4	at SR 557		6	Interchange	-	SIS	-	0.04	SIS	Committed	-	SIS	-	55.78	SIS	2019-2020	55.82
	305	Crews Lake Road/E.F. Griffin Road Connector	Crews Lake Road	E.F. Griffin Road	-	Roadway - New Construction	0.44	Developer	Committed	1.32	Developer	Committed	0.53	Developer	Committed	8.79	Developer	2021-2025	11.08
	310	Crevasse - Lakeland Park Drive Connector	Union Drive	Lakeland Park Drive		Roadway - New Construction	0.41	Local	Completed	1.24	Local	Underway	1.50	Local	Committed	5.90	Local	Committed	1.65
	312A	North Ridge Trail	Deen Still Road	Four Corners Blvd	-	Roadway - New Construction	0.84	-	Completed	2.53	-	Completed	16.45	-	Completed	11.85 4.68 3.59 3.58	Multiple Sources IF Dist A TRIP Ad Valorem	2021-2025	31.67

Polk Parkway Footnote

* This project includes the Braddock Road/Polk Parkway Interchange project which includes an improved 2-lane facility on Braddock Road between Polk Parkway and CR 655 with ROW for 4 lanes.

SR 33 Footnote

** This project also includes the PD&E and Design phases for the Interstate 4 at SR 33 Interchange. Future funding for Row and CST of the interchange will ultimately be allocated from FDOT's SIS Cost-Feasible Plan.

Legend of Funding Sources

OA = Other Arterial funds (State & Federal)
TMA = Transportation Management Area funds (Federal)
SIS = Strategic Intermodal System funds
Turnpike = Florida's Turnpike Enterprise Funds
Local = Local funds
IF District = Impact Fee District (Local)
TRIP = Transportation Regional Incentive Program
TALL = Transportation Alternatives- <200k
TALT = Transportation Alternatives- Any Area
TALU = Transportation Alternatives- >200k

Roadway Projects and Costs (Present Day Cost)

Project Details							PD&E			Project Engineering			ROW			Construction			Total
Project Tier	ID/ FPN	Facility	From	To	No. of Existing Lanes	Project Type	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)	Funding Source	YOE	Cost ($PDC in millions)
III (Cost Feasible in 2031-2040)	43A	I-4	50th St	SR 570	6	Interstate	-	SIS	-	32.88	SIS	2021-2025	131.38	SIS	2026-2030	564.75	SIS	2031-2040	729.01
	43B	I-4	SR 570 (Polk Parkway)	US 98	6	Interstate	-	SIS	-	1.68	SIS	2021-2025	-	SIS	-	326.14	SIS	2031-2040	327.81
	43C	I-4	US 98	SR 570 (Polk Parkway)	6	Interstate	-	SIS	-	2.58	SIS	2021-2025	-	SIS	-	491.70	SIS	2031-2040	494.28
	43D	I-4	SR 570 (Polk Parkway)	US 27 (SR 25)	6	Interstate	4.02	SIS	2021-2025	3.87	SIS	2026-2030	-	SIS	-	749.97	SIS	2031-2040	757.86
	56	SR 544 (Lucerne Park Rd)	Avenue T	US 27	2	Roadway - Widening	3.34	OA	2019-2020	10.02	OA	2021-2025	43.47	OA	2021-2025	66.78	OA	2031-2040	13.36
	57A	SR 544 (Lucerne Park Rd)	US 27	SR 17	2	Roadway - Widening	0.93	OA	2019-2020	2.78	OA	2021-2025	2.34	OA	2021-2025	18.53	OA	2031-2040	24.58
	88A	Spirit Lake Rd	US 17	Thornhill Rd	2	Roadway - Widening	0.90	IF Dist D	2019-2020	2.70	IF Dist D	2021-2025	"7.32 2.59 4.73"	"Multiple Sources IF Dist D Ad Valorem"	2021-2025	18.03 13.04 2.75 2.24	Multiple Sources IF Dist D Ad Valorem OA	2031-2040	28.96
	98A	US 27	Highlands Co/L	CR 630A	4	Roadway - Widening	1.14	SIS	Committed	0.18	SIS	Committed	4.01	SIS	2021-2025	96.96	SIS	2031-2040	102.29
	98B	US 27	CR 630A	Presidents Drive	4	Roadway - Widening	1.14	SIS	Committed	0.18	SIS	Committed	2.30	SIS	2021-2025	66.09	SIS	2026-2030	69.71
	129	Marigold Avenue	Poinciana Parkway	Coyote Rd	2	Roadway - Widening	1.19	IF Dist C	2019-2020	3.56	IF Dist C	2021-2025	0.00	IF Dist C	2026-2030	23.74	OA	2031-2040	28.49
	134	Marigold Avenue	Coyote Road	CR 580 (Cypress Parkway)	2	Roadway - Widening	1.06	IF Dist C	2021-2025	3.19	IF Dist C	2021-2025	0.00	IF Dist C	2026-2030	21.24 21.02 0.22	Multiple Sources IF Dist C Ad Valorem	2031-2040	25.49
	234	Pipkin Road West	Medulla Road	Pipkin Road South	2	Roadway - Widening	1.06	IF Dist E	2019-2020	3.17	IF Dist E	2021-2025	8.58	Ad Valorem	2026-2030	21.14	Ad Valorem	2031-2040	33.94
	235	Pipkin Road West	Pipkin Road South	Harden Blvd/Old 37	2	Roadway - Widening	0.63	IF Dist E	2021-2025	1.89	IF Dist E	2026-2030	"5.12 4.64 0.48"	"Multiple Sources IF Dist E Ad Valorem"	2026-2030	12.62 9.97 2.65	Multiple Sources IF Dist E Ad Valorem	2031-2040	36.04
	300E	CPP East Corridor*‡	US 17/92	Interstate 4	-	Interstate	7.87	Other	Completed	3.51	Other	Committed	102.62	Other	2019-2020	157.38	Other	2021-2025	271.38
	Tier III Totals						15.40			68.67			165.34			2,422.39			2,671.81

Central Polk Parkway Footnotes
*30% Design committed to all project segments (includes interchanges/overpass as appropriate). Only partially funded segments are included in the totals for each corridor.
‡Project 300E includes interchage at I-4.

Legend of Funding Sources

OA = Other Arterial funds (State & Federal)
TMA = Transportation Management Area funds (Federal)
SIS = Strategic Intermodal System funds
Turnpike = Florida's Turnpike Enterprise Funds
Local = Local funds
IF District = Impact Fee District (Local)
TRIP = Transportation Regional Incentive Program
TALL = Transportation Alternatives- <200k
TALT = Transportation Alternatives- Any Area
TALU = Transportation Alternatives- >200k

Roadway Projects and Costs (Year of Expenditure Costs)

Project Details							PD&E			Project Engineering			ROW			Construction			Total
Project Tier	ID/ FPN	Facility	From	To	No. of Existing Lanes	Project Type	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)
I (Committed)	329	SR 570 (Polk Parkway)*	S/O CR 546	N/O Eastern Toll Plaza	2	Interstate	-	-	-	4.00	Turnpike	Committed	-	-	-	32.00	Turnpike	Committed	36.00
	Tier I Totals						0.00			4.00			0.00			32.00			36.00
II (Cost Feasible in 2019-2030)	26	SR 542 (Dundee Rd)	Buckeye Loop Rd	US 27	2	Roadway - Widening	2.07	OA	Completed	6.20	OA	Completed	17.39	OA	Completed	47.10	OA	2019-2020	72.76
	42	SR 400 (I-4) "I-4 BEYOND THE ULTIMATE"	W. of US 27	E. of CR 532	6	Interstate	-	SIS	-	3.10	SIS	Committed	29.07	SIS	2019-2020	166.44	SIS	2019-2020	198.61
	64	US 92 (New Tampa Hwy)	Hillsborough Co/L	Wabash Ave	2	Roadway - Widening	1.95	OA	Underway	5.16	OA	2019-2020	2.06	OA	2021-2025	58.35	OA	2026-2030	67.52
	89B	SR 33**	Old Combee Road	University Blvd (excludes interchange)	2	Roadway - Widening	0.95	OA	Underway	2.84	OA	Completed	-	OA	2019-2020	24.07	OA	2021-2025	27.86
	96	US 17/92 (Hinson Ave)	10th St	17th St	2	Roadway - Widening	0.16	OA	Committed	0.48	OA	Committed	1.87	OA	2021-2025	4.07	OA	2021-2025	6.59
	98C	US 27	Presidents Dr	SR 60	4	Roadway - Widening	-	SIS	-	0.78	SIS	Committed	5.57	SIS	Committed	53.59	SIS	2019-2020	59.94
	112	Wabash Ave Extension	Harden Blvd	Ariana St	-	Roadway - New Construction	1.41	Local	Completed	1.05	Local	Underway	7.17	Local	2021-2025	"15.88 14.56 1.32"	Multiple Sources Local TALU	2021-2025	25.51
	114	Wabash Ave	US 92 (Memorial Blvd)	10th St	2	Roadway - New Construction	0.34	Local	2021-2025	1.03	Local	2021-2025	-	Local	2026-2030	8.46	Local	2026-2030	9.83
	115	Wabash Ave Extension	10th St	Interstate Drive	-	Roadway - New Construction	0.41	Local	Completed	1.24	Local	Underway	1.70	Local	Underway	4.53	Local	2021-2025	7.88
	153	I-4	at SR 557		6	Interchange	-	SIS	-	0.04	SIS	Committed	-	SIS	-	63.59	SIS	2019-2020	63.63
	305	Crews Lake Road/E.F. Griffin Road Connector	Crews Lake Road	E.F. Griffin Road	-	Roadway - New Construction	0.44	Developer	Committed	1.32	Developer	Committed	0.53	Developer	Committed	11.17	Developer	2021-2025	13.45
	310	Crevasse - Lakeland Park Drive Connector	Union Drive	Lakeland Park Drive		Roadway - New Construction	0.41	Local	Completed	1.24	Local	Underway	1.50	Local	Committed	5.90	Local	Committed	1.65
	312A	North Ridge Trail	Deen Still Road	Four Corners Blvd	-	Roadway - New Construction	0.84	-	Completed	2.53	-	Completed	16.45	-	Completed	"15.05 5.94 4.56 4.55"	Multiple Sources IF Dist A TRIP Ad Valorem	2021-2025	34.87

Polk Parkway Footnote
* This project includes the Braddock Road/Polk Parkway Interchange project which includes an improved 2-lane facility on Braddock Road between Polk Parkway and CR 655 with ROW for 4 lanes.

SR 33 Footnote
** This project also includes the PD&E and Design phases for the interstate 4 at SR 33 interchange. Future funding for Row and CST of the interchange will ultimately be allocated from FDOT's SIS Cost-Feasible Plan.

Legend of Funding Sources

OA = Other Arterial funds (State & Federal)	IF District = Impact Fee District (Local)
TMA = Transportation Management Area funds (Federal)	TRIP = Transportation Regional Incentive Program
SIS = Strategic Intermodal System funds	TALL = Transportation Alternatives- <200k
Turnpike = Florida's Turnpike Enterprise Funds	TALT = Transportation Alternatives- Any Area
Local = Local funds	TALU = Transportation Alternatives- >200k

Roadway Projects and Costs (Year of Expenditure Costs)

Project Details							PD&E			Project Engineering			ROW			Construction			Total
Project Tier	ID/ FPN	Facility	From	To	No. of Existing Lanes	Project Type	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)	Funding Source	YOE	Cost ($YOE in millions)
III (Cost Feasible in 2031-2040)	43A	I-4	50th St	SR 570	6	Interstate	-	SIS	-	32.88	SIS	2026-2030	131.38	SIS	2026-2030	950.49	SIS	2031-2040	1114.75
	43B	I-4	SR 570 (Polk Parkway)	US 98	6	Interstate	-	SIS	-	2.04	SIS	2021-2025	-	SIS	-	622.92	SIS	2031-2040	624.96
	43C	I-4	US 98	SR 570 (Polk Parkway)	6	Interstate	-	SIS	-	3.14	SIS	2021-2025	-	SIS	-	939.14	SIS	2031-2040	942.29
	43D	I-4	SR 570 (Polk Parkway)	US 27 (SR 25)	6	Interstate	4.90	SIS	2021-2025	5.34	SIS	2026-2030	-	SIS	-	1432.44	SIS	2031-2040	1442.68
	56	SR 544 (Lucerne Park Rd)	Avenue T	US 27	2	Roadway - Widening	3.87	OA	2019-2020	12.21	OA	2021-2025	62.59	OA	2021-2025	127.54	OA	2031-2040	206.22
	57A	SR 544 (Lucerne Park Rd)	US 27	SR 17	2	Roadway - Widening	1.07	OA	2019-2020	3.39	OA	2021-2025	3.38	OA	2021-2025	35.40	OA	2031-2040	43.24
	88A	Spirit Lake Rd	US 17	Thornhill Rd	2	Roadway - Widening	1.05	IF Dist D	2019-2020	3.30	IF Dist D	2021-2025	10.54 3.73 6.81	Multiple Sources IF Dist D Ad Valorem	2021-2025	34.44 24.91 5.25 4.28	Multiple Sources IF Dist D Ad Valorem OA	2031-2040	49.32
	98A	US 27	Highlands Co/L	CR 630A	4	Roadway - Widening	1.14	SIS	Committed	0.18	SIS	Committed	5.24	SIS	2021-2025	185.18	SIS	2031-2040	191.74
	98B	US 27	CR 630A	Presidents Drive	4	Roadway - Widening	1.14	SIS	Committed	0.18	SIS	Committed	3.00	SIS	2021-2025	99.13	SIS	2026-2030	103.45
	129	Marigold Avenue	Poinciana Parkway	Coyote Rd	2	Roadway - Widening	1.38	IF Dist C	2019-2020	4.34	IF Dist C	2021-2025	-	IF Dist C	2026-2030	45.35	OA	2031-2040	51.06
	134	Marigold Avenue	Coyote Road	CR 580 (Cypress Parkway)	2	Roadway - Widening	1.29	IF Dist C	2021-2025	3.88	IF Dist C	2021-2025	-	IF Dist C	2026-2030	40.56 40.10 0.55	Multiple Sources IF Dist C Ad Valorem	2031-2040	45.74
	234	Pipkin Road West	Medulla Road	Pipkin Road South	2	Roadway - Widening	1.23	IF Dist E	2019-2020	3.86	IF Dist E	2021-2025	15.76	Ad Valorem	2026-2030	40.37	Ad Valorem	2031-2040	61.23
	235	Pipkin Road West	Pipkin Road South	Harden Blvd/Old 37	2	Roadway - Widening	0.77	IF Dist E	2021-2025	2.61	IF Dist E	2026-2030	9.41 8.53 0.88	Multiple Sources IF Dist E Ad Valorem	2026-2030	24.11 19.05 5.06	Multiple Sources IF Dist E Ad Valorem	2031-2040	36.90
	300E	CPP East Corridor*‡	US 17/92	Interstate 4	-	Interstate	7.87	Other	Completed	3.51	Other	Committed	140.73	Other	2019-2020	240.33	Other	2021-2025	392.44
	Tier III Totals						17.87			77.36			241.30			4,577.07			4,913.57

Central Polk Parkway Footnotes
*30% Design committed to all project segments (includes interchanges/overpass as appropriate). Only partially funded segments are included in the totals for each corridor.
‡Project 300E includes interchage at I-4.

Legend of Funding Sources

OA = Other Arterial funds (State & Federal)
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Transportation Improvement Program 2016/17 - 2020/21

This document is available online at www.polktpo.com. For information regarding this document, please contact Mrs. Xiomara Meeks, Senior Transportation Planner, xiomarameeks@polk-county.net.

This report was prepared as a cooperative effort of the US Department of Transportation (USDOT), Federal Highway Administration (FHWA), Florida Department of Transportation (FDOT), and the Polk Transportation Planning Organization as a requirement of 23 Code of Federal Regulations (CFR) Part 540 Sections 320, 324, 326, 328, 330 and 332 (Transportation Improvement Program) and 339.175(6) and (8), Florida Statues (FS). This document does not necessarily reflect the official views or policies of the USDOT.

Polk Transportation Planning Organization

2017-2021 TIP Adopted June 9, 2016

Item Number: 413656 1 Project Description: WINTER HAVEN TRAFFIC SIGNALS REIMBURSEMENT *NON-SIS*								
District: 01 County: POLK Type of Work: TRAFFIC SIGNALS Project Length: 2.880 LRTP: 1-3								
OPERATIONS / RESPONSIBLE AGENCY City of Winter Haven								
DDR -DISTRICT DEDICATED REVENUE	571,472	142,107	145,904	150,281	154,790	159,433	0	1,323,987
Item 413656 1 Totals:	**571,472**	**142,107**	**145,904**	**150,281**	**154,790**	**159,433**	**0**	**1,323,987**
Project Total:	**571,472**	**142,107**	**145,904**	**150,281**	**154,790**	**159,433**	**0**	**1,323,987**

Fund	<2017	2017	2018	2019	2020	2021	>2021	All Years
Item Number: 419243 1 Project Description: US 27 FROM HIGHLANDS C/L TO N OF SR 60 *SIS*								
District: 01 County: POLK Type of Work: PD&E/EMO STUDY Project Length: 19.037 LRTP: 4-9								
P D & E / MANAGED BY FDOT								
-TOTAL OUTSIDE YEARS	3,401,675	0	0	0	0	0	0	3,401,675
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
-TOTAL OUTSIDE YEARS	41,061	0	0	0	0	0	0	41,061
Item 419243 1 Totals:	**3,442,736**	**0**	**0**	**0**	**0**	**0**	**0**	**3,442,736**
Item Number: 419243 2 Project Description: SR25 (US 27) FROM HIGHLANDS COUNTY LINE TO CR 630A *SIS*								
District: 01 County: POLK Type of Work: ADD LANES & RECONSTRUCT Project Length: 8.612 LRTP: 4-9								
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	6,703,441	0	0	0	0	0	0	6,703,441
DIH -STATE IN-HOUSE PRODUCT SUPPORT	201,125	0	0	0	0	0	0	201,125
RIGHT OF WAY / MANAGED BY FDOT								
ACNP -ADVANCE CONSTRUCTION NHPP	0	0	0	0	0	0	4,014,308	4,014,308
RAILROAD & UTILITIES / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	10,000	0	0	0	0	0	0	10,000
ENVIRONMENTAL / MANAGED BY FDOT								
ACNP -ADVANCE CONSTRUCTION NHPP	0	0	0	0	0	350,000	150,000	500,000
Item 419243 2 Totals:	**6,914,566**	**0**	**0**	**0**	**0**	**350,000**	**4,164,308**	**11,428,874**
Item Number: 419243 3 Project Description: US 27 FROM CR 630A TO PRESIDENTS DRIVE *SIS*								
District: 01 County: POLK Type of Work: ADD LANES & RECONSTRUCT Project Length: 5.026 LRTP: 4-9								
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	4,842,633	0	0	0	0	0	0	4,842,633
DIH -STATE IN-HOUSE PRODUCT SUPPORT	200,461	0	0	0	0	0	0	200,461
RIGHT OF WAY / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	0	0	0	0	0	2,229,296	0	2,229,296
DIH -STATE IN-HOUSE PRODUCT SUPPORT	0	0	0	0	0	71,643	0	71,643
ENVIRONMENTAL / MANAGED BY FDOT								
ACNP -ADVANCE CONSTRUCTION NHPP	0	0	0	0	0	300,000	70,000	370,000
Item 419243 3 Totals:	**5,043,094**	**0**	**0**	**0**	**0**	**2,600,939**	**70,000**	**7,714,033**
Item Number: 419243 4 Project Description: US 27 FROM PRESIDENTS DRIVE TO SR 60 *SIS*								
District: 01 County: POLK Type of Work: ADD LANES & RECONSTRUCT Project Length: 5.178 LRTP: 4-9								
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	6,664,450	0	0	0	0	0	0	6,664,450
DIH -STATE IN-HOUSE PRODUCT SUPPORT	100,370	0	0	0	0	0	0	100,370
RIGHT OF WAY / MANAGED BY FDOT								
DDR -DISTRICT DEDICATED REVENUE	0	0	1,560,033	3,660,798	0	0	0	5,220,831
DIH -STATE IN-HOUSE PRODUCT SUPPORT	0	0	106,213	247,831	0	0	0	354,044
RAILROAD & UTILITIES / MANAGED BY FDOT								
DDR -DISTRICT DEDICATED REVENUE	0	0	0	0	1,575,076	0	0	1,575,076
CONSTRUCTION / MANAGED BY FDOT								
DDR -DISTRICT DEDICATED REVENUE	0	0	0	0	49,505,031	0	0	49,505,031
DIH -STATE IN-HOUSE PRODUCT SUPPORT	0	0	0	0	921,700	0	0	921,700
ENVIRONMENTAL / MANAGED BY FDOT								
DI -ST. - S/W INTER/INTRASTATE HWY	0	0	240,000	75,000	338,472	0	0	653,472
SIWR -2015 SB2514A-STRATEGIC INT SYS	0	0	0	0	161,528	0	0	161,528
Item 419243 4 Totals:	**6,764,820**	**0**	**1,906,246**	**3,983,629**	**52,501,807**	**0**	**0**	**65,156,502**

STIP Project Detail and Summaries On-Line Report

Selection Criteria	
Current STIP	**Detail Report**
County/MPO Area: Polk	**Financial Project:** 419243 1
Related Items Shown	

Item Number: 419243 1 **Project Description:** US 27 FROM HIGHLANDS C/L TO N OF SR 60

District: 01 **County:** POLK **Type of Work:** PD&E/EMO STUDY **Project Length:** 19.037MI

		Fiscal Year						
Phase / Responsible Agency		**<2017**	**2017**	**2018**	**2019**	**2020**	**>2020**	**All Years**
P D & E / MANAGED BY FDOT								
Fund Code:	DIH - STATE IN-HOUSE PRODUCT SUPPORT	187,834	40,686					**228,520**
	DS - STATE PRIMARY HIGHWAYS & PTO	3,227,602						**3,227,602**
	Phase: P D & E Totals	**3,415,436**	**40,686**					**3,456,122**
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
Fund Code:	DS - STATE PRIMARY HIGHWAYS & PTO	41,061						**41,061**
	Item: 419243 1 Totals	**3,456,497**	**40,686**					**3,497,183**

STIP Project Detail and Summaries On-Line Report

Selection Criteria	
Current STIP	**Detail Report**
County/MPO Area: Polk	**Financial Project:** 419243 2
Related Items Shown	

Item Number: 419243 2 **Project Description:** SR25 (US 27) FROM HIGHLANDS COUNTY LINE TO CR 630A

District: 01 **County:** POLK **Type of Work:** ADD LANES & RECONSTRUCT **Project Length:** 8.612MI

		Fiscal Year						
Phase / Responsible Agency		**<2017**	**2017**	**2018**	**2019**	**2020**	**>2020**	**All Years**
ENVIRONMENTAL / MANAGED BY FDOT								
Fund Code:	ACNP - ADVANCE CONSTRUCTION NHPP						500,000	**500,000**
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY	6,703,441						**6,703,441**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT	30,624	63,953					**94,577**
	Phase: PRELIMINARY ENGINEERING Totals	**6,734,065**	**63,953**					**6,798,018**
RIGHT OF WAY / MANAGED BY FDOT								
Fund Code:	ACNP - ADVANCE CONSTRUCTION NHPP						3,897,387	**3,897,387**
RAILROAD & UTILITIES / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY	10,000						**10,000**
	Item: 419243 2 Totals	**6,744,065**	**63,953**				**4,397,387**	**11,205,405**

STIP Project Detail and Summaries On-Line Report

Selection Criteria	
Current STIP	**Detail Report**
County/MPO Area: Polk	**Financial Project:** 419243 3
Related Items Shown	

Item Number: 419243 3 **Project Description:** US 27 FROM CR 630A TO PRESIDENTS DRIVE

District: 01 **County:** POLK **Type of Work:** ADD LANES & RECONSTRUCT **Project Length:** 5.026MI

		Fiscal Year						
Phase / Responsible Agency		**<2017**	**2017**	**2018**	**2019**	**2020**	**>2020**	**All Years**
ENVIRONMENTAL / MANAGED BY FDOT								
Fund Code:	ACNP - ADVANCE CONSTRUCTION NHPP						370,000	**370,000**
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY	4,842,633						**4,842,633**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT	26,521	69,378					**95,899**
Phase: PRELIMINARY ENGINEERING Totals		**4,869,154**	**69,378**					**4,938,532**
RIGHT OF WAY / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY						2,164,365	**2,164,365**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT						69,556	**69,556**
Phase: RIGHT OF WAY Totals							**2,233,921**	**2,233,921**
Item: 419243 3 Totals		**4,869,154**	**69,378**				**2,603,921**	**7,542,453**

STIP Project Detail and Summaries On-Line Report

Selection Criteria	
Current STIP	**Detail Report**
County/MPO Area: Polk	**Financial Project:** 419243 4
Related Items Shown	

Item Number: 419243 4 **Project Description:** US 27 AT SR 60

District: 01 **County:** POLK **Type of Work:** INTERCHANGE - ADD LANES **Project Length:** 5.178MI

		Fiscal Year						
Phase / Responsible Agency		**<2017**	**2017**	**2018**	**2019**	**2020**	**>2020**	**All Years**
CONSTRUCTION / MANAGED BY FDOT								
Fund Code:	DDR - DISTRICT DEDICATED REVENUE					48,300,854		**48,300,854**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT					466,080		**466,080**
	Phase: CONSTRUCTION Totals					**48,766,934**		**48,766,934**
ENVIRONMENTAL / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY			240,000	75,000	338,472		**653,472**
	SIWR - 2015 SB2514A-STRATEGIC INT SYS					161,528		**161,528**
	Phase: ENVIRONMENTAL Totals			**240,000**	**75,000**	**500,000**		**815,000**
PRELIMINARY ENGINEERING / MANAGED BY FDOT								
Fund Code:	DI - ST. - S/W INTER/INTRASTATE HWY	7,135,165	26,683					**7,161,848**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT	44,138	53,089					**97,227**
	Phase: PRELIMINARY ENGINEERING Totals	**7,179,303**	**79,772**					**7,259,075**
RIGHT OF WAY / MANAGED BY FDOT								
Fund Code:	DDR - DISTRICT DEDICATED REVENUE			1,575,313	2,731,971			**4,307,284**
	DIH - STATE IN-HOUSE PRODUCT SUPPORT			132,400	198,600			**331,000**
	Phase: RIGHT OF WAY Totals			**1,707,713**	**2,930,571**			**4,638,284**
RAILROAD & UTILITIES / MANAGED BY FDOT								
Fund Code:	DDR - DISTRICT DEDICATED REVENUE					1,575,076		**1,575,076**
	Item: 419243 4 Totals	**7,179,303**	**79,772**	**1,947,713**	**3,005,571**	**50,842,010**		**63,054,369**
	Project Totals	**22,249,019**	**253,789**	**1,947,713**	**3,005,571**	**50,842,010**	**7,001,308**	**85,299,410**
	HIGHWAYS Totals	**22,249,019**	**253,789**	**1,947,713**	**3,005,571**	**50,842,010**	**7,001,308**	**85,299,410**
	Grand Total	**22,249,019**	**253,789**	**1,947,713**	**3,005,571**	**50,842,010**	**7,001,308**	**85,299,410**

APPENDIX B

RESOURCE AGENCY CORRESPONDENCE LETTERS

NATIONAL RESOURCES CONSERVATION SERVICE LETTER AND COORDINATION

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
Florida State Office
2614 NW 43rd Street
Gainesville, FL 32606

PH 352-338-9500
FX 352-338-9574
www.fl.nrcs.usda.gov

June 11th, 2014

Martin Horwitz
Environmental Project Manager
Florida Department of Transportation
P.O. Box 1249
Bartow, Florida 33830

RE: Important Farmland Assessment for FPID# 419243-1 US 27 in Polk County

This letter is in response to your request on the Prime, Unique, or Locally Important Farmland assessment as part of the FPPA requirements for the U.S. Highway 27 project in Polk County, Florida. Enclosed are the Important Farmlands map and Farmland Conversion Impact Rating forms (AD-1006) for the project area.

Briefly, the USDA-NRCS is responsible for monitoring the conversion of Prime, Unique, or Locally Important Farmland to urban uses. We have determined that there are delineations of Important Farmland soils (Farmland of Unique Importance) within the scope of this project.

As discussed, if the project corridor remains within the existing right-of-way there will be no impact to Important (Unique) Farmland soils. The off-site wetland mitigation site does not impact any Important Farmland soils.

Therefore, we have indicated that there are no Important Farmlands impacted on the attached AD-1006 (Farmland Conversion Impact Rating) form.

If you have any questions, please feel free to contact me.

Regards,

Rick

Rick Robbins
USDA-NRCS
Soil Scientist
Gainesville, Florida

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 6/23/2014
Name of Project US 27 PD&E Study from Polk/Highlands CL to SR 60	Federal Agency Involved Federal Highway Administration (FHWA)
Proposed Land Use Transportation	County and State Polk County, Florida
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 6/10 /2014 — Person Completing Form: Robbins, Rick

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐	NO ☑	Acres Irrigated / Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount of Farmland As Defined in FPPA Acres: %
Name of Land Evaluation System Used	Name of State or Local Site Assessment System		Date Land Evaluation Returned by NRCS

PART III *(To be completed by Federal Agency)* Project w/in existing US 27 ROW, except for 59.67 ac parcel	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	59.67			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	581.37			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)* 6.49	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160				
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or local site assessment)*	160				
TOTAL POINTS ***(Total of above 2 lines)***	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ■

Reason For Selection:

Site selected due to Low level of significance (i.e., less than 160 total points) for impacted farmlands within and adjacent to the proposed corridor.

Name of Federal agency representative completing this form: Gwen Pipkin, FDOT D1 DEMO	Date: 6/23/2014

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

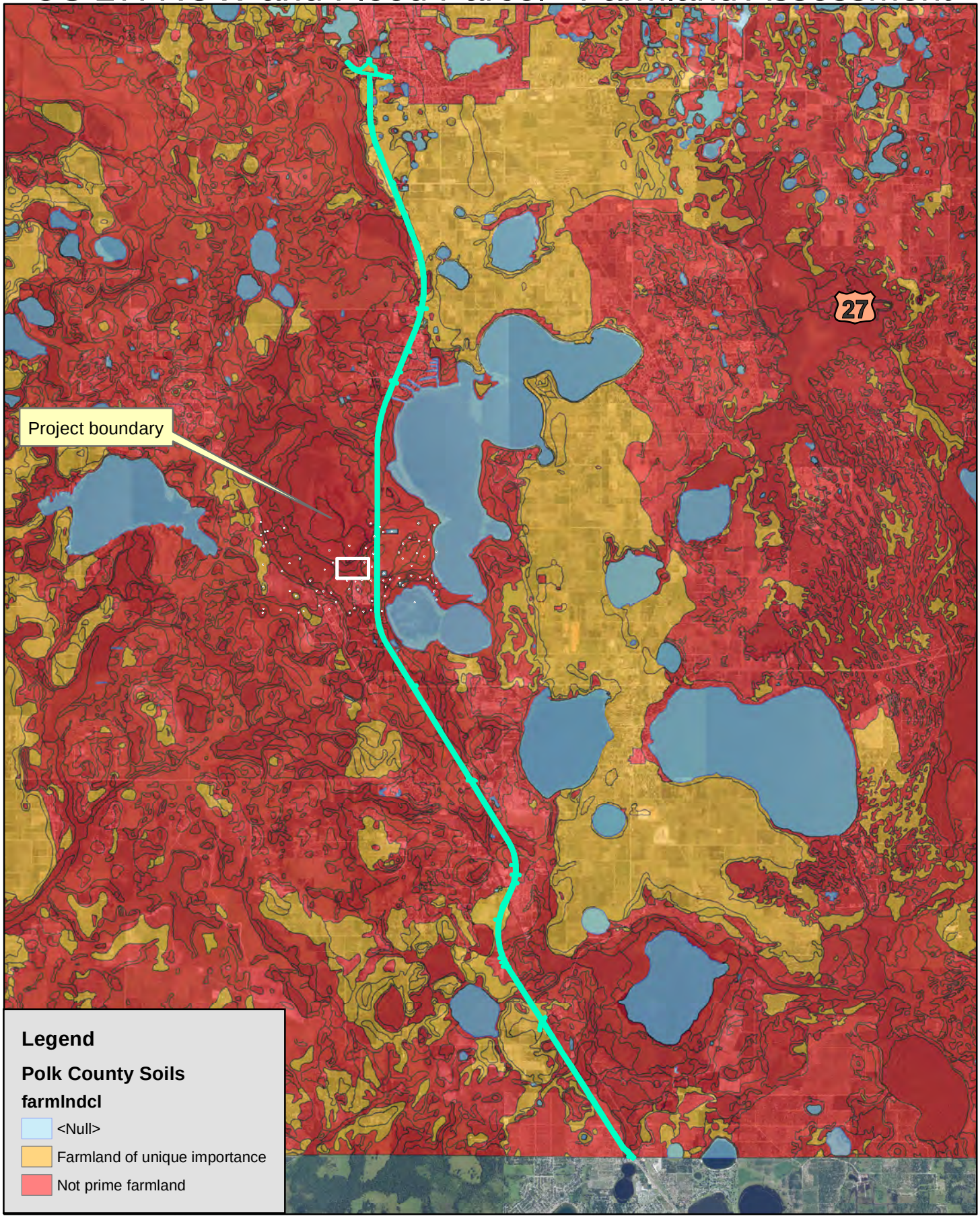
Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

US 27: ROW and Flood Parcel - Farmland Assessment

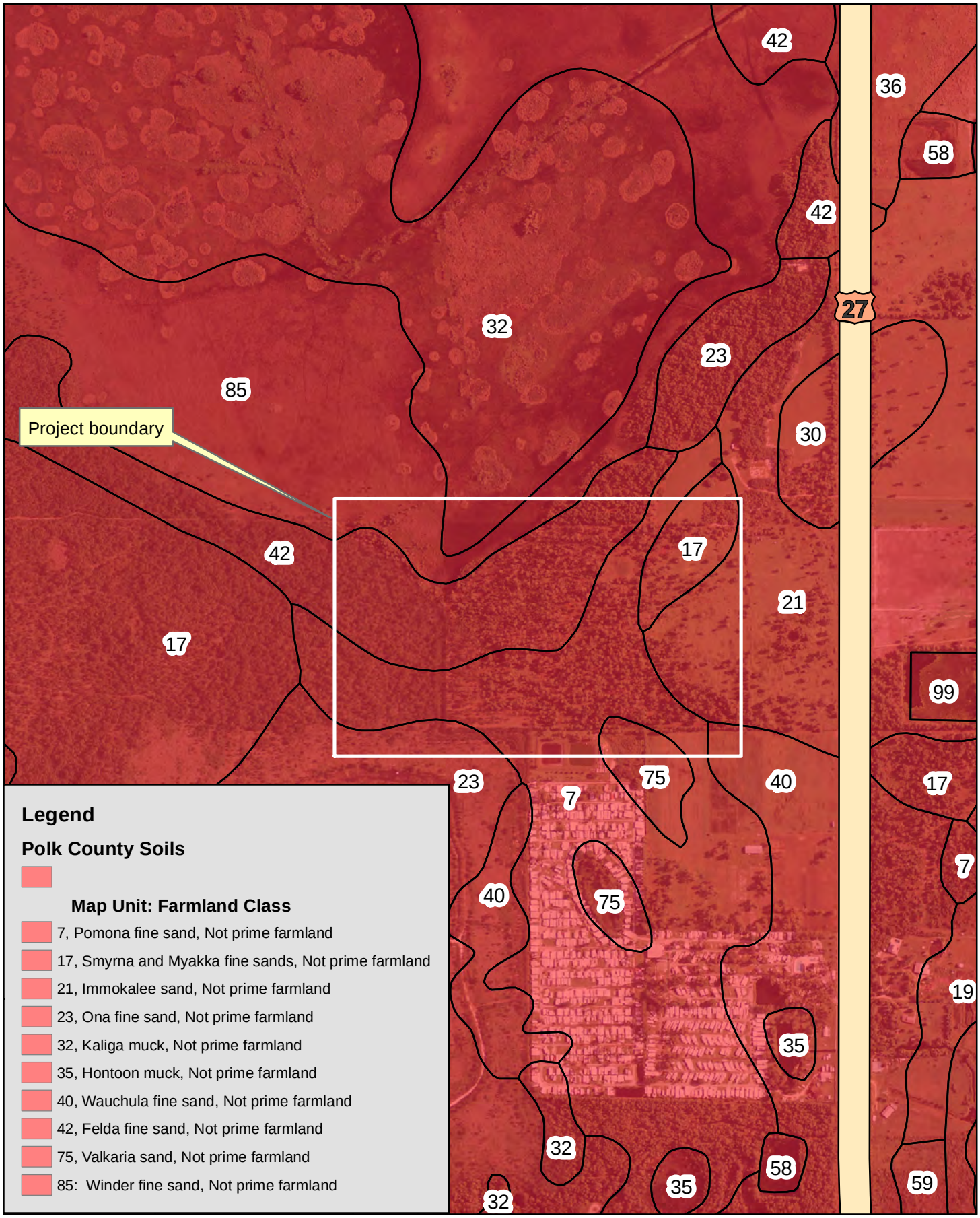


Survey Area: Polk County, Florida
Survey Area Version and Date: V-7. 1/13/2010
USDA-NRCS NCGC: Mr.Sid Mosaic
Map Created: 6/11/14
R. Robbins
USDA-NRCS

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

0 5,500 11,000 22,000 Feet

US 27: Flood Parcel - Farmland Assessment



Legend

Polk County Soils

Map Unit: Farmland Class

- 7, Pomona fine sand, Not prime farmland
- 17, Smyrna and Myakka fine sands, Not prime farmland
- 21, Immokalee sand, Not prime farmland
- 23, Ona fine sand, Not prime farmland
- 32, Kaliga muck, Not prime farmland
- 35, Hontoon muck, Not prime farmland
- 40, Wauchula fine sand, Not prime farmland
- 42, Felda fine sand, Not prime farmland
- 75, Valkaria sand, Not prime farmland
- 85: Winder fine sand, Not prime farmland

Survey Area: Polk County, Florida
Survey Area Version and Date: V-7. 1/13/2010
USDA-NRCS NCGC: Mr.Sid Mosaic
Map Created: 6/11/14
R. Robbins
USDA-NRCS

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

0 425 850 1,700 Feet

Mullen, Gordon S

From: Horwitz, Martin [Martin.Horwitz@dot.state.fl.us]
Sent: Wednesday, June 11, 2014 11:37 AM
To: Mullen, Gordon S; Peate, Martin
Cc: Pipkin, Gwen G; Sherrard, Antone N; Warren, Kimberly D; Gregory, Ron
Subject: FW: FPID# 419243-1; FDOT D1 US 27 PD&E from Highlands/Polk County Line to SR 60; Polk County - Prime/Unique Farmlands assistance
Attachments: US27_project_files.zip

Please see the email below and the attached zip file containing NRCS letter and supporting docs for your records and use in CE document.

Martin Horwitz
Environmental Project Manager

FDOT District 1
801 N. Broadway Avenue
P.O. Box 1249
Bartow, Florida 33830
(863)519-2805

From: Robbins, Rick - NRCS, Gainesville, FL [mailto:rick.a.robbins@fl.usda.gov]
Sent: Wednesday, June 11, 2014 10:45 AM
To: Horwitz, Martin
Subject: RE: FPID# 419243-1; FDOT D1 US 27 PD&E from Highlands/Polk County Line to SR 60; Polk County - Prime/Unique Farmlands assistance

Martin,

Ran this by an administrator and we will ignore the 0.63 acre of citrus since the landowner impinged on FDOT ROW.

Therefore, the attached files should satisfy your FPPA and NEPA requirements.

Rick

Rick Robbins
Soil Scientist
USDA-Natural Resources Conservation Service
Gainesville, FL 32606

Myakka series: *State Soil of Florida*

From: Horwitz, Martin [mailto:Martin.Horwitz@dot.state.fl.us]
Sent: Wednesday, June 11, 2014 9:57 AM
To: Robbins, Rick - NRCS, Gainesville, FL
Cc: Pipkin, Gwen G; gordon.mullen@atkinsglobal.com; Peate, Martin
Subject: RE: FPID# 419243-1; FDOT D1 US 27 PD&E from Highlands/Polk County Line to SR 60; Polk County - Prime/Unique Farmlands assistance

Rick,

I confirmed with our consultants that the ROW are accurate and came from FDOT Survey department. The project will remain in the ROW therefore the citrus grove was planted within the FDOT ROW without FDOT permission. For this situation, have we completed the form correctly or do we need to revise the form?

Please let me know if you need additional information or what changes to the submitted information is required.

Thanks,

Martin Horwitz
Environmental Project Manager

FDOT District 1
801 N. Broadway Avenue
P.O. Box 1249
Bartow, Florida 33830
(863)519-2805

From: Robbins, Rick - NRCS, Gainesville, FL [mailto:rick.a.robbins@fl.usda.gov]
Sent: Wednesday, June 11, 2014 8:26 AM
To: Horwitz, Martin
Subject: RE: FPID# 419243-1; FDOT D1 US 27 PD&E from Highlands/Polk County Line to SR 60; Polk County - Prime/Unique Farmlands assistance

Martin,

How accurate are the ROW shapefiles you sent? Your email indicated the project will remain within the existing ROW, but it appears that some farmland may be impacted. I realize this may be of limited importance, but the AD-1006 asks if any important farmland will be impacted.

Just a question. Thanks.

Rick

From: Horwitz, Martin [mailto:Martin.Horwitz@dot.state.fl.us]
Sent: Tuesday, June 10, 2014 11:11 AM
To: Robbins, Rick - NRCS, Gainesville, FL
Cc: Pipkin, Gwen G; Sherrard, Antone N; gordon.mullen@atkinsglobal.com
Subject: FPID# 419243-1; FDOT D1 US 27 PD&E from Highlands/Polk County Line to SR 60; Polk County - Prime/Unique Farmlands assistance

Rick,

As a follow-up to your phone discussion with Gordon Mullen with Atkins on June 3, 2014, I have attached the GIS shapefiles pertinent to the ROW needed for the subject project. Sections I and III in the attached Form AD-1006 have also been completed, and the form is attached for your review and completion.

This project was screened previously in ETDM (project # 3869). The study begins at the Polk-Highlands County Line (MP 0.00) and ends just north of State Road (SR) 60 (MP 18.816). The objective of the current PD&E study is to evaluate widening the existing four-lane divided facility to a six-lane divided facility including the development of interchange configurations at US 27 and SR 60 to accommodate the proposed widening. All project work is expected to remain within the existing US 27 and SR 60 rights-of-way (i.e., no land conversion), with the exception of one potential off-site wetland mitigation/floodplain compensation parcel (known as the Flood parcel). The privately-owned Flood parcel is approximately 60 (59.67±) acres in size, and occurs on the west side of US 27 across from the southern portion of Crooked Lake. Based on a review of the Farmlands soils layers available in the ETDM EST, it does not appear that there are any Prime/Unique Farmlands on the Flood Parcel (see last attached PDF file).

In closing, the Florida Department of Transportation District One understands that Prime/Unique Farmlands are not a significant issue for the subject project, but needs to verify this for inclusion into the final NEPA document for approval by the Federal Highway Administration. Feel free to let me know if you need anything further to assist your review and completion of the pertinent sections of AD-1006. Thank you in advance for your time and assistance with this evaluation.

Martin Horwitz
Environmental Project Manager

FDOT District 1
801 N. Broadway Avenue
P.O. Box 1249
Bartow, Florida 33830
(863)519-2805

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FEDERAL HIGHWAY ADMINISTRATION SECTION 4(F) DETERMINATION OF APPLICABILITY COORDINATION

Mullen, Gordon S

Subject: FW: 419243-1 US 27 Highland CL to north of SR 60 - Section 4(f) determination acceptance

From: Cathy.Kendall@dot.gov [mailto:Cathy.Kendall@dot.gov]
Sent: Thursday, March 10, 2016 1:53 PM
To: Cross, Vivianne
Subject: 419243-1 US 27 Section 4(f) determination

Vivianne,

Thank you for your February 5, 2016 letter requesting Section 4(f) applicability findings for four potential resources in the vicinity of the US 27 project (#419243-1). The documentation does not have sufficient information on resource significance and function to make a definitive determination as to whether the properties are protected under Section 4(f), but we can concur that the project, as currently proposed, will have no Section 4(f) impacts since there is no incorporation of use of the properties by the project for transportation purposes.

Because we see it as likely that the properties may be Section 4(f) protected resources, please have as a commitment in the environmental documents that the project, including the project stormwater ponds and floodplain compensation acquisitions, will be designed to avoid all use of these potential Section 4(f) properties. If the project changes to the extent that acquisition of any of these properties cannot be avoided, please send more detailed information including input from the official with jurisdiction to assess significance, as well as information related to potential wildlife/waterfowl refuge function.

Cathy Kendall, AICP
Senior Environmental Specialist
FHWA - FL, PR and VI
3500 Financial Plaza, Suite 400
Tallahassee, FL 32312
(850) 553-2225
cathy.kendall@dot.gov

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

801 North Broadway
Bartow, FL 33830

JIM BOXOLD
SECRETARY

February 5, 2016

Ms. Cathy Kendall
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, FL 32312

RE: Section 4(f) Determination of Applicability
US 27 PD&E Study from Highlands County Line to North of SR 60
Polk County, Florida
Financial Project ID No.: 419243-1-22-01

Dear Ms. Kendall:

The Florida Department of Transportation (FDOT), District 1, is conducting a Project Development and Environment (PD&E) study for the improvement of US 27 from the Highlands County Line to north of SR 60 in Polk County, Florida.

Analysis conducted as part of the PD&E Study identified four potential Section 4(f) resources in the vicinity of the project to include: Lake Wales Ridge Wildlife and Environmental Area, Crooked Lake West – Britt Tract, Crooked Lake West – Stuart Tract, and Lake Weaver Park. The FDOT believes that the proposed alternatives avoid impact to the identified potential Section 4(f) resources.

You will find one (1) copy of the Section 4(f) Determination of Applicability attached to aid FHWA in the determination of Section 4(f) applicability. Please advise us of your findings so that we may take the appropriate action.

If you have any questions, or if I may be of assistance, please contact me at (863) 519-2805 or Vivianne.Cross@dot.state.fl.us.

Sincerely,

Vivianne Cross

Vivianne Cross
Environmental Project Manager

Enclosures
CC: Gwen Pipkin, FDOT
Tony Sherrard, FDOT
Ron Gregory, AECOM
Gordon Mullen, Atkins

FEDERAL HIGHWAY ADMINISTRATION AND STATE HISTORIC PRESERVATION OFFICER JUNE 2014 CONCURRENCE LETTER

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

801 North Broadway
Bartow, FL 33830

ANANTH PRASAD, P.E.
SECRETARY

June 18, 2014

Ms. Cathy Kendall
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, FL 32303

RECEIVED
BUREAU OF
HISTORIC PRESERVATION
2014 JUL -2 P 2:52

RE: Cultural Resource Assessment Survey
US 27 Project Development and Environment (PD&E) Study
From the Highlands County Line to North of SR 60
Polk County, Florida
FPID No.: 419243-1-22-01
FAP: Not assigned

Dear Ms. Kendall:

The Florida Department of Transportation (FDOT) District One is conducting a Project Development and Environment (PD&E) study to evaluate options for widening United States (US) Highway 27 (US 27) in Polk County. The study begins at the Polk-Highlands County Line (MP 0.00) and ends just north of State Road (SR) 60 (MP 18.816) for a total length of 18.816 miles. The objective of the PD&E study is to evaluate widening the existing four-lane divided facility to a six-lane divided facility including the development of interchange configurations at US 27 and SR 60 to accommodate the proposed widening. The archaeological APE is comprised of the existing US 27 ROW. The historic APE is comprised of the archaeological APE and any properties within 200 feet of the centerline of the existing road.

The purpose of the review was to locate and identify historic or archaeological sites within or immediately adjacent to the APE and to assess the significance of such sites in terms of eligibility for listing in the National Register of Historic Places (NRHP).

Enclosed you will find the CRAS Report. The following documents are attached:

- One bound copy of the CRAS final report and one CD containing a .pdf version of the report (for FHWA); and
- One SHPO package containing an unbound copy of the report, loose FMSF forms (updated 8PO05383; 8PO07117 addendum, and 38 historic resources: five resource groups [8PO07639-7641 and 8PO07726-7727], 31 buildings [8PO07608-7634, 8PO07728-7731], one linear resource [8PO07654], and one cemetery [8PO07635]), and Survey Log; and
- a CD containing a .pdf version of the report, forms, and log.

The field work was conducted in accordance with the FDOT's PD&E Manual and the research plan and field methodology follows the standards and guidelines of the Florida Division of Historical Resources *Cultural Resource Management Standards and Operational Manual.*

Background research and a review of the Florida Master Site File (FMSF) and the NRHP indicated that historical background research, including a review of the FMSF and NRHP, indicated that two historic resources (50 years of age or older) were previously recorded within the APE. These include a Masonry Vernacular building (8PO05383) at 403 Bullard Avenue and the Seaboard Airline Wahneta Railroad (8PO07117) which runs under the US 27. The Masonry Vernacular building was determined ineligible for listing in the NRHP by the State Historic Preservation Officer (SHPO), but the form was updated to record changes in the building materials. Based on FMSF guidelines, an addendum was prepared for the existing Seaboard Airline Wahneta resource group form to include the portion within this project area. As the 0.5 mile segment is only a small section of the entire railroad, there is insufficient information to determine its eligibility for listing in the NRHP. As a result of historical field survey, 38 historic resources were newly identified and recorded. These resources include five resource groups (8PO07639-7641 and 8PO07726-7727), 31 buildings (8PO07608-7634, 8PO07728-7731) constructed between 1935 and 1962, one linear resource (8PO07654), and one cemetery (8PO07635).

The resource groups, buildings, and linear resource (US 27) represent commonly occurring types of architecture and engineering for the locale, and none is associated with significant historical events or persons. Therefore, it is the opinion of ACI's architectural historian that none of these newly recorded historic structures is eligible for listing in the NRHP. However, it is the professional opinion of ACI's architectural historian that the Lake Wales Cemetery (8PO07635) is eligible for listing in the NRHP at the local level under Criteria A and B in the areas of early settlement and community planning and development, as well as through its association with the early founders of Lake Wales (Criteria Consideration D). In summary, proposed improvements to approximately 18 miles (mi) of US 27 will include about 0.4 mi of highway adjacent to the NRHP-eligible Lake Wales Cemetery (8PO7635); however, no additional right-of-way (ROW) will be required. The improvements to US 27 will not alter the qualities of the cemetery that make it eligible for listing in the NRHP, nor will the change from a 4-lane to a 6-lane highway significantly diminish the setting. Therefore, the proposed undertaking appears to have no adverse effect on the Lake Wales Cemetery.

The project area was deemed to have a variable potential for the discovery of prehistoric and historic archaeological sites. Background research and a review of the FMSF and the NRHP indicated that 14 archaeological sites have been recorded within one mile of the project corridor, but none is contained within the area of potential effect (APE). The site location predictive model for the region indicated a variable potential for archaeological sites within the study corridor. As a result of this survey, no archaeological sites were discovered.

This information is being provided in accordance with the provisions of the National Historic Preservation Act of 1966 (as amended), which are implemented by the procedures contained in 36 CFR, Part 800, as well as the provisions contained in the revised Chapter 267, *Florida Statutes.*

Please process the attached report and accompanying documentation and then forward to the SHPO for their concurrence. The second copy of the report is for your files. If you have any questions, or if I may be of assistance, please contact me at (863) 519-2805 or Martin.Horwitz@dot.state.fl.us.

Sincerely,

Martin Horwitz
Environmental Project Manager

Enclosures

CC: Gwen Pipkin, FDOT
Marty Peate, URS Corporation
Marion Almy, ACI

The FHWA finds the attached Cultural Resources Assessment Report complete and sufficient and ✓ approves/ _____ does not approve the above recommendations and findings. Or, FHWA finds the attached Cultural Resource Assessment contains _____insufficient information.

The FHWA requests the SHPO's opinion on the sufficiency of the attached report and the SHPO's opinion on the recommendations and findings contained in this cover letter and in the comment block below.

FHWA Comments:

/s/
Mr. James Christian, Division Administrator
Federal Highway Administration

6/27/14
Date

The Florida State Historic Preservation Officer finds the attached Cultural Resources Assessment Report complete and sufficient and ✓ concurs/ _____ does not concur with the recommendations and findings provided in this cover letter for SHPO/DHR Project File Number 2014-2658. Or, SHPO finds the attached Cultural Resource Assessment contains _____insufficient information.

SHPO Comments:
* CRITERIA D DOES NOT APPLY TO BP07635 (CEMETERY)

Mr. Robert F. Bendus
State Historic Preservation Officer
Florida Division of Historical Resources

8/12/14
Date

FEDERAL HIGHWAY ADMINISTRATION AND STATE HISTORIC PRESERVATION OFFICER FEBRUARY 2016 CONCURRENCE LETTER

FDOT

Florida Department of Transportation

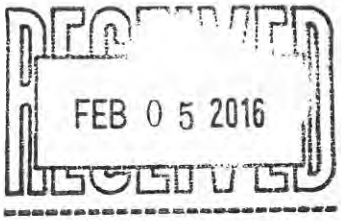
RICK SCOTT
GOVERNOR

801 North Broadway
Bartow, FL 33830

JIM BOXOLD
SECRETARY

February 4, 2016

Ms. Cathy Kendall
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, FL 32312



RE: Cultural Resource Assessment Survey
Technical Memorandum Addendum
US 27/SR 60 Interchange
Polk County, Florida
Financial Project ID No.: 419243-1-22-01

Dear Ms. Kendall:

A cultural resource assessment survey (CRAS) was conducted within the area of potential effects (APE) for the US 27/SR 60 Interchange Improvement in Polk County. This work was conducted for the Florida Department of Transportation (FDOT), District 1, as part of the proposed improvements to US 27. In 2013, a CRAS Project Development and Environment (PD&E) study was conducted for the US 27 corridor, from the Highlands County Line to SR 60. This report was approved by the State Historic Preservation Officer (SHPO) (FDHR Concurrence #2014-2658). Since the submittal of the CRAS, design changes have occurred and additional archaeological testing and historic reconnaissance was required. The design chosen, Alternate 3B (Single Point Urban Interchange [SPUI]), is similar to the diamond interchange except the two ramp terminal intersections are combined into a single intersection. This improvement also includes signalization of the ramp terminals and six lanes on US 27, as well as provides additional turn lanes at both ramp terminals. While the SPUI right-of-way requirements are similar to the diamond interchange, the footprint of the interchange is considerably wider.

The archaeological APE for the current undertaking is defined as the area contained within the newly defined project area. The historical APE includes the archaeological APE and 250 feet from the center of US Highway 27 and State Road 60 on both sides of the road for the entire span of the project area. Where the project description called for road improvements or reconfiguration and at the interchange of US 27/SR 60, the APE was extended an additional 200 feet from the project area boundary.

Enclosed you will find the CRAS Report. The following documents are attached:

- One bound copy of the CRAS final report and one CD containing a .pdf version of the report (for FHWA); and
- One SHPO package containing an unbound copy of the report and a CD containing a .pdf version of the report, FMSF forms, and the Survey Log.

The field work was conducted in accordance with the FDOT's Project Development & Environment (PD&E) Manual and the research plan and field methodology follows the standards and guidelines of the Florida Division of Historical Resources *Cultural Resource Management Standards and Operational Manual*.

Historical/architectural field survey resulted in the identification of 33 individual historic resources; of these, 17 were previously recorded and 16 were newly identified. Six of the 7 previously recorded buildings within the APE were evaluated by the SHPO in July of 2014 and found to be ineligible for listing in the NRHP. Limited research conducted as part of this survey and a comparison of photos previously submitted to FMSF to current conditions observed in the field indicated that these resources remain unchanged since they were last recorded in 2013. In addition, no significant historic associations were newly discovered. As a result, these six previously recorded resources remain ineligible for listing in the NRHP and no FMSF forms for these six resources were updated but are summarized in the report. Eleven of the 17 previously recorded buildings within the APE have not been evaluated by the SHPO. They were first recorded in 1989 and the buildings, all private residences constructed between 1920 and 1964, are typical examples of the Masonry Vernacular, Frame Vernacular, and Bungalow styles found throughout Polk County and lack significant historic associations. In addition, they retain little architectural integrity. As a result, these buildings do not appear eligible for listing in the NRHP, either individually or as part of a historic district.

Sixteen buildings were newly identified within the project APE. These buildings include 12 private residences, a daycare facility, a medical clinic, a commercial building and a Sunday school and are all typical examples of the Masonry Vernacular, Frame Vernacular, and Mission styles built between 1920 and 1963. All lack significant architectural or design attributes, and limited research did not reveal any significant historic associations to persons or events. In addition, the area these buildings are in lacks the potential to be considered a historic district. As such, none is considered potentially eligible for listing in the NRHP, either individually or as part of a historic district.

The project area was deemed to have a low potential for the discovery of prehistoric and historic archaeological sites. As a result of field survey, no sites were found.

Therefore, based on the results of the background research and field survey, it is in the opinion of ACI that the proposed undertaking will have no effect on any archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible for listing in the NRHP.

This information is being provided in accordance with the provisions of the National Historic Preservation Act of 1966 (as amended), which are implemented by the procedures contained in 36 CFR, Part 800, as well as the provisions contained in the revised Chapter 267, *Florida Statutes*.

Please process the attached report and accompanying documentation and then forward to the SHPO for their concurrence. The second copy of the report is for your files. If you have any questions, or if I may be of assistance, please contact me at (863) 519-2805 or Vivianne.Cross@dot.state.fl.us.

Sincerely,

Vivianne Cross

Vivianne Cross
Environmental Project Manager

Enclosures

CC: Gwen Pipkin, FDOT
Tony Sherrard, FDOT
Ron Gregory, AECOM
Gordon Mullen, Atkins
Marion Almy, ACI

The FHWA finds the attached Cultural Resource Assessment Survey Technical Memorandum Addendum complete and sufficient and ✓ approves/ _____ does not approve the above recommendations and findings. Or, the FHWA finds the attached Cultural Resource Assessment Survey Technical Memorandum Addendum contains _____ insufficient information.

The FHWA requests the SHPO's opinion on the sufficiency of the attached report and the SHPO's opinion on the recommendations and findings contained in this cover letter and in the comment block below.

FHWA Comments:

/s/ _____ 2/29/16
Mr. James Christian, Division Administrator — Date
Federal Highway Administration

The Florida State Historic Preservation Officer (SHPO)/Florida Division of Historical Resources (FDHR) finds the attached Cultural Resources Assessment Survey Technical Memorandum Addendum complete and sufficient and ✓ concurs/ _____ does not concur with the recommendations and findings provided in this cover letter for SHPO/DHR Project File Number 2016-876. Or, the SHPO/FDHR finds the attached Cultural Resource Assessment Survey Technical Memorandum Addendum contains _____ insufficient information.

SHPO Comments:

Alissa Lotane, Deputy SHPO — 3/10/16
for Dr. Timothy Parsons, Interim Director — Date
Florida Division of Historical Resources
and State Historic Preservation Officer

UNITED STATES FISH AND WILDLIFE SERVICE FEBRUARY 2014 RESPONSE LETTER

United States Department of the Interior

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

February 25, 2014

Martin Horwitz
Florida Department of Transportation
801 North Broadway Avenue
Bartow, Florida 33830

Service CPA Code: 2011-CPA-0158
Service Consultation Code: 2011-F-0150
Date Received: February 19, 2014
Project: U.S. Highway 27 from Highlands County Line to North of State Road 60
County: Polk

Dear Mr. Horwitz:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter dated February 9, 2014, and Endangered Species Biological Assessment (ESBA) submitted by the Florida Department of Transportation (FDOT), on behalf of the Federal Highway Administration, for the project referenced above. This letter 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.*).

PROJECT DESCRIPTION

The FDOT proposes to widen an 18.8-mile segment of U.S. Highway 27 from the Highlands County Line to North of State Road (SR) 60. The existing four-lane roadway will be enlarged to six lanes. The project will also include improvements to the existing U.S. Highway 27 interchange at SR 60. The project site is located in Sections 2, 3, 10, 11, 14, 23, 26, and 35, Township 30 South, Range 27 East; Sections 2, 3, 10, 11, 14, 15, 22, 23, 26, 35, and 36, Township 31 South, Range 27 East; Sections 1 and 13, Township 32 South, Range 27 East; and Sections 6, 7, 18, 19, 29, 30, 32, and 33, Township 32 South, Range 28 East, in Polk County, Florida.

THREATENED AND ENDANGERED SPECIES

Eastern indigo snake

The project occurs within the geographic range of the threatened eastern indigo snake (*Drymarchon couperi* = *Drymarchon corais couperi*). To minimize adverse effects to this species during construction, the FDOT has agreed to follow the Service's *Standard Protection*

Measures for the Eastern Indigo Snake (Service 2013) during construction of the project. The FDOT has determined the project "may affect, but is not likely to adversely affect" the eastern indigo snake. Based on the adherence to the indigo snake protection measures, the Service concurs with this determination.

Florida grasshopper sparrow

The project is located within the Service's consultation area for the endangered Florida grasshopper sparrow (*Ammodramus savannarum floridanus*). The Service does not have any records of grasshopper sparrow occurring in or near the project footprint. Moreover, grasshopper sparrows were not observed during inspections of the project footprint conducted by the FDOT's consultant. The FDOT has determined the project "may affect, but is not likely to adversely affect" the Florida grasshopper sparrow. Based on the information provided, the Service concurs with this determination.

Everglade snail kite

The project is located in the geographic range of the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*). Active nests of the snail kite were not observed during surveys of the project footprint and adjacent areas conducted by the FDOT's consultant. The FDOT has determined the project "may affect, and is not likely to adversely affect" the Everglade snail kite. Based on the information provided, the Service concurs with the FDOT's determination.

Florida bonneted bat

A 6.8-mile segment of the U.S. Highway 27 project corridor, from the Highlands County Line to County Road 700, is located in the Service's consultation area for the endangered Florida bonneted bat (*Eumops floridanus*). Widening activities will occur with the existing maintained right-of-way, and this segment of the project footprint does not contain trees, bridges, or other structures that provide suitable roosting habitat for the Florida bonneted bat. The FDOT has determined the project "may affect, but is not likely to adversely affect" the Florida bonneted bat. Based on the information provided, the Service concurs with this determination.

Florida panther

The project is not located in the Service's Focus Area for the endangered Florida panther (*Puma concolor coryi*). The Focus Area is based on the scientific information on panther habitat usage provided in Kautz et al. 2006, and Thatcher et al. 2006, and denotes areas in Florida where development projects could potentially affect the panther. The FDOT has determined the project "may affect, but is not likely to adversely affect" the Florida panther. Telemetry data provided by the Florida Fish and Wildlife Conservation Commission indicate a transient male panther occurred about 1.5 miles east of the project footprint in 2005. However, the Service does not

have any evidence of panthers occurring within 5 miles of the project footprint since 2005. Moreover, the project will not affect suitable panther habitat within the project footprint. Based on the information provided, the Service concurs with the FDOT's determination.

For the species listed above, this letter 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.

Federally-listed plants

The project is located within the geographic range of the endangered pygmy fringe tree (*Chionanthus pygmaeus*), short-leaved rosemary (*Conradina brevifolia*), scrub-buckwheat (*Eriogonum longifolium var. gnaphalifolium*), sandlace (*Polygonella myriophylla*), and scrub plum (*Prunus geniculata*), and the threatened papery whitlow-wort (*Paronychia chartacea*). These species were observed in the project footprint during pedestrian surveys conducted by the FDOT's consultant. The FDOT has determined the project "may affect, and is likely to adversely affect" the pygmy fringe tree, short-leaved rosemary, scrub-buckwheat, papery whitlow-wort, sandlace, and scrub plum. The Service concurs with the FDOT's determinations for these species. However, we do not have enough information to initiate formal consultation pursuant to section 7 of the Act, as described in 50 CFR § 402.14.

To comply with section 7 of the Act, the FDOT has committed to reinitiate consultation with the Service prior to advancing the project to construction. At that time, the FDOT will provide additional information, as needed, which will allow the Service to complete our analysis of the project's effects on the above listed plants and complete consultation on the project. The FDOT must document this commitment in their final environmental document, and in documents for any subsequent reevaluation of the project.

Wood stork

The project site is located within the core foraging areas (CFA) of several active breeding colonies of the endangered wood stork (*Mycteria americana*). The CFA is defined as all lands within 18.6 miles of the colony. The Service believes the loss of wetlands within a CFA may reduce foraging opportunities for wood storks. The project will impact wetlands that may provide foraging habitat for the wood stork. However, the amount of wetlands impacted by the project has not yet been quantified. The FDOT has determined the project "may affect, and is not likely to adversely affect" the wood stork. The Service does not have enough information at this time to provide concurrence or non-concurrence with FDOT's determination. To comply with section 7 of the Act, the FDOT has committed to reinitiate consultation with the Service prior to advancing the project to construction. At that time, the FDOT will provide additional information, as needed, which will allow the Service to complete our analysis of the project's effects on the wood stork and complete consultation on the project. The FDOT must document this commitment in their final environmental document, and in documents for any subsequent reevaluation of the project.

Audubon's crested caracara

The project site is located within the geographic range of the threatened Audubon's crested caracara (*Polyborus cheriway = Polyborus plancus audubonii*). Active nests of the Audubon's crested caracara were not observed during surveys conducted by the FDOT's consultant in 2013. The FDOT has determined the project "may affect, and is not likely to adversely affect" the Audubon's crested caracara. The Service does not have enough information at this time to provide concurrence or non-concurrence with FDOT's determination. To comply with section 7 of the Act, the FDOT has committed to reinitiate consultation with the Service prior to advancing the project to construction. At that time, the FDOT will provide additional information, as needed, which will allow the Service to complete our analysis of the project's effects on the caracara and complete consultation on the project. The FDOT must document this commitment in their final environmental document, and in documents for any subsequent reevaluation of the project.

Florida scrub-jay

The project is located within the geographic range of the threatened Florida scrub-jay (FSJ; *Aphelocoma coerulescens*). Complete surveys for the FSJ, based on the Service's guidance, have not yet been conducted within and near the project footprint. The FDOT has determined the project "may affect, and is not likely to adversely affect" the FSJ. The Service does not have enough information at this time to provide concurrence or non-concurrence with FDOT's determination. To comply with section 7 of the Act, the FDOT has committed to reinitiate consultation with the Service prior to advancing the project to construction. At that time, the FDOT will provide additional information, as needed, which will allow the Service to complete our analysis of the project's effects on the FSJ and complete consultation on the project. The FDOT must document this commitment in their final environmental document, and in documents for any subsequent reevaluation of the project.

Sand skink and blue-tailed mole skink

The project is located within the geographic range of the threatened sand skink (*Plestiodon reynoldsi = Neoseps reynoldsi*) and blue-tailed mole skink (*Plestiodon egregius lividus = Eumeces egregius lividus*). Tracks of the sand skink were observed during the pedestrian surveys of the project site conducted by the FDOT's consultant. The FDOT has determined the project "may affect and is not likely to adversely affect" the sand skink and blue-tailed mole skink. The Service does not have enough information at this time to provide concurrence or non-concurrence with FDOT's determination. To comply with section 7 of the Act, the FDOT has committed to reinitiate consultation with the Service prior to advancing the project to construction. At that time, the FDOT will provide additional information, as needed, which will allow the Service to complete our analysis of the project's effects on sand skinks and blue-tailed mole skinks and complete consultation on the project. The FDOT must document this commitment in their final environmental document, and in documents for any subsequent reevaluation of the project.

Thank you for your cooperation in the effort to protect federally listed species and fish and wildlife resources. If you have any questions regarding this project, please contact John Wrublik at 772-469-4282.

Sincerely yours,

for Craig Aubrey
Field Supervisor
South Florida Ecological Services Office

cc: electronic only
Corps, Palm Beach Gardens, Florida (Garett Lips)
FHWA, Tallahassee, Florida (Benito Cunill)
FWC, Tallahassee, Florida (FWC-CPS)
NOAA Fisheries, St. Petersburg, Florida (David Rydene)

LITERATURE CITED

Kautz, R., R. Kawula, T. Hoctor, J.Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How much is enough? Landscape-scale conservation for the Florida panther. Biological Conservation 130:118-133.

Thatcher, C. A., F. T. van Manen, and J. D. Clark. 2006. An assessment of habitat north of the Caloosahatchee River for Florida panthers. Leetown Science Center, Southern Appalachian Research Branch, U. S. Geological Survey, Knoxville, Tennessee, USA.

U. S. Fish and Wildlife Service (Service). 2013. Standard Protection Measures for the Eastern Indigo Snake. http://www.fws.gov/verobeach/ListedSpeciesReptiles.html

UNITED STATES FISH AND WILDLIFE SERVICE MAY 2015 BIOLOGICAL OPINION

United States Department of the Interior

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

May 21, 2015

James Christian
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Service CPA Code:	04EF2000-2011-CPA-0158
Service Consultation Code:	04EF2000-2011-F-0150
Date Received:	December 12, 2014
Consultation Initiation Date:	December 12, 2014
Project:	U.S. Highway 27 from Highlands County Line to North of State Road 60
County:	Polk

Dear Mr. Christian:

The U.S. Fish and Wildlife Service (Service) has found some typographical errors in our Biological Opinion contained in the letter to the Federal Highway Administration dated May 11, 2015, for the project referenced above. The Service has corrected the errors and we submit the attached letter dated May 21, 2015, to replace our letter dated May 11, 2015.

Thank you for your cooperation in the effort to protect federally listed species and fish and wildlife resources. If you have any questions regarding this project, please contact John Wrublik at 772-469-4282.

Sincerely yours,

Donald (Bob) Progulske
Everglades Field Supervisor
South Florida Ecological Services Office

cc: electronic only
Corps, Tampa, Florida (Elizabeth Bishop)
NOAA Fisheries, St Petersburg, Florida (David Rydene)
FWC, Tallahassee, Florida (FWC-CPS)
FHWA, Tallahassee, Florida (Cathy Kendall)
Service, Atlanta, Georgia (Dave Flemming)
Service, St. Petersburg, Florida (Todd Mecklenborg)
Service, Vero Beach, Florida (David Bender, Marilyn Knight)

United States Department of the Interior

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

May 21, 2015

James Christian
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Service CPA Code:	04EF2000-2011-CPA-0158
Service Consultation Code:	04EF2000-2011-F-0150
Date Received:	December 12, 2014
Consultation Initiation Date:	December 12, 2014
Project:	U.S. Highway 27 from Highlands County Line to North of State Road 60
County:	Polk

Dear Mr. Christian:

The Service has received your letter dated December 5, 2014, requesting we initiate formal consultation for the Federal Highway Administration's (FHWA) authorization of the Florida Departments of Transportation's (FDOT) U.S. Highway 27 from the Highlands County Line to North of State Road 60 widening project (US 27 project). This document transmits the Service's Biological Opinion on the US 27 project and its effects on the threatened Florida scrub-jay (*Aphleocoma coerulescens; scrub-jay*), sand skink (*Plestiodon reynoldsi = Neoseps reynoldsi*), blue-tailed mole skink (*Plestiodon egregius lividus = Eumeces egregius lividus*), scrub buckwheat (*Eriogonum longifolium var. gnaphaflfolium*), and papery whitlow-wort (*Pronychia chartacea*); and the endangered pygmy fringe tree (*Chionanthys pygmaeus*), short-leaved rosemay (*Conradina brevifolia*), sandlace (*Polygonella myriophylla*), and scrub plum (*Prunus geniculata*) . It also includes and summarizes our determinations for the endangered Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Everglade snail kite (*Rostrhamus sociabilis*), Florida bonneted bat (*Eumops floridanus*), and Florida panther (*Puma concolor coryi*); and the threatened eastern indigo snake (*Drymarchon corais couperi = Drymarchon couperi*), wood stork (*Mycteria americana*), and Audubon's crested caracara (*Caracara cheriway = Polyborus plancus audubonii*). This document is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended in 1998 (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

Consultation History

In a letter to the Service dated February 19, 2014, the FDOT (a designated representative of the FHWA for informal Section 7 consultations under the Act) provided an Endangered Species Biological Assessment (ESBA) for the US 27 project. The FDOT determined the project may affect, but is not likely to adversely affect the endangered Florida grasshopper sparrow,

Everglade snail kite, Florida bonneted bat, and Florida panther; and the threatened eastern indigo snake, wood stork, sand skink, blue-tailed mole skink, Florida scrub-jay, and Audubon's crested caracara. The FDOT also determined the US 27 project may affect, and is likely to adversely affect the threatened scrub buckwheat and papery whitlow-wort, and the endangered pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum.

In a letter to the FDOT dated February 25, 2014, the Service provided concurrence for the FDOT's determination for the Eastern indigo snake, Florida grasshopper sparrow, Everglade snail kite, Florida bonneted bat, Florida panther, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace and scrub plum. The Service also indicated we did not have enough information to provide concurrence or non-concurrence with FDOT's determinations for the wood stork, Audubon's crested caracara, scrub-jay, sand skink, and blue-tailed mole skink. Finally, the Service also stated we did we do not have enough information to initiate formal consultation pursuant to section 7 of the Act for the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum.

In a letter to the Service dated November 11, 2014, the FDOT provided an addendum to its ESBA that provided additional information on the US 27 project. Specifically, the addendum provided results of surveys conducted in and near the project footprint for federally listed species discussed in the Service's February 25, 2014, letter. Based on the survey results, 39.67 acres (ac) [16.1 hectares (ha)] of occupied sand skink habitat and 6.2 ac (2.51 ha) of occupied scrub-jay habitat was identified on the project site.

In a letter to the Service dated December 5, 2014, the FHWA determined the US 27 project may affect and is likely to adversely affect the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum. The FHWA requested the Service initiate formal consultation for the US 27 project's adverse effects to these species pursuant to section 7 of the Act.

Species not likely to be adversely affected by the proposed action

As indicated above, several additional federally-listed species may occur within the project area. The Service has already provided concurrence to the FDOT for their determination that the US 27 project may affect, but is not likely to adversely affect the eastern indigo snake, Florida grasshopper sparrow, Everglade snail kite, Florida bonneted bat, and Florida panther (Service 2014). The Service also received additional information from the FDOT in their letter to the Service dated November 11, 2014, regarding the US 27 project's effects to the wood stork, and Audubon's crested caracara.

Wood stork

The US 27 project site is located in the geographic range of the wood stork. The project will fill 12.25 ac (4.96 ha) of wetlands, canals, and ditches that provide potential foraging habitat for the wood stork. Based on the minor loss of potential foraging habitat, the Service concurs with the FDOT's determination that the US 27 project may affect, but is not likely to adversely affect the

wood stork. Critical habitat has not been designated for the wood stork and will not be affected. The FDOT used the Service's *Wood Stork Foraging Habitat Assessment Methodology* (Service 2012) to assess the amount of wood stork forage biomass lost from the project. Approximately 4.53 kilograms (kg) of wood stork forage biomass from 7.11 ac of short hydroperiod wetlands (inundated < 180 days per year), and 17.3 kg of wood stork forage biomass from 5.14 ac of long hydroperiod wetlands (inundated ≥ 180 days per year) will be lost due to the project. As a conservation measure, the FDOT will provide credits providing at least 4.53 kg of wood stork forage biomass from short hydroperiod wetlands and 17.3 kg of wood stork forage from long hydroperiod wetlands from an approved wetland mitigation bank to offset the loss of potential wood stork foraging habitat resulting from the project.

Audubon's crested caracara

The project site is located in the geographic range of the Audubon's crested caracara. To determine the status of caracara nesting on and near the project footprint, consultants to the FDOT conducted surveys of suitable habitat in January, February, March, and April of 2014 based on the Service's protocol (Service 2004). Active nests of the caracara were not observed during the surveys. Based on the information provided, the Service concurs with the FDOT's determination that the US 27 project may affect, but is not likely to adversely affect the caracara. Critical habitat has not been designated for the caracara, and will not be affected.

BIOLOGICAL OPINION

The purpose of this section is to document the Service's opinion as to whether the US 27 project is: (1) likely to jeopardize the continued existence (also referred to in this document by the term "jeopardy") of the scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum and (2) likely to result in in the destruction or adverse modification of designated critical habitat for these species.

Jeopardy is defined as an action that is reasonably expected, directly or indirectly, to diminish the numbers, reproduction, or distribution of a species so that the likelihood of survival and recovery in the wild of the species is appreciably reduced. In making a determination on whether an action will result in jeopardy, the Service begins by looking at the current status of the species, or "baseline." Added to the baseline are the various direct, indirect, interrelated, and interdependent effects of the proposed Federal action. The Service also examines the cumulative effects of other non-Federal actions that may occur in the action area, including state, tribal, local, or private activities that are reasonably certain to occur in the project area.

Critical habitat is defined as: (1) specific geographic areas within the occupied range of a species containing physical or biological features essential for the conservation of the species (these areas may also require special management and protection) and (2) specific areas outside the occupied geographic range of the species that are essential for the conservation of the species.

Destruction or adverse modification of critical habitat is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a species. Such alterations include, but are not limited to, those that modify any physical or biological feature or features that were the basis of the designation of the critical habitat for the species.

This Biological Opinion is based on information provided in the FDOT's letter to the Service dated October 31, 2014; information on the project from the applicant's consultant; and meetings, telephone conversations, emails, and other sources of information. A complete record of this consultation is on file at the Service's South Florida Ecological Services Office, Vero Beach, Florida. As of December 5, 2014, the Service had received all the information necessary for initiation of formal consultation on the scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace and scrub plum for this project as required in the regulations governing interagency consultations (50 CFR § 402.14). The Service is providing this Biological Opinion in conclusion of formal consultation for the U.S. 27 Project.

DESCRIPTION OF PROPOSED ACTION

The FDOT has requested authorization and funding from the FHWA for the construction of the U.S. 27 project. The project consists of widening an 18.8-mile segment of U.S. Highway 27 from the Highlands County Line to North of State Road (SR) 60. The existing four-lane roadway will be enlarged to six lanes. The project will also include improvements to the existing U.S. Highway 27 interchange at SR 60. The 60 ac (24.28 ha) project footprint consists of disturbed uplands, citrus groves, ditches, and an abandoned railroad bed. A total of 0.236 ac (0.096 ha) of jurisdictional ditches will be filled in association with the project. The purpose of the project is to reduce traffic congestion associated with ongoing human population growth and development. The FDOT used an Average Annual Daily Traffic Standard Urban Transportation Model, and Polk County population projections, to determine that the existing four lane roadway would need to be expanded to six lanes for U.S. Highway 27 to operate at or above the minimum acceptable level of service established for the Florida Intrastate Highway System. The time needed to complete the project is not precisely known. However, it is likely that all works associated with the project will be completed in two to three years. The project site is located in Sections 2, 3, 10, 11, 14, 23, 26, and 35, Township 30 South, Range 27 East; Sections 2, 3, 10, 11, 14, 15, 22, 23, 26, 35, and 36, Township 31 South, Range 27 East; Sections 1 and 13, Township 32 South, Range 27 East; and Sections 6, 7, 18, 19, 29, 30, 32, and 33, Township 32 South, Range 28 East, in Polk County, Florida (Figure 1).

To minimize the loss of federally listed plants resulting from the project, the FDOT has proposed to work with Bok Tower Gardens (BTG), a participating institution of the National Center for Plant Conservation (NCPC), to collect seeds or cuttings or translocate (depending on the species) Federally listed plants found in the project footprint. The extent of the collection process or transplanting efforts will be determined by the BTG personnel so that the most imperiled species will have priority status. There are limitations of available space in the BTG collection beds for transplanting. Consequently, the measures enacted may not include conservation of each individual plant specimen, but are intended to maintain a genetically distinct population of each species. Plant materials that are collected (*i.e.*, seeds or cuttings) would be under the protection of the NCPC and either stored or used for propagation. Transplanted individuals may be relocated to the National Collection Beds that exist on-site at the BTG, depending on available space. It may also be possible to use volunteer resources, such as nurseries associated with the Florida Native Plant Society (FNPS), to temporarily cultivate and care for collected plants, cuttings, and seedlings until permanent placement within nearby conservation lands can be coordinated.

Action area

The action area is defined as all areas to be directly or indirectly affected by the Federal action and not just the immediate area involved in the action. The project will result in the widening of an existing roadway. The Service notes the project will not provide new access to undeveloped lands. Therefore, it is unlikely the project will induce new development in the project area. However, the widening of the existing roadway will introduce new paved traffic lanes and associated disturbance from construction activities and motor vehicle traffic using the roadway following completion of the project into lands immediately adjacent to the existing roadway footprint. Consequently, the Service considers the action area for this project as all lands within the project footprint, and all lands within 500 feet (ft) [152.4 m] of the project footprint. The Service believes an action area of this size is sufficiently large to capture the indirect and cumulative effects resulting from the proposed roadway widening.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Florida scrub-jay

This section summarizes Florida scrub-jay biology and ecology as well as information regarding the status and trends of the Florida scrub-jay throughout its entire range. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of the species. The Environmental Baseline section summarizes information on status and trends of the Florida scrub-jay specifically within the action area. This summary provides the foundation for the Service's assessment of the effects of the proposed action, as presented in the Effects of the Action section. A thorough history of the biology and ecology of the Florida scrub-jay can be found in the *South Florida Multi-Species Recovery Plan* (Service 1999).

Species/critical habitat description

Scrub-jays are about 10 to 12 inches long and weigh about 3 ounces. They are similar in size and shape to blue jays (*Cyanocitta cristata*), but differ significantly in coloration (Woolfenden and Fitzpatrick 1996a). In addition, the scrub-jay lacks the crest, white-tipped wings and tail feathers, black barring, and a bridle seen in the blue jay. The scrub-jay's head, nape, wings, and tail are pale blue, and its body is pale gray on its back and belly. The throat and upper breast are lightly striped and bordered by a pale blue-gray "bib" (Woolfenden and Fitzpatrick 1996a). Scrub-jay sexes are not distinguishable by plumage (Woolfenden and Fitzpatrick 1984), and males, on average, are only slightly larger than females (Woolfenden 1978). The sexes may be identified by a distinct "hiccup" call made only by females (Woolfenden and Fitzpatrick 1984, 1986). Scrub-jays that are less than about 5 months of age are smoky gray on the head and back, and lack the blue crown and nape of adults. Molting occurs between early June and late November and peaks between mid-July and late September (Bancroft and Woolfenden 1982). During late summer and early fall, when the first basic molt is nearly done, fledgling scrub-jays may be indistinguishable from adults in the field (Woolfenden and Fitzpatrick 1984). The wide variety of vocalizations of scrub-jays is described in Woolfenden and Fitzpatrick (1996b).

The Florida scrub-jay is classified within a "superspecies complex" of four species of *Aphelocoma* that are distributed within the United States and Mexico. The western scrub jay (*A. californica*) occurs from southwestern Washington through Baja California, the island scrub-jay (*A. insularis*) is found on Santa Cruz in the Channel Islands of California, Woodhouse's scrub-jay (*A. woodhousii*) occurs from western United States to Oaxaca, Mexico, and the Florida scrub-jay (*A. coerulescens*) is restricted to peninsular Florida (American Ornithologists' Union [AOU] 1983). Other congeneric jays include the Mexican jay or gray-breasted jay (*A. ultramarina*) and the unicolored jay (*A. unicolor*) of Central America and southwest North America (Woolfenden and Fitzpatrick 1996b).

The Florida scrub-jay was originally named *Corvus coerulescens* by Bosc in 1795 and the genus was changed to *Aphelocoma* in 1851 by Cabanis. In 1858, Baird adopted species name *coerulescens*. The Florida scrub-jay has been considered a subspecies (*A. c. coerulescens*) for the past several decades (AOU 1957), but recently regained recognition as a full species (*A. coerulescens*) from the AOU (AOU 1995) based on genetic, morphological, and behavioral differences from the western scrub-jay and the island scrub-jay. This species account references the full species name, *A. coerulescens*, as listed in the Federal Register (Service 1987). The term "scrub-jay" will be used to indicate the Florida scrub-jay throughout the remainder of this document.

Critical habitat has not been designated for the Florida scrub-jay. Therefore, critical habitat will not be affected by the project.

Life history

The scrub-jay prefers xeric oak scrub habitats within the ancient dune systems of peninsular Florida (Laessle 1958, 1968; Myers 1990). This plant community type occurs on well-drained to excessively well-drained sandy soils that are nutrient-poor, and is adapted to periodic drought, and frequent fires (Abrahamson 1984). Xeric oak scrub on the Lake Wales Ridge (LWR) is characterized by four species of stunted, low-growing oaks: sand live oak (*Quercus geminata*), Chapman oak (*Q. chapmanii*), myrtle oak (*Q. myrtifolia*), and scrub oak (*Q. inopina*) (Myers 1990). Optimal scrub-jay habitat contains the following attributes: (1) 10 to 50 percent bare sand or sparse herbaceous vegetation; (2) greater than 50 percent of the shrub layer made up of scrub oaks; (3) a mosaic of oak scrubs that occur in optimal height (4 to 6 ft [1.22 to 1.83 m]) and shorter; (4) less than 15 percent canopy cover; and (5) greater than 984 ft (299.9 m) from a forest (Breininger et al. 1998). Woolfenden and Fitzpatrick (1991) reported optimal habitat for scrub-jays on the LWR contains oaks are 3 to 10 ft (0.91 to 3.05 m) high, interspersed with 10 to 50 percent unvegetated, sandy openings, and a sand pine (*Pinus clausa*) canopy of less than 20 percent. Other plant species often found in optimal scrub-jay habiat include: saw palmetto (*Serenoa repens),* scrub palmetto *(Sabal etonia*), Florida rosemary (*Ceratiola ericoides*), and rusty lyonia (*Lyonia ferruginea*).

Scrub-jays occupy areas with less scrub oak cover and fewer openings on the Merritt Island/Cape Canaveral Complex in east central Florida and in southwest Florida than typical of xeric oak scrub habitat on the LWR (Schmalzer and Hinkle 1992b; Breininger et al. 1995; Thaxton and Hingtgen 1996). The predominant plant communities in these localities are oak scrub and scrubby flatwoods. Scrubby flatwoods differ from other scrub communities by containing a

sparse canopy of slash pine (*Pinus elliotii*). Scrubby flatwoods usually do not contain sand pines, scrub oak and scrub palmetto, but runner oak (*Q. minima*), turkey oak (*Q. laevis*), bluejack oak (*Q. incana*), and longleaf pine (*Pinus palustris*) have been reported. The scrubby flatwoods within the Kennedy Space Center, in Brevard County, support one of the largest contiguous populations of scrub-jays, and studies conducted there give good descriptions of this habitat type (Schmalzer and Hinkle 1992b).

Much potential scrub-jay habitat occurs as patches of oak scrub within a matrix of little-used habitat of saw palmetto and herbaceous swale marshes (Breininger et al. 1991, 1995). These native matrix habitats supply prey for scrub-jays and habitat for other species of conservation concern. The flammability of native matrix habitats is important for spreading fires into oak scrub (Breininger et al. 1995, 2002). Degradation or replacement of native matrix habitats with habitat fragments and industrial areas attract predators of scrub-jays, such as fish crows (*Corvus ossifragus*), that are rare in most regularly burned, native matrix habitats (Breininger and Schmalzer 1990; Woolfenden and Fitzpatrick 1991). Matrix habitats often develop into woodlands and forests when there is a disruption of fire regimes. These woodlands and forests are not suitable for scrub-jays, decrease the habitat suitability of nearby scrub, attract predators, and further disrupt fire patterns.

Scrub-jays have a social structure that involves cooperative breeding, a trait not observed for the other North American species of scrub-jays (Woolfenden and Fitzpatrick 1984, 1990). Scrub-jays live in families ranging from two birds (a single mated pair) to extended families of eight adults (Woolfenden and Fitzpatrick 1984) and one to four juveniles. Fledgling scrub-jays stay with the breeding pair in their natal territory as "helpers," forming a closely-knit, cooperative family group. Prebreeding numbers are generally reduced to either a pair with no helpers or families of three or four individuals (a pair plus one or two helpers) (Woolfenden and Fitzpatrick 1996a).

Scrub-jays have a well-developed intrafamilial dominance hierarchy with breeder males most dominant, followed by helper males, breeder females, and, finally, female helpers (Woolfenden and Fitzpatrick 1977, 1984). Helpers take part in sentinel duties, territorial defense, predator-mobbing, and the feeding of both nestlings and fledglings (McGowan and Woolfenden 1989, 1990; Stallcup and Woolfenden 1978, Woolfenden and Fitzpatrick 1984). The well-developed sentinel system involves having one individual occupying an exposed perch watching for predators or territory intruders. When a predator is seen, the sentinel scrub-jay gives a distinctive warning call (McGowan and Woolfenden 1989, 1990), and all family members seek cover in dense shrub vegetation (Fitzpatrick et al. 1991).

Scrub-jay pairs occupy year-round, multipurpose territories (Woolfenden and Fitzpatrick 1978, 1984; Fitzpatrick et al. 1991). Territory size averages 22 to 25 ac, with a minimum size of about 12 ac (Woolfenden and Fitzpatrick 1984, 1990; Fitzpatrick et al. 1991). The availability of territories is a limiting factor for scrub-jay populations. Because of this limitation, nonbreeding adult males may stay at the natal territory as helpers for up to 6 years, waiting for either a mate or territory to become available (Woolfenden and Fitzpatrick 1984). Scrub-jays may become breeders in several ways: (1) by replacing a lost breeder on a non-natal territory (Woolfenden and Fitzpatrick 1984); (2) through "territorial budding," where a helper male becomes a breeder in a segment of its natal territory (Woolfenden and Fitzpatrick 1978); (3) by inheriting a natal

territory following the death of a breeder; (4) by establishing a new territory between existing territories (Woolfenden and Fitzpatrick 1984); or (5) through "adoption" of an unrelated helper by a neighboring family followed by resident mate replacement (Woolfenden and Fitzpatrick 1984). Territories also can be created by restoring habitat through effective habitat management efforts in areas that are overgrown (Thaxton and Hingtgen 1994).

To become a breeder, a scrub-jay must find a territory and a mate. Evidence presented by Woolfenden and Fitzpatrick (1984) suggests scrub-jays are monogamous. The pair retains ownership and sole breeding privileges in its particular territory year after year. Courtship to form the pair is lengthy and ritualized and involves posturing and vocalizations made by the male to the female (Woolfenden and Fitzpatrick 1996b). Copulation between the pair is generally out of sight of other scrub-jays (Woolfenden and Fitzpatrick 1984). These authors also reported never observing copulation between unpaired scrub-jays or courtship behavior between a female and a scrub-jay other than her mate. Age at first breeding in the scrub-jay varies from 1 to 7 years, although most individuals become breeders between 2 and 4 years of age (Fitzpatrick and Woolfenden 1988). Persistent breeding populations of scrub-jays exist only where there are scrub oaks in sufficient quantity and form to provide an ample winter acorn supply, cover from predators, and nest sites during the spring (Woolfenden and Fitzpatrick 1996b).

Scrub-jay nests are typically constructed in shrubby oaks, at a height of 1.6 to 8.2 ft (0.49 to 2.50 m)(Woolfenden 1974). Sand live oak and scrub oak are the preferred shrubs on the LWR (Woolfenden and Fitzpatrick 1996b), and myrtle oak is favored on the Atlantic Coastal Ridge (Toland 1991) and southern Gulf coast. In suburban areas, scrub-jays nest in the same evergreen oak species as well as in introduced or exotic trees; however, they build their nests in a significantly higher position in these oaks than when in natural scrub habitat (Bowman et al. 1996). Scrub-jay nests are an open cup, about 7 to 8 inches outside diameter and 3 to 4 inches inside diameter. The outer basket is bulky and built of course twigs from oaks and other vegetation, and the inside is lined with tightly wound palmetto or cabbage palm (*Sabal palmetto*) fibers. There is no foreign material as may be present in a blue jay nest (Woolfenden and Fitzpatrick 1996b).

Nesting is synchronous, normally occurring from 1 March through 30 June (Woolfenden and Fitzpatrick 1984). On the Atlantic Coastal Ridge and southern Gulf coast, nesting may be protracted through the end of July. In suburban habitats, nesting is consistently started earlier (March) than in natural scrub habitat (Fleischer 1996), although the reason for this is unknown. Clutch size ranges from one to five eggs, but is typically three or four eggs (Woolfenden and Fitzpatrick 1990). Clutch size is generally larger in suburban habitats, and the birds try to rear more broods per year (Fleischer 1996). Double brooding by as much as 20 percent has been documented on the Atlantic Coastal Ridge and in suburban habitat within the southern Gulf coast, compared to about 2 percent on the LWR. Scrub-jay eggs measure 1.1 inches x 0.8 inches (length x breadth) (Woolfenden and Fitzpatrick 1996b), and coloration "varies from pea green to pale glaucous green...blotched and spotted with irregularly shaped markings of cinnamon rufous and vinaceous cinnamon, these being generally heaviest about the larger end" (Bendire 1895). Eggs are incubated for 17 to 19 days (Woolfenden 1974), and fledging occurs 15 to 21 days after hatching (Woolfenden 1978). Only the breeding female incubates and broods eggs and nestlings (Woolfenden and Fitzpatrick 1984). Average production of young is two fledglings per pair, per

year (Woolfenden and Fitzpatrick 1990; Fitzpatrick et al. 1991), and the presence of helpers improves fledging success (Woolfenden and Fitzpatrick 1990; Mumme 1992). Annual productivity must average at least two young fledged per pair for a population of scrub-jays to support long-term stability (Fitzpatrick et al. 1991).

Fledglings depend upon adults for food for about 10 weeks, during which time they are fed by both breeders and helpers (Woolfenden 1975; McGowan and Woolfenden 1990). Survival of scrub-jay fledglings to yearling age class averages about 35 percent in optimal scrub, while annual survival of both adult males and females averages around 80 percent (Woolfenden and Fitzpatrick 1996b). Data from Archbold Biological Station, however, suggest survival and reproductive success of scrub-jays in suboptimal habitat is lower (Woolfenden and Fitzpatrick 1991). These data help explain why local populations inhabiting unburned, late successional habitats become extirpated. Similarly, data from Indian River County show mean annual productivity declines significantly in suburban areas where Toland (1991) reported productivity averaged 2.2 young fledged per pair in contiguous optimal scrub, 1.8 young fledged per pair in fragmented moderately-developed scrub, and 1.2 young per pair fledged in very fragmented suboptimal scrub. The longest observed lifespan of a scrub-jay is 15.5 years at Archbold Biological Station in Highlands County (Woolfenden and Fitzpatrick 1996b).

Scrub-jays are nonmigratory and permanently territorial. Juveniles stay in their natal territory for up to 6 years before dispersing to become breeders (Woolfenden and Fitzpatrick 1984, 1986). Once scrub-jays pair and become breeders, generally within two territories of their natal area, they stay on their breeding territory until death. In suitable habitat, fewer than 5 percent of scrub-jays disperse more than 5 miles (Stith et al. 1996). All documented long-distance dispersals have been in unsuitable habitat such as woodland, pasture, or suburban plantations. Scrub-jay dispersal behavior is affected by the intervening land uses. Protected scrub habitats will most effectively sustain scrub-jay populations if they are located within surrounding habitat types that can be used and traversed by scrub-jays. Brushy pastures, scrubby corridors along railway and road rights-of-way, and open burned flatwoods offer links for colonization among scrub-jay populations. Stith et al. (1996) believe a dispersal distance of 5 miles is close to the biological maximum for scrub-jays.

Scrub-jays forage mostly on or near the ground, often along the edges of natural or man-made openings. They visually search for food by hopping or running along the ground beneath the scrub or by jumping from shrub to shrub. Insects, particularly orthopterans (*e.g.*, locusts, crickets, grasshoppers, beetles) and lepidopteran (*e.g.*, butterfly and moth) larvae, form most of the animal diet throughout most of the year (Woolfenden and Fitzpatrick 1984). Small vertebrates are eaten when encountered, including frogs and toads (*Hyla femoralis*, *H. squirella,* rarely *Bufo quercicus,* and unidentified tadpoles, lizards (*Anolis carolinensis*, *Chemidophorus sexlineatus*, *Sceloporus woodi*, *Eumeces inexpectatus*, *Neoseps reynoldsi*, *Ophisaurus compressus*, *O. ventralis*), small snakes (*Thamnophus sauritus*, *Opheodrys aestivus*, *Diadophis punctatus*), small rodents (cotton rat [*Sigmodon hispidus*], *Peromyscus polionotus*, black rat [*Rattus rattus*] young), downy chicks of the bobwhite (*Colinus virginianus*), and fledgling common yellowthroat (*Geothlypis trichas*). In suburban areas, scrub-jays will accept supplemental foods once the scrub-jays have learned about them (Woolfenden and Fitzpatrick 1984).

Acorns are the principal plant food (Woolfenden and Fitzpatrick 1984; Fitzpatrick et al. 1991). From August to November each year, scrub-jays may harvest and cache 6,500 to 8,000 oak (*Quercus* spp.) acorns throughout their territory. Acorns are typically buried beneath the surface of bare sand patches in the scrub during fall, and retrieved and consumed year-round, though most are consumed in fall and winter (DeGange et al. 1989). On the Atlantic Coastal Ridge, acorns are often cached in pine trees, either in forks of branches, in distal pine boughs, under bark, or on epiphytic plants, from 1 to 30 ft (0.3 to 9.1 m) in height. Other small nuts, fruits, and seeds also are eaten (Woolfenden and Fitzpatrick 1984).

Status and distribution

The scrub-jay was federally listed as threatened in 1987 primarily because of habitat fragmentation, degradation, and loss (Service 1987).

Historically, oak scrub habitat used by the scrub-jay occurred as numerous isolated patches in peninsular Florida. These patches were concentrated along both the Atlantic and Gulf coasts and on the central ridges of the peninsula (Davis 1967). Probably until as recently as the 1950s, scrub-jay populations occurred in the scrub habitats of 39 of the 40 counties south of, and including Levy, Gilchrist, Alachua, Clay, and Duval Counties. Historically, most of these counties would have contained hundreds or even thousands of breeding pairs (Fitzpatrick et al. 1994). Only the southernmost county, Monroe, lacked scrub-jays (Woolfenden and Fitzpatrick 1996a). Although scrub-jay numbers probably began to decline when European settlement began in Florida (Cox 1987), the decline was first noted in the literature by Byrd (1928). After 40 years of personal observation of the Etonia scrub (now known as Ocala National Forest), Webber (1935) observed many changes to the previously-undisturbed scrub habitat found there, noting "The advent of man has created a new environmental complex."

A state-wide scrub-jay census was last conducted in 1992 and 1993, at which time there were an estimated 4,000 pairs of scrub-jays left in Florida (Fitzpatrick et al. 1994). At that time, the scrub-jay was considered extirpated in ten counties (Alachua, Broward, Clay, Duval, Gilchrist, Hernando, Hendry, Pinellas, and St. Johns), and considered functionally extinct in an additional five counties (Flagler, Hardee, Levy, Orange, and Putnam), where ten or fewer pairs remained. Recent information indicates there are at least 12 to 14 breeding pairs of scrub-jays located within Levy County, higher than previously thought, and there is at least 1 breeding pair of scrub-jays remaining in Clay County. A scrub-jay has been documented in St. Johns County as recently as 2003. Populations are close to becoming extirpated in Gulf coast counties (from Levy south to Collier) (Woolfenden and Fitzpatrick 1996a). In 1992 to 1993, population numbers in 21 of the counties were below 30 or fewer breeding pairs (Fitzpatrick et al. 1994). Based on the amount of destroyed scrub habitat, scrub-jay population loss along the LWR is 80 percent or more since pre-European settlement (Fitzpatrick et al. 1991). Since the early 1980s, Fitzpatrick et al. (1994) estimated in the northern third of the species' range, the scrub-jay has declined somewhere between 25 and 50 percent. The species may have declined by as much as 25 to 50 percent in the last decade alone (Stith et al. 1996).

On protected lands, scrub-jays have continued to decline due to inadequate habitat management (Stith 1999). However, over the last several years, steps to reverse this decline have occurred, and management of scrub habitat is continuing in many areas of Florida (Hastie and Eckl 1999; Stith 1999; The Nature Conservancy 2001; Turner et al. 2006a).

Stith (1999) utilized a spatially explicit, individual-based population model developed specifically for the scrub-jay to complete a metapopulation viability analysis of the species. The species' range was divided into 21 metapopulations demographically isolated from each other. Metapopulations are defined as collections of relatively discrete demographic populations distributed over the landscape; these populations are connected within the metapopulations through dispersal or migration (Hanski and Gilpin 1991). A series of simulations were run for each of the 21 metapopulations based on different scenarios of reserve design ranging from the minimal configuration consisting of only currently protected patches of scrub (no acquisition option) to the maximum configuration, where all remaining significant scrub patches were acquired for protection (complete acquisition option) (Stith 1999). The assumption was made that all areas that were protected were also restored and properly managed.

Results from Stith's (1999) simulation model included estimates of extinction, quasi-extinction (the probability of a scrub-jay metapopulation falling below 10 pairs), and percent population decline. These were then used to rank the different state-wide metapopulations by vulnerability. The model predicted five metapopulations (Northeast Lake, Martin, Merritt Island, Ocala National Forest, and LWR) have low risk of quasi-extinction. Two of the five (Martin and Northeast Lake), however, experienced significant population declines under the "no acquisition" option; the probability for survival of both of these metapopulations could be improved with more acquisitions. Eleven of the remaining 21 metapopulations were shown to be highly vulnerable to quasi-extinction if no more habitats were acquired (Central Brevard, North Brevard, Central Charlotte, Northwest Charlotte, Citrus, Lee, Levy, Manatee, Pasco, St. Lucie, and West Volusia). The model predicted the risk of quasi-extinction would be greatly reduced for 7 of the 11 metapopulations (Central Brevard, North Brevard, Central Charlotte, Northwest Charlotte, Levy, St. Lucie, and West Volusia) by acquiring all or most of the remaining scrub habitat. The model predicted the remaining four metapopulations (Citrus, Lee, Manatee, and Pasco) would moderately benefit if more acquisitions were made. Two metapopulations (South Brevard and Sarasota) as moderately vulnerable with a moderate potential for improvement; they both had one or more fairly stable populations of scrub-jays under protection, but the model predicted population declines. The rest of the metapopulations could collapse without further acquisitions, making the protected populations there vulnerable to epidemics or other catastrophes. Finally, three of the metapopulations evaluated (Flagler, Central Lake, and South Palm Beach) were classified as highly vulnerable to quasi-extinction and had low potential for improvement, since little or no habitat is available to acquire or restore.

Current threats

Habitat loss

Scrub habitats have continued to decline throughout peninsular Florida since listing occurred, and habitat destruction continues to be one of the main threats to the scrub-jay. Cox (1987) noted local extirpations and major decreases in numbers of scrub-jays and attributed them to the

clearing of scrub for housing and citrus groves. Eighty (80) percent or more of the scrub habitats have been destroyed along the LWR since pre-European settlement (Turner et al. 2006a). Fernald (1989), Fitzpatrick et al. (1991), and Woolfenden and Fitzpatrick (1996a) noted habitat losses due to agriculture, silviculture, and commercial and residential development have continued to play a role in the decline in numbers of scrub-jays throughout the state. State-wide, estimates of scrub habitat loss range from 70 to 90 percent (Woolfenden and Fitzpatrick 1996a). Various populations of scrub-jays within the species' range have been monitored closely, and more precise estimates of habitat loss in these locations are available (Snodgrass et al. 1993; Thaxton and Hingtgen 1996). Toland (1999) estimated about 70 to 78 percent of pre-European settlement scrub habitats had been converted to other uses in Brevard County. This is due mainly to development activity and citrus conversion, which were the most important factors that contributed to the scrub-jay decline between 1940 and 1990. A total of only 10,656 ac of scrub and scrubby flatwoods remain in Brevard County (excluding Federal ownership), of which only 1,600 ac (15 percent) is in public ownership for the purposes of conservation. Less than 1,977 ac of an estimated pre-European settlement of 14,826 ac of scrubby flatwoods habitat remain in Sarasota County, mostly occurring in patches averaging less than 2.5 ac in size (Thaxton and Hingtgen 1996). Only 10,673 ac of viable coastal scrub and scrubby flatwoods remained in the Treasure Coast region of Florida (Indian River, Saint Lucie, Martin, and Palm Beach counties) according to Fernald (1989). He estimated 95 percent of scrub had already been destroyed for development purposes in Palm Beach County.

Habitat destruction not only reduces the amount of area scrub-jays can occupy, but also increases fragmentation of habitat. As more scrub habitat is altered, the habitat is cut into smaller and smaller pieces, separated from other patches by larger distances; such fragmentation increases the probability of inbreeding and genetic isolation, which is likely to increase extinction probability (Fitzpatrick et al. 1991; Woolfenden and Fitzpatrick 1991; Stith et al. 1996; Thaxton and Hingtgen 1996). Dispersal distances of scrub-jays in fragmented habitat are further than in optimal unfragmented habitats, and demographic success is poor (Thaxton and Hingtgen 1996; Breininger 1999).

Predation

Most scrub-jay mortality results from predation and a variety of predators have been reported to prey on scrub-jays (Woolfenden and Fitzpatrick 1990; Woolfenden and Fitzpatrick 1996a, 1996b; Fitzpatrick et al. 1991;, Schaub et al. 1992; Breininger 1999). The second most frequent cause of scrub-jay mortality may be disease, or predation on disease-weakened scrub-jays (Woolfenden and Fitzpatrick 1996b). Reptiles known to prey on scrub-jays include: eastern coachwhip (*Coluber flagellum flagellum*), eastern indigo snake, black racer (*Coluber constrictor*), pine snake (*Pituophus melanoleuous mugitus*), and corn snake (*Pantherophis guttatus*). Mammalian predators include bobcats (*Lynx rufus*), raccoons (*Procyon lotor*), sometimes cotton rats (known to eat eggs), black rats, and free-roaming cats (*Felis catus*) Franzreb and Puschock (2004) also have documented spotted skunks (*Spilogale putorius*) and grey fox (*Urocyon cinereoargenteus*) as mammalian predators of scrub-jay nestlings. Avian nest predators include the great horned owl (*Bubo virginianus*), eastern screech-owl (*Otus asio*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), fish crow, boat-tailed grackle (*Quiscalus major*), common grackle (*Q. quiscula*), American crow (*Corvus brachyrhynchos*),

blue jay, swallow-tailed kites (*Elanoides forficatus*),merlin (*Falco columbarius*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), and northern harrier. Woolfenden and Fitzpatrick (1996b) and Toland (1999) suggest hunting efficiency for scrub-jay predators is increased in overgrown scrub habitats. Bowman and Averill (1993) noted scrub-jays occupying fragments of scrub found in or near housing developments were more prone to predation by house cats and competition from blue jays and mockingbirds (*Mimus* spp.). Fitzpatrick et al. (1991) suggest that free-roaming cats are able to eliminate small populations of scrub-jays. Woolfenden and Fitzpatrick (1996a, 1996b) stated proximity to housing developments (and increased exposure to domestic cats) needs to be taken into consideration when designing scrub preserves. Young scrub-jays are especially vulnerable to ground predators (*e.g.*, snakes and mammals) before they are fully capable of sustained flight.

Parasites

The scrub-jay hosts two protozoan blood parasites (*Plasmodium cathemerium* and *Haemoproteus danilewskyi*), but incidence is low (Woolfenden and Fitzpatrick 1996b). Several scrub-jays sick from these two agents in March 1992 survived to become breeders. The scrub-jay carries at least three types of mosquito-borne encephalitis: St. Louis, eastern equine, and "Highlands jay" (Woolfenden and Fitzpatrick 1996b). Of particular concern is the arrival of West Nile virus (the agent of another type of encephalitis) in Florida during 2001 (Stark and Kazanis 2001). Because other corvids have been particularly susceptible to the disease in states north of Florida, it is expected scrub-jays will be affected (Breininger et al. 2003).

Woolfenden and Fitzpatrick (1996b) noted three episodes of elevated mortality (especially among juveniles) in 26 years at Archbold Biological Station. Each of these incidents occurred in conjunction with elevated water levels following unusually heavy rains in the fall, although high mortality does not occur in all such years. During the most severe of these presumed epidemics (August 1979 through March 1980), all but one of the juvenile cohort and almost half of the breeding adults died (Woolfenden and Fitzpatrick 1984, 1990). The 1979 through 1980 incident coincided with a known outbreak of eastern equine encephalitis among domestic birds in central Florida (Woolfenden and Fitzpatrick 1996b). From the fall of 1997 through the spring of 1998, the continuing population decline of scrub-jays along the Atlantic coast and in central Florida may have been augmented by an epidemic of unknown origin (Breininger 1999).

At Cape Canaveral Air Force Station, Stevens and Hardesty (1999) noted a decline in juvenile survival from 60 to 70 percent in the preceding years to only 22 percent in 1997 and 1998. It stayed low (only 25 percent) in 1998 and 1999 before again climbing into the mid-60 percent range. Also, adult survival dropped from 70 to 80 percent survival in the preceding years to 50 to 60 percent in 1997 and 1998. Overall, their annual surveys documented the largest 1-year drop (pairs decreased by 17 percent and birds by 20 percent) in this population at the same time as the presumed state-wide epidemic.

In the winter-summer of 1973, 15 species of intestinal parasitic fauna (including 8 nematodes, 5 trematodes, 1 cestode, and 1 acanthocephalan) were found in 45 scrub-jays collected in south-central Florida; the parasite load was attributed to a varied arthropod diet (Kinsella 1974). These naturally-occurring parasites are not believed to have a negative impact on scrub-jay population levels.

Larvae of the burrowing fly, *Philornis porteri*, occur irregularly on scrub-jay nestlings. The species pupates in the base of the nest; larvae locate in nasal openings, mouth flanges, bases of flight feathers, and toes; apparently no serious effect on the scrub-jay host occurs (Woolfenden and Fitzpatrick 1996b). Additionally, one undescribed chewing louse (*Myrsidea* sp.) (Woolfenden and Fitzpatrick 1996b), one wing-feather mite (*Pterodectes* sp.), two chiggers (*Eutrombicula lipovskyana* and *E. alfreddugesi*), and a flea (sticktight flea [*Echidnophaga gallinacea*]) (Woolfenden and Fitzpatrick 1996b) occur on some individuals, usually at low densities. Nymphs and larvae of four ticks (*Amblyomma americanum*, *A. tuberculatum*, *Haemaphysalis leporispalustris*, and *Ixodes scapularis*) are known to occur on scrub-jays, as well as the larvae of the tick *A. maculatum* (Woolfenden and Fitzpatrick 1996b). These naturally-occurring parasites were not believed to have a negative impact on scrub-jay population levels; however, a recent study of the impact of the sticktight flea on scrub-jays indicates that low fitness and death can be caused by this parasite (Boughton et al. 2006). The host vector for this flea was a domestic dog (*Canis familiaris*), suggesting introduction of human pets into scrub-jay areas may increase parasite loads and reduce fitness.

Inadequacy of existing regulatory mechanisms

Woolfenden and Fitzpatrick (1996a) state the importance of enforcing existing Federal laws regarding the management of Federal lands as natural ecosystems for the long-term survival of the scrub-jay. The Service consults regularly on activities on Federal lands which may affect scrub-jays and also works with private landowners through the section 10(a)(1)(B) incidental take permitting process of the Act when take is likely to occur and no Federal nexus is present. Florida's State Comprehensive Plan and Growth Management Act of 1985 is administered mostly by regional and local governments. Regional Planning Councils administer the law through Development of Regional Impact Reviews; at the local level, although comprehensive plans contain policy statements and natural resource protection objectives, they are only effective if counties and municipalities enact and enforce ordinances. As a general rule, counties have not enacted and enforced ordinances that are effective in protecting scrub-jays (Fernald 1989).

The Wildlife Code of the State of Florida (Chapter 68A, Florida Administrative Code) prohibits taking of individuals of threatened species, or parts thereof, or their nests or eggs, except as authorized. The statute does not prohibit clearing of habitat occupied by protected species, which limits the ability of the FWC to protect the scrub-jay and its habitat.

Other natural or anthropogenic factors

Human interference with natural fire regimes has a had a major role in the decline of the scrub-jay and may exceed habitat loss as the single most important threat to the species (Woolfenden and Fitzpatrick 1991, 1996a; Fitzpatrick et al. 1994; Schaub et al. 1992; Stith et al. 1996; Breininger et al. 1999). Lightning strikes cause virtually all naturally-occurring fires in south Florida scrub habitat (Abrahamson 1984; Hofstetter 1984; Woolfenden and Fitzpatrick 1990) and fire has been known to be important in maintenance of scrub habitat for decades (Nash 1895; Harper 1927; Webber 1935; Davis 1943; Laessle 1968; Abrahamson et al. 1984). Human efforts to prevent and/or control natural fires have allowed scrub vegetation to become too dense and tall to support populations of scrub-jays. Although scrub-jays can persist for many years in

overgrown habitats, their long-term persistence is doubtful (Swain et al. 1995; Stith et al. 1996; Root 1998; Breininger et al. 2001). The overgrowth of scrub-jay habitats due to fire suppression is resulting in the decline of local populations of scrub-jays throughout the State (Woolfenden and Fitzpatrick 1984, 1990, 1991, 1996a; Schaub et al. 1992; Stith et al. 1996; Breininger et al. 1999; Fernald 1989; Percival et al. 1995; Thaxton and Hingtgen 1996; Toland 1999; Duncan and Breininger 1998; Schmalzer and Boyle 1998; Duncan et al. 1999).

Stith et al. (1996) estimated at least 2,100 breeding pairs of scrub-jays were living in overgrown habitat. Toland (1999) reported most of Brevard County's remaining scrub (estimated to be only 15 percent of the original acreage) is overgrown due to fire suppression. He further suggests the overgrowth of scrub habitats reduces the number and size of sand openings which are crucial not only to scrub-jays, but also many other scrub plants and animals. Reduction in the number of potential scrub-jay nesting sites, acorn cache sites, and foraging sites presents a problem for scrub-jays. It appears overgrowth of scrub results not only in the decline of species diversity and abundance, but also in a reduction in the percentage of open sandy patches (Fernald 1989; Woolfenden and Fitzpatrick 1996b). Fitzpatrick et al. (1994) believed fire suppression was just as responsible as habitat loss in the decline of the scrub-jay, especially in the northern third of its range. Likewise, the continued population decline of scrub-jays within Brevard County between 1991 and 1999 has been attributed mainly to the overgrowth of remaining habitat patches (Breininger et al. 2001). Breininger et al. (1999) concluded optimal habitat management is essential in fragmented ecosystems maintained by periodic fire, especially to lessen risks of decline and extinction resulting from epidemics and hurricanes.

Woolfenden and Fitzpatrick (1996a) cautioned fire applied too often to scrub habitat can also result in local extirpations of scrub-jays. Data from Archbold Biological Station show fire-return intervals varying between 8 and 15 years are optimal for long-term maintenance of productive scrub-jay populations in central Florida (Woolfenden and Fitzpatrick 1996b). These intervals also correspond with those yielding healthy populations of listed scrub plants (Menges and Kohfeldt 1995; Menges and Hawkes 1998). Optimal fire-return intervals may, however, be shorter in coastal habitats (Schmalzer and Hinkle 1992a; Schmalzer and Hinkle 1992b).

Fitzpatrick et al. (1991, 1994) and Woolfenden and Fitzpatrick (1996a) expressed concern for the management practices taking place on Federal lands at Ocala National Forest, Merritt Island National Wildlife Refuge at the Kennedy Space Center, and Cape Canaveral Air Force Station, all supporting large contiguous populations of scrub-jays. They predicted fire suppression and/or too frequent fires (on the latter two Federal lands indicated) and silvicultural activities involving the cultivation of sand pine on Ocala National Forest would be responsible for declines of scrub-jays in these large contiguous areas of scrub. These areas should be those where populations are most secure because of Federal agencies' responsibilities under section 7(a)(1) of the Act. Monitoring of scrub-jay populations, demography, and nesting success is ongoing on all of these properties to assess the effectiveness of management practices in meeting scrub-jay recovery objectives.

Roads and motor vehicles represent a potential threat to scrub-jays. Lands immediately adjacent to roadways are usually mowed and maintained in open, low stature vegetation (*e.g.*, sod) that attracts foraging scrub-jays. The close proximity of motor vehicle traffic greatly increases the

potential that scrub-jays will be hit when they forage in these areas. Research by Mumme et al. (2000) along a two-lane paved road indicated clusters of scrub-jay territories found next to the roadside represented population sinks (breeder mortality exceeds production of breeding-age recruits) that are supported only by immigration of other birds. Injuries and mortalities due presents a significant and growing management problem throughout the remaining range of the scrub-jay (Dreschel et al. 1990; Mumme et al. 2000), and proximity to high-speed paved roads needs to be considered when designing scrub preserves (Woolfenden and Fitzpatrick 1996a).

Supplemental feeding by humans may be another threat to scrub-jays (Bowman and Averill 1993; Woolfenden and Fitzpatrick 1996a; Bowman 1998). The presence of additional food may allow scrub-jays to persist in fragmented habitats, but recruitment in these populations is lower than in native habitats. However, even though human-feeding may postpone local extirpations, long-term survival cannot be ensured in the absence of protecting native oak scrub habitat necessary for nesting. Scrub-jays in suburban settings often nest high in tall shrubbery. These nests are susceptible to destruction when windy conditions occur during the nesting season (Woolfenden and Fitzpatrick 1996b; Bowman 1998).

Breininger et al. (1999) modeled the effects of disease epidemics and hurricanes on scrub-jay populations in varying levels of habitat quality. Small populations of scrub-jays are more vulnerable to extirpation where epidemics and hurricanes are common. Storm surge from Category Three to Five hurricanes could inundate entire small populations of scrub-jays, and existing habitat fragmentation could prevent repopulation of affected areas. However, the modelling also predicted that long-term habitat degradation had greater influence on extinction risk than hurricanes or epidemics. Observations made on the Charlotte County scrub-jay populations after Hurricane Charley indicates that at least one member of all 20 family groups surveyed survived the storm (Miller 2006).

Other potential threats to the scrub-jay include off-road vehicles (ORVs), illegal dumping, and exotic plants and animals. Fernald (1989) reported many of the relatively few remaining patches of scrub within the Treasure Coast region of Florida had been degraded by trails created by ORVs, illegal dumping of construction debris, abandoned cars and appliances, or household waste. The invasion of scrub-jay habitat by exotic plant species, including Brazilian pepper (*Schinus terebinthifolius*), white cypress-pine (*Callitris glaucophylla*), and Australian pine (*Casuarina equisetifolia*) has also resulted in the degradation or loss of habitat for the scrub-jay. In addition, Fernald (1989) surmised that many exotic animal species (*e.g.*, black rats, greenhouse frogs [*Eleutherodactylus planirostris]*, giant toads [*Rhinella marina]*, Cuban tree frogs [*Osteopilus septentrionalis*], and brown anoles [*Anolis sagrei]*) may compete with scrub-jays for habitat and food.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE – SAND SKINK

The most recent review of the sand can be found in the 5-year review (Service 2007). This review builds on the detailed information in the MSRP (Service 1999) The MSRP is incorporated by reference and can be used to obtain more detailed information about these species.

Species/critical habitat description

The sand skink is a small, fossorial lizard that reaches a maximum length of about 5 inches (in) (12.7 centimeters [cm]). The tail makes up about half the total body length. The body is shiny and usually gray to grayish-white in color, although the body color may occasionally be light tan. Hatchlings have a wide black band located along each side from the tip of the tail to the snout. The band is reduced in adults and may only occur from the eye to the snout on some individuals (Telford 1959). Sand skinks contain a variety of morphological adaptations for a fossorial lifestyle. The legs are vestigial and practically nonfunctional, the eyes are greatly reduced, the external ear openings are reduced or absent (Greer 2002), the snout is wedge-shaped, and the lower jaw is countersunk.

The taxonomic classification of the sand skink has been reevaluated since it was listed as *Neoseps reynoldsi* in 1987 (52 FR 42658), and the commonly accepted scientific name for the sand skink is now *Plestiodon reynoldsi* (Brandley et al. 2005; Smith 2005). A detailed description of the recent taxonomic review can be found in Service (2007). We continue to use the scientific name as published in the final listing rule (52 FR 42658).

Critical habitat has not been designated for the sand skink.

Genetics and evolutionary history

The sand skink evolved on the central LWR (Branch et al. 2003). Analysis of mitochondrial DNA indicates populations of the sand skink are highly structured with most of the genetic variation partitioned among four lineages: three subpopulations on the LWR characterized by high haplotype diversity; and a single, unique haplotype subpopulation found only on the Mount Dora Ridge (MDR) (Branch et al. 2003). Based on the conventional molecular clock, the 4.5 percent divergence in genetic variation observed in sand skinks from the two ridges represents about a 2-million year separation of the subpopulations. The absence of haplotype diversity on the MDR suggests the population was founded by only a few individuals or severely reduced by genetic drift (Branch et al. 2003).

Distribution, habitat and abundance

The sand skink occurs on the sandy ridges of interior central Florida from Marion County south to Highlands County. The extant range of the sand skink includes Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties (Christman 1988; Telford 1998). Principal populations occur on the LWR and Winter Haven Ridges (WHR) in Highlands, Lake, and Polk Counties (Christman 1992a; Mushinsky and McCoy 1991). The sand skink is uncommon on the MDR, including sites within the Ocala National Forest (ONF) (Christman 1970; 1992a). Despite intensive sampling efforts in scrub habitat with similar herpetofauna, the sand skink has not been recorded at Avon Park Air Force Range on the Bombing Range Ridge (Branch and Hokit 2000). Although we do not have estimates of acreage for all of the ridges, the largest ridge, the LWR, encompasses approximately 517,303 ac (209,300 ha) (Weekley et al. 2008). According to the Florida Natural Areas Inventory (FNAI) database, updated as of September 2006, there were

132 records for the sand skink, including 115 localities on the LWR, 7 on the MDR, and 4 on the WHR (Griffin 2007). FNAI also reports four localities for this species west of the MDR in Lake County and two localities between the LWR and the Lake Hendry Ridge.

The sand skink is widespread in native xeric uplands containing excessively well-drained soils (Service 2012) at elevations greater than 80 ft (24.4 m) above mean sea level. Commonly occupied native habitats include Florida scrub (described as sand pine scrub, xeric oak scrub, rosemary scrub and scrubby flatwoods) as well as high pine communities that include sandhill, longleaf pine/turkey oak, turkey oak barrens and xeric hammock (see habitat descriptions in Myers 1990 and Service 1999). Coverboard transects extended from scrub or high pine (sandhill) through scrubby flatwoods to pine flatwoods revealed that sand skinks left more tracks in scrub than the other three habitats and did not penetrate further than 130 ft (39.6 m) into scrubby flatwoods or 65 ft (19.8 m) into pine flatwoods (Sutton et al. 1999). Sand skinks also use disturbed habitats such as citrus groves, pine plantations, and old fields, especially when adjacent to existing scrub (Pike et al. 2007; 2008).

Various authors have attempted to characterize optimal sand skink habitat (Telford 1959; 1962; Christman 1978; 1992a; Campbell and Christman 1982). Literature descriptions of scrub characteristics have not proven very useful to predict sand skink abundance, but expert opinion was more successful (McCoy et al. 1999). McCoy et al. (1999) used trap-out enclosures to measure sand skink densities at seven scrub sites and attempted to rank each area individually based on eight visual characteristics to identify good habitat: (1) root-free, (2) grass-free, (3) patchy bare areas, (4) bare areas with lichens, (5) bare areas with litter, (6) scattered scrubs, (7) open canopy, and (8) sunny exposure. None of the individual literature descriptions of optimal habitat (or any combination thereof) accurately predicted actual sand skink abundance at these sites, which ranged in density from 52 to 270 individuals per ac (Sutton 1996). Knowledgeable researchers can identify environmental variables important to sand skinks, but are currently not able to develop a set of rules that others could use to identify optimal sand skink habitat (McCoy et al. 1999).

Multiple studies (Collazos 1998; Hill 1999; Mushinsky and McCoy 1999; Gianopulos 2001; Mushinsky et al. 2001) have determined the relationships between sand skink density and a suite of environmental variables. These studies have found sand skink relative density was positively correlated with low canopy cover, percent bare ground, amount of loose sand and large sand particle size, but negatively correlated with understory vegetation height, litter cover, small sand particle size, soil moisture, soil temperature, and soil composition. In an unburned sandhill site at Archbold Biological Station (ABS), Meshaka and Lane (2002) captured significantly more sand skinks in pitfall traps set in openings without shrubs than at sites with moderate to heavy shrub density. Telford (1959) suggested scattered debris and litter provided moisture that was important to support an abundant food supply and nesting sites for sand skinks. Cooper (1953) noted the species was most commonly collected under rotting logs, and Christman (1992a) suggested they nest in these locations. Christman (2005) found skinks continue to occupy scrub with a closed canopy and thick humus layer, although at lower densities. Recent surveys have also shown sand skinks may occupy both actively managed lands, such as citrus groves and pine plantations, and old-field communities (Pike et al. 2007), particularly if these sites are adjacent to patches of native habitat that can serve as a source population for recolonization.

Experimental studies have been conducted to investigate the effects of management techniques, such as mechanical treatment and prescribed burning, on sand skink abundance. Several studies found a decrease in relative abundance of skinks immediately following both mechanical and burning treatments (Mushinsky and McCoy 1999; Gianopulos 2001; Gianopulos et al. 2001; Mushinsky et al. 2001; Sutton et al. 1999). Gianopulos (2001) and Gianopulos et al. (2001) reported a significant increase in skink captures in mechanical treatment plots over the 5-year period following the treatment. However, a clear increase in skink numbers following a burn was not observed (Navratil 1999; Gianopulos et al. 2001; Mushinsky et al. 2001). Christman (2005) conducted trap surveys at sites with a known burn history on the LWR in Polk and Highlands Counties and did not observe a strong correlation between skink density and number of years since the site was burned. Mushinsky et al. (2001) noted significantly larger skinks were captured in burned plots, indicating more insect prey may have been available from decaying logs following the burn, or older skinks inhabited these sites. Habitat size may be a factor in maintaining viable skink populations. Pike et al. (2006) monitored sand skinks and quantified vegetation change in six areas from 5 to 69 ac (2 to 27.9 ha) that were restored to a more natural state using fire and canopy thinning, and set aside for conservation in residential areas. Pike et al. (2006) documented a severe decline in occupancy and relative density of sand skinks, and hypothesized indirect impacts from surrounding development, such as changes in soil hydrology, may have caused the decline. Hydrologic changes in the soil may have occurred as a result of construction of retention ponds or run-off from neighborhoods that caused a rise in the groundwater level (Pike et al. 2006). The population decline of skinks noted may also have been caused by prescribed burning used to restore these sites (Mushinsky in Service 2007).

Life history

The sand skink is usually found below the soil surface burrowing through loose sand in search of food, shelter, and mates. Sand skinks feed on a variety of hard and soft-bodied arthropods that occur below the ground surface. The diet consists largely of beetle larvae and termites (*Prorhinotermes* spp.). Spiders, larval ant lions, lepidopteran larvae, roaches, and adult beetles are also eaten (Myers and Telford 1965; Smith 1982).

Sand skinks are most active during the morning and evening in spring and at mid-day in winter, periods when body temperatures can easily be maintained at a preferred level from 82 to 88 degrees Fahrenheit (27.8 to 31.1 degrees Celius) in open sand (Andrews 1994). During the hottest parts of the day, sand skinks move under shrubs to maintain their preferred body temperatures in order to remain active near the surface. With respect to season, Telford (1959) reported skinks most active from early March through early May, whereas Sutton (1996) found skinks most active from mid-February to late April. Based on monthly sampling of pitfall traps, Ashton and Telford (2006) found captures peaked in March at ABS, but in May at ONF. All of these authors suggested the spring activity peak was associated with mating. At ABS, Ashton and Telford (2006) noted a secondary peak in August that corresponded with the emergence of hatchling sand skinks.

Telford (1959) assumed sand skinks become sexually mature during the first year following hatching, at a size of 1.78 in (4.52 cm) snout-vent length. He suspected most of the breeders in his study were in their second year and measured between 1.78 and 2.24 in (4.52 and 5.69 cm) snout-vent length. However, Ashton (2005) determined sand skinks become sexually

mature between 19 and 23 months of age and have a single mating period each year from February through May. Sand skinks first reproduce at 2 years of age and females produce a single clutch in a season, although some individuals reproduce biennially or less frequently (Ashton 2005). Sand skinks lay between two and four eggs, typically under logs or debris, in May or early June (Ashton 2005; Mushinsky in Service 2007), approximately 55 days after mating (Telford 1959). The eggs hatch from June through July. Sand skinks can live at least to 10 years of age (Meneken et al. 2005). Gianopulos (2001) and Sutton (1996) found the sex ratio of sand skinks did not differ significantly from 1:1.

There is limited information available on the movements and dispersal capabilities of the sand skink. Mushinsky et al. 2001 found that most sand skinks move less than 130 ft (39.6 m) between captures, but some individuals were observed to move over 460 ft (140.2 m) in 2 weeks. Limited dispersal ability has been suggested to explain the relatively high degree of genetic structure within and among sand skink populations (Branch et al. 2003; Reid et al. 2004).

A few studies have determined the types of parasites that affect the sand skink. Analysis of blood and fecal samples obtained from 20 sand skinks in ONF demonstrated that no blood parasites were present and only normal protistan and helminth symbiotes were observed, with no evidence of effect on survival of individuals or the population (Telford 1998). Similarly, a species of nematode (*Parapharyngodon ocalaensis*) was collected from the intestinal tracts of 22 sand skinks (Bursey and Telford 2002), but it not known to be a threat to the species. Subsequently, Telford and Bursey (2003) examined 45 sand skinks from ONF and observed 3 species of endoparasites : an unknown species of ameba (*Hartmannella* spp.), and two species of coccidians (*Eimeria egregia*, and *Isospora neosepsorum*).

Population dynamics

The population dynamics of sand skinks within their extant ranges are not well known because the skink's small size and secretive habits make their study difficult. Sand skinks are known to exhibit life-history traits that are also found in a number of other fossorial lizard species, such as: delayed maturity, a small clutch size of relatively large eggs, low frequency of reproduction, and a long lifespan (Ashton 2005). Such character traits may have resulted from, and be indicative of, high intraspecific competition or predation.

Status and distribution

Reason for listing

The modification and destruction of xeric upland communities in central Florida were a primary consideration in listing the sand skink as threatened under the Act in 1987 (52 FR 42658). By some estimates, as much as 90 percent of the scrub ecosystem has already been lost to residential development and conversion to agriculture, primarily citrus groves (Kautz 1993; Turner et al. 2006b). Xeric uplands remaining on private lands are especially vulnerable to destruction because of increasing residential and agricultural pressures. The 5-year review found no justification for change in the threatened status (Service 2007).

Rangewide trends

The current status of the sand skink throughout its geographic range is unclear because recent comprehensive, rangewide surveys have not been conducted. At the time of Federal listing in 1987, FNAI had recorded 31 known sites for the sand skink. By September 2006, 132 localities were known by FNAI (Griffin 2007). This increase is largely the result of more intensive sampling of scrub habitats in recent years and does not imply this species is more widespread than originally supposed. Nonetheless, except for a few locations where intensive research has been conducted, limited information about the presence or abundance of sand skinks exists. Reptile surveys in a variety of scrub habitats in the ONF did not detect sand skinks (Greenberg et al. 1994). Telford (1998) cited the ephemeral nature of early successional scrub habitats due to dynamic changes as an important confounding factor in the evaluation of the sand skink's present status in the ONF. At least two persistent populations are known from the ONF (Telford 1998), where sand skinks have been collected for genetic analysis (Branch et al. 2003) and population studies (Ashton and Telford 2006). Additional studies have provided presence/absence information that has been used to determine the extant range of the species (Mushinsky and McCoy 1991; Stout and Corey 1995). However, few long-term monitoring efforts have been undertaken to evaluate the population size, or population trends, of sand skinks at these sites, on remaining scrub habitat on private lands, or rangewide.

Approximately 85 percent of xeric upland communities historically used by sand skinks on the LWR are estimated to have been lost due to development (Turner et al. 2006b). It is likely continued residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded habitat containing sand skinks. Protection of the sand skink from further habitat loss and degradation provides the most important means of ensuring its continued existence. Of the 73 locations examined by Turner et al. (2006a) on which sand skinks were reported, 39 are protected and, as of 2004, 27 were managed. Current efforts to expand the system of protected xeric upland communities on the LWR, coupled with implementation of effective land management practices, represent the most likely opportunity for assuring the sand skink's survival.

Existing private and public conservation lands on the LWR likely provide significant suitable habitat for sand skinks. Over the last 20 years, the State of Florida has acquired xeric upland habitat through the Florida Forever program and its predecessors (Florida Department of Environmental Protection 2008). Combined, these land acquisition programs have protected almost 25,000 ac (10,120 ha) of xeric uplands (Turner et al. 2006a). The Service has also acquired portions of several tracts totaling 1,800 ac (728.4 ha) as a component of the LWR National Wildlife Refuge (Service 1993). Finally, private organizations, such as The Nature Conservancy and ABS, have acquired and currently manage xeric uplands within the LWR. Recovery of the sand skink may also require rehabilitation of suitable but unoccupied habitat or restoration of potentially suitable habitat.

Because sand skinks have low dispersal abilities, introductions into restored or created unoccupied habitat may be necessary. Sand skinks relocated to two former citrus groves in Orange County have persisted for at least 5 years (Hill 1999; Mushinsky et al. 2001). Comparisons of persistence, recruitment, and survival were used to determine translocation

success of sand skinks on two restored scrub sites for 6 years following relocation (Mushinsky et al. 2001; Penney 2001; Penney et al. 2001). One site established a self-sustaining population, while the other did not. It was determined site location, habitat suitability, and initial propagule size were the factors affecting success; researchers concluded the chances of long-term survival may improve when habitat is restored and skinks are introduced to sites close to intact scrub, rather than to isolated sites (Mushinsky et al. 2001; Penney 2001).

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Blue tailed mole skink

Species/critical habitat description

The mole skink (*Eumeces egregius*) is a small, fossorial lizard that occupies xeric upland habitats of Florida, Alabama and Georgia (Mount 1963). Five subspecies have been described (Mount 1965), but only the blue-tailed mole skink (*Eumeces egregius lividus*) is federally listed as threatened (52 FR 42658). The blue-tailed mole skink reaches a maximum length of about 5 in (12.7 cm), and the tail makes up about half the body length. The body is shiny, and brownish to pink in color, with lighter paired dorsolateral stripes diverging posteriorly (Christman 1978). Males develop a colorful orange pattern on the sides of the body during breeding season. Juveniles usually have a blue tail (Christman 1992b). Regenerated tails and the tails of older individuals are typically pinkish. The legs are somewhat reduced in size and used only for surface locomotion and not for "swimming" through the sand (Christman 1992b).

Mount (1965) described the blue-tailed mole skink largely on the basis of a bright blue tail in juveniles and restricted this subspecies to the southern LWR in Polk and Highlands Counties. Christman (1978) also limited the range of blue-tailed mole skinks to these two counties, but later added Osceola County to the range, based on the collection of a single blue-tailed mole skink juvenile just north of the Polk County line on the LWR (Christman 1992b). Analysis of mitochondrial DNA (Branch et al. 2003) supports Mount's (1965) hypotheses that blue-tailed mole skinks from the lower LWR represents the ancestral stock, which radiated from there. Genetic analysis also indicates substantial population variability with limited dispersal in mole skinks among sandy habitats (Branch et al. 2003). Based on conventional estimates of molecular evolutionary clocks, these authors suggest a separation of approximately 4 million years between mole skinks occurring on the two oldest ridges (LWR and MDR), which overlaps the proposed Pliocene origin of scrub habitats (Webb 1990).

The taxonomic classification of the mole skinks has been reevaluated since it was listed as *Eumeces egregius lividus*, and the commonly accepted scientific name for the blue-tailed mole skink is now *Plestiodon egregius lividus* (Brandley et al. 2005; Smith 2005). A detailed description of the recent taxonomic review can be found in Service (2007). We continue to use the scientific name as published in the final listing rule (52 FR 42658).

Critical habitat has not been designated for the blue-tailed mole skink.

Distribution, habitat and abundance

A variety of xeric upland communities provide habitat for the blue-tailed mole skink, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks. Areas with few plant roots, open canopies, scattered shrub vegetation, and patches of bare, loose sand provide optimal habitats (Christman 1988; 1992b). Within these habitat types, blue-tailed mole skinks are typically found under leaves, logs, palmetto fronds, and other ground debris. Shaded areas presumably provide suitable microhabitat conditions for thermoregulation, egg incubation, and foraging (Mount 1963). Blue-tailed mole skinks tend to be clumped in distribution with variable densities that may approach 25 adults per ac (10.12 per ha) (Christman 1992b). The distribution of blue-tailed mole skinks appears to be closely linked to the distribution of surface litter and, in turn, suitable microhabitat sites. Meshaka and Lane (2002) found blue-tailed mole skinks persisted on a sandhill at ABS that remained unburned for 67 years, and the relative abundance of blue-tailed mole skinks did not decrease over time. Campbell and Christman (1982) characterized blue-tailed mole skinks as colonizers of a patchy, early successional, or disturbed habitat, which may occur as a result of natural or anthropogenic factors. Susceptibility of mature sand pine to windthrow may be an important factor in maintaining bare, sandy microhabitats required by blue-tailed mole skinks and other scrub endemics (Myers 1990).

Life history

Blue-tailed mole skinks are typically found in a variety of xeric upland communities, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks. Foraging activities of the blue-tailed mole skink occur primarily at or within 2 in (2.54 cm) of the soil surface (Christman 1992b), usually during the morning or evening. Roaches, crickets, and spiders make up the bulk of the diet (Mount 1963). Their diet is more generalized than that of the fossorial sand skink, which probably reflects their tendency to feed at the surface (Smith 1982). Like sand skinks, mole skinks show an activity peak in spring (Mount 1963; Smith 1982).

The reproductive biology of the blue-tailed mole skink is poorly known, but is presumably similar to the peninsula mole skink (*Eumeces egregius onocrepis*). In the peninsula mole skink, individuals probably become reproductively active at 1 year of age (Mount 1963; Christman 1978) and mating occurs in the fall or winter. Two to nine small eggs are laid in a shallow nest cavity less than 12 in (30.5 cm) below the surface (Mount 1963). The eggs incubate for 31 to 51 days and the female tends the nest.

Population dynamics

The population dynamics of the blue-tailed mole skink are not well known because the skinks' diminutive size and secretive habits make their study difficult. The best current method available to detect blue-tailed mole skinks involves the raking of sand and organic liter and intensive searching, or the use of pit-fall traps and drift fences. Because these methods are laborious and time-consuming, they are not well suited for use over large areas. Unfortunately, a reliable and easily-applied detection method, such as coverboard surveys used to detect sand skinks, has not been developed. As such, assessing the status of the blue-tailed mole skink over large areas is difficult.

Blue-tailed mole skinks appear to be far less common than sand skinks. A recent survey of seven protected sites conducted in 2004-2005 by Christman (2005) reported a density of 1.3 individuals per ac (0.53 per ha), compared to 56 sand skinks per ac (22.7 per ha), or a ratio of 1 blue-tailed mole skink for every 42 sand skinks collected. Other studies revealed blue-tailed mole skink to sand skink ratios of 1:1.89 based on 54 total skinks captured in six trap arrays (Christman 1988), 1:4.3 based on 332 total skinks in 58 trap arrays (Mushinsky and McCoy 1991) and 1:2.7 based on 49 total skinks in 31,640 pitfall trap-days (Meshaka and Lane 2002). Christman (1992b) suggested only 1 blue-tailed mole skink is encountered for every 20 sand skinks. Blue-tailed mole skinks often seem rare or absent at the same study sites where sand skinks are common (Christman 1988; 1992b; 2005). Even within suitable habitat, blue-tailed mole skinks are patchily distributed (Mushinsky and McCoy 1991). Mount (1963) noted peninsula mole skinks also are patchily distributed and mostly occurred on xeric sites greater than 100 ac (40.5 ha). Early maturity and a large clutch size suggest the population dynamics of mole skinks are different from sand skinks.

Status and distribution

Reason for listing

The historical and anticipated future modification and destruction of xeric upland communities in central Florida were primary considerations in listing the blue-tailed mole skink as threatened under the Act in 1987 (52 FR 42662). As stated previously, almost 85 percent of the xeric upland communities on the LWR have already been lost because of habitat destruction and degradation due to residential development and conversion to agriculture, primarily citrus groves (Turner et al. 2006b). Remaining xeric habitat on private lands is especially vulnerable because projections of future human population growth suggest additional demands for residential development within the range of the blue-tailed mole skink. The 5-year review found no justification for change in the threatened status (Service 2007).

Rangewide trends

The current rangewide status of the blue-tailed mole skink is not well known. As discussed above, the small size and secretive nature of the species, and the lack of a reliable and easily-applied survey method, makes it difficult to assess the status of the blue-tailed mole skink. Consequently, recent comprehensive, rangewide surveys have not been conducted. At the time of Federal listing, there were 20 locality records for the blue-tailed mole skink according to FNAI database (Griffin 2007). Currently, 43 records are known. The increase in locality records is largely the result of more intensive sampling of scrub habitats in recent years, and does not imply this species is more widespread than originally believed. Turner et al. (2006a) examined 23 known locations of the blue-tailed mole skink and found that 13 of these site were protected and 10 were managed as of 2004. Blue-tailed mole skinks are known to be present on 52.4 percent of the 21,597 ac (8,741 ha) of Florida scrub and high pine that is currently protected (Turner et al. 2006a). However, the extent of suitable habitat that is actually occupied is unknown, as is their population size. It is likely ongoing residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded extensive tracts of habitat containing the blue-tailed mole skink. Unlike sand skinks, their tracks cannot be easily detected in the sand, and most of the extant scrub, including protected sites, on the LWR has not been adequately surveyed for blue-tailed mole skinks.

Blue-tailed mole skinks seem to be underrepresented in the network of protected public lands (Turner et al. 2006a). The protection and recovery of blue-tailed mole skinks will require that habitat loss be limited to disturbed areas, and that suitable unoccupied habitat be restored. Current efforts to expand the system of protected xeric upland habitats on the LWR, in concert with implementation of aggressive land management practices, represent the most likely opportunity for securing the future of this species.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Scrub buckwheat

The following discussion is summarized from the MSRP (Service 1999) f or South Florida, as well as from recent research publications and monitoring reports. A complete scrub buckwheat life history discussion may be found in the MSRP. Critical habitat has not been designated for scrub buckwheat.

Species description

Scrub buckwheat is a long-lived perennial herb belonging to the buckwheat family (*Polygonaceae*). Scrub buckwheat is a variety of *Eriogonum longifolium*, a widespread species of the Great Plains that is represented east of the Mississippi by var. *harperi* in northern Alabama, Tennessee, and Kentucky (Kral 1983), and by var. *gnaphalifolium* in Florida (Reveal 1968). This species has a substantial taproot that provides ample food reserves for re-sprouting (McConnell and Menges 2002), basal rosettes, and one to three or more leafless, upright above-ground flowering stems (scapes) up to 3.28 ft (1 m) tall. The basal rosette of leaves are 5.9 to 7.9 in (15 to 20 cm) long, narrow, and have a white-woolly underside. The stem leaves are smaller than the rosette leaves. Scrub buckwheat is easiest to recognize when it is in flower or fruit. The stem terminates in a corymb, with each branch ending in a cup-shaped involucre containing a cluster of 15 to 20 small flowers. The involucre is silvery, silky-pubescent, and the flowers are green with pink anthers (Rickett 1967, Archbold Biological Station 2003).

Life history

Scrub buckwheat is a perennial herb, once relatively widespread, and currently distributed within high pineland (sandhill) and scrub communities in north central and central Florida from Ocala National Forest through the LWR. The growing season is April to mid-July and flowers occur from May to mid-October. This species probably does not have a long-lived seed bank (Archbold Biological Station 2003).

Individual scrub buckwheat plants produce only one or a few flowers at any one time, but continue flowering for months. "Flowers have an easily accessible, generous drop of nectar. Flowers are visited by a variety of insects, including solitary digger and twig-nesting wasps (*Parancistrocerus* spp. and *Stenodynerus* spp.), flies (*Geron* spp.), small solitary bees, and occasional social wasps. Visiting wasps learn the location of each plant and use trap-line strategies. The small number of flowers per plant induces them to visit several plants and

probably promotes outcrossing. Individual flowers avoid self-pollination by opening the anthers and shedding their pollen first. The pistils, which have kept their stigmas tucked into a tuft of hairs at the base of the flower, then straighten up and offer their receptive surfaces to incoming insects. An extremely low number of seeds and fruits developed by experimentally covered flowers (compared to open pollinated flowers) indicate that pollinators are needed to set seed." (Archbold Biological Station 2003).

In Highlands County, plants produce flowering stalks mainly during summer (May-July) (Archbold Biological Station 2003), but this species can flower at other times of year following burns. Plants in the Ocala National Forest have been observed with immature flower stalks between April and mid-July and bloom from May to mid-October. Seedlings have been observed in a variety of substrates within a few feet of the parent plant (J. Clutts, U.S. Forest Service, personal communication 1998).

Population dynamics

Scrub buckwheat is able to re-sprout repeatedly after fire, the primary agent of disturbance in sandhill and scrub habitats (McConnell and Menges 2002). Fire benefits this plant by stimulating resprouting, followed by "quick and heavy flowering and seed production" (McConnell and Menges 2002). New seedlings appear promptly after seed drop. McConnell and Menges (2002) observed that seedling numbers peaked during July, two months after a fire (and a month after another experimental treatment of the vegetation—litter removal). Scrub buckwheat is unlike most other scrub species because seedlings will appear in summer as well as winter. This may allow the species to take advantage of summer rains, but seedlings are likely to desiccate during hot weather. Seedlings of scrub buckwheat that appear after a fire are unlikely to originate from a seed bank. McConnell and Menges (2002) observed that the seeds are very small, and those buried deeply enough to survive heat from a Florida scrub fire (about 2 centimeters) would be unlikely to reach the surface. Satterthwaite et al. (2002) placed fresh seeds at the soil surface and saw high germination rates.

This species occupies both high pineland and scrub communities, each experiencing very different fire regimes. High pineland, under historic natural conditions, burns roughly every one to ten years, while scrub may burn at intervals of five to as much as 100 years (McConnell and Menges 2002, citing Menges 1999). A population viability analysis by Satterthwaite et al. (2002) suggested that over the long term scrub buckwheat populations require fire at intervals of 5 to 20 years to remain viable.

Prescribed burning is the "most appropriate treatment for enhancing both seed production and seedling recruitment, and linking the two in time" (McConnell and Menges 2002). Because this species tolerates a wide variety of fire intervals, prescribed fire regimes do not have to be tailored to its specific needs. At the Carter Creek tract of the LWR National Wildlife Refuge, biologists from Archbold Biological Station have carried out experimental fires that show promise of restoring the vegetation by suppressing evergreen oaks, reducing the sizes of turkey oaks, and making conditions better for reproduction by longleaf pines (*Pinus palustris*) and wiregrass (*Aristida stricta* var. *beyrichiana*). Similar results were observed during past studies

on scrub buckwheat, and three other species, conducted by Menges (1995), Menges and Yahr (1996, 1998), and Menges and Weekley (1999). McConnell and Menges (2002) experimentally applied alternative treatments to promote a "demographic response" in scrub buckwheat. They applied top-clipping, litter canopy removal, shrub canopy removal, and ash addition in a replicated, factorial experiment. None of these alternatives was found to be as productive as fire.

Menges et al. (2005) suggest that for a long-unburned tract like the Carter Creek tract of LWR NWR, "pre-treatments to facilitate the application of fire management may be important to scrub buckwheat and other species." In experiments conducted at the Carter Creek tract, a saw-and-burn treatment "created a hotter, more complete fire and more open post-treatment canopies. This had generally favorable effects on scrub buckwheat. The saw and burn treatment enhanced seedling recruitment, plant dormancy, flowering (both percentages and amount per plant) and reduced herbivory." Saw-and-burn areas were nearly completely burned, while large patches within the burn-only treatment remained unburned.

Status, distribution and threats

Scrub buckwheat occurs in Marion, Pasco, Hillsborough, Lake, Orange, Osceola, Highlands, and Polk counties in Florida. In Polk and Highlands counties, it is found on the LWR as far south as Archbold Biological Station, south of Lake Placid. Most of the recent records for the species are from Polk and Highlands counties, partly because intensive biological surveys of scrub vegetation have been conducted in those counties (Christman 1988). On the LWR in South Florida, scrub buckwheat is protected at Lake Arbuckle State Preserve, the Arbuckle and Lake Walk-in-the-Water tracts of LWR State Forest, Broussard Catfish Creek State Preserve, the Lake Apthorpe tract of the LWR Wildlife and Environmental Area, The Nature Conservancy preserve at Tiger Creek, the Carter Creek and Flamingo Villas tracts of LWR National Wildlife Refuge, and Archbold Biological Station. A population is also protected on the Pine Ridge nature preserve at Bok Tower Gardens. On the LWR, scrub buckwheat is also present in Polk County at Lake Davenport, Horse Creek Scrub, and Hesperides; in Highlands County at Avon Park Lakes (Schultz et al. 1999).

The long-term outlook for this threatened species is good because of habitat acquisition during the 1990s and efforts by managers of these conservation lands to restore natural fire regimes. Major threats to this species are the ongoing conversion of the small amount of remaining high pineland and turkey oak scrub for agricultural, commercial, and residential purposes. Recreational motorized off-road vehicles also have the potential to severely impact scrub buckwheat. Excavation around the roots of this species could stress the plants as well as opening up previously shaded areas to full sun.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Papery whitlow-wort

The following discussion is summarized from the MSRP for South Florida (Service 1999), as well as from recent research publications and monitoring reports. A complete papery whitlow-wort life history discussion may be found in the MSRP. Critical habitat has not been designated for the papery whitlow-wort.

Species description

Papery whitlow-wort is a small mat-forming herb with many bright yellowish-green branches radiating flatly from a taproot (Kral 1983; Small 1933). The stems are two to nine in (5.02 to 22.86 cm) long and wiry. The leaf blades are small and sessile, ovate to triangular-ovate in shape, and strongly revolute. The plant has numerous small cream-colored to greenish flowers (Small 1933; Service 1996) that produce a very thin-walled one-seeded dry fruit that remains intact, functioning as a "seed" (Kral 1983).

This species consists of two geographically isolated subspecies, with papery whitlow-wort (*Paronychia chartacea* ssp. *chartacea*) in the Florida peninsula (Anderson 1991) and the similar Crystal Lake nailwort (*P. chartacea* ssp. *minima*) in the Florida panhandle. This discussion is limited to the peninsula subspecies.

Life history

Flowering and fruiting occurs in late summer or fall (Anderson 1991) and the seeds mature in September or October (T. Race, Bok Tower Gardens, personal communication 1996). This species is a short-lived perennial (Anderson 1991 and observations by staff at the Historic Bok Sanctuary).

Population dynamics

Papery whitlow-wort is most frequently seen in open, sunny gaps in rosemary balds within scrub vegetation (Abrahamson *et al.* 1984, Christman 1988, Menges and Kohfeldt 1995). At Archbold Biological Station, rosemary scrubs are found only on the higher ridges and knolls surrounded by scrubby flatwoods with dense oaks. The main soil types are St. Lucie and Archbold (Abrahamson *et al.* 1984), both well-drained white sands (U.S. Dept. of Agriculture, Soil Conservation Service 1989). The fire cycle in rosemary scrub can range from 10 to as long as 100 years (Johnson 1982, Myers 1990). Rosemary scrub has abundant Florida rosemary (*Ceratiola ericoides*) and scrub oaks including Chapman oak (*Quercus chapmannii*), sand live oak (*Q. geminata*), Archbold oak (*Q. inopina*) and occasional sand pine (*Pinus clausa*). The open sandy areas of rosemary scrub contain small herbs and lichens (Abrahamson *et al.* 1984, Hawkes and Menges 1996). These gaps in the dense vegetation are more persistent in rosemary scrubs than in scrubby flatwoods (Hawkes and Menges 1996).

Papery whitlow-wort also occurs in high pineland (upland longleaf pine vegetation, also called "sandhill") in the Walk in the Water tract of LWR State Forest (A. Cox, Florida Division of Forestry, personal communication 2002), at TNC's Crooked Lake Sandhill Preserve (B. Pace-Aldana, TNC, in litt. 2002), and at the Tiger Creek Preserve.

In studies of the responses of plants to fire in rosemary balds, Johnson and Abrahamson (1990) and Ostertag and Menges (1994) identified two groups of scrub plants, those that resprout after a fire and those that return from seed. They found papery whitlow-wort appeared in rosemary balds after fires, even though it had been rare or absent prior to the burn. This strongly indicates

that papery whitlow-wort maintains seed banks in the soil, waiting for suitable germination conditions. Within about 9 to 12 years after a fire, papery whitlow-wort was displaced by Florida rosemary and reindeer lichens (*Cladonia* and *Cladina*) (Johnson and Abrahamson 1990). Some gap plants such as snakeroot and Highlands scrub hypericum disappear relatively quickly after fires and require large populations consisting of tens of thousands of plants to persist (Quintana-Ascencio and Menges 2000), but papery whitlow-wort persists longer after fire and it has many large populations over a relatively large geographic range, compared to other LWR endemic plants.

The density of papery whitlow-wort increases in relation to available open space (Hawkes and Menges 1996; Menges and Kohfeldt 1995), so the species is most abundant in disturbed, sandy areas such as road rights-of-way and recently cleared high pine (Abrahamson et al. 1984; Christman 1988; Service 1996). Papery whitlow-wort can become very abundant after a fire or on disturbed sites such as along fire lanes or trails (Service 1996; Johnson and Abrahamson 1990) and is least likely of the federally-listed scrub plants to suffer local extirpations as open areas become covered by shrubs.

Loose sand affects papery whitlow-wort. According to research by Petrů and Menges (2004), "the demographic responses of the species to sand movements indicate that mobile sands create constantly shifting arrays of microsites that can influence post-dispersal seed germination, survival, and growth of Florida scrub herbs. Roadside habitats have more dynamic patterns of sand movement than natural gaps and may alter selection regimes important for demographic variation of endemic Florida scrub plants." Papery whitlow-wort persists on road edges in the absence of fire in the vegetation. These roadside sandy areas constitute habitats that are significantly different from the bare areas within the vegetation, and may be less suitable for persistence of the species. This research bolsters the already-substantial evidence that prescribed fire is essential to maintain Florida scrub vegetation and its biota, including other federally listed plants and animals.

Management for papery whitlow-wort requires burning regimes that mimic the natural fire cycles of rosemary scrub. Relationships among fire, open space, and plant distributions within a xeric scrub are complex and need to be studied further (Hawkes and Menges 1996). Management practices for rosemary scrub should include fire at intervals suitable for a variety of plants and animals, rather than at intervals optimized for just a single species (Hawkes and Menges 1996; Quintana-Ascencio et al. 2003).

Status and distribution

Papery whitlow-wort occurs on the LWR and at least one smaller nearby ridge (Kral 1983), in Highlands, Polk, Osceola, Orange, and Lake Counties (Anderson 1991). It is present on the small ridge at the Lake McLeod tract of LWR National Wildlife Refuge, but not on the Bombing Range Ridge on Avon Park Air Force Range. On the LWR, it is present in essentially all of the scrub conservation lands. Since the last comprehensive survey (Schultz et al. 1999), it has been found in high pineland at the Walk in Water tract of LWR State Forest (Anne Cox, LWR State Forest, personal communication 2002). It is also present in high pineland on the Tiger Creek Preserve, owned by The Nature Conservancy.

The northern range limit of papery whitlow-wort is in Lake County, where it occurs on the north side of Lake Louisa at Crooked River Preserve owned by the Lake County Water Authority. The species is also possibly present at the nearby Schofield sandhill site (proposed for acquisition under the Florida Forever program, but not acquired). The only site the species is known to occur on conservation lands in Orange County is Shadow Bay Park (formerly Lake Cane-Marsha Park) near where the Florida Turnpike crosses Interstate 4. The species was reported from localities in western Orange County, but the area has since become urbanized, and there are few if any opportunities for setting aside conservation lands in this area. The only site in Osceola County containing papery whitlow-wort that has been proposed for State acquisition is at Lake Davenport, in the northwestern corner of the County (Florida Natural Areas Inventory 2005).

Papery whitlow-wort occurs on nearly all conservation lands with scrub habitats on the LWR in Polk and Highlands Counties. The southernmost known occurrencse of this species on conservation lands are located on Gould Road (part of the LWR Wildlife and Environmental Area operated by the FWC) and Archbold Biological Station, both in Highlands County south of Lake Placid (Schultz et al. 1999).

During 2003, the Florida Fish and Wildlife Conservation Commission and Archbold Biological Station purchased adjoining portions of a ranch that bordered the Biological Station's preserve to the west. The recently-acquired land provides an important buffer for Archbold, and it protects additional occupied and restorable habitat for this species.

Although FNAI data provide the best available overall view of the distribution of this species, intensive local inventories add important detail. The LWR State Forest is represented in the FNAI database by nine element occurrences, yet the Arbuckle tract of the Forest has 188 records of this plant in its GIS database, based upon an inventory by K. DeLaney in 1988 (data provided by A. Cox, LWR State Forest). Of the 188 records, 23 represented more than 100 individuals.

Archbold Biological Station has not monitored this plant because it thrives in fire lanes that usually do not have exotic plant problems (E. Menges and M. Deyrup, Archbold, personal communication 1995, in Service 1996). The propensity of this species to occupy fire lanes, roadsides, and other artificially disturbed areas is a primary conservation concern for the papery whitlow-wort, because it tends to be far more abundant in such disturbed areas than within the vegetation itself. This situation was researched by Petrů and Menges (2004), and they confirmed prescribed fire is essential to create and restore open, sandy habitat for this and other plants.

The papery whitlow-wort occurs in association with several other federally listed species: in scrub, Florida bonamia, Highlands scrub hypericum, wireweed, Florida perforate cladonia, snakeroot, and scrub blazing star. In high pineland at the Tiger Creek Preserve, pygmy fringe tree, pigeon wings, scrub buckwheat, Britton's beargrass, scrub plum, and Carter's mustard.

Papery whitlow-wort is the most abundant and widespread of the listed LWR scrub and high pineland plants, and it has benefited greatly from acquisition of conservation lands in its range. Like several other scrub species, including Highlands scrub hypericum, it is particularly abundant in human-disturbed areas such as road edges and fire lanes. Researchers based at Archbold Biological Station are interested in finding ways to lessen these plants' dependence on such artificial habitats through restoration of fire regimes.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Pygmy fringe-tree

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete pygmy fringe-tree life history discussion may be found in the MSRP. No critical habitat has been designated for the pygmy fringe-tree

Species description

Pygmy fringe-tree is a shrub or small tree that is often less than 3 ft (1 m) tall, but can reach 4.37 ft (4 m). The twigs are opposite or sub-opposite and stiff, while the leaf scars and leaves are mostly opposite but sometimes alternate. The leaves are simple, 3 to 10 cm (about 1 to 4 inches) long, and lack stipules. They have short petioles, and the somewhat leathery blades are ovate to elliptic or obovate in shape, and acute to round at the tip. The base of the blade is attenuated to the petiole. The upper surface of the blade is dark yellow-green and smooth, but the lower surface is paler and reticulate. The inflorescence is a leafy-bracted panicle that appears with the new shoots from the axils of most leaf scars from the previous season. The axis (main stem) of the inflorescence is rather short with numerous opposite branches that are spreading, slender and dropping, terminating in clusters of three to six flowers. Bracts toward the base of the inflorescence are similar to, but smaller than, the leaves. The flowers are regular, perfect, and pleasingly fragrant. The four sepals are green, united at the base, and 1.5 to 2.0 millimeters (mm) long. The four petals are white, united at the base to a short, campanulate throat, with narrowly linear lobes, 1.0 to 1.5 cm long and somewhat spreading. The two stamens are fused (adnate) to the corolla base. The ovary is superior with a single style. The fruit is a drupe 2.0 to 2.5 cm long, oval, and green, becoming purplish-brown when ripe.

The pygmy fringe-tree is deciduous (*i.e.*, leafless during the winter). Leafing occurs mid-March, budding occurs in March, and anthesis is from late March to early April. When it is in leaf, pygmy fringe tree may be confused with scrub wild olive (*Osmanthus megacarpus*).

This species was named by Small (1933). Hardin (1974) continued to recognize it as distinct from the much more widespread white fringe-tree (*Chionanthus virginicus*), and Elfers (1989) reaffirmed its distinctness in an unpublished thesis. The species is recognized by Wunderlin and Hansen (2003, 2004).

Life history

Pygmy fringe-tree inhabits excessively drained sandy soils on central Florida's LWR (and historically on the Mount Dora Ridge, Orange County). This species is found on low- nutrient St. Lucie fine sand soil that is subject to rapid drying (Wunderlin et al. 1981), as well as other dry sand soils. Pygmy fringe-tree occurs primarily in scrub as well as high pine, dry hammocks, and transitional habitats. It is abundant at a few sites, where it may form thickets along with evergreen oaks and other shrubs such as tallow wood, silk bay, and scrub hickory. In some

locations, it may be the dominant plant while in others it may be codominant or subdominant (Wunderlin et al. 1981). At Carter Creek, where it is relatively abundant, it is scattered among turkey oaks.

Although the reproductive biology of this species has not been thoroughly investigated, it is known to spread by root sprouts and occasionally by seed (Stout in press). The plants appear to be functionally dioecious (Gill and Pogge 1974), and the female flowers have stunted anthers that usually do not open (Goodrum and Halls 1961). The four plants in the endangered species display garden at the Historic Bok Sanctuary (2 males, 2 females) flowered and set seed in 1997 (Center for Plant Conservation 2003). After spring flowering, fruiting probably occurs in June, with seed dispersal in September (Gill and Pogge 1974, Ward and Godfrey 1979). Seeds (drupes) may remain on the plants well into winter (Stout in press).

Little is known about seed dissemination of pygmy fringe-tree, and seed production is variable from year to year, with mixed reports for success of germination. In nursery conditions the best results are obtained with cleaned, air-dried seed, but whole fruits have also germinated. Bok Tower Gardens has achieved 60 to 70 percent germination rates under greenhouse conditions (T. Race, Bok Tower Gardens, personal communication 1996).

Germination dates for pygmy fringe-tree are unknown. Leafing occurs mid-March, budding occurs in March, and anthesis is from late March to early April.

Population dynamics

Recruitment is exceedingly slow in this species. At The Nature Conservancy's Tiger Creek Preserve (Possum Creek Trail Scrub), over 100 individuals of pygmy fringe trees have been tagged and monitored (I.J. Stout, University of Central Florida, personal communication 1997). In more than 10 years of monitoring, hundreds of root sprouts were found, but only one seedling was located. Despite this extremely low seedling recruitment, the number of individuals at the site appears to be stable. Due to population stability and this species' reliable resprouting after fires, The Nature Conservancy no longer conducts detailed monitoring on this species (B. Pace-Aldana, The Nature Conservancy, in litt. 2005).

This species is long lived and persists in scrub that is burned on a frequency between 20 and 70 years. However, it is a fire-dependent species that re-sprouts after fire events. This species has above-ground stems growing from rootstocks or buried stems that have survived the infrequent fires that are characteristic of the hahitat (Kral 1983, Ward and Godfrey 1979). It has been observed to re-sprout from rootstocks following a spring burn (Stout in press). Fires may have an important indirect effect on pygmy fringe tree by regulating the numbers and sizes of plants that might shade or otherwise compete with it (Kral 1983).

The effects of fire on the pygmy fringe-tree and other plants within sand hill communities have been monitored at the Nature Conservancy's Tiger Creek (I.J. Stout, personal communication 1997; Center for Plant Conservation 2003), and the Carter Creek tract of LWR National Wildlife Refuge (Menges et al. 2005). The results indicate burning is beneficial in maintaining community structure and the populations of several important sandhill plant species including the pygmy fringe-tree.

Status and distribution

Pygmy fringe-tree occurs in Seminole, Lake, northwestern Osceola, Polk, and Highlands Counties in central Florida. Wunderlin and Hansen (2004) have recently added the east side of Tampa Bay (Hillsborough, Manatee, and Sarasota Counties) to its distribution. Detailed information on localities and habitats is not yet available.

In central Florida, pygmy fringe-tree is known from west of Lake Apopka in Lake County, northwestern Osceola County, and the LWR in Polk and Highlands counties. It is no longer found in its historic habitat on the Mount Dora Ridge. One of the largest known populations is at the Carter Creek tract of LWR NWR in Highlands County, where it occurs with turkey oak (*Quercus laevis*) and scattered longleaf pine (*Pinus palustris*) with an understory with abundant scrub palmetto (*Sabal etonia*). Experimental prescribed fires and reintroductions of Florida ziziphus (*Ziziphus celata*) have been conducted here by Archbold Biological Station in a project like the one underway at The Nature Conservancy's Tiger Creek Preserve. Pygmy fringe-tree is represented at Tiger Creek Preserve by thirteen populations with few to numerous individuals, which have been mapped. Approximately 75 percent of the individuals occur in yellow sand scrub at the extreme northwestern edge of the preserve. The remaining individuals are scattered throughout xeric hammocks. Because of the stability of this plant's populations with and without fire, monitoring of this species consists only of mapping of individuals during complete surveys, which are conducted throughout the preserve every 5 years Bea Pace-Aldana of The Nature Conservancy (in litt., March 2005).

Pygmy fringe-tree is protected in Polk County at Horse Creek Scrub (South Florida Water Management District and Southwest Florida Water Management District), Snell Creek (LWR NWR), A. D. Broussard Catfish Creek State Park, Saddle Blanket Lakes and Tiger Creek Preserve (TNC), Arbuckle and Walk in Water tracts of LWR State Forest; in Highlands County at Flamingo Villas (LWR NWR) and Lake Apthorpe (LWR Wildlife and Environmental Area). It is maintained as part of the National Collection of Endangered Plant Species at Bok Tower Gardens.

The Service does not have current information on threats because this shrub is considered relatively abundant and secure by managers of the conservation lands of the LWR, so limited funds for monitoring have been devoted to other species. After this plant was listed, an extensive network of state conservation lands and the LWR National Wildlife Refuge came into existence, providing habitat and habitat management supported by extensive ecological research and monitoring programs.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Short-leaved rosemary

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete short-leaved rosemary life history discussion may be found in the MSRP. Critical habitat has not been designated for the short-leaved rosemary.

Species description

Short-leaved rosemary is a branched shrub growing about 3 ft (1 m) tall" (Kral 1983) has short, narrow leaves and lavender flowers about 1.3 cm (0.5 inch) long that are bilaterally symmetric (with upper and lower lips). Short-leaved rosemary is similar to *Conradina canescens* of the Florida panhandle, but has (as its name implies) shorter leaves. Somewhat larger leaves (0.24 to 0.31 in [6.0-8.2 mm]) occur on the well-developed flowering branches, and the internodes are generally longer than those of *C. canescens*. Short-leaved rosemary also tends to have more flowers per axil than *C. canescens*: one to six per axil versus one to three in *C. canescens* (Shinners 1962, Kral 1983). Gray (1965) showed short-leaved rosemary, like *Conradina glabra* of the Florida panhandle, is morphologically not strongly differentiated from, and is less variable than, *C. canescens*. Kral and McCartney (1991) upheld *C. brevifolia* as a distinct species, while Wunderlin and Hansen (2004), without explanation, treat it as part of *C. canescens*.

Short-leaved rosemary is one of five shrubby mints in the interior central Florida scrub. The others are *Calamintha ashei* (Ashe's calamint), *Dicerandra frutescens* (scrub mint) (including *D. frutescens* ssp. *modesta*), and *D. christmanii* (Garrett's mint). Short-leaved rosemary can be distinguished from the *Dicerandra* mints by its flowers not having sharply-bent corollas, and by its lack of the strong mint or camphor scents of the *Dicerandra* leaves. Short-leaved rosemary and other members of *Conradina* are distinguished from *Calamintha* by differences in the branches of the flowers' stigmas and by *Conradina* having appressed trichomes (hairs) on the lower sides of the leaves, while *Calamintha* has erect trichomes (Shinners 1962, Kral 1983). The other "rosemary" in central Florida scrub is Florida rosemary, *Ceratiola ericoides*, a larger shrub that is not a member of the mint family, and is so distinctive it cannot be mistaken for short-leaved rosemary.

Life history

Short-leaved rosemary inhabits white sand scrub with evergreen scrub oaks (*Quercus* spp.) and sometimes a scattered overstory of sand pine (*Pinus clausa*). Short-leaved rosemary is usually found interspersed in gaps between the shrubs on bare sand with other small shrubs and herbs (Service 1992).

Specific information is not available on the ecological requirements of short-leaved rosemary. However, existing information on the natural fire regimes of various scrub communities suggest that the white sand scrub inhabited by short-leaved rosemary requires periodic, patchy, high-intensity fires. Fire cycles of 15 to 20 years, or possibly less, reduce overstory competition and provide disturbed open sandy patches within which obligate seeding species may re-establish. Short-leaved rosemary, like other scrub mints, is probably killed by fire (Service 1996), or other disturbance, but readily germinates post-fire from seeds stored in the sand (Menges 1992). To conserve short-leaved rosemary, managers of conservation lands must restore and maintain scrub communities by mimicking the timing and intensity of natural fire regimes.

Status and distribution

Short-leaved rosemary has a very restricted distribution in the middle of the LWR. It occurs at only about 30 sites whose total area is less than 2,400 ha (6,000 ac) in the Sebring-Avon Park area of Highlands and Polk Counties (Christman 1988, Christman and Judd 1990). Wunderlin and Hansen (2004) also report it, or *Conradina canescens*, from Hernando County, on the

Brooksville Ridge, outside the South Florida Ecological Service Office's service area. A survey of sites under consideration for acquisition by the State (Schultz et al. 1999) found no significant new sites for this plant.

Short-leaved rosemary is present on the following conservation lands : Carter Creek unit of the LWR Wildlife and Environmental Area (FWC), Highlands County, Silver Lake unit of the LWR Wildlife and Environmental Area (FWC), Highlands County (Schultz et al. 1999), Saddle Blanket Lakes Preserve (The Nature Conservancy), Polk County, Hickory Lake unit of the LWR Wildlife and Environmental Area (FWC), Polk County, Hickory Lake Scrub County Park (Polk County) (Schultz et al. 1999), and the Arbuckle Tract of LWR State Forest (Division of Forestry), Polk County. The species is also present on private lands in the Avon Park Lakes area southwest of Avon Park (Schultz et al. 1999).

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Sandlace

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete sandlace life history discussion may be found in the MSRP. Critical habitat has not been designated for sandlace.

Species description

Sandlace (*Polygonella myriophylla*) is a sprawling shrub with zigzag branches that hug the ground and root at the nodes (Wunderlin et al. 1980). This species forms low mats that looks somewhat like the ornamental creeping juniper (*Juniperus horizontalis*). The lower parts of the branches have bark that cracks and partly separates in long, flat, interlacing strips. The short lateral branches end in flowering racemes. Sandlace has the sheathing leaf stipules (ocreae and ocreolae) typical of the jointweed family. The leaves are needle-like and are from 0.3 to 10.0 mm (0.1 to 0.4 inches) long. The small, white or cream colored flowers have white petallike sepals up to 3.4 mm (0.1 inch) long (Kral 1983). Sandlace flowers and fruits all year.

Sandlace, a member of the jointweed family (Polygonaceae), is one of three species of *Polygonella* that occur in Florida scrub in Highlands and Polk Counties of south central Florida (Lewis and Crawford 1995). While these species have rather similar inflorescences and flowers, the shrubby habit of sandlace is extremely distinctive, and for that reason the early status surveys of scrub (Christman 1988) provided very accurate coverage of its distribution.

Life history

Sandlace occupies open, sandy areas within the scrub vegetation, and it appears to require fire or other disturbances that create or maintain these sandy gaps. This species is killed by fire, and reoccupies burned sites from seed (Pedro Quintana-Ascencio, University of Central Florida, pers. comm. 2004). The abundance this species is easily overestimated because it tends to colonize disturbed areas along easily accessible road cuts and rights-of-way. Weekley and Menges (2003a) confirmed that sandlace does not resprout after fire, but recolonizes burned areas from seed arriving from unburned areas, and perhaps by spreading from unburned areas. Pollinators

of sandlace are genus-specific bees and likely a few varieties of wasps. Little is known about seed production and germination for this species, but seedlings do not survive in the vicinity of the allelopathic (*i.e.,* plants that produce chemicals that inhibit the growth and survival of other nearby plants) mature plants (Weidenhamer et al.1989). The major allelochemicals are gallic acid and hydroquinone (Weidenhamer and Romeo 2004). Most of the available information on the life history of this plant comes from a study of cutting and burning of scrub, conducted by Archbold Biological Station ecologists (Quintana-Ascencio et al. 2004). This study did not focus on sandlace, but it provided valuable data on it and other species. The study has emphasized the value of disturbance (fire or mechanical) in this ecosystem. Although fire kills individual plants, sandlace benefits from fires or other disturbances that create sandy gaps that can be occupied by new plants that grow from seed. Like most other LWR endemics, sandlace is threatened by fire suppression and habitat loss resulting from agricultural and residential development (Fish and Wildlife Service 1999).

Menges (1999) presents useful information on scrub management, although very productive research, monitoring, and experience have been conducted since then. Menges and his colleagues at Archbold Biological Station have regularly cautioned that management of wireweed and other endemic plants on conservation lands should not employ as benchmark their presence or abundance in altered habitats. Instead, management decisions should be made to maintain and enhance the dynamic diversity of Florida's scrub vegetation, encouraging the endemic plants to re-occupy scrub vegetation that may have become overgrown and unsuitable in the absence of fire. These ecologists have suggested using staggered burning schedules, providing a variety of return frequencies that will accommodate the differing needs of various species of the scrub biota (Quintana-Ascencio et al. 2003).

Population dynamics

Because sandlace is a sprawling clonal shrub, with plants taking root where their stems touch the ground (Wunderlin et al. 1980), individuals may spread significant distances by vegetative means. Therefore, it is difficult to identify genetically-distinct individuals (Pedro Quintana-Ascencio, University of Central Florida, pers. comm. 2004). Despite being a narrow endemic, these species has the highest within-population genetic diversity of any species in the genus *Polygonella* (Lewis and Crawford 1995).

Little is known of the population biology of this species. Based on work on other scrub species, such as wireweed (*Polygonella basiramia*) (Boyle et al. 2003), it is likely that sandlace numbers fluctuate dramatically, increasing following a fire and decreasing in areas where fire is lacking.

Status and distribution

Sandlace ranges from Orange County south through Highlands County. The species is known to occur near Interstate 4 in Orange County and at one site in northwestern Osceola County. In Polk County, sandlace is found on the LWR from the Davenport-Poinciana area. It is also found well west of the LWR in a highly altered area just southeast of Bartow. In Highlands County, sandlace is found on the LWR as far south as the Archbold Biological Station.

Sandlace is known to occur within the following protected lands (acreages of tracts were obtained from the FNAI database 2001, updated through the Florida Natural Areas website in November 2004):

1. The Allen David Broussard Catfish Creek Preserve State Park comprises 8,077 ac (3,268 ha) operated by the Florida Department of Environmental Protection. It has a management plan, active fire management with annual requests for prescribed burning, and rare plant monitoring.

2. Hickory Lake Scrub County Park is a 57 ac (23 ha) tract owned by Polk County. It has a management plan, prescribed fire management, and rare plant monitoring.

3. Saddle Blanket Lakes Preserve comprises 663 ac (268 ha) owned by TNC.

4. Sun Ray Scrub is a component of the LWR Wildlife and Environmental Area. Acreage for this tract is not available through the FNAI, but the tract as a whole is comparable in size to Saddle Blanket Lakes.

5. LWR State Forest, operated by the Florida Department of Agriculture and Consumer Services, Division of Forestry, consists of three tracts (Arbuckle, Walk-in-th-Water, and Babson/Hesperides) and collectively contains 26,488 ac (10,719 ha).

6. The LWR National Wildlife Refuge, operated by the Service, consists of the Lake McLeod and Snell Creek units in Polk County and the Carter Creek and Flamingo Villas units in Highlands County. They comprise 1,839 ac (744 ha). Sandlace is present at Lake McLeod and Flamingo Villas.

7. The LWR Wildlife and Environmental Area (LWR WEA), administered by the FWC, consists of 12 tracts, totaling over 16,167 ac (6,544 ha). The tracts include Blue Lake, Silver Lake, Carter Creek, Henscratch, Highlands, Royce, Lake Apthorpe, Lake Placid, and McJunkin.

8. The Preserve, operated by Highlands County, comprises 1,380 ac (559 ha), in part longleaf pine vegetation. Sandlace is probably present, but not confirmed.

9. Highlands Hammock State Park comprises 9,251 ac (3744 ha) and has been expanded to include scrub habitat.

10. Jack Creek, comprising 1,285 ac (520 ha), is owned by the Southwest Florida Water Management District, and adjoins the Henscratch Road/Jack Creek tract of the LWR Wildlife and Environmental Area.

11. Lake June-in-Winter Scrub State Park contains 846 ac (342 ha).

12. The private Archbold Biological Station comprises over 3,592 ha (8,877 ac). Sandlace is present, but rare.

Sandlace has benefited from the extensive State and private land acquisition programs on the LWR since it was listed, and it appears to be benefiting from prescribed fire programs on these lands.

STATUS OF THE SPECIES/CRITICAL HABITAT RANGEWIDE

Scrub plum

The following discussion is summarized from the South Florida Multi-Species Recovery Plan (MSRP) (Service 1999), as well as from recent research publications and monitoring reports. A complete scrub plum life history discussion may be found in the MSRP. Critical habitat has not been designated for scrub plum.

Species description

Scrub plum is a highly branched shrub that can reach 6 ft (2 m) in height, although 1.5 ft (0.5 m) is more typical at sites with frequent fires. The species contains gnarled, half-buried trunks and twigs that are strongly geniculate (zigzag shaped). The lateral branches are either short, stubby, spur shoots bearing leaves and flowers, or are strongly tapering and spine-like. The bark of old stems is thin, gray, usually lichen-encrusted, and forms small rectangular or square plates. The bark of new shoots is lustrous reddish-brown or purplish and smooth.

The scrub plum's leaves are crowded on the spur shoots (an arrangement typical of the Rosaceae family) and are widely spaced on the normal shoots. The flowers of scrub plum (0.43 to 0.51 in [1.1 to1.3 cm] wide) are fragrant, five-petaled and distinctive in being sessile, and not containing stalks. The flowers have "numerous stamens with conspicuous yellow anthers that are exerted well above the floral cup. Some flowers have a well-developed pistil equal in height to the stamens, and in others the pistil is vestigial and nonfunctional." (Archbold Biological Station 2003). The fruit of the scrub plum is an ovoid or ellipsoidal drupe, 0.47 to 0.98 inch (1.2 to 2.5 cm) long, and dull reddish or "vaguely peachy" (Archbold Biological Station 2003) in color. The seeds are thin and slightly flattened.

Although the species is distinctive as the only plum with crooked twigs, scrub plum can be casually mistaken for other scrub and sandhill plants. Several have a similar geniculate, thorny habit of growth, including tough bumelia (*Sideroxylon tenax*), hog plum (*Ximenia americana*), Florida ziziphus (*Ziziphus celata*), and a local hawthorn, a variant of *Crataegus lepida* (Judd and Hall 1984). Hog plum has yellow fruit, straight twigs, and thorns only in the angles of leaf and stem. Florida ziziphus has entire leaf margins and yellow fruit (and is exceedingly rare). Buckthorns have thorns and clustered leaves, but the leaves or twigs are very hairy (Florida Natural Areas Inventory 2000).

Life history

Scrub plum has a very unusual breeding system called andromonoecy, where male and bisexual flowers are present on the same plant (Weekley and Menges 2001). Flowering occurs in January to February, leafing occurs from late February to March, fruit begins to develop in late February and may continue to early May, seed dispersal is in early May, but germination dates are unknown (Harper 1911, Ward 1979, C. Weekley, personal communication 1998). Archbold Biological Station's plant ecology lab reports that flowering occurs in February-March when the plants are largely leafless. Individuals drop most of their leaves in the winter dry season.

Scrub plum is believed to be self-incompatible and pollinators are essential for fruit set (Weekley 1997). The fragrant white flowers attract insect visitors and insects may disseminate the pollen of the scrub plum. Flowering occurs in January to February, leafing occurs from late February to March, fruit begins to develop in late February and can continue to early May. Fruit maturation is low in comparison to flowering due to high levels of premature abscission and predation. Seed dispersal is in early May, but little is known about germination dates (Archbold Biological Station 2003). Birds and possibly mammals disperse the seeds.

Plants add new stems every year, especially after fire (Archbold Biological Station 2003). Fire stimulates growth and flowering; flowering and fruit production gradually declines until the next fire (Menges et al. 2005). Seedlings have not yet been observed in the wild.

Population dynamics

Little information is available regarding the population dynamics of the scrub plum. The species nearly always re-sprout after fire (Menges and Kohfeldt 1995, Menges et al. 2005, Weekley and Menges 2001, 2003a, 2003b). Three years after a fire, more than 98 percent of burned plants had survived, though they had lesser height and crown diameter than unburned control plants). In 3 years of collecting demographic data, four plants died from fire effects, six from other causes (Menges et al. 2005).

Status and distribution

Scrub plum prefers dry, sunny, nutrient-poor sites of acidic, entisols (deep, nearly featureless, sand soils). The species is usually associated with oak-dominated scrub and high pine, sandhill and Florida scrub communities.

Scrub plum occurs in three general areas on Florida's central ridges: Lake County, west and southwest of Lake Apopka; the southwest and northwest corners of Orange and Osceola Counties, respectively; and Polk and Highlands Counties, from the City of Lake Wales south to the Highlands County/Glades County border (FNAI 1996) on the LWR. This species is absent from the Bombing Range Ridge of Avon Park Air Force Range.

Scrub plum is present on nearly all conservation lands within its range that have scrub or high pineland vegetation (FNAI 1985, Stout 1982). In Polk County, protected sites containing scrub plum exist at the Arbuckle and the Lake Walk-in-the-Water tracts of LWR State Forest, at the Pine Ridge Nature Preserve of Historic Bok Sanctuary, at the Allen David Broussard Catfish Creek State Preserve, and at The Nature Conservancy's Tiger Creek Preserve and probably at the

Saddle Blanket Lakes Preserve. In Highlands County, the scrub plum is protected on the Carter Creek tract and Apthorpe, Holmes Avenue, Lake Placid, and Gould Road areas of the LWR Wildlife and Environmental Area; the Carter Creek and Flamingo Villas tracts of LWR National Wildlife Refuge; Archbold Biological Station; and Lake June in Winter Scrub State Park.

Although the historic range was rather extensive compared to other narrowly endemic plants of Florida's central ridges, this species has declined with destruction and fragmentation of its scrub habitat. Habitat loss due to conversion to agriculture and residential development continue to threaten this species. Removal by plant collectors has been an additional threat that land acquisitions and conservation areas are alleviating. Fire suppression has degraded the habitat required by this species. This federally endangered species apparently requires periodic fire or other disturbances to maintain suitable habitat.

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area. The environmental baseline does not include the effects of the action under review in this Biological Opinion.

ENVIRONMENTAL BASELINE

Florida scrub-jay

Status of the species within the action area

As stated previously, the action area is defined as all areas to be directly or indirectly affected by the Federal action, and not just the immediate area involved in the action. For the purposes of this consultation, the action area includes all lands within the project footprint, and all lands within 500 ft (152.4 m) of the project footprint.

Florida scrub-jays have been documented to occur in the action area within the project footprint. Scrub-jay call surveys, based on the Service's survey guidance (Service 2004), were conducted by the applicant's consultant within suitable habitat in the US 27 project footprint during March and April, 2011. The area surveyed included the project footprint. Results of the survey indicate that portions of the territories of two family groups (denoted as A and B) occur on the project footprint (Figures 2a and 2b). Two adult birds were observed in territory A and three adult birds were observed in territory B. The sexes of these birds were not determined.

The proposed vegetation clearing will impact 6.2 ac (2.51 ha) of occupied habitat within the territories of scrub-jay families A and B (5.64 ac [2.28 ha] within territory A and 0.56 ac [0.23 ha] within territory B). To minimize the adverse effects resulting from the project, the FDOT will acquire sufficient credits from a Service-approved conservation bank to provide at least 12.4 ac (5.02 ha) of occupied scrub-jay habitat.

A survey for scrub-jays of the remainder of the action area (*i.e.*, all lands within 500 feet [152.4 m] of the project footprint) has not been conducted. Because the average size of a scrub-jay territory is about 25 ac (10.12 ha), it is likely that most of territories A and B described above occur in the portion of the action area outside of the project footprint (although the exact size of each territory was not determined). However, the status of the scrub-jay within the remainder of the action area outside of the project footprint is not known. It is likely that scrub-jays occur within some of the remaining scrub-jay habitat in the action area.

Factors affecting the species environment within the action area

Habitat for the scrub-jay in the action area has been lost due to residential and commercial development, and degraded due to the lack of fire or vegetation management. The expected population growth, and concomitant development, in the action area threatens remaining scrub-jay habitat. The overgrowth of vegetation in scrub habitats is known to significantly reduce the quality of these habitats to scrub-jays (Breininger et al. 1996; Fitzpatrick et al. 1991; Woolfenden and Fitzpatrick 1996b). Scrub-jays are adapted to early successional habitat conditions. Lack of fire or vegetation management results in the loss of open areas scrub-jays use to cache acorns and forage for prey. Moreover, overgrown vegetation in scrub habitats provides more favorable conditions for predators and competitors of scrub-jays (Miller and Stith 2002).

Operation of the existing roadway and other roads within the action area represent a potential threat of injuries or mortalities to scrub-jays resulting from collisions with motor vehicles. Scrub-jays are a highly vagile, and low-flying species that, by habit, seldom move a significant distance away from their territory. Therefore, it's possible scrub-jays may adapt to the presence of motor vehicle traffic in the action area. However, ongoing population growth results in more development that coincides with an increase in the number of roadways built and motor vehicle used in the action area. This significantly increases the potential that scrub-jays will be struck and injured or killed due to collisions with motor vehicles.

Our analyses under the Act include consideration of observed or likely environmental effects related to ongoing and projected changes in climate. As defined by the Intergovernmental Panel on Climate Change (IPCC), "climate" refers to average weather, typically measured in terms of the mean and variability of temperature, precipitation, or other relevant properties over time; thus "climate change" refers to a change in such a measure which persists for an extended period, typically decades or longer, due to natural conditions (*e.g.*, solar cycles) or human-caused changes in the composition of the atmosphere or in land use (IPCC 2013, p. 1450). Detailed explanations of global climate change and examples of various observed and projected changes and associated effects and risks at the global level are provided in reports issued by the IPCC (2014 and citations therein). Information for the United States at national and regional levels is summarized in the National Climate Assessment (Melillo *et al.* 2014 entire and citations therein; see Melillo *et al.* 2014, pp.28-45 for an overview). Because observed and projected changes in climate at regional and local levels vary from global average conditions, rather than using global scale projections, we use "downscaled" projections when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species

and the conditions influencing it. (See Melillo *et al.* 2014, Appendix 3, pp. 760-763 for a discussion of climate modeling, including downscaling). In our analysis, we use our expert judgment to weigh the best scientific and commercial data available in our consideration of relevant aspects of climate change and related effects.

Climate change may result in an increase in the intensity or frequency of tropical storms and hurricanes in Florida. Since small scrub-jay populations are more vulnerable to these events, they may be extirpated at an increased rate. The Atlantic Multi-decadal Oscillation (AMO) influences rain patterns in Florida. We are currently in an AMO wet phase that is predicted to persist through 2020 (miller 2010). The increased rainfall associated with this phase could reduce our ability to effectively use prescribed burning to manage habitat in optimal conditions for scrub-jays.

It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006).

ENVIRONMENTAL BASELINE

Sand skink and blue-tailed mole skink

The sand skink and the blue-tailed mole skink have similar habitat requirements. Therefore, these species will be discussed together in this section.

Status of the species within the action area

The applicant's consultants surveyed the project footprint to determine the status of sand skinks and blue-tailed mole skinks. Pedestrian and coverboard surveys based on the Service's guidance (Service 2012) were conducted in April and May of 2014. Because sand skinks leave a distinctive sinusoidal (s-shaped) track at the soil surface when they move through the soil, these survey methods can be used to detect the tracks of the sand skink. The survey methods employed can be used to estimate the relative abundance of sand skinks on the project site, and the extent of the project site used by skinks. However, the actual number of skinks that currently occur on the site is not known. Blue-tailed mole skinks were not observed on the project site. However, a reliable survey method has not been developed for this species. The entire known geographic range of the blue-tailed mole skink occurs within the known geographic range of the sand skink. Therefore, the Service assumes blue-tailed mole skinks are likely to occur wherever sand skinks occur.

Results of the surveys suggest that federally listed skinks occur within 39.67 ac (16.1 ha) of the project site. To compensate for the loss of skinks and skink habitat, the FDOT has proposed to restore, enhance, and preserve at least 79.34 ac (32.1 ha) of skink habitat. This habitat will be provided through the purchase of 79.34 skink credits at a Service-approved conservation bank or banks.

An area-wide survey of the remainder of the action area (*i.e.*, all lands within 500 ft (152.4 m) of the project footprint) for federally-listed skinks has not been conducted. Therefore, the status of the sand skink and the blue-tailed mole skink within the remainder of the action area is not known. However, it is likely that skinks occur within some of the remaining habitat in the action area.

Factors affecting species environment within the action area

The action area occurs within the known geographic range of the sand skink and blue-tailed mole skink, and includes the entire project footprint and all lands within 500 ft (152.4 m) of the project footprint. The project will result in the permanent conversion of skink habitat within the project footprint into a paved highway, maintained road right-of-way, and stormwater detention system. Suitable habitat for skinks is not expected to persist in the project footprint following completion of the US 27 Project.

The loss of uplands due to agricultural, commercial and residential development has resulted in the loss of skink habitat and the decline of the sand skink and blue-tailed mole skink in the action area as well as throughout their range. A significant proportion of skink habitat in the action area has been converted to cattle pastures, citrus groves, housing developments, commercial buildings, roads, golf courses, and other land uses. Moreover, skinks are directly killed by land clearing and other activities associated with construction and development.

Fire suppression and the lack of vegetation management within scrub habitats and sandy uplands in the action area have also resulted in the loss of skink habitat in the action area. Skinks require habitats containing large patches of root-free, bare soils interspersed with shrubs or trees in low densities. The lack of fire or mechanical management of vegetation results in the overgrowth of vegetation and the loss of bare soils favored by skinks.

The presence of invasive and exotic invasive plant species has resulted in the loss of skink habitat. Exotic plants such as Brazilian pepper (*Schinus terebinthifolius*), Bahia grass (*Paspalum notatum*), and cogongrass (*Imperata cylindrica*) form dense stands that reduce or cover open patches of bare soils used by skinks.

It is not clear what effect increases in frequency and amount of rainfall associated with climate change and the wet phase of the AMO have on skinks. It is possible these changes make skink habitat less suitable by making the soil more difficult for skinks to move through. It is also possible increased rainfall could stimulate the growth of vegetation whose roots could inhibit skink movement.

ENVIRONMENTAL BASELINE

Federally listed plant species

The scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum are all federally listed plants with similar habitat requirements. Therefore, these species will be discussed together in this section.

Status of the species within the action area

The applicant's consultants surveyed the project footprint to determine the status of federally listed plants. The following federally listed plants were observed during the surveys: 2 specimens of scrub buckwheat, >20 specimens of papery whitlow-wart, 2 specimens of pygmy fringe-tree, >20 specimens of short-leaved rosemary, >50 specimens of sandlace, and 3 specimens of scrub plum. To minimize the loss of federally listed plants resulting from the project, the FDOT has proposed to work with BTG, a participating institution of the NCPC, to collect seeds or cuttings or translocate (depending on the species) federally listed plants found in the project footprint. The extent of the collection process or transplanting efforts will be determined by the BTG personnel so that the most imperiled species will have priority status. There are limitations of available space in the BTG collection beds for transplanting. The conservation measures enacted may not include conservation of each individual plant specimen, but the measures are intended to maintain a genetically distinct population of each species. Plant materials that are collected (*i.e.*, seeds or cuttings) would be under the protection of the NCPC and either stored or used for propagation. Transplanted individuals may be relocated to the National Collection Beds that exist on-site at the BTG, depending on available space. It may also be possible to use volunteer resources, such as nurseries associated with the FNPS, to temporarily cultivate and maintain collected plants, cuttings and seedlings until permanent placement within nearby conservation lands can be coordinated.

An area-wide survey of the remainder of the action area (*i.e.*, all lands within 500 ft (152.4 m) of the project footprint) for federally-listed plants has not been conducted. Therefore, the status of the federally listed plant species discussed in this Biological Opinion within the remainder of the action area is not known. However, these species may occur within some of the remaining habitat in the action area.

Factors affecting species environment within the action area

The action area occurs within the known geographic range of the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum; and includes the entire project footprint and all lands within 500 ft (152.4 m) of the project footprint. The project will result in the permanent conversion of habitat for these federally listed plant species within the project footprint into a paved highway, and maintained road right-of-way. Suitable habitat for these plant species is not expected to persist in the project footprint immediately following completion of the US 27 project. However, it is likely that several years in the future the sod placed in the road right-of-way will deteriorate due to the existing nutrient poor soils and the lack of regular watering. Bare spaces are likely to develop that may allow these plant species to re-populate the U.S. Highway 27 right-of-way to some minor extent.

The loss of uplands and scrub habitat due to agricultural, commercial and residential development has resulted in the loss of habitat and the decline of the federally listed plant species, discussed in this Biological Opinion, in the action area as well as throughout their range. A significant proportion of habitat in the action area has been converted to cattle pastures, citrus groves, housing developments, commercial buildings, roads, golf courses, and other land uses. Moreover, federally listed plants are directly killed by land clearing and other activities associated with construction and development.

Fire suppression and the lack of vegetation management within scrub habitats and sandy uplands in the action area have also resulted in the loss of habitat for the federally listed plants in the action area. These plant species require sandy scrub habitats containing large patches of root-free, bare soils. The lack of fire or mechanical management of vegetation results in the overgrowth of vegetation and a change in the character of the scrub habitat favored by these plant species.

The presence of invasive and exotic invasive plant species has also resulted in the loss of habitat for the federally listed plants discussed in this Biological Opinion. Exotic plants such as Brazilian pepper (*Schinus terebinthifolius*), Bahia grass (*Paspalum notatum*), and cogongrass (*Imperata cylindrica*) form dense stands and reduces or covers open patches of bare soils favored by these plant species.

Increases in frequency and amount of rainfall associated with climate change and the wet phase of the AMO could exacerbate the effects of both fire suppression and invasive and exotic plant species on the federally listed plant species within the action area. Increased rainfall could decrease the probability of wildfires occurring or could extinguish wildfires in progress. It could also lead to more favorable conditions for growth of invasive and exotic plant species.

EFFECTS OF THE ACTION

Florida scrub-jay

This section analyzes the beneficial, direct, and indirect effects of the proposed action and the effects of any interrelated and independent actions on the Florida scrub-jay and its habitat.

Factors to be considered

The project site contains scrub-jay habitat and is located within the geographic range of the scrub-jay. The timing of construction for this project relative to sensitive periods of the scrub-jay's life cycle is unknown. Scrub-jays are currently found within, and adjacent to, portions of the proposed construction footprint. The project will be constructed in a single, disruptive event and alter soils and the native vegetation within the project site. The time required to complete construction of the project is not known, but it is likely the project will be completed within 2 to 3 years following the initiation of construction activities. The disturbance to scrub-jays and scrub-jay habitat associated with the project will be permanent and will result in a loss of habitat currently available to scrub-jays.

Effects of the action

The US 27 project will widen the existing four-lane roadway to six lanes, and includes improvements to the existing U.S. Highway 27 interchange at SR 60. The following section presents a discussion of the effects of the project to the Florida scrub-jay.

Beneficial effects: Beneficial effects are those effects of the proposed action that are completely positive, without any adverse effects to the listed species or its critical habitat. The proposed action will not result in beneficial effects to the scrub-jay.

Direct effects: Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, and are reasonably certain to occur. The direct effects that this project will have on the scrub-jay within the action area are discussed below.

The construction of the project will convert all potential scrub-jay habitat in the project footprint to paved travel lanes for motor vehicles, and sodded and maintained road right-of-way. The proposed land clearing associated with the US 27 project will result in the permanent loss of 6.2 ac (2.51 ha) of occupied scrub-jay habitat within two active scrub-jay territories (5.64 ac [2.28 ha] within territory A and 0.56 ac [0.23 ha] within territory B) (Figures 2a and 2b). The project footprint will be unsuitable as nesting and foraging habitat for the scrub-jay. However, scrub-jays could potentially use portions of the sodded and maintained road right-of-way for storing acorns. The project will add to the continued fragmentation of scrub-jay habitat in the region and result in a small reduction of the geographic distribution of the species. Therefore, the project is expected to directly affect scrub-jay persistence in the action area.

Land clearing and road construction activities are not expected to result in the direct mortality of adult or nestling scrub-jays. Scrub-jays are and intelligent and will likely avoid areas where land clearing is taking place. The destruction of a scrub-jay nest is also unlikely because the land clearing activities will occur outside the nesting season of the scrub-jay. Nonetheless, the land clearing and road construction activities are expected to result in harassment to scrub-jays at the project site. Scrub-jays may respond to the harassment by persisting within the affected territory, shifting their territory to other xeric uplands in the project area, or abandoning the project site and failing to establish a new territory.

Interrelated and interdependent actions: An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that does not have independent utility apart from the action under consultation. Interrelated or interdependent actions are not expected to result from the project.

Indirect Effects - Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur.

As indicated above, the US 27 project will result in the placement of a new paved traffic lane within the western portion of two active scrub-jay territories east of the existing roadway. Motor vehicles will use the new roadway following completion of the project. As such, the project will move disturbance and harassment from motor vehicles closer to any scrub-jays occurring within the remaining lands of the two active territories identified during the scrub-jay call surveys completed for the project. The widened roadway will be used by motor vehicles following the completion of the project. Consequently, scrub-jays may respond to disturbance and harassment from motor vehicles by persisting within the undeveloped portion of the affected territory, shifting their territory to other xeric uplands in the project area, or abandoning their existing territory and failing to establish a new territory.

The potential for injury or mortality of scrub-jays due to vehicle collisions will increase if scrub-jays remain within lands immediately adjacent to the project footprint. Dreschel et al. (1990), Fitzpatrick et al. (1991), and Mumme et al. (2000) provide the best scientific and commercial data on the likelihood of incidental take as the result of scrub-jays being killed by the vehicles. The only documented road-kill mortalities of scrub-jays are from birds living in territories immediately adjacent to a road. Injuries and mortalities from collisions have not been documented for scrub-jays dispersing across roads in hopes of establishing a new territory.

Species response to the proposed action

Scrub-jays may respond to the commencement of construction activities by attempting to flee the project site to avoid the disturbance. Because scrub-jays are highly vagile and intelligent, they should be able to successfully flee the project site before they are affected by construction activities. Similarly, following completion of the project scrub-jays may respond to the disturbance caused by motor vehicles using the new roadway lanes by either abandoning their existing territories or adapting to the disturbance and remaining in the undeveloped portions of their existing territories.

EFFECTS OF THE ACTION

Sand skink and blue-tailed mole skink

The sand skink and the blue-tailed mole skink have similar habitat requirements. Therefore, these species will be discussed together in this section. This section analyzes the beneficial, direct, and indirect effects of the proposed action and the effects of any interrelated and independent actions on federally listed skinks and their habitat.

Factors to be considered

The project site contains skink habitat and is located within the geographic range of the sand skink and blue-tailed mole skink. The timing of construction for this project relative to sensitive periods of the skink's life cycle is unknown. Skinks are currently found within, and adjacent to, the proposed construction footprint. The project will be constructed in a single, disruptive event and alter soils and the vegetation within the project site. The time required to complete construction of the project is not known, but it is likely the project will completed within 2 to 3 years following the initiation of construction activities. The disturbance to skinks and skink habitat associated with the project will be permanent and will result in incidental mortality of skinks and a loss of habitat currently available to skinks.

Effects of the action

Beneficial effects: Beneficial effects are those effects of the proposed action that are completely positive, without any adverse effects to the listed species or its critical habitat. The proposed action will not result in beneficial effects to the sand skink or the blue-tailed mole skink.

Direct effects: Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, and are reasonably certain to occur. The direct effects that this project will have on the sand skink and the blue-tailed mole skink within the action area are discussed below.

The construction of the project will convert all potential skink habitat in the project footprint to paved travel lanes for motor vehicles, and sodded and maintained road right-of-way. Suitable habitat for skinks is not expected to occur in the project footprint following completion of the project. The project will result in the direct loss of 39.67 ac (16.1 ha) of skink habitat. Incidental mortality of skinks due to land clearing and construction activities may also occur. Construction activities within the project site can crush or injure individual skinks and skink eggs, and destroy or degrade occupied and potential habitat and feeding areas. In addition, construction activities may result in disturbance to skinks by causing them to leave the area and possibly miss foraging and mating opportunities. The project will also add to the continued fragmentation of skink habitat in the region and result in a small reduction of the geographic distribution of these species. Therefore, the project is expected to directly affect skink persistence in the action area.

Interrelated and interdependent actions: An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that does not have independent utility apart from the action under consultation. Interrelated or interdependent actions are not expected to result from the project.

Indirect effects: Indirect effects are those effects that result from the proposed action, are later in time, and are reasonably certain to occur. The project will not result in indirect effects to the sand skink and the blue-tailed mole skink.

Species response to the proposed action

Federally listed skinks may respond to the commencement of construction activities by attempting to flee the project site to avoid the disturbance. However, skinks are not vagile and may not be able to successfully flee the project site before they are affected by construction activities. As such, skinks may be crushed by construction vehicles or entombed during earth moving, vegetation clearing, contouring and filling activities associated with the US 27 project.

EFFECTS OF THE ACTION

Federally listed plants

The scrub buckwheat, papery whitlow-wort, pygmy fringe tree, short-leaved rosemary, sandlace, and scrub plum are all federally listed plants with similar habitat requirements. Therefore, all of these species will be discussed in this section. This section analyzes the beneficial, direct, and indirect effects of the proposed action and the effects of any interrelated and independent actions on federally listed plants and their habitat.

Factors to be considered

The project site contains habitat for federally listed plants and is located within the geographic range of the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary,

sandlace, and scrub plum. The timing of construction for this project, relative to sensitive periods of the life cycle for these plant species, is unknown. The scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum are currently found within, and potentially occur adjacent to, the proposed construction footprint. The project will be constructed in a single, disruptive event and alter soils and the vegetation within the project site. The time required to complete construction of the project is not known, but it is likely the project will completed within 2 to 3 years following the initiation of construction activities. The disturbance associated with the project to the federally listed plants discussed herein will be permanent and will result in incidental mortality of these plant species and a loss of currently available habitat.

Effects of the action

Beneficial effects: Beneficial effects are those effects of the proposed action that are completely positive, without any adverse effects to the listed species or its critical habitat. The proposed action will not result in beneficial effects to the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, or scrub plum.

Direct effects: Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, and are reasonably certain to occur. The direct effects that this project will have on the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum within the action area are discussed below.

The construction of the project will convert all potential habitat for federally listed plants in the project footprint to paved travel lanes for motor vehicles, and sodded and maintained road right-of-way. Suitable habitat for these plant species is not expected to occur in the project footprint following completion of the project. However, it is likely several years in the future the sod placed in the road right-of-way will deteriorate due to the existing nutrient poor soils and the lack of regular watering. Bare spaces are likely to develop that may allow these plant species to re-populate the U.S. Highway 27 right-of-way to some minor extent.

The project will result in the direct loss of habitat for federally listed plants, although the exact acreage lost is difficult to determine. Incidental mortality of federally listed plants due to land clearing and construction activities may also occur. Land clearing will kill any plant specimens and destroy or disrupt the seed beds of federally listed plants within the project site. The project will also add to the continued fragmentation of habitat for the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum in the region and result in a small reduction of the geographic distribution of these species. Therefore, the project is expected to directly affect persistence of these species in the action area.

Interrelated and interdependent actions: An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that does not have independent utility apart from the action under consultation. Interrelated or interdependent actions are not expected to result from the project.

Indirect effects: Indirect effects are those effects that result from the proposed action, are later in time, and are reasonably certain to occur. The project will not result in indirect effects to the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, or scrub plum.

Species response to the proposed action

The specimens of the federally listed plants discussed in this Biological Opinion that occur in the project footprint will be incidentally killed by the land clearing activities associated with the project. In order to stabilize the soil, sod will be placed in portions of the project footprint that do not contain roadway pavement. Therefore, suitable habitat for these plant species is not expected to occur in the project footprint following completion of the project. However, it is possible several years in the future the sod placed in the road right-of-way will deteriorate due to the existing nutrient poor soils and the lack of regular watering. Bare spaces are likely to develop that may allow some of these plant species to establish themselves. However, because the FDOT maintains their road right-of-ways by periodic mowing, it is not clear if any of the federally listed plant species discussed would be able to persist in the U.S Highway 27 right-of-way.

CUMULATIVE EFFECTS

Florida scrub-jay, federally listed skinks, federally listed plants

The cumulative effects of the U.S. 27 Project on the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe tree, short-leaved rosemary, sandlace, and scrub plum will be discussed r in this section. The Service defines "cumulative effects" considered in this Biological Opinion as the effects of future State, Tribal, local, or private actions (*i.e.,* non-Federal actions) reasonably certain to occur in the action area. Our definition of cumulative effects does not include future Federal actions unrelated to the proposed action because these actions require separate consultation pursuant to section 7 of the Act.

Anticipated future county actions in the action area that will adversely affect the habitat of these species include the issuance of county building permits. Permits to construct single-family homes and commercial buildings within the action area are required by Polk County. Many of the construction projects impacting scrub-jay habitat in the action area will require both a county building permit and a U.S. Army Corps of Engineers (Corps) permit, and will require consultation under section 7 of the Act.

A small proportion of construction projects requiring county building permits will not impact wetlands and will not require a permit from the Corps. In general, these projects will not have a Federal nexus requiring consultation with the Service under the Act. However, applicants obtaining county building permits are not absolved from the prohibition of take of listed species under the Act. Section 10 of the Act provides a means for permitting the incidental take of listed species associated with non-Federal actions such as county building permits. In order to obtain an incidental take permit, the applicant must prepare a Habitat Conservation Plan (HCP), acceptable to the Service, describing how impacts to the species will be minimized and mitigated

to the maximum extent practicable. To be acceptable to the Service, an HCP for a non-Federal action affecting scrub-jays would generally include the enhancement, restoration, or preservation of habitat for the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe tree, short-leaved rosemary, sandlace, and scrub plum. The Service has considered cumulative effects within the action area for the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe tree, short-leaved rosemary, sandlace, and scrub plum and based on the above discussion, we have not identified any additional cumulative effects beyond those already discussed in the Environmental Baseline.

CONCLUSION

After reviewing the current status of the Florida scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the project as proposed is not likely to jeopardize the continued existence of the scrub-jay, sand skink, blue-tailed mole skink, scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum. Critical habitat has not been designated for these species and will not be affected.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by the FHWA so that they become binding conditions of any grant or permit issued to the FDOT, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require the FDOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA or FDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

Sections 7(b)(4) and 7 (o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

AMOUNT OR EXTENT OF TAKE

Florida scrub-jay

Incidental take of the Florida scrub-jay in the form of harm (*i.e.*, the loss 12.4 ac [5.02 ha] of habitat in the project footprint, and the increased potential for scrub-jay mortality and injury resulting from collisions with motor vehicles) and harassment (*i.e.*, disturbance to scrub-jays resulting from land clearing and construction activity) is expected from the action. The Service has chosen not to quantify the level of incidental take in terms of a specific number of birds because documenting the adverse effects of loss of habitat and disturbance on survival and reproduction of scrub-jays from the project is difficult. Instead, we have quantified take as the amount of scrub-jay habitat lost due to the project. The project will result in the loss of 12.4 ac (5.02 ha) of habitat within the project footprint. The Service has determined this amount of anticipated take is not likely to result in jeopardy to the species. If this amount of take is exceeded during the course of this action; such take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for modification of the reasonable and prudent measures.

Sand skink and blue-tailed mole skink

The Service anticipates incidental take of sand skinks and blue-tailed mole skinks in the form of harm (*i.e.,* injury, mortality and habitat loss). Construction activities associated with the project may wound or kill skinks, and result in the loss of 39.67 ac (16.1 ha) of occupied skink habitat. The Service finds the number of sand skinks and blue-tailed mole skinks incidentally taken by the action will be difficult to quantify for the following reasons: (1) individuals have a small body size and spend the majority of their time underground, making the detection of a dead or impaired specimens unlikely; and (2) a suitable survey method has not been developed to accurately estimate skink density, thus the number of skinks currently occurring in the project footprint is not well known. Blue-tailed mole skinks have not been documented within the project corridor, but are known to occur in habitats occupied by sand skinks. Since a reliable survey technique to detect blue-tailed mole skinks is not currently available, the Service assumes blue-tailed mole skinks are likely to occur wherever sand skinks occur. The Service finds all sand skinks and blue-tailed mole skinks occurring within the 39.67 ac (16.1 ha) of skink habitat on the project site will be taken incidental to the action. The Service has determined the anticipated take is not likely to result in jeopardy to federally listed skinks. If, during the course of this action, this level of take is exceeded, such take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for modification of the reasonable and prudent measures.

Federally listed plants

As indicated above, Sections 7(b)(4) and 7 (o)(2) of the Act generally do not apply to federally listed plant species. Consequently, the scrub buckwheat, papery whitlow-wort, pygmy fringe-tree, short-leaved rosemary, sandlace, and scrub plum will not be discussed further in this incidental take statement.

Effect of the Take

In the accompanying Biological Opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the scrub-jay, sand skink or blue-tailed mole skink. Critical habitat has not been designated for the scrub-jay, sand skink or blue-tailed mole skink and will not be affected.

REASONABLE AND PRUDENT MEASURES

When providing an incidental take statement, the Service is required to give reasonable and prudent measures it considers necessary or appropriate to minimize the take along with terms and conditions that must be complied with, to implement the reasonable and prudent measures. Furthermore, the Service must also specify procedures to be used to handle or dispose of any individuals taken. The Service finds the following reasonable and prudent measures are necessary and appropriate to reduce take and to minimize the direct and indirect effects of the proposed project on the scrub-jay:

1. Minimize the adverse effects of harm and harassment to the scrub-jay, sand skink, and blue-tailed mole skink by implementing an appropriate skink and scrub-jay habitat compensation and management plan.

2. Minimize the adverse effects of the action to the scrub-jay through appropriate timing of vegetation removal.

3. Notify the Service of any unauthorized take of scrub-jays, sand skinks and blue-tailed mole skinks.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the FHWA and the FDOT must comply with the following terms and conditions that implement the reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. Construction of the US 27 project will not commence until: a) the FDOT provides the Service with a receipt (in the form of a letter or email) from one or more Service approved conservation banks stating that at least 12.4 ac (5.1 ha) of scrub jay habitat or 12.4 scrub jay credits and 79.34 ac (32.1 ha) of sand skink habitat or 79.34 sand skink credits have been

acquired by the FDOT; and b) the FDOT and FHWA receive an email or letter from the Service indicating that we have received the receipt from the approved conservation bank(s).

2. Vegetation removal and land clearing activities may not occur within occupied scrub-jay habitat on the project site during the scrub-jay nesting season (March 1 to June 30).

3. Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made to the nearest Service Law Enforcement Office: U.S. Fish and Wildlife Service; 9549 Koger Boulevard, Suite 111; St. Petersburg, Florida 33702; 727-570-5398. Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission: South Region; 3900 Drane Field Road; Lakeland, Florida; 33811-1299; 1-800-282-8002; and

4. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured skinks, or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service is not proposing any conservation recommendations at this time.

REINITIATION NOTICE

This concludes formal consultation on the US 27 Project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded (see below); (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; (3) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. The amount of incidental take authorized by this consultation may be exceeded should impacts from the proposed project increase or mitigation fail to provide habitat values proposed and analyzed within this biological opinion. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation in the effort to protect fish and wildlife resources. If you have any questions regarding this project, please contact John Wrublik at 772-469-4282.

Sincerely yours,

Donald (Bob) Progulske
Everglades Field Supervisor
South Florida Ecological Services Office

cc: electronic only
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LITERATURE CITED

Abrahamson, W., A. Johnson, J. Layne, and P. Peroni. 1984. Vegetation of the Archbold Biological Station, Florida: An example of the Southern Lake Wales Ridge. Florida Scientist. 47(4):209-250.

American Ornithologists' Union. 1995. Fortieth supplement to the North American Ornithologists' Union Checklist of North American Birds. Auk 112(3):819-830.

American Ornithologists' Union. 1983. Checklist of North American Birds. Sixth edition. Allen Press; Lawrence, Kansas.

American Ornithologists' Union. 1957. Check-list of North American Birds. Fifth edition. Allen Press; Lawrence, Kansas.

Anderson, L. 1991. *Paronychia chartacea* ssp. *minima* (Caryophyllaceae): a new subspecies of a rare Florida endemic. Sida 14(3): 435-441.

Andrews R.M. 1994. Activity and thermal biology of the sand-swimming skink *Neoseps reynoldsi*: Diel and seasonal patterns. Copeia 1994(1):91-99.

Archbold Biological Station, plant ecology laboratory. 2003. *Eriogonum longifolium* species account. http://www.archbold-station.org/abs/plantspp/erilonsppacc.htm and *Prunus geniculata* species account. http://www.archbold-station.org/abs/plantspp/prugensppacc.htm

Ashton, K.G. 2005. Life history of a fossorial lizard, *Neoseps reynoldsi*. Journal of Herpetology 39(3):389-395.

Ashton, K.G. and S.R. Telford, Jr. 2006. Monthly and daily activity of a fossorial lizard, *Neoseps reynoldsi*. Southeastern Naturalist 5(1):175-183.

Bancroft, G.T. and G.E. Woolfenden. 1982. The molt of scrub-jays and blue jays in Florida. Ornithological Monograph Number 29. American Ornithologists' Union; Washington, D.C.

Bendire, C.E. 1895. Life histories of North American birds. U.S. National Museum Special Bulletin No. 3. U.S. Government Printing Office; Washington, D.C.

Boughton, R.K., J.W. Atwell, and S.J. Schoech. 2006. An introduced generalist parasite, the sticktight flea (*Echidnophaga gallinacea*), and its pathology in the threatened Florida scrub-jay (*Aphelocoma coerulescens*). Journal of Parasitology 92(5):941–948.

Boyle, O.D., E.S. Menges, and D. M. Waller. 2003. Dances with fire: Tracking metapopulation dynamics of *Polygonella basiramia* in Florida scrub (USA). Folia Geobotanica 38:255-262.

Bowman, R. 1998. Population dynamics, demography, and contributions to metapopulation dynamics by suburban populations of the Florida scrub-jay, *Aphelocoma coerulescens*. Final report on Project No. NG94-032 to Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.

Bowman, R. and L. Averill. 1993. Demography of a suburban population of Florida scrub-jay. Annual progress report for U.S. Fish and Wildlife Service cooperative agreement number 14-16-0004-91-950. December 1993.

Bowman, R., G.E. Woolfenden, A.L. Fleischer, Jr., and L.M. Walton. 1996. Nest site selection by Florida scrub-jays in natural and modified habitats [abstract]. Page 2 *in* Symposium on Current Research at Archbold Biological Station. Lake Placid, Florida.

Branch, L.C., and D.G. Hokit. 2000. A comparison of scrub herpetofauna on two central Florida sand ridges. Florida Scientist 63(2):108-117.

Branch, L.C., A.M. Clark, P.E. Moler, and B.W. Bowen. 2003. Fragmented landscapes, habitat specificity, and conservation genetics of three lizards in Florida scrub. Conservation Genetics 4:199-212.

Brandley, M.C., A. Schmitz, and T.W. Reeder. 2005. Partitioned Bayesian analyses, partition choice, and the phylogenetic relationships of Scincid lizards. Systematic Biology 54(3):373-390.

Breininger, D. 1999. Florida scrub-jay demography and dispersal in fragmented urban landscape. Auk. 116: 520-527.

Breininger, D.R. and P.A. Schmalzer. 1990. Effects of fire and disturbance on plants and birds in a Florida oak/palmetto scrub community. American Midland Naturalist 123(1):64-74.

Breininger, D.R, B. Toland, D. Oddy, M. Legare, J. Elseroad, and G. Carter. 2003. Biological criteria for the recovery of Florida scrub-jay populations on public lands in Brevard County and Indian River County. Final Report to Endangered Species Office, U.S. Fish and Wildlife Service, Jacksonville, Florida. Dynamac Corporation, DYN-2, Kennedy Space Center, Florida.

Breininger, D.R., B.W. Duncan, and N.J. Dominy. 2002. Relationships between fire frequency and vegetation type in pine flatwoods of east-central Florida, USA. Natural Areas Journal 22(3):186-193.

Breininger, D.R., B. Toland, D. Oddy, M. Legare, J. Elseroad, and G. Carter. 2001. Biological criteria for the recovery of Florida scrub-jay populations on public lands in Brevard County and Indian River County. Annual Progress Report, U.S. Fish and Wildlife Service; Jacksonville, Florida.

Breininger, D.R., M.A. Burgman, and B.M. Stith. 1999. Influence of habitat quality, catastrophes, and population size on extinction risk of the Florida scrub-jay. Wildlife Society Bulletin 27(3):810-822.

Breininger, D.R., V.L. Larson, B.W. Duncan, and R.B. Smith. 1998. Linking habitat suitability to demographic success in Florida scrub-jays. Wildlife Society Bulletin 26(1):118-128.

Breininger, D.R., V.L. Larson, B.W. Duncan, R.B. Smith, D.M. Oddy, and M.F. Goodchild. 1995. Landscape patterns of Florida scrub-jay habitat use and demographic success. Conservation Biology 9(6):1442-1453.

Breininger, D.R., M.J. Provancha, and R.B. Smith. 1991. Mapping Florida scrub-jay habitat for purposes of land-use management. Photogrammetric Engineering and Remote Sensing 57(11):1467-1474.

Bursey, C.R., and S.R. Telford, Jr. 2002. *Parapharyngodon ocalaensis* n. sp. (Nematoda: Pharyngodonidae) from the sand skink, *Neoseps reynoldsi* (Scincidae), of Florida. The Journal of Parasitology 88(5):929-931.

Byrd, H. 1928. Notes from correspondents: Florida jay. Florida Naturalist 1(4):87.

Campbell, H.W. and S.P. Christman. 1982. The herpetological components of Florida sandhill and sand pine scrub associations. Pages 163-171 *in* N.J. Scott, editor. Herpetological communities. U.S. Fish and Wildlife Service, Wildlife Research Report No. 13., Washington, D.C.

Center for Plant Conservation. 2003. CPC National Collection plant profile: *Chionanthus pygmaeus*.

Christman, S.P. 2005. Densities of *Neoseps reynoldsi* on the Lake Wales Ridge. Final report submitted to U.S. Fish and Wildlife Service, Vero Beach, Florida.

Christman, S.P. 1992a. Threatened: sand skink, *Neoseps reynoldsi* (Stejneger). Pages 135-140 *in* P.E. Moler, editor. Rare and endangered biota of Florida. University Press of Florida, Gainesville, Florida.

Christman, S.P. 1992b. Threatened: bluetailed mole skink, *Eumeces egregius lividus* (Mount). Pages 117-122 *in* P.E. Moler, editor. Rare and endangered biota of Florida. University Press of Florida; Gainesville, Florida.

Christman, S.P. 1988. Endemism and Florida's interior sand pine scrub. Final project report no.GFC-84-101, Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.

Christman, S.P. 1978. Threatened: bluetailed mole skink, *Eumeces egregius lividus* (Mount). Pages 38-41 *in* R.W. McDiarmid, editor. Rare and endangered biota of Florida. Volume 3: amphibians and reptiles. University Press of Florida; Gainesville, Florida.

Christman, S.P. 1970. The possible evolutionary history of two Florida skinks. Quarterly Journal of the Florida Academy of Science 33(4): 291-293.

Christman, S.P. and W.S. Judd. 1990. Notes on plants endemic to Florida scrub. Florida Scientist 53:52-73.

Clutts, J. 1998. Comments on draft species account for *Eriogonum longifolium.* January 27.

Collazos, A. 1998. Microhabitat selection in *Neoseps reynoldsi*: The Florida sand swimming skink. M.S. Thesis. University of South Florida; Tampa, Florida.

Cooper, B.W. 1953. Notes on the life history of the lizard, *Neoseps reynoldsi* Stejneger. Quarterly Journal of the Florida Academy of Sciences. 16(4):235-238.

Cox, J.A. 1987. Status and distribution of the Florida scrub-jay. Florida Ornithological Society Special Publication Number 3.

Davis, J.H., Jr. 1967. General map of natural vegetation of Florida. Agricultural Experiment Station, Institute of Food and Agricultural Sciences, University of Florida; Gainesville, Florida.

Davis, J.H., Jr. 1943. The natural features of southern Florida: especially the vegetation and the Everglades. Florida Department Conservation, Florida Geographical Survey Bulletin 25. 311 pp.

DeGange, A.R., J.W. Fitzpatrick, J.N. Layne, and G.E. Woolfenden. 1989. Acorn harvesting by Florida scrub-jays. Ecology 70(2):348-356.

Dreschel, T.W., R.B. Smith, and D.R. Breininger. 1990. Florida scrub-jay mortality on roadsides. Florida Field Naturalist 18: 82-83.

Duncan, B.W. and D.R. Breininger. 1998. Quantifying habitat change: modeling historic and current Florida scrub-jay habitat suitability. Proceedings of GIS/LIS 1998 Annual Conference; Fort Worth, Texas.

Duncan, B.W., S. Boyle, D.R. Breininger, and P.A. Schmalzer. 1999. Coupling past management practice and historic landscape change on John F. Kennedy Space Center, Florida. Landscape Ecology 14:291-309.

Elfers, S.C. 1989. A biosystematic study of *Chionanthus* in the southeastern United States. Unpublished thesis, University of Central Florida; Orlando, Florida.

Fernald, R.T. 1989. Coastal xeric scrub communities of the Treasure Coast region, Florida: A summary of their distribution and ecology, with guidelines for their preservation and management. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report Number 6. Tallahassee, Florida.

Fitzpatrick, J.W. and G.E. Woolfenden. 1988. Components of lifetime reproductive success in the Florida scrub-jay. Pages 305-320 *in* T.H. Clutton-Brock, editor, Reproductive Success. University of Chicago Press; Chicago, Illinois.

Fitzpatrick, J.W., B. Pranty, and B. Stith. 1994. Florida scrub-jay state-wide map, 1992-1993. Archbold Biological Station. Lake Placid, Florida.

Fitzpatrick, J.W., G.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub-jay (*Aphelocoma coerulescens coerulescens*). Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report Number 8. Tallahassee, Florida. 49pp.

Fleischer, A.L., Jr. 1996. Pre-breeding time budgets of female Florida scrub-jays in natural and suburban habitats. Abstract, Archbold Biological Station 1996 Symposium. September 12, 1996. Lake Placid, Florida.

Florida Department of Environmental Protection (FDEP). 2008. Acquisition and Restoration Council February 2008 Florida Forever Priority List [Internet] [cited October 1, 2008] Available from: http://www.dep.state.fl.us/lands/FLForever/FF_Acquisition/ Feb_2008 _FF_list.doc.

Florida Natural Areas Inventory (FNAI). 2005. Florida conservation lands interactive map. http://www.fnai.org/data.cfm#MAACREAGE

Florida Natural Areas Inventory (FNAI). 2000. Field guide to the rare plants and animals of Florida online. Scrub plum, *Prunus geniculata.* http://www.fnai.org/FieldGuide/pdf/Prunus_geniculata.PDF

Florida Natural Areas Inventory (FNAI). 1996. Element occurrence data for: *Prunus geniculata*. Tallahassee, Florida.

Florida Natural Areas Inventory [FNAI]. 1985. Element occurrence data for *Prunus geniculata*. Tallahassee, Florida.

Franzreb, K.E. and J. Puschock. 2004. Year 3 (FY 2003): Status, population dynamics, and habitat use of the Florida scrub-jay on the Ocala National Forest, Florida. Draft annual report 2003. Southern Region, U.S. Forest Service; Asheville, North Carolina.

Gianopulos, K.D. 2001. Response of the threatened sand skink (*Neoseps reynoldsi*) and other herpetofaunal species to burning and clearcutting in the Florida sand pine scrub habitat. M.S. Thesis, University of South Florida; Tampa, Florida.

Gianopulos, K.D., H.R. Mushinsky, and E.D. McCoy. 2001. Response of the threatened sand skink (*Neoseps reynoldsi*) to controlled burning and clear-cutting in Florida sand pine scrub habitat. Proceedings from the Florida Scrub Symposium; Orlando, Florida.

Gill, J.D., and F.L. Pogge. 1974. *Chionanthus virginicus*. Pages 323- 325 *in* C. S. Schopmeyer. Seeds of woody plants in the United States. Agriculture Handbook No. 450. Forest Service, U.S. Department of Agriculture; Washington, DC.

Goodrum, P.D., and L.K. Halls. 1961. Fringetree. Pages 10-11 *in* L.K. Halls and T.H. Ripley, eds. Deer browse plants of southern forests.

Gray, T.C. 1965. A monograph of the genus *Conradina* A. Gray (Labiatae) from northeastern peninsular Florida. Sida 14:391-398.

Greenberg, C.H., D.G. Neary, and L.D. Harris. 1994. Effect of high-intensity wildfire and silvicultural treatments on reptile communities in sand-pine scrub. Conservation Biology 8:1047-1057.

Greer, A.E. 2002. The loss of the external ear opening in scincid lizards. Journal of Herpetology 36(4):544-555.

Griffin, J.A. 2007. Personal communication. Data Services Coordinator. Email to the U.S Fish and Wildlife Service dated June 12, 2007. Florida Natural Areas Inventory; Tallahassee, Florida.

Hanski, I., and M. Gilpin. 1991. Metapopulation dynamics: brief history and conceptual domain. Biological Journal of the Linnaean Society 42:3-16.

Hardin, J.W. 1974. Studies of the southeastern United States flora. IV. Oleaceae. Sida 5:274-285.

Harper, R.M. 1927. Natural Resources of Southern Florida. Florida Department Conservation, Florida Geological Survey Annual Report. 18:27-206.

Hastie, K. and E. Eckl. 1999. North Florida team rallies around scrub-jay. Page 28 *in* M. Durhan, editor. Fish and Wildlife News. July/August 1999. U.S. Fish and Wildlife Service; Washington, D.C.

Hawkes, C., and E. Menges. 1996. The relationship between open space and fire for species in a xeric Florida shrubland. Bulletin of the Torrey Botanical Club 123(2):81-92.

Harper, R. 1911. A new plum from the Lake Region of Florida. Torreya 11:64-67.

Hill, K. 1999. Responses of released populations of the sand skink, *Neoseps reynoldsi*, to scrubhabitat translocation in Central Florida. M.S. Thesis. University of South Florida; Tampa, Florida.

Hofstetter, R.H. 1984. The effect of fire on the pineland and sawgrass communities of southern Florida. Pages 465-476 *in*: P.J. Gleason (ed.). Environments of South Florida: present and past II. Miami Geological Society, Coral Gables, Florida.

Intergovernmental Panel on Climate Change (IPCC). 2013. Annex III: Glossary [Planton, S.(ed.)]. Pp. 1147-1465 In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, New York, USA. https://www.ipcc.ch/pdf/assessmentreport/ar5/wg1/WG1AR5_AnnexIII_FINAL.pdf

Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate Change 2014 Synthesis Report*. [Pachauri, R.K. *et al.*] 133 pp. http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

Johnson, A. F. 1982. Some demographic characteristics of the Florida rosemary, *Ceratiola ericoides* Michx. Amer. Midl. Nat. 108: 170-174.

Johnson, A. F. and W. G. Abrahamson. 1990. A note on the fire responses of species in rosemary scrubs on the southern Lake Wales Ridge. Florida Scientist 53:138-143.

Judd, W.S., and D.W. Hall. 1984. A new species of *Ziziphus* (Rhamnaceae) from Florida. Rhodora 86:38l-387.

Kautz, R.S. 1993. Trends in Florida wildlife habitat 1936-1987. Florida Scientist 56(1):7-24.

Kinsella, J.M. 1974. Helminth fauna of the Florida scrub-jay: host and ecological relationship. Proceedings of the Helminthological Society of Washington 41(2):127-130.

Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA Forest Service. Technical Publication R8-TP 2.

Kral, R., and R.B. McCartney. 1991. A new species of *Conradina* (Lamiaceae) from northeastern peninsular Florida. Sida 14:391-398.

Laessle, A.M. 1968. Relationships of sand pine scrub to former shore lines. Quarterly Journal. Florida Academy of Science 30-269-286.

Laessle, A.M. 1958. The origin and successional relationship of sandhill vegetation and sand-pine scrub. Ecological Monograph, 28:361-387.

Lewis, P.O. and D.J. Crawford. 1995. Pleistocene refugium endemics exhibit greater allozymic diversity than widespread congeners in the genus *Polygonella* (Polygonaceae). American Journal of Botany 82:141-149.

McConnell, K. and E.S. Menges. 2002. The effects of fire and treatments that mimic fire on the Florida endemic scrub buckwheat (*Eriogonum longifolium* Nutt. var. *gnaphalifolium* Gand.). Natural Areas Journal 22:194-201.

McCoy, E.D., P.E. Sutton, and H.R. Mushinsky. 1999. The role of guesswork in conserving the threatened sand skink. Conservation Biology 13(1):190-194.

McGowan, K.J. and G.E. Woolfenden. 1990. Contributions to fledgling feeding in the Florida scrub-jay. Journal of Animal Ecology 59:691-707.

McGowan, K.J. and G.E. Woolfenden. 1989. A sentinel system in the Florida scrub-jay. Animal Behavior 37:1000-1006.

Melillo J. M., T.C. Richmond, and G. W. Yohe, Eds. 2014. *Climate Change Impacts in the United States: The Third National Climate Assessment.* U.S. Global Change Research Program. http://nca2014.globalchange.gov/downloads

Meneken, B.M., A.C.S. Knipps, J.N. Layne, and K.G. Ashton. 2005. *Neoseps reynoldsi.* longevity. Herpetological Review 36:180-181.

Menges, E. S. 1999. Ecology and conservation of Florida scrub. Pp. 7-21 *in* R. C. Anderson, J. S. Fralish, and J. M. Baskin, eds., Savannas, Barrens, and Rock Outcrop Plant Communities of North America. Cambridge University Press, New York.

Menges, E. S. 1998. Comments on technical draft multi-species recovery plan for South Florida. February 5, 1998.

Menges, E. S. 1995. Report on Experimental Research and Monitoring of Four Species of Endangered Plants on the Lake Wales Ridge, Florida. Report to Florida Statewide Endangered and Threatened Plant Conservation Program. Florida Department of Agriculture and Consumer Services, Division of Forestry. Tallahassee.

Menges, E.S. 1992. Habitat preferences and responses to disturbance for *Dicerandra frutescens*, a Lake Wales Ridge (Florida) endemic plant. Bulletin of the Torrey Botanical Club 119(3):308-313.

Menges, E. S. and C. W. Weekley. 1999. Final Report on Continued Ecological Monitoring and Experimental Research on Four Florida Scrub Endemic Plants. Report to Florida Statewide Endangered and Threatened Plant Conservation Program. Florida Department of Agriculture and Consumer Services, Division of Forestry. Tallahassee.

Menges, E.S. and N. Kohfeldt. 1995. Life history strategies of Florida scrub plants in relation to fire. Bulletin of the Torrey Botanical Club 122(4):282-297.

Menges, Eric S. and R. Yahr. 1998. Final Report on Continued Ecological Monitoring and Experimental Research on Four Florida Scrub Endemic Plants. Report to Florida Statewide Endangered and Threatened Plant Conservation Program. Florida Department of Agriculture and Consumer Services, Division of Forestry. Tallahassee.

Menges, E. S., and R. Yahr. 1996. Continued Ecological Monitoring and Research on Four Florida Scrub Plants. Report to Florida Statewide Endangered and Threatened Plant Conservation Program. Florida Department of Agriculture and Consumer Services, Division of Forestry. Tallahassee.

Menges, E.S., and N. Kohfeldt. 1995. Life history strategies of Florida scrub plants in relation to fire. Bulletin of the Torrey Botanical Club 122(4):282-297.

Menges, E. S., C. W. Weekley, and M. A. Rickey. 2005. Sandhill restoration studies and experimental introduction of *Ziziphus celata* at Lake Wales Ridge National Wildlife Refuge (Carter Creek). Annual report, project NG02-002, contract 03148. 68 pages.

Meshaka Jr., W.E., and J.N. Layne. 2002. Herpetofauna of a long unburned sandhill in southcentral Florida. Florida Scientist 65(1):35-50.

Miller, K.E. 2006. Assessing impacts of Hurricane Charley on Florida scrub-jays in Charlotte County. Progress Report to U.S. Fish and Wildlife Service; Vero Beach, Florida.

Miller, K.E. and B.M. Stith. 2002. Florida scrub-jay distribution and habitat in Charlotte County. Center for Avian Conservation, Final report contract Number 2001000116: Charlotte County scrub-jay survey.

Miller, L. (2010). *Climate of South Florida; Everglades Restoration Transition Plan Phase I Biological Opinion.* Vero Beach, Florida: U.S. Fish and Wildlife Service.

Mount, R.H. 1965. Variation and systematics of the scincoid lizard, *Eumeces egregius* (Baird). Bulletin of the Florida State Museum. 9(5):183-213.

Mount, R.H. 1963. The natural history of the red-tailed skink, *Eumeces egregius* (Baird). American Midland Naturalist 70:356-385.

Mumme, R.L. 1992. Do helpers increase reproductive success? An experimental analysis in the Florida scrub-jay. Behavioral Ecology and Sociobiology 31:319-328.

Mumme, R.L. and S.J. Schoech, G.E. Woolfenden, and J.W. Fitzpatrick. 2000. Life and death in the fast lane: demographic consequences of road mortality in the Florida scrub-jay. Conservation Biology 14: 501-512.

Mushinsky, H.R., and E.D. McCoy. 1999. Studies of the sand skink (*Neoseps reynoldsi*) in Central Florida. Final report to Walt Disney Imagineering. University of South Florida, Tampa, Florida.

Mushinsky, H.R. and E.D. McCoy. 1991. Vertebrate species compositions of selected scrub islands on the Lake Wales Ridge of Central Florida. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program, Project Report GFC-87-149; Tallahassee, Florida.

Mushinsky, H.R., E.D. McCoy, K. Gianopulos, K. Penney and C. Meyer. 2001. Biology of the threatened sand skink of restored scrub habitat and their responses to land management practices. Final report to the Disney Wildlife Conservation Fund. University of South Florida, Tampa, Florida.

Myers, R.L. 1990. Scrub and high pine. Pages 150-193 *in* R.L. Myers and J.J. Ewel, editors. Ecosystems of Florida. University Presses of Florida; Gainesville, Florida.

Myers, C.W., and S.R. Telford, Jr. 1965. Food of *Neoseps*, the Florida sand skink. Quarterly Journal of the Florida Academy of Science. 28:190-194.

Nash, G.V. 1895. Notes of some Florida plants. Bulletin. Torrey Botany. Club 22:141-161.

Navratil, G. 1999. A study of selected land management practices on the sand pine scrub habitat of Florida: A measure of the effects of land management on the sand skink, *Neoseps reynoldsi.* M.S. Thesis, University of South Florida, Tampa, Florida.

Ostertag, R., and E.S. Menges. 1994. Patterns of reproductive effort with time since last fire in Florida scrub plants. Journal of Vegetation Science 5:303-310.

Penney, K.M. 2001 . Factors affecting translocation success and estimates of dispersal and movement patterns of the sand skink *Neoseps reynoldsi* on restored scrub. M.S. Thesis. University of South Florida, Tampa, Florida.

Penney, K.M., H.R. Mushinsky, and E.D. McCoy. 2001. Translocation success of the threatened sand skink [Internet]. Pages 26-28 *in* D. Zattau, editor. Proceedings of the Florida Scrub Symposium 2001; Orlando Florida [cited October 29, 2008]. Available from: http://www.fws.gov/northflorida/Scrub-Jays/Docs/Proceedings-07-2001.pdf

Percival, H.F., D.B. McDonald, and M.J. Mazurck. 1995. Status and distribution for the Florida scrub-jay (*Aphelocoma coerulescens*) in Cape Canaveral, Florida. Technical Report Number 51, final report for U.S. Air Force, Environmental Flight, research work order 136. Florida Cooperative Fish and Wildlife Research Unit, October 31, 1995.

Petrů, M. and E. S. Menges. 2004. Shifting sands in Florida scrub gaps and roadsides: dynamic microsites for herbs. American Midland Naturalist 151: 101-113.

Pike, D.A, K.S. Peterman, and J.H. Exum. 2008. Habitat structure influences the presence of sand skinks (*Plestiodon reynoldsi*) in altered habitats. Wildlife Research 35:120–127.

Pike, D.A., K.S. Peterman, and J.H. Exum. 2007. Use of altered habitats by the endemic *Plestiodon reynoldsi* Stejneger (sand skink). Southeastern Naturalist 6:715–726.

Pike, D.A., R.S. Mejeur, W.D. Lites, and J.H. Exum. 2006. Do neighborhood conservation areas work? A drastic reduction in lizard occupancy coinciding with improved habitat quality and surrounding development. Abstract in Joint Meeting of the 22nd Annual Meeting of the American Elasmobranch Society, 86th Annual Meeting of the American Society of Ichthyologists and Herpetologists, 64th Annual Meeting of the Herpetologists' League, and the 49th Annual Meeting of the Society for the Study of Amphibians and Reptiles; 12–17 July 2006; New Orleans, Louisiana.

Quintana-Ascencio, P.F. and E.S. Menges 2000. Competitive abilities of three narrowly endemic plant species in experimental neighborhoods along a fire gradient. American Journal of Botany 87, pp. 690–699.

Quintana-Ascencio, P. F., E. S. Menges, and C. W. Weekley. 2004. Spatially explicit disturbance-demographic models for federally-listed Florida scrub plant species. Final report to U.S. Fish and Wildlife Service, Vero Beach Office. January 2004. 36 pages.

Quintana-Ascencio, P. F., E. S. Menges, and C. W. Weekley. 2003. A fire-explicit population viability analysis of *Hypericum cumulicola* in Florida rosemary scrub. Conservation Biology, v. 17, no. 2, p. 433-449.

Reid, D.T., K.G. Ashton and K.R. Zamudio. 2004. Characterization of microsatellite markers in the threatened sand skink (*Neoseps reynoldsi*). Molecular Ecology Notes 4:691-693.

Reveal, J.L. 1968. Notes on the Texas *eriogonums*. Sida 3:195-205.

Rickett, H.W. 1967. Wild flowers of the U.S., vol. 2: the southeastern states (*Eriogonum longifolium* var. *gnaphalifolium*).

Root, K.V. 1998. Evaluating the effects of habitat quality, connectivity, and catastrophes on a threatened species. Ecological Applications 8(3):854-865.

Satterthwaite, W., Menges, E.S. and Quintana-Ascencio, P.F. 2002. Population viability of scrub buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*) in relation to fire. Ecological Applications 12: 1672-1687.

Schaub, R., R.L. Mumme, and G.E. Woolfenden. 1992. Predation on the eggs and nestlings of Florida scrub-jays. The Auk 109(3):585-593.

Schmalzer, P.A. and S.R. Boyle. 1998. Restoring long-unburned oak-saw palmetto scrub requires mechanical cutting and prescribed burning. Restoration and Management Notes 16(1):96-97.

Schmalzer, P.A. and C.R. Hinkle. 1992a. Recovery of oak-saw palmetto scrub after fire. Castanea 57(3):158-173.

Schmalzer, P.A. and C.R. Hinkle. 1992b. Species composition and structure of oak-saw palmetto scrub vegetation. Castanea 57(4):220-251.

Schultz, G. E., L. G. Chafin, and S. T. Krupenevich. 1999. Rare plant species and high quality natural communities of twenty-six CARL sites in the Lake Wales Ridge Ecosystem. Final Report. Produced for South Florida Ecosystem Office, U. S. Fish and Wildlife Service, Vero Beach, Fla. 202 pages.

Shinners, L.H. 1962. Synopsis of *Conradina* (Labiatae). Sida 1:84-88.

Small, J.K. 1933. Manual of the southeastern flora. University of North Carolina Press; Chapel Hill, North Carolina.

Small, J.K. 1903. Flora of the southeastern United States. Published by the author, New York.

Smith, H.M. 2005. *Plestiodon*: A replacement name for most members of the genus *Eumeces* in North America. Journal of Kansas Herpetology 14:15-16.

Smith, C.R. 1982. Food resource partitioning of fossorial Florida reptiles. Pages 163-171 *in* N.J. Scott, editor. Herpetological communities. U.S. Fish and Wildlife Service, Wildlife Research Report No. 13; Washington, D.C.

Snodgrass, J.W., T.Townsend, and P. Brabitz. 1993. The status of scrub and Florida scrub-jay in Brevard County, Florida. Florida Field Naturalist 21(3):69-74.

Stallcup, J.A. and G.E. Woolfenden. 1978. Family status and contribution to breeding by Florida scrub-jays. Animal Behavior 26: 1144- 1156.

Stark, L.M. and D. Kazanis. 2001. Arbovirus surveillance: annual summary report, 2001. Florida Department of Health [Internet]. Tampa, Florida [cited December 14, 2006]. Available from: http://www.myfloridaeh.com/community/arboviral/pdfs/2001/2001_arboannual.pdf

Stevens, T. and J. Hardesty. 1999. Status and distribution of the Florida scrub-jay (*Aphelocoma coerulescens*) at Cape Canaveral Air Station, Florida, Annual Report: 1998-1999. Report to U.S. Air Force; Patrick Air Force Base, Florida.

Stith, B.W. 1999. Metapopulation viability analysis of the Florida scrub-jay (*Aphelocoma coerulescens*): a state-wide assessment. Final report to the Service, Contact Number 1448-40181-98-M324, 201 pp.

Stith, B.M., J.W. Fitzpatrick, G.E. Woolfenden, and B. Pranty. 1996. Classification and conservation of metapopulations: a case study of the Florida scrub-jay. Pages 187-215 *in* Metepopulations and wildlife conservation. Island Press; Washington, D.C.

Stout, I.J. 1982. Descriptions of 84 stands of Florida sand pine scrub vegetation. Unpublished report prepared for U.S. Fish and Wildlife Service; Jacksonville, Florida.

Stout, I.J. In press. *Chionanthus pygmaeus*. Submitted to the Florida Committee on Rare and Endangered Plants and Animals. 2nd edition Rare and Endangered Biota of Florida, plant volume. On file in U.S. Fish and Wildlife Service, South Florida Ecosystem Office, Vero Beach, Florida.

Stout, I.J. and D.T. Corey. 1995. Effects of patch-corridor configurations on nongame birds,mammals, and herptiles in longleaf pine-turkey oak sandhill communities. Nongame Project Report No. RFP-86-003, Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.

Sutton, P.E. 1996. A mark and recapture study of the Florida Sand skink *Neoseps reynoldsi* and a comparison of sand skink sampling methods. M.S. Thesis, University of South Florida; Tampa, Florida.

Sutton, P.E., H.R. Mushinsky and E.D. McCoy. 1999. Comparing the use of pitfall drift fences and cover boards for sampling the threatened sand skink (*Neoseps reynoldsi*). Herpetological Review 30(3):149-151.

Swain, H.M., R. Bowman, D. Breininger, P. Schmalzer, K. Root, S. Boyle, S. Bergen, and S. MacCaffree. 1995. Out of the pyrogenic frying pan and into the political fire: developing reserve designs for the Florida scrub-jay [abstract]. Page 79 *in* Society of Conservation Biology annual meeting; Fort Collins, Colorado.

Telford, S.R., Jr. 1998. Monitoring of the sand skink (*Neoseps reynoldsi*) in Ocala National Forest. Final report submitted to U.S. Forest Service, Ocala National Forest, Silver Springs, Florida.

Telford, S.R., Jr. 1962. New locality records for the sand skink, *Neoseps reynoldsi* Stejneger. Copeia 1959:110-119.

Telford, S.R., Jr. 1959. A study of the sand skink, *Neoseps reynoldsi*. Copeia 1959 (2):100-119.

Telford, S.R., Jr., and C.R. Bursey. 2003. Comparative parasitology of squamate reptiles endemic to scrub and sandhills communities of north-central Florida, U.S.A. Comparative Parasitology 70:172–181.

Thaxton, J.E. and T.M. Hingtgen. 1996. Effects of suburbanization and habitat fragmentation on Florida scrub-jay dispersal. Florida Field Naturalist 24 (2): 25-60.

Thaxton, J.E. and T.M. Hingtgen. 1994. Responses of Florida scrub-jays to management of previously occupied habitat. District 4 Annual Research Report, Florida Park Service.

The Nature Conservancy. 2001. Saving the Florida scrub-jay: recommendations for preserving Florida's scrub habitat. 13 pp.

Toland, B.R. 1999. Current status and conservation recommendations for the Florida scrub-jay in Brevard County. Report to Brevard County Board of County Commissioners. September 1, 1999.

Toland, B.R. 1991. Nest site characteristics of a Florida scrub-jay population in Indian River County. Abstract. Florida scrub-jay Workshop. May 23, 1991. Ormond Beach, Florida.

Turner, W.R., D.S. Wilcove, and H.M. Swain. 2006a. State of the scrub: conservation progress, management responsibilities, and land acquisition priorities for imperiled species of Florida's Lake Wales Ridge. Archbold Biological Station [Internet]. Lake Placid, Florida [Cited December 13, 2006]. Available from: http://www.archboldstation.org/abs/ publicationsPDF/ Turner_etal-2006-StateotScrub.pdf

Turner, W. R., D. S. Wilcove, and H. M. Swain. 2006b. Assessing the effectiveness of reserve acquisition programs in protecting rare and threatened species. Conservation Biology 20(6):1657-1669.

U.S. Dept. of Agriculture, Soil Conservation Service. 1989. Soil Survey of Highlands County, Florida. 178 pp., 55 maps.

U.S. Fish and Wildlife Service (Service). 2014. U.S. Highway 27 from Highlands County Line to North of State Road 60 (Service Consultation Code 2011-F-0150) February 25, 2014. Fish and Wildlife Service, South Florida Ecological Services Office; Vero Beach, Florida

U.S. Fish and Wildlife Service (Service). 2012. Species Conservation Guidelines, South Florida – Sand Skink and Bluetail Mole Skink [Internet]. U.S. Fish and Wildlife, South Florida Ecological Services Office; Vero Beach, Florida [cited October 29, 2008]. Available from: http://www.fws.gov/verobeach/ReptilesPDFs/20120206_Skink%20CCG_Final.pdf

U.S. Fish and Wildlife Service (Service). 2012. Wood Stork Foraging Habitat Assessment Methodology. http://www.fws.gov/verobeach/BirdsPDFs/20120712_WOST%20Forage%20Assessment%20Methodology_Appendix.pdf

U.S. Fish and Wildlife Service (Service). 2007. Bluetail mole skink (*Eumeces egregius lividus*) and sand skink (*Neoseps reynoldsi*) [Internet]. 5-year review: summary and evaluation. South Florida Ecological Services Office, Vero Beach, Florida [cited October 29, 2008]. Available from: http://ecos.fws.gov/docs/five_year_review/doc1071.pdf

U.S. Fish and Wildlife Service (Service). 2006. Strategic Habitat Conservation. Final Report of the National Ecological Assessment Team to the U.S. Fish and Wildlife Service and U.S. Geologic Survey. 48 pages.

U.S. Fish and Wildlife Service (Service). 2004. Florida scrub-jay survey protocol. Appendix A in Draft Species Conservation Guidelines for the Florida Scrub-jay (*Aphelocoma coerulescens*). http://www.fws.gov/verobeach/BirdsPDFs/FSJConservationGuidelinesALLINCLUSIVE1.pdf

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan [Internet]; Atlanta, Georgia [cited October 29, 2008]. Available from: http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=3&programID=107&ProgramCategoryID=3

U.S. Fish and Wildlife Service. 1996. Recovery plan for nineteen central Florida scrub and high pineland plants (revised). U.S. Fish and Wildlife Service; Atlanta, Georgia.

U.S. Fish and Wildlife Service (Service). 1993. Proposed Establishment of Lake Wales Ridge National Wildlife Refuge. U.S. Fish and Wildlife Service, Atlanta, Georgia.

U.S. Fish and Wildlife Service (Service). 1992. Endangered and threatened species of the southeast United States (The Red Book). Prepared by Ecological Services, Division of Endangered Species, Southeast Region, Government Printing Office; Washington, D.C.

U.S. Fish and Wildlife Service (Service). 1987. Determination of endangered or threatened status for seven Florida scrub plants. Federal Register 52:(13) 2227- 2234.

Ward, D. 1979. Rare and endangered biota of Florida, vol. 5: Plants. University Presses of Florida; Gainesville, Florida.

Ward, D.B., and R.K. Godfrey. 1979. Pygmy fringe- tree *in* Ward, D.B., editor. Rare and endangered biota of Florida. Plants. vol. 5. University of Florida Presses; Gainesville, Florida.

Webb, S.D. 1990. Historical biogeography. Pages 70–100 in R.L. Myers and J.J. Ewel, editors., Ecosystems of Florida. University of Central Florida Press; Orlando, Florida.

Webber, H.J. 1935. The Florida scrub, a fire-fighting association. American Journal of Botany 22(3):344-361.

Weekley, C. 1997. *Prunus geniculata* Monitoring Report Report to Florida Statewide Endangered and Threatened Plant Conservation Program. Florida Department of Agriculture and Consumer Services, Division of Forestry. Tallahassee.

Weekley, C. S. and E. S. Menges. 2003a. Species and vegetation responses to prescribed fire in a long-unburned, endemic-rich Lake Wales Ridge scrub. Journal of the Torrey Botanical Society 130 (4): 265–282.

Weekley, C. W. and E. S. Menges. 2003b. Demography, floral biology, and breeding system of scrub plum (*Prunus geniculata*), a federally listed endangered plant. Report to U.S. fish and Wildlife Service, Jacksonville, Fla. 9+ pages

Weekley, C. W. and E. S. Menges 2001. Demography, floral biology, and breeding system of scrub plum (*Prunus geniculata*), a federally listed endangered plant. Report to U.S. fish and Wildlife Service, Jacksonville, Fla. 14+ pages.

Weekley , C. W. , E. S. Menges , and R. L. Pickert. 2008. An ecological map of Florida ' s Lake Wales Ridge: A new boundary delineation and an assessment of post-Columbian habitat loss. *Florida Scientist* 71: 45 – 64.

Weidenhamer J. D. and J. T. Romeo. 2004. Allelochemicals of *Polygonella myriophylla*: chemistry and soil degradation. Journal of Chemical Ecology. 30: 1067-82

Weidenamer, J. D., D. C. Hartnett, and J. T. Romeo. 1989. Density-dependent phytotoxicity: distinguishing resource competition and allelopathic interference. Journal of Applied Ecology 26: 613-624.

Woolfenden, G.E. 1978. Growth and survival of young Florida scrub-jays. Wilson Bulletin 90:1-1X.

Woolfenden, G.E. 1975. Florida scrub-jay helpers at the nest. Auk 92:1-15.

Woolfenden, G.E. 1974. Nesting and survival in a population of Florida scrub-jays. Living Bird 12:25-49.

Woolfenden, G.E. and J.W. Fitzpatrick. 1996a. Florida scrub-jay. Pages 267-280 *in* J.A. Rodgers, H.W. Kale, and H.T. Smith, eds. Rare and Endangered Biota of Florida, Volume V. Birds. University Presses of Florida, Gainesville, Florida.

Woolfenden, G.E. and J.W. Fitzpatrick. 1996b. Florida scrub-jay. Pages 1-27 *in* A. Poole and F. Gill, eds. The birds of North America, Number 228. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union; Washington, D.C.

Woolfenden, G.E. and J.W. Fitzpatrick. 1991. Florida scrub-jay ecology and conservation studies: relevance to conservation and management. Oxford University Press, Oxford. United Kingdom.

Woolfenden, G.E. and J.W. Fitzpatrick. 1990. Florida scrub-jays: A synopsis after 18 years of study. Pages 241-266 *in* P.B. Stacey and W.B. Koenig, eds. Cooperative breeding in birds. Cambridge University Press.

Woolfenden, G.E. and J.W. Fitzpatrick. 1986. Sexual asymmetries in the life histories of the Florida scrub-jay. Pages 97-107 *in* D. Rubenstrin and R.W. Wrangham, eds. Ecological aspects of social evolution: birds and mammals. Princeton University Press, Princeton, New Jersey.

Woolfenden, G.E. and J.W. Fitzpatrick. 1984. The Florida scrub-jay: Demography of a Cooperative-Breeding Bird. Princeton University Press, Princeton, New Jersey. 406 pp.

Woolfenden, G.E. and J.W. Fitzpatrick. 1978. The inheritance of territory in group-breeding birds. BioScience 28:104-108.

Woolfenden, G.E. and J.W. Fitzpatrick. 1977. Dominance in the Florida scrub-jay. Condor 79: 1-12.

Wunderlin, R. P. and B. Hansen. 2004. Atlas of Vascular Plants of Florida. *Chionanthus pygmaeus*. http://www.plantatlas.usf.edu/main.asp?plantID=1159 and http://www.plantatlas.usf.edu/main.asp?plantID=645

Wunderlin, R. P. and B. Hansen. 2003. Guide to the vascular plants of Florida, second edition. University Press of Florida. Gainesville. 787 pp.

Wunderlin, R.P., D. Richardson, and B. Hansen. 1981. Status report on *Chionanthus pygmaeus*. Unpublished report for: U.S. Fish and Wildlife Service; Atlanta, Georgia.

Wunderlin, R. P., D. Richardson, and B. Hansen. 1980. Status report on *Polygonella myriophilla*. Report to U.S. Fish and Wildlife Service, Jacksonville, Florida. 54 pp.

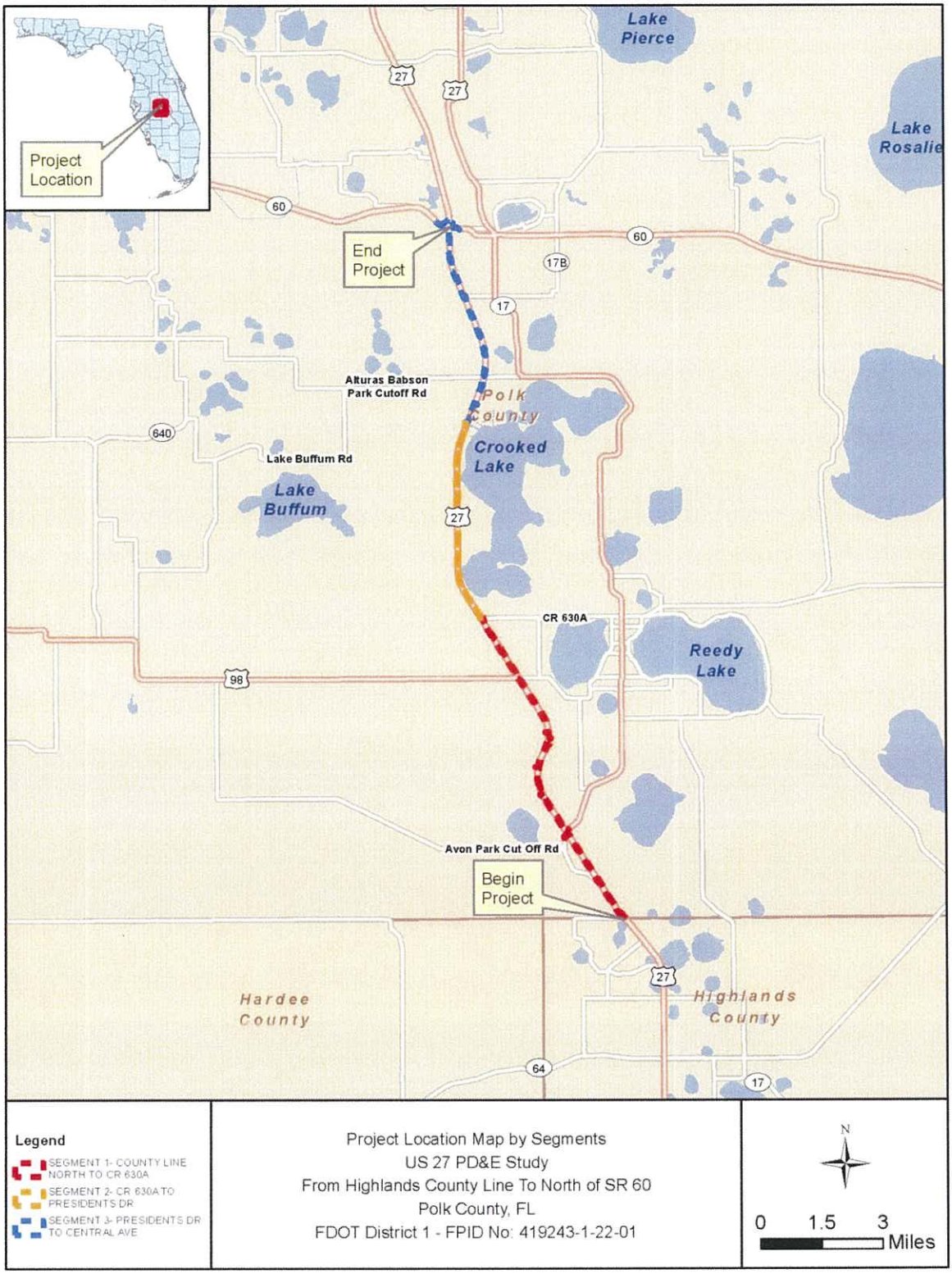

Figure 1. Map showing location of US 27 Project in Polk County, Florida

Figure 2a. Aerial Map showing location of Florida scrub-jay family A observed during call surveys conducted in US 27 Project corridor.

Figure 2b. Aerial Map showing location of Florida scrub-jay family B observed during call surveys conducted in US 27 Project corridor.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSON MARCH 2014 RESPONSE LETTER

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March 20, 2014

Mr. Martin Horwitz
Environmental Project Manager
Florida Department of Transportation (FDOT) District One
801 North Broadway Avenue
Bartow, FL 33830
Martin.Horwitz@DOT.state.fl.us

Re: US 27 from Highlands County line to SR 60 PD&E Study, Polk County, Endangered Species Biological Assessment and Wetland Evaluation Report

Dear Mr. Horwitz:

The Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the Endangered Species Biological Assessment (ESBA) and the Wetland Evaluation Report (WER) for the above-referenced project. The ESBA and WER were prepared as part of the PD&E Study for the proposed project. The FWC reviewed this project in May 2011 as ETDM 3869. We provide the following comments and recommendations for your consideration in accordance with Chapter 379, Florida Statutes and Rule 68A-27, Florida Administrative Code (F.A.C.).

The project involves an evaluation of widening US 27 from a four-lane divided roadway to a six-lane divided roadway between the Highlands County line and SR 60 in Polk County, a distance of 18.816 miles. The project area is on the Lake Wales Ridge for most of its length. In addition to urban and agricultural land uses adjacent to the right-of-way, there are diverse plant community types varying from herbaceous and wooded wetlands to well-drained xeric uplands.

The ESBA evaluated potential project impacts to 27 wildlife species classified under the Endangered Species Act as Federally Endangered (FE) or Threatened (FT), or by the State of Florida as Threatened (ST) or Species of Special Concern (SSC). Listed species were evaluated based on range and potential appropriate habitat or because the project is within a U.S. Fish and Wildlife Service (USFWS) Consultation Area. Included were: Florida panther (FE), Florida bonneted bat (FE), Florida grasshopper sparrow (FE), snail kite (FE), wood stork (FE), Florida scrub-jay (FT), Eastern indigo snake (FT), blue-tailed mole skink (FT), sand skink (FT), crested caracara (FT), Southeastern American kestrel (ST), Florida sandhill crane (ST), least tern (ST), gopher tortoise (ST), short-tailed snake (ST), Florida pine snake (SSC), gopher frog (SSC), Florida burrowing owl (SSC), limpkin (SSC), snowy egret (SSC), little blue heron (SSC), tricolored heron (SSC), white ibis (SSC), roseate spoonbill (SSC), Sherman's fox squirrel (SSC), Homosassa shrew (SSC), and Florida mouse (SSC).

Other species evaluated included the Florida black bear, the bald eagle, and osprey. While the Florida black bear has been delisted, a management plan has been developed to further guide black bear conservation. The bald eagle has also been delisted by state and federal agencies, but this species remains protected under state rule in Section 68A-16.002, F A,C. and by the federal Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d); the osprey is protected by the Migratory Bird Treaty Act (16 U.S.C. 703-712).

Project biologists made a finding of "may affect, but is not likely to adversely affect" for all of the federally and state-listed wildlife species above, as well as the black bear. An effect determination was not made for the bald eagle or osprey, but a commitment was made to survey for active nests of these species during project design and permitting, and to coordinate with FWC to secure all necessary approvals prior to construction. With adherence to the project commitments listed below, we agree with these determinations.

We support the project commitments for protected species, which include the following:

1. To avoid potential adverse impacts to migratory bird species with active nests observed during field reviews, the FDOT will commit to resurvey the project area for bald eagle, osprey, and Southeastern American kestrel nests during design and permitting. If active nests are observed, the FDOT will coordinate with FWC and USFWS (as necessary) to secure proper permits concerning these species. We recommend that these pre-construction surveys also include nests of the Florida sandhill crane and Sherman's fox squirrel.

2. The standard FDOT Construction Precautions for the Eastern indigo snake will be followed during construction.

3. Due to the presence of gopher tortoise habitat within and adjacent to the existing right-of-way, a gopher tortoise survey in appropriate habitat will be performed within construction limits prior to construction, and the FDOT will secure any necessary relocation permit from the FWC.

Please reference the FWC's Gopher Tortoise Permitting Guidelines (Revised April 2013 http://www.myfwc.com/media/1410274/GTPermittingGuidelines.pdf) for survey methodology and permitting guidance prior to any construction activity. Specifically, these guidelines include methods for avoiding permitting as well as options and state requirements for minimizing, mitigating, and permitting potential impacts of the proposed activities. Any commensal species observed during the burrow excavations should be relocated in accordance with Appendix 9 of the above-referenced guidelines. To the maximum extent possible, the FWC also recommends that all staging and storage areas be sited to avoid impacts to gopher tortoise burrows and their habitat.

4. Based on coordination with USFWS and to comply with Section 7 of the Endangered Species Act, FDOT commits to re-initiate consultation and to provide updated information as necessary for the blue-tailed mole skink, sand skink, wood stork, crested caracara, Florida scrub-jay, and federally listed plant species during the design and permitting phase of the project.

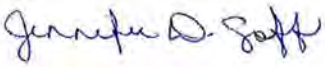
5. Wetland impacts will result in loss of wood stork foraging habitat, thus requiring mitigation acceptable to the USFWS. We expect this mitigation would also compensate for habitat loss for the other potentially affected wading birds.

The WER evaluates the potential project impacts to wetlands, projected to be 24.40 acres of permanent direct and secondary impacts. The northern third of the project (Segment 3) is within the service area of two mitigation banks, and purchase of credits at one or

both of these banks is a possible mitigation option. The southern two thirds of the project (Segments 1 and 2) are not within a mitigation bank service area. To meet the wetland mitigation requirements for these road segments, the WER proposes purchase of a 59.67-acre parcel (Flood parcel) within the Crooked Lake floodplain located less than 1,000 feet west of US 27. The 16.29 acres of wetlands on the property would be either restored or enhanced, and 9.66 acres of uplands would be used for new wetland creation. We support this mitigation option, but note that the wetland creation requires the loss of pine/mesic oak habitat which is not accounted for in the Uniform Mitigation Assessment Methodology. We hope that this loss can be offset by improved management of the remaining uplands on the Flood parcel.

Thank you for the opportunity to review the ESBA and WER for the US 27 project in Polk County. If you need further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or at FWCConservationPlanningServices@MyFWC.com. If you have specific technical questions regarding the content of this letter, contact Brian Barnett at (772) 579-9746 or email brian.bamett@MyFWC.com.

Sincerely,



Jennifer D. Goff
Land Use Planning Program Administrator
Office of Conservation Planning Services

jdg/bb
ENV 1-13-2
US 27—Highlands-Polk County Line to SR 60_18751_032014